

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

COLLEGE OF HUMANITIES AND SOCIAL SCIENCES

KNUST SCHOOL OF BUSINESS, KUMASI

THE EFFECT OF SUSTAINABLE LOGISTICS PRACTICES ON ORGANISATIONAL  
PERFORMANCE: THE MODERATING ROLE OF ENVIRONMENTAL AWARENESS  
AND PRACTICES

BY

STEPHEN ARTHUR DADZIE

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# KNUST



## DECLARATION

I hereby declare that this submission is my own work toward the MSc. Procurement and Supply Chain Management degree, and that to the best of my knowledge, it contains no material previously published by another person, nor material that has been accepted for the award of any other degree of the University, except where due acknowledgement is made in the text.

STEPHEN ARTHUR DADZIE

PG9454921

.....

Signature

.....

Date

Certified by:

DR MATILDA OWUSU- BIO

.....

Signature

.....

Date

(Supervisor)

Certified by:

PROF DAVID ASAMOAH

.....

Signature

Date

(Head, SCIS Department)

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## **DEDICATION**

I dedicate this work to God, my wife Judith Arthur Dadzie, my children and to Educational

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## **ABSTRACT**

Rising issues of sustainability have brought attention to sustainable logistics practices in supply chains. This study aimed to examine the moderating role of environmental awareness on the relationship between sustainable logistics practices and organizational performance. The study



was motivated by the need to understand how environmental awareness influences the implementation and outcomes of sustainable logistics. Using the institutional theory as the theoretical lens, a quantitative study was conducted through a survey of 90 employees from logistics firms in Ghana's Greater Accra Region. Data was analyzed using regression analysis. The findings showed that sustainable logistics practices positively influence operational performance and customer satisfaction but not financial performance. Additionally, environmental awareness positively impacts organizational performance. However, environmental awareness did not significantly moderate the relationship between sustainable logistics practices and organizational performance dimensions. The study provides evidence that firms should adopt sustainable logistics practices to enhance operational performance. It also highlights the importance of environmental awareness in improving organizational outcomes. The findings will help managers make informed decisions regarding environmental commitment when implementing sustainable logistics.

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## ABBREVIATIONS

EM - Structural Equation Modeling

SLP - Sustainable Logistics Practices

EA - Environmental Awareness

FP - Financial Performance

OP - Operational Performance

CS - Customer Satisfaction

SD - Standard Deviation

PLS - Partial Least Squares

SEM - Structural Equation Modeling

CFA - Confirmatory Factor Analysis

EFA - Exploratory Factor Analysis

FLC - Fornell-Larcker Criterion

HTMT - Heterotrait-Monotrait Ratio

ROI - Return on Investment

KMO - Kaiser-Meyer-Olkin

AVE - Average Variance Extracted

CR - Composite Reliability

CA - Cronbach's Alpha

GHS - Ghana Cedi (currency)

SPSS - Statistical Package for Social Sciences

SDGs - Sustainable Development Goals

GSCM - Green Supply Chain Management

SSCM - Sustainable Supply Chain Management

NRBV - Natural Resource Based Perspective

ISO - International Organization for Standardization

LSP - Logistics Service Provider

SME - Small and Medium Enterprise

CSI - City Sustainability Index

PLS-SEM - Partial Least Squares Structural Equation Modeling



## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the Study

The escalation of challenges including climate change, energy scarcity, and the degradation of the ozone layer has heightened the focus on sustainability across all spheres of human life. This focus becomes particularly pronounced within the realm of business, attributed to the significant environmental impact of industrial practices (Fahimnia and Jabbarzadeh, 2016).

On the other hand, the field of logistics operations contributes positively to various socioeconomic factors. It enhances the need for transportation and ease of access, fosters infrastructure development, creates new job opportunities, and mitigates issues such as poverty, hunger, and criminal activities, thereby augmenting wealth for individuals and nations.. Nonetheless, logistical operations may have a harmful impact on the environment and civilisations (Ali *et al.*, 2021a). There is now a lack of sustainable development among governments and the business world due to mounting evidence of climate change caused by fast resource use (Busse *et al.*, 2017; Fahimnia and Jabbarzadeh, 2016). As a result, target 12 of the Sustainable Development Goals (SDGs) emphasises sustainable production and consumption practices (de Kervenoael *et al.*, 2019a). Adopting and implementing sustainability is essential to prevent unforeseen climate change, resource depletion, unjustified increases in oil and raw material prices, pollution, and associated atmospheric concerns (Agyabeng-Mensah *et al.*, 2020). Essentially, the three pillars of sustainable development, namely economic, social, and environmental, cannot be completely realised without sustainable logistics methods since the environmental repercussions of logistical activities cannot be ignored (Baah *et al.*, 2021a)



It is anticipated that the effective and efficient management of sustainable logistics practices will drive firm performance. Sustainable logistics practices, among other things, contribute significantly to a company's competitive advantage in terms of efficiency and effectiveness (Ali *et al.*, 2021b). Sustainable logistics practices can enhance the efficiency of firm internal activities, and improve operational performance, such as on-time delivery and cycle time reduction, to achieve a lower operational cost. Thus, internal logistics has a positive effect on the firm performance (Vienažindienė *et al.*, 2021a)

Adopting and effectively implementing sustainable logistics strategies strongly relies on a company's ability to recognise and handle environmental and sustainability concerns. Businesses may communicate sustainability goals and advantages to stakeholders by measuring and reporting sustainability. Environmental awareness is also an effective method for influencing public opinion and boosting public understanding of the problem (Afum *et al.*, 2020a). Environmental awareness is a person's understanding of environmental issues and active engagement in environmental organisations (Baah *et al.*, 2021a).

Accordingly, this study examines the moderating role of environmental awareness in the relationship between sustainable logistics practices and organisational performance. Using the Institutional theory (Finch *et al.*, 2017) as theoretical background, the study develops a model to examine the relationship between sustainable logistics and organisational performances and how environmental awareness moderates such relationship. This study posits that firms driven by Institutional pressures are compelled to adopt and implement sustainable logistics practices throughout their supply chains.

## 1.2 Statement of Problem

The examination of logistics practices over time reveals a considerable environmental footprint that not only affects ecological systems but also holds significant implications for human welfare. Therefore, the necessity for enhancing environmental consciousness becomes integral to both economic progression and societal transformation (Baah et al., 2020). As international trade continues to expand, assessing the ecological consequences of transportation and logistics grows increasingly urgent. While ample research exists focusing on the manufacturing sector, there is a notable dearth of studies specifically examining the logistics sector (Baah et al., 2020; Afum et al., 2020).

This scholarly inquiry aims to fill this gap by concentrating on the escalating significance of logistics operations and the associated industry. The objective is to raise awareness and provide empirical evidence concerning sustainable logistics methodologies. Despite the rallying calls from multiple stakeholders for the adoption of green initiatives (Bag, 2017), limited research exists that explores the efficacy of such practices in enhancing a firm's environmental responsibility and overall sustainability performance, particularly within emerging economies and specifically within the logistics industry. This study seeks to augment existing literature by exploring how various sustainable logistics practices—ranging from sustainable transportation and reverse logistics to waste management, sustainable packaging and distribution, green monitoring and evaluation, and sustainable information dissemination—contribute to a logistics company's commitment to environmental sustainability and performance in this crucial sector. Although, the concept of sustainable logistics and supply chain performance has received much attention. The link between these variables, however, remains unknown. For example, Isaksson et al. (2019) and Jadhav et al. (2019) found a link between sustainable logistics and sustainable supply chain performance. In contrast, Agyabeng-Mensah and Tang

(2021) and Werner-Lewandowska and Golinska-Dawson (2021) found a negative association between the factors. A thorough literature review to evaluate the environmental sustainability of logistics service providers (LSPs). They create a taxonomy of green activities for LSPs and claim that its relationship to sustainability performance is not well known. However, their studies demonstrated a favourable association between LSPs' environmental sustainability and sustainable supply chain performance.

Similarly, Gouda and Saranga, (2018) investigate whether environmental sustainability is taken into account in LSP decision-making by examining internal and external factors that influence the long-term viability of LSP sustainability performance. Their research found that environmental sustainability has a favourable and substantial impact on the sustainability performance of LSPs. Gevaers *et al.*, (2009) investigated the City Sustainability Index (CSI) criteria utilising several measures such as ecological footprint, human development, and real progress. All three pillars of the triple bottom line were represented by social, economic, and environmental indicators.

Ali et al. (2021) investigated sustainable logistics methods in Malaysian-certified firms. Their research looked at the impact of sustainable logistics techniques on corporate success (financial and market performance). Furthermore, Vienažindienė et al. (2021) contend that firms in developing countries that include reverse logistics minimise waste and boost profitability via recycling activities. Furthermore, Isaksson et al. (2019) emphasise the importance of sustainable logistics techniques in increasing a company's profitability, reputation, and market share. Furthermore, Jayarathna et al. (2022) demonstrate that sustainable logistics is a key predictor of corporate sustainability performance.

Sustainable logistics practices offer a framework for resource conservation, waste reduction, and operational efficiency through the elimination of ineffective procedures (Chhabra et al., 2017). While the implementation of these practices often necessitates significant financial investment, their long-term impact tends to be beneficial, not only environmentally but also economically. Agyabeng-Mensah and Tang (2021) note that sustainable logistics initiatives initially strain an organization's financial resources but ultimately reinforce its commitment to environmental sustainability, thereby enhancing social, environmental, and economic performance. This sentiment is echoed by Shashi et al. (2019), who argue that although green initiatives entail substantial financial outlays at the onset, they eventually contribute positively to an organization's financial well-being.

However, existing literature appears to have a limited focus on the role that environmental awareness plays in mediating the relationship between sustainable logistics practices and organizational performance. This study aims to address this lacuna by investigating how environmental awareness acts as a moderating variable in the relationship between sustainable logistics and organizational performance. In doing so, this study employs Institutional theory as its theoretical underpinning to comprehensively understand and analyze the dynamics between these variables.



### **1.3 Objectives of the Study**

#### **1.3.1 General Objective**

The study's main objective is to examine the moderating role of environmental awareness on the relationship between sustainable logistics practices and organisational performance. Specifically, the study seeks

#### **1.3.2 Specific Objectives**

1. To determine the relationship between sustainable logistics practices and organisational performance.
2. To examine the effect of environmental awareness on organisational performance
3. To examine the moderating role of environmental awareness in the relationship between sustainable logistics practices and organisational performance

### **1.4 Research Questions**

1. What are the sustainable logistics practices of logistics firms?
2. What is the effect of sustainable logistics practices on organisational performance?
3. What is the effect of environmental awareness on organisational performance?
4. How does environmental awareness moderate the relationship between sustainable logistics practices and organisational performance?



## **1.5 Significance of the Study**

This research holds significant implications for various stakeholders, including academic scholars, business executives, and policymakers. For the academic community, it enriches the existing corpus of knowledge on sustainable logistics, particularly by addressing the understudied area of how environmental awareness moderates the relationship between sustainable logistics and organizational performance. Through the lens of Institutional Theory, this study adds a nuanced understanding of the mechanisms that underlie these relationships, thereby contributing to a more robust theoretical framework.

For managers, the findings from this study provide a business case to improve their commitment and awareness of environmental issues when implementing sustainable logistics. Through this study, managers would be well informed on the environmental commitment required to implement sustainable logistics practices successfully. This study could help reduce waste in landfills, pollution, and carbon emissions for the economy through companies' enhanced and improved environmental performances. The outcomes of this study could therefore support Ghana in achieving the 7<sup>th</sup>, 11<sup>th</sup>, 12<sup>th</sup>, and 13<sup>th</sup> Sustainable Development Goals.

## **1.6 Overview of Methodology**

The research designs for this study are the explanatory and descriptive design, focusing on examining the relationship between sustainable logistics practices, environmental awareness and organisational performance. The study also adopts a quantitative research approach. The research strategy for this study is a survey of logistics firms operating within the Greater Accra Region. The sample size for this study is one hundred (100), drawn from the target population using purposive sampling, a non-probability sampling. To test the model for this study, the

researcher performs Ordinary Least Regression and Moderated hierarchical moderation using IBM SPSS, version 26.

### **1.7 Scope of the Study**

The geographical area selected for the study is Greater Accra region of Ghana. To enable the researcher to empirically test the proposed theoretical framework, data is obtained from logistics firms operating within the Greater Accra region of Ghana, because of its dense population of logistics industry. Conceptually, the study adopts twenty (20) items to measure sustainable logistics practices, the predictor variable. Environmental awareness, the moderating variable, is measured using five (5) items adopted from Noordin and Sulaiman (2010). Organisational performance, the outcome variable, is measured using six items adopted from Selvam et al. (2016)

### **1.8 Limitations of the Study**

This research, like many scholarly endeavors, faced a range of challenges that bear mentioning. Among these, the reticence of many companies to engage in the study significantly constrained the scope of the sample size. Firms that initially expressed willingness to participate either retracted their consent or did not return the issued questionnaires. Additionally, the restricted timeline allocated for the completion of this study presented another obstacle. A number of companies cited the limited timeframe as a reason for their inability to participate, thereby affecting the research outcomes. Lastly, the limitations of the methodology used in the study, such as the confined sample size and data collection restricted to a single geographical area, also impact the breadth and generalizability of the findings.

## **1.9 Organisation of the Study**

This research is structured into five distinct chapters to provide a comprehensive understanding of the study. The inaugural chapter serves as an introduction and encompasses an array of components, such as the background of the study, problem statement, research objectives, questions, scope, significance, methodology, limitations, and the overall organization of the research. Subsequent to the introductory chapter, the second chapter furnishes a thorough review of literature pertinent to the subject matter. This chapter is subdivided into four primary sections: a review of key concepts, a theoretical exploration, an empirical analysis, and the development of a conceptual framework alongside the formulation of hypotheses.

Proceeding to the third chapter, it elucidates the methodology employed in the study, detailing aspects such as the research design, target population, sampling techniques, methods for data collection and analysis, as well as tests for reliability and validity, coupled with considerations related to ethics. The fourth chapter is dedicated to the presentation and discussion of the data analyses and results. Included in this chapter are metrics regarding the rate of response, descriptive statistics, tests for validity and reliability, inferential statistics, and a comprehensive discussion of the findings.

The concluding fifth chapter synthesizes the research findings, offers recommendations and final conclusions, and also suggests avenues for future scholarly investigations

## **CHAPTER TWO**

## **LITERATURE REVIEW**

### **2.1 Introduction**

This chapter undertakes a comprehensive review of existing literature related to sustainable logistics practices, environmental awareness, and organizational performance. It serves as an intellectual scaffolding that informs and substantiates the study, offering an academic context within which the research questions are framed.

### **2.2 Conceptual Review**

This section reviews the literature on sustainable logistics practices, environmental awareness, and organisational performance.

#### **2.2.1 Sustainable Logistics Practices**

This segment explores pivotal concepts like logistics, logistics management, logistics management practices, and sustainable logistics practices. Logistics is defined as the orchestrated planning, execution, and oversight of the movement and allocation of goods, services, and associated information from their inception point to their end-use, aiming to meet customer or organizational demands (de Kervenoael et al., 2019b). This function stands as an integral element of the supply chain, covering varied activities such as the transportation of goods, inventory oversight, warehousing, and product packaging. The role of logistics is crucial in facilitating the efficient transit of goods and services, curtailing operational costs, and heightening customer satisfaction (Baah et al., 2021b).

Logistics management is delineated as the strategic planning, execution, and governance of the flow and storage of goods, services, and information from their origin to their final destination



(Baah et al., 2021). Effective logistics management necessitates the harmonization of diverse tasks, ranging from transportation and warehousing to inventory control and packaging. Moreover, logistics managers ought to account for multiple variables such as customer preferences, market demand, and resource availability in their quest to fine-tune the logistics operations (Baah et al., 2021).

The term "logistics management practices" encompasses the range of methods, strategies, and instruments employed to direct the flow and allocation of goods, services, and information from their starting point to their end-users. Various methodologies can be embraced by organizations aiming to refine their logistics procedures.

#### **2.2.1.1 Transportation Management**

Transportation management refers to the systematic planning, implementation, and refinement of the procedures governing the transit of goods between different locations. The objective of efficacious transportation management is multi-faceted, aiming to curtail operational expenses, accelerate delivery schedules, and elevate levels of customer satisfaction (WernerLewandowska and Golinska-Dawson, 2021).

#### **2.2.1.2 Inventory Management**

Inventory management entails the systematic oversight and regulation of stock levels with the aim of guaranteeing the timely availability of the appropriate products. Excellence in inventory management practices yields multiple benefits, including a reduction in inventory-related expenditures, elevated rates of order fulfillment, and a diminution in the instances of stockouts (Werner-Lewandowska and Golinska-Dawson, 2021b).



### **2.2.1.3 Warehousing**

Warehousing pertains to the secure storage and manipulation of goods prior to their shipment to the designated endpoints. Proficient warehousing techniques yield a variety of advantages for organizations, including the efficient utilization of storage spaces, a decrease in the costs associated with handling goods, and heightened accuracy in order fulfillment (Jayarathna et al., 2022).

### **2.2.1.4 Packaging**

Packaging refers to the process of designing, producing, and using materials to enclose, protect, and present products for various purposes, such as transportation, storage, display, and sale. Packaging plays a critical role in protecting goods during transportation and storage. Effective packaging practices can help organizations reduce damages, minimize waste, and enhance brand recognition (Isaksson et al., 2019).

### **2.2.1.5 Information Management**

Information management pertains to the gathering, scrutiny, and distribution of data pertinent to logistics operations. Effectual information management can enhance organizational transparency into logistics processes, pinpoint operational inefficiencies, and facilitate data-informed decision-making (Andersson and Forslund, 2018).

Sustainable logistics refers to the environmentally, socially, and economically responsible management of the movement and storage of goods and materials. It aims to minimize the adverse effects of logistics activities on the natural world, societal structures, and economic frameworks while amplifying their positive contributions (Ali et al., 2021). Sustainable logistics encompasses activities such as decreasing greenhouse gas emissions, curtailing waste,

encouraging renewable energy use, and optimizing networks to reduce energy and travel distances (Dima et al., 2014).

Adoption of sustainable logistics practices contributes to a reduction in environmental impact, an enhancement in organizational reputation, and the creation of a more robust and efficient supply chain. It can also result in cost savings and unfold new avenues for business opportunities through the provision of sustainable products and services (Grabara, 2013).

Sustainable logistics practices involve the methods, techniques, and tools employed to manage the flow of goods, services, and information in a manner that is ecologically sound, socially beneficial, and economically viable (Ren et al., 2020). Key practices include the use of alternative fuels to reduce greenhouse gas emissions and adopting energy-efficient transportation means. Moreover, green warehousing practices like energy-efficient lighting can diminish energy consumption. Reverse logistics activities such as recycling also contribute to waste reduction and a circular economy (Isaksson et al., 2019).

The advantages of implementing these practices range from cost savings due to reduced energy and material expenditures to enhanced supply chain efficiency. Furthermore, they contribute to environmental conservation and elevate the organization's societal standing. These practices also align with increasing regulatory requirements related to sustainability, thereby ensuring compliance.

### 2.2.2 Environmental Awareness

Increasing environmental awareness provides firms with opportunities to engage in quality improvement and problem solving on environmental issues. This section provides the various definitions to environmental awareness provided in literature.

(Mei *et al.*, 2016) define environmental awareness as three (3) concepts: emotional, attitude, and practice. Environmental awareness describes a person's understanding of environmental issues and active engagement in environmental organizations (Nazarenko and Kolesnik, 2018). Inadequate environmental information and enormous environmental issues such as urbanization, industrialization, deforestation, rising global temperatures, and biodiversity degradation jeopardise governments' efforts to manage environmental stresses. As a result, the quality of life declines (Isaksson *et al.*, 2019a). Quality of life may be characterized by economic, ecological, social, and human factors (Obydenkova and Salahodjaev, 2016a). Finally, since the concept of quality of life has traditionally been connected with environmental studies, it demands the complete attention of policymakers in charge of planning and administering our living environment (Yu *et al.*, 2019a). According to (Nazarenko and Kolesnik, 2018), environmental awareness is "overt and visible activities undertaken by a person in response to a comprehension of environmental concerns to which they have an emotional reaction."

Table 2.1 summarizes these key definitions

**Table 2.1 Definitions of environmental Awareness**

<b>AUTHORS</b>	<b>DEFINITIONS</b>
Wijethilake (2017)	Awareness of the environment is a concept that refers to a psychological attachment and long-term orientation to the natural world that exists between a person and the natural world
Rahman and Reynolds (2016)	Environmental awareness are also defined as the number of resources that an organisation commits to various policies and activities to conserve and maintain the natural environment in general and, more specifically, to reduce the environmental footprints of its own and its products
Liu et al. (2014)	Environmental awareness refers to policies, initiatives, and engrained operational practices that reflect an organisation's concern for its stakeholders and the natural environment
Baah et al. (2021)	Environmental consciousness refers to the mental orientation, innate inclination, and psychological condition that signify an individual's level of engagement and obligation toward ecological issues within a professional setting.
Shashi et al. (2019)	Environmental awareness signifies an individual's active engagement in ecological sustainability, readiness to forego personal indulgences, minimization of resource wastage, adoption of eco-friendly novel products, and endorsement of governmental adaptation strategies.

Source: Researcher's construct (2022)

Environmental awareness refers to understanding the impact of human activities on the natural environment and taking steps to mitigate those impacts. According to Isaksson et al. (2019), there are several advantages of environmental awareness. Environmental awareness encourages people to conserve natural resources such as water, forests, and minerals, which helps to preserve them for future generations. Environmental awareness helps people understand the negative impact of pollution on the environment and encourages them to take steps to reduce pollution levels. This can lead to a cleaner and healthier environment.



Environmental awareness can lead to improved public health by reducing exposure to harmful pollutants and promoting healthy living practices such as recycling and reducing waste. Environmental awareness can lead to economic benefits by promoting sustainable business practices and reducing waste, which can lead to cost savings for businesses. Environmental awareness can help to mitigate the impact of climate change by promoting the use of renewable energy sources and reducing greenhouse gas emissions.

### **2.2.3 Organisational Performance**

Firm performance evaluates the efficiency with which an organization utilizes both human and material assets to achieve its objectives, according to Obydenkova and Salahodjaev (2016). The metrics to assess this performance are context-dependent and often relate to an organization's financial condition, or the outcomes of management decisions as executed by its members (Yu et al., 2019). Building on Afsar and Umrani's work (2020), organizational performance is conceived as the successful coordination of productive resources like human, physical, and capital assets towards a collective objective.

Martins et al. (2019) articulate corporate performance as the comparison of realized outcomes against declared goals and objectives. The notion of organizational success serves as a dependent variable in numerous studies, requiring a carefully chosen set of indicators for realistic comparisons over time (de Kervenoael et al., 2019b). Kingoto and Ismail (2021) broaden the term 'performance' to describe the manner in which tasks are completed based on criteria such as accuracy, cost-effectiveness, and alignment with stated expectations. This expands upon Nduhura et al.'s (2021) description, which identifies performance as the competency level in job-related activities and tasks. Moreover, Johnson Mwangi (2020) suggests that performance excellence is crucial in contemporary high-achieving organizations.



According to Masuruli and Nditi (2021), organizational performance is an intricate interplay of six criteria: innovation, effectiveness, efficiency, productivity, quality, and profitability.

Despite extensive scholarly engagement with the concept, academic opinion remains divided (Ssejemba, 2015). For Dagba & Dagba (2019), organizational performance serves as a metric for businesses to gauge their effectiveness and deliver value to stakeholders. Changelima et al. (2022) similarly identify it as a tool and metric for evaluating an organization's ability to generate and deliver value to both external and internal stakeholders.

Performance measurement is vital for the effectiveness of organizational management and is seen as an essential component of management (Torres et al., 2018). According to Zhao et al. (2018), nothing can be changed until it is first measured. Thus, improving organizational performance necessitates the use of specific measures to determine the extent to which organizational resources effectively fulfill business goals (Banyenzaki, 2015)

Traditional approaches to assessing organizational performance have primarily relied on financial metrics. Nevertheless, contemporary literature suggests the incorporation of nonfinancial indicators to create a more comprehensive evaluation framework (Jacobs, 2021). Mbeba and Njoroge (2022) argue that performance measurement ought to consist of a set of metrics designed to scrutinize both efficiency and effectiveness, as sole reliance on financial markers like profit, sales, debt, and return on investment may not suffice in today's competitive landscape. Concurring with this perspective, Akanmu et al. (2019) propose a balanced scorecard approach that evaluates performance through four distinct dimensions: financial, internal business processes, innovation and growth, and customer perspectives.

In the specific context of Ghanaian manufacturers of bottled and sachet water, financial performance is perceived as a subjective evaluation of a firm's ability to generate revenue through its primary operations, employing available assets (Kaguri, 2013). This often involves

financial metrics such as return on investment (ROI), return on assets (ROA), return on equity (ROE), and profitability. Conversely, market performance assesses a firm's standing and success in the marketplace through key indicators like customer loyalty, customer satisfaction, revenue growth, and market share (Guta, 2016). This study aims to analyze corporate performance by adopting a multidimensional approach that includes both financial and market performance metrics, in alignment with contemporary scholarly discussions.

### **2.2.3.1 Operational Performance**

Operational performance refers to the effectiveness and efficiency of an organization's processes and systems in achieving its objectives. It is an essential aspect of organizational success and involves the measurement and management of various performance indicators, such as quality, productivity, cost, and customer satisfaction (Leninkumar, 2017).

The concept of operational performance can be traced back to the early 20th century, with the introduction of scientific management principles by Frederick Taylor. Taylor's work emphasized the importance of optimizing work processes to improve efficiency and productivity (Hassan *et al.*, 2015).

In the mid-20th century, the development of total quality management (TQM) and lean manufacturing further emphasized the importance of operational performance. TQM focused on improving the quality of products and services by involving all employees in continuous improvement efforts, while lean manufacturing focused on minimizing waste and maximizing value for customers (Oh and Kim, 2017).

Today, operational performance is critical for organizations in all industries, as it enables them to remain competitive and meet the changing needs of their customers. Advancements in technology, such as the use of automation and artificial intelligence, have also contributed to

the evolution of operational performance, allowing organizations to optimize their processes and systems to achieve greater efficiency and effectiveness (El-Adly, 2019).

Overall, operational performance is a fundamental aspect of organizational success, and its evolution over time has been driven by the need for organizations to continuously improve their processes and systems to remain competitive and meet the needs of their stakeholders (Ngo, 2015).

### **2.2.3.2 Financial Performance**

Financial performance refers to an organization's ability to generate profits, manage costs, and maximize the value of its assets. It is a critical aspect of organizational success, as it enables an organization to fund its operations, invest in growth opportunities, and provide returns to its shareholders (Hamzah and Shamsudin, 2020).

The concept of financial performance can be traced back to the earliest days of commerce, where merchants and traders kept records of their transactions to measure their profits and losses. However, it was not until the 20th century that financial performance became a key focus of management theory and practice (Suchánek and Králová, 2018).

The development of financial ratios and metrics, such as return on investment (ROI) and earnings per share (EPS), provided a way for organizations to measure and compare their financial performance against industry benchmarks and competitors (Otto *et al.*, 2020).

Today, financial performance remains a critical aspect of organizational success, and advancements in technology, such as the use of financial analytics and big data, have further enhanced the ability of organizations to measure and manage their financial performance (Agnihotri *et al.*, 2016).

Overall, financial performance is essential for an organization's success, and its evolution over time has been driven by the need for organizations to generate profits, manage costs, and maximize the value of their assets in an increasingly competitive global marketplace (Kurdi *et al.*, 2020).

### **2.2.3.3 Customer Satisfaction**

Customer satisfaction is a term used to describe how happy or content customers feel with a product or service they have purchased. It is a key metric in measuring the success of a business, as satisfied customers are more likely to return and make additional purchases, as well as recommend the business to others (Zamry and Nayan, 2020). The concept of customer satisfaction has been around for a long time, but it became more prominent in the mid-20th century with the rise of consumerism and the focus on meeting customer needs and expectations. Today, customer satisfaction is a key part of customer relationship management and is often measured through surveys, feedback forms, and other tools (Suchánek and Králová, 2018). Customer satisfaction is affected by many factors, including the quality of the product or service, the level of customer service provided, the price of the product or service, the ease of use, and the overall customer experience. It is important for businesses to understand what drives customer satisfaction and to continually strive to improve in these areas in order to build a loyal customer base and maintain a competitive advantage in the marketplace (Agnihotri *et al.*, 2016).

### **2.3 Theoretical Review**

This section reviews the theories underpinning the study: Institutional Theory



### 2.3.1 Institutional Theory

The Institutional Theory is a sociological and organizational theory that seeks to explain how organizations, institutions, and social structures shape behavior and outcomes. The theory posits that social structures, norms, and values influence the actions of individuals and organizations, as well as the distribution of power and resources. The Institutional Theory was founded by a group of organizational scholars, including John W. Meyer, Brian Rowan, and Paul DiMaggio, in the late 1970s and early 1980s. The theory has its roots in sociology and draws on the work of theorists such as Max Weber, Emile Durkheim, and Talcott Parsons (Zucker, 1987).

Institutional theory serves as a robust framework for understanding the uniformity in organizational practices, strategies, and structures within a specific industry, as indicated by Finch et al. (2017). The theory places considerable emphasis on two core concepts: organizational legitimacy and institutional isomorphism. While organizational legitimacy hinges on the external stakeholders' belief that a business adheres to widely accepted industry practices, thereby accruing positive reputation and social capital, institutional isomorphism focuses on an organization's adoption of similar structures, practices, and strategies to align with industry norms (Finch et al., 2017). The works of Tsingopoulos et al. (2018) and Zhao et al. (2017) further reinforce the understanding that a firm's behavior is significantly influenced by the imperative to conform to established standards and norms, citing social influence and the quest for efficiency as key drivers of institutional isomorphism.

In today's competitive business environment, organizations increasingly strive for competitive advantages, stakeholder endorsements, and legitimacy. This has led to greater adherence to environmental regulations and a focus on external norms, epitomizing institutional isomorphism (Eijdenberg et al., 2019). Such alignment significantly influences organizations'

strategic choices, decision-making processes, and practices. Consequently, institutional isomorphism and organizational legitimacy become instrumental in elucidating the factors contributing to the adoption of specific environmental policies, such as sustainable logistics practices, particularly in the context of this study.

Developed nations have been at the forefront in the adoption of sustainable logistics practices due to early engagements with sustainable technologies, green investment, and eco-friendly practices and strategies. This sets the stage for institutional isomorphism, as firms in developing nations increasingly emulate these practices to gain legitimacy, improve performance, and minimize environmental impacts. In this vein, this study employs institutional theory to shed light on how external pressures, including stakeholder expectations, regulations, and competitive forces, compel firms to adopt an array of sustainable logistics practices such as sustainable transport, reverse logistics, and waste management. The theory is further harnessed to elucidate how these external factors drive firms to enhance their environmental awareness through the formulation of environmental policies and increased resource commitment to environmental programs.

## **2.4 Empirical Review**

This section empirically reviews the prior studies on sustainable logistics practices, and environmental awareness

Studies on supply chain sustainability are often directed at manufacturers and are thus inapplicable to evaluating the performance of logistics service providers. Several studies on logistics sustainability have looked at ways to reduce the environmental impact of logistics

operations (Abbasi et al., 2016). Centobelli et al. (2017) perform a thorough literature review to establish the environmental sustainability of logistics service providers (LSPs). They create a taxonomy of green activities for LSPs and claim that its relationship to sustainability performance is not well known. They emphasise variables that permit long-term success, such as the company's size, the quality of its human resources, and decision-makers willingness to engage in long-term initiatives. Ali et al. (2021) investigate if environmental sustainability is taken into account in LSP decision-making. They investigate internal and external factors that influence the long-term sustainability of LSP performance. They claim that most studies primarily look at large logistics companies that pursue corporate social responsibility.

Consequently, they make a concerted effort to include medium-sized LSPs to better understand their approach to sustainability. Internal variables such as decision-makers motivation to engage in sustainable activities, cost-cutting and profitability pressure, and firm image preservation were emphasised. Bask et al. (2018) examined 600 logistics companies to evaluate, among other things, the qualities of a business that is likely to be sustainable. They say that global LSPs are more concerned with the environment and outperform smaller competitors and that sustainability should be integrated into operations management. Studies on the logistics industry's sustainability seldom focus on small firms.

Abbasi et al. (2016) make an effort (on a very modest scale) to include SMEs in their study of LSPs' long-term performance. They learn that LSPs feel "their efforts to provide more environmental solutions are fruitless since they are not prioritised when cost or time restrictions exist. Consequently, we presume that small and medium-sized enterprises prioritise economic/profit concerns due to limited resources. They are followed by environmental concerns and, eventually, concerns for social/human performance

Although most academic study on supply chain sustainability has concentrated on the environmental effects, some researchers have combined the environmental, economic, and social components to create the well-known triple bottom line. This strategy was enhanced by Centobelli et al. (2017) by integrating institutional impact. Werner-Lewandowska and Golinska-Dawson (2021b) contend that the concept of supply network sustainability needs to be extended to include all aspects of the supply chain, such as manufacturing, consumption, client care, and product disposal. They talked about a variety of topics related to supply chains in the future, including (a) resource types to be used, (b) pollution levels, (c) the number of renewable resources, (d) technological advancements, and (e) the role of government regulations in achieving a competitive position in sustainability.

Jayarathna et al. (2022) examined 94 company reports and discovered 585 unique sustainability criteria used by Canadian firms. These studies included measurements of customer happiness, pollution levels, garbage generation, and water consumption and covered various commercial sectors in Canada. They observed that all of these indicators were evenly spread throughout the triple bottom line and that 31 firms were explicitly embracing the Global Reporting Initiative (GRI) criteria.

Martins et al. (2019) used a variety of metrics, including ecological footprint, human development, and actual progress, to explore the City Sustainability Index (CSI) criteria. These metrics reflected the triple bottom line's three pillars—social, economic, and environmental—. The CSI is essential for evaluating cities' sustainability performance on a global scale and might assist authorities in charting a course for achieving their sustainability goals.

Andersson and Forslund (2018) identified 12 SSCM definitions and 2 green supply chain management definitions through a comprehensive literature study. They sought to locate areas



where the definitions of the two conceptions converged and diverged. They used SCM and several business sustainability criteria, such as economic, environmental, social, and long-term considerations, in their study (i.e., flow, coordination, stakeholder relationship, and efficiency).

Isaksson et al. (2019) researched GSCM and environmental sustainability in Malaysian certified firms. Their research looked at whether reverse logistics practices improved company success (financial and market performance). Furthermore, Hung Lau and Wang (2009) contend that firms in developing countries that include reverse logistics minimise waste and boost profitability via recycling activities.

Guta et al. (2016) discovered a significant positive link between financial and marketing success and reuse and recycling as reverse logistics options in Kenya. Similarly, Siew et al. (2015) discovered that reverse logistics options such as remanufacturing, repair, and recycling improved firm performance by increasing sales growth and profitability. As a result, manufacturing firms that incorporate reverse logistics practices into their supply chain (including those in Ghana that manufacture bottled and sachet water) can reduce their reliance on new raw materials, create value-added products, and lower their total cost of production, all of which will eventually have a significant impact on the firm's performance (both financial and market performance). Taking the above evaluation into account, our research advanced the fundamental concept.

To be competitive, businesses must constantly assess their environment and use methods that distinguish their operations and product offerings from those of their nearest and furthest competitors. According to evidence from multiple studies, reverse logistics is a method or tool businesses may use to gain a competitive advantage. (Gouda and Saranga, 2018) conducted research on Nairobi-based water bottling companies and discovered a strong and favourable relationship between reverse logistics techniques and a company's competitive advantage.

(Giannakis and Papadopoulos, 2016) emphasises the need to integrate and implement reverse logistics solutions to provide a firm with a competitive advantage and increase market share. Similarly, companies that engage in reverse logistics improve their product image, giving them a major competitive edge.

In light of the increased interest in green supply chain management, Chin-Chan et al. (2015) conducted a study on the subject (GSCM). The development and implementation of the GSCM method were heavily reliant on environmental cooperation, which was seen as a critical relational ability. The study's objectives were to investigate GSCM, environmental cooperation, and sustainability performance in Malaysian manufacturing businesses. They also sought to create a suitable conceptual model to describe these three characteristics in Malaysian manufacturing firms. A link has been established between GSCM, environmental collaboration, and sustainability performance.

Choi and Hwang (2015) use the Natural Resource Based Perspective (NRBV) and a relational perspective to add to the expanding body of research on green supply chain management (GSCM) solutions. Their research looks at the important role of collaboration in minimising the detrimental effects of GSCM practices on company performance. We analysed data from a survey of 230 South Korean businesses using hierarchical regression techniques. The data suggest that GSCM principles may help improve a company's environmental and financial performance. According to the data, organisations that use GSCM synergistically may anticipate higher financial results.

Choi et al. (2018) categorised different GSCM strategies and evaluated their impact on operational performance (especially manufacturing and marketing). Furthermore, their study looks at how the size of a firm affects the GSCM method it takes. According to studies, different GSCM tactics have different implications on the overall performance of an organisation.

Chu et al. (2016) investigate three institutional constraints on enterprises' environmental and operational performance: the government, customers, and competition. Three institutional restrictions are investigated: green supply chain management, top management, and supply chain social capital. Using electronic mail surveys, we gathered data from Korean industrial buying firms. To test their hypothesis, the researchers employed structural equation modelling and analysed 241 complete and useable replies. The study found a link between the three institutional demands and environmental and operational success.

Concerns about the environment compel corporations to adopt green operations and diversify their supply networks (GSCM). Transaction costs may explain some of an organisation's dependence on external GSCM. Approaches to GSCM operations based on resources are more logical now that the company's performance has improved. On the other hand, there are major reservations about the link between practice and performance. Based on this concept, Zhang et al. (2018) researched to solve the following challenges: Is there a link between strong GSCM procedures and improved company performance? What circumstances must exist for the relationship to be strengthened or weakened? To address these concerns, the study will undertake a statistical analysis of the existing GSCM literature. A random-effects metaanalysis compiled empirical data from 54 trials with a total sample size of 245 people. Using subgroup analysis and meta-regression, they investigated several moderators of the practiceperformance connection. According to the study, internal and external GSCM processes are favourably connected with company success. The moderating effect of the practiceperformance relationship is influenced by industry type, ISO certification, export orientation, and a cultural component of uncertainty avoidance.

Laari et al. (2017) has linked customer-driven green supply chain management (GSCM) techniques to the environmental and financial performance of manufacturing. The assumptions



were evaluated on 119 Finnish industrial enterprises using the partial least squares method. Contrary to common opinion, their research shows that customer demands substantially affect the development of internal GSCM procedures. Manufacturers may respond to customer demand by cooperating with suppliers to bring environmental standards upstream in the supply chain or monitor their suppliers' environmental performance. It has been discovered that environmental monitoring leads to environmental cooperation. The environmental performance will likely improve for organisations with stringent internal supply chain management rules and independently monitor their suppliers' environmental performance. Furthermore, the effects of GSCM may differ depending on the exercise used. Financial success necessitates a deeper level of connection between businesses and their customers.

Bag (2017) presented a study in which they intended to add to research on the impact of sustainable supply chain management (SSCM) strategies on Chinese firm performance. (Bag, 2017b) thought that their publication would substantially contribute to the field's research. Furthermore, the article attempts to build and analyse a model for SSCM practices and overall performance. The concept investigates two unique SSCM practices: internal and external management. Furthermore, it evaluates the influence of these practices on a company's overall sustainability performance from various perspectives. This study suggests that SSCM procedures impact a company's performance. Using the PLS structural equation approach, this article investigated 172 Chinese enterprises and assessed the impact of SSCM methods on each of the metrics examined. When a company adopts ethical behaviour on the inside, its environmental and social performance increases. Economic success is intrinsically tied to environmental and social performance and vice versa.

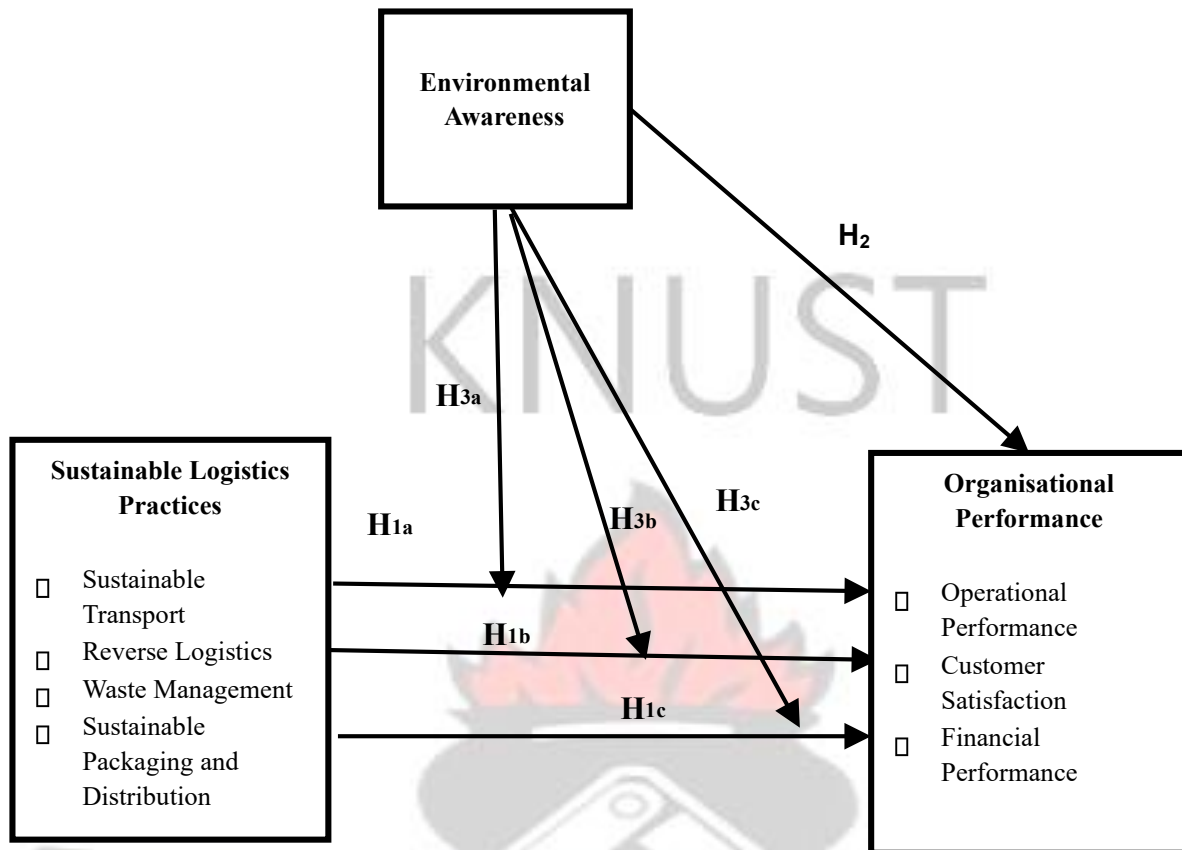
According to Vanalle et al. (2017), during the previous several decades, corporations have been increasingly concerned about the environmental effect of their industrial operations.



Manufacturers have investigated green supply chain management to reduce environmental effects while enhancing operational efficiency (GSCM). According to the literature, more study on institutional pressures, performance, and environmental policies is required, particularly in less rich nations and developing economies. This study investigates suppliers' GSCM standards, methods, and performance in a Brazilian automotive supply chain. The SmartPLS program's partial least squares structural equation modelling (PLS-SEM) function was used to analyse the data. The findings suggest that employing GSCM approaches improves the economic and environmental performance of the supply chain. Furthermore, the institutional factors that encourage this supply chain to adopt green supply chain management solutions were a crucial consequence of this study. This research shows how many firms in Brazil may become more environmentally conscious by using GSCM practices.

## **2.5 Conceptual Framework**

The study's research model posits a direct relationship between sustainable logistics practices and supply chain sustainability. Sustainable logistics practices have indirect effects on supply chain sustainability through environmental awareness. Figure 2.1 illustrates the direct and indirect relationship between the study's variables.



Source: Researcher's Construct (2022)

Figure 2.1 Conceptual framework for the study

### 2.5.1 Sustainable Logistics Practices and Organisational Performance

The Institutional theory explains why organisations established in the industry in which they operate and conduct business adhere to uniform business practices, strategies, and structures. According to institutional theory, for organisations to be successful, they must adjust their strategies, procedures, and systems to external factors such as regulators and rivals. In this research, the Institutional theory explains how external forces that require organisations to adopt sustainable logistics practices improve organisational performance. Regarding freight,

logistics, and supply chain activities, sustainable logistics emphasises sustainability and a decreased environmental imprint. Sustainable logistics practices, such as efficient transportation routing, reducing energy consumption, and minimizing waste results in cost savings, thereby enhancing financial performance (Shashi *et al.*, 2019). Sustainable logistics practices, such as adopting green products, increases the marketability of an organization's products and services, which in turn increase revenue (Bag, 2017). Sustainable logistics practices improve the customer experience by ensuring timely delivery of products, minimizing product damage, and providing eco-friendly packaging and disposal options. Sustainable logistics practices can improve supply chain resilience and agility, which can lead to better operational performance (Chhabra *et al.*, 2017). For example, using sustainable sourcing practices can reduce supply chain risk, while implementing green warehouse practices which improves inventory management and reduce waste (Baah and Jin, 2019). Sustainable logistics practices also improve workforce engagement and retention by demonstrating an organization's commitment to social and environmental responsibility (Grabara, 2013). The researcher, therefore, states the following hypotheses:

**H<sub>1a</sub>: Sustainable Logistics Practices have a positive and significant effect on operational performance**

**H<sub>1b</sub>: Sustainable Logistics Practices have a positive and significant effect on customer satisfaction**

**H<sub>1c</sub>: Sustainable Logistics Practices have a positive and significant effect on financial performance**

### **2.5.2 Environmental Awareness and Organisational Performance**

According to the Institutional theory, firms are under immense pressure from national and international regulators to reduce the impact of their supply chain and logistics activities on the environment. Therefore, the institutional theory proposed in this study describes how firms are compelled to increase their awareness to the environment due to environmental regulations. This study posits that increased environmental awareness enhances firms' social, economic and economic sustainability, which in turn enhances their corporate performance. This is in line with the argument by researchers such as (Baah et al., 2020; Afum et al., 2020; Ba 2017), who argued that environmental awareness positively affects organisational performance. The rationale is that increased environmental awareness enforces firms to dedicate many resources to ensuring logistics and supply chain activities impact less on the environment. Also, increased awareness to the environment creates awareness throughout the organisation about the firm's need to reduce its impact on the environment. Based on the above, the researcher states the following:

**H<sub>2</sub>: Environmental Awareness has a significant and positive effect on Organisational performance**

### **2.5.3 Moderating Role of Environmental Awareness**

Institutional isomorphism requires organisations to adopt comparable industry structures, procedures, and tactics to conform to accepted norms and behaviour (Finch *et al.*, 2017). As a result, this research contends that such reasons motivate organisations to strengthen their

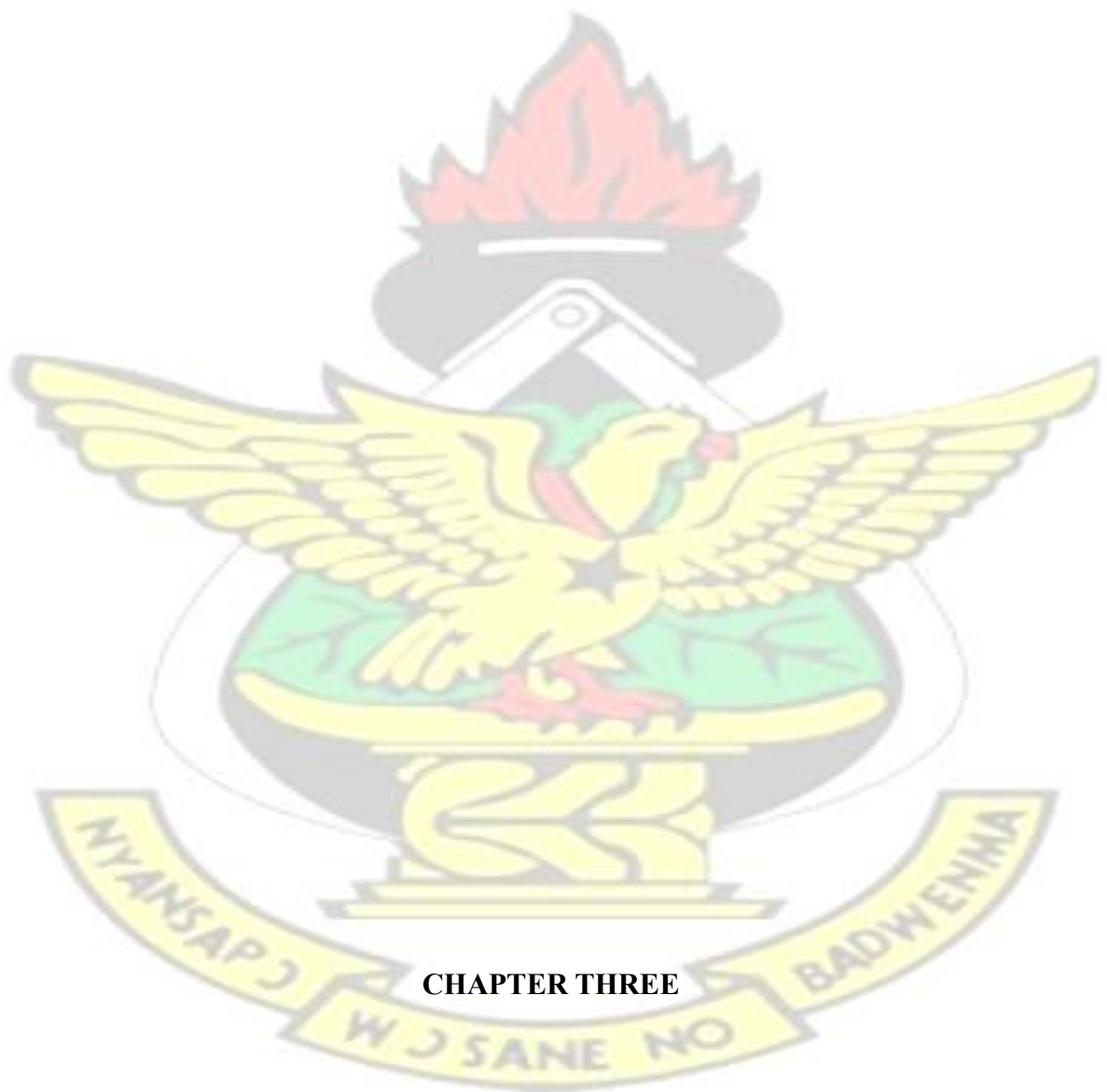


awareness to environmental protection. As a result, this research contends that the degree to which a firm's sustainable logistics practices enhances organisational significantly depends on varying level of environmental awareness. Environmental awareness can increase the emphasis on sustainable logistics practices, which can lead to more significant financial benefits. For example, an organization with a high level of environmental awareness may be more likely to invest in renewable energy sources, such as solar or wind power, which can reduce energy costs and increase the organization's profitability (Wijethilake, 2017). Additionally, environmentally aware organizations may be more likely to leverage sustainable practices to improve their reputation and brand value, which can lead to increased revenue growth (Rahman and Reynolds, 2016). Environmental awareness can increase the importance of sustainable logistics practices for customers. Customers who are highly environmentally aware may be more likely to demand sustainable products and services, and may be more likely to switch to a competitor if their sustainability expectations are not met (Liu *et al.*, 2014). As a result, organizations with a high level of environmental awareness may be more likely to prioritize sustainable logistics practices to meet customer demand and enhance customer satisfaction (Baah *et al.*, 2021b). Environmental awareness can increase the focus on sustainability across an organization's operations, which can lead to better operational performance. For example, organizations with a high level of environmental awareness may be more likely to implement sustainable practices across their supply chains, which can reduce waste and increase efficiency (Shashi *et al.*, 2019). Additionally, environmentally aware organizations may be more likely to engage their workforce in sustainability initiatives, which can improve employee morale, retention, and productivity (Graci and Dodds, 2008). Based on the above, the researcher states the following hypotheses:

**H<sub>3a</sub>: Environmental Awareness moderates the relationship between sustainable logistics practices and operational performance**

**H<sub>3b</sub>: Environmental Awareness moderates the relationship between sustainable logistics practices and customer satisfaction**

**H<sub>3c</sub>: Environmental Awareness moderates the relationship between sustainable logistics practices and financial performance**



### **CHAPTER THREE**

## METHODOLOGY

### 3.1 Introduction

This section outlines the methodological framework utilized to accomplish the study's aims. Included in this chapter are the research blueprint, the demographic focus of the study, the sampling strategy and techniques employed, approaches to data gathering, data interpretation methods, evaluations of validity and reliability, as well as ethical guidelines.

### 3.2 Research Design

The research design serves as a comprehensive plan employed by the researcher to fulfill the objectives of the study, respond to the research queries, and substantiate the study's hypothesis, as described by Zyphur and Pierides (2017). In agreement with Zyphur and Pierides (2020), the research design acts as an overarching strategy aimed at answering the study's research questions. Various kinds of research designs exist, including descriptive, exploratory, explanatory, and evaluative. The design of this study is explanatory, as it aims to explore and scrutinize the correlation between sustainable logistics practices, organizational performance, and environmental consciousness. Explanatory design is chosen because it facilitates causal predictions and hypothesis formulation. Research strategy refers to an empirical examination that scrutinizes a contemporary phenomenon within its actual context, especially when the demarcation between reality and theory is not easily distinguishable, as noted by Carter and Hurtado (2007). Almalki (2016) categorizes research methods into six kinds: case study, survey, experimental, ethnography, action research, and grounded theory. This study opts for a survey method, focusing on the workforce of logistics companies situated in the Greater Accra region.

Research approaches consist of strategies and procedures that span from overarching assumptions to specific methods of data collection, analysis, and interpretation, as stated by Barnham (2015). Three main types of approaches are identified by Barnham (2015):

qualitative, quantitative, and mixed methods. This investigation utilizes a quantitative research approach. Quantitative research involves numerical data collection and evaluation, adhering to a logical paradigm that prioritizes theory verification and is influenced by empiricist and positivist perspectives. The study adopted a quantitative approach due to the nature of its objectives: to examine the relationship among the variables. Additionally, quantitative research produces objective information that can be accurately presented through statistical measures.

### **3.3 Population of the Study**

The population in a research context encompasses all the elements that qualify for selection into the sample of the study. Farghaly (2018) delineates the population of a study as the entirety of individuals, objects, or events that meet the criteria for sample inclusion. In accordance with Farghaly (2018), the population signifies the comprehensive set of cases from which a sample is extracted for research purposes. In this study, the unit of analysis is the organization, and consequently, the population is constituted of employees belonging to a logistics firm that is operational within the regional capital.



### 3.4 Sample and Sampling Technique

Sampling constitutes the act of selecting a subset of examples from a larger set for the purpose of making generalizations about the entire population (McNabb, 2010). For the data collection in this study, non-probability sampling techniques were employed. In non-probability sampling, not every individual in the population has an equal likelihood of being chosen for the study. The types of non-probability sampling methods encompass quota, purposive, convenience, and snowball sampling. This research opted for purposive sampling to draw a sample of 100 respondents from the target population.

Purposive sampling is a type of non-probability sampling where participants are deliberately chosen based on specific attributes or features that are pertinent to the research objective or question. This method facilitates the focused selection of a subset that accurately represents a specific subgroup or demographic within the larger population, even though it may not stand as a representative sample of the larger population. The utility of purposive sampling becomes particularly pronounced when the relevant population is restricted in scope, making the identification of suitable participants via other means either arduous or time-intensive. Moreover, purposive sampling often proves to be a cost-effective technique, obviating the need to survey an extensive pool of individuals. These factors justified the adoption of purposive sampling for this study.

The importance of selecting an appropriate sample size for any research cannot be overstated. According to Maciej Serda (2013), the general consensus among most researchers is that a sample size ranging between 100 to 150 participants is satisfactory. However, Gabriel et al. (2019) contend that a sample size of around 200 observations is acceptable. Based on the aforementioned guidelines, this study chose a sample size of 100.

### 3.5 Data Collection Method

Primary data serves as the main source of information to fulfill the objectives and address the research questions of this study. According to Abutabenjeh and Jaradat (2018), primary data constitutes information gathered directly from the field to facilitate the researcher's ability to meet the study's objectives and answer the research questions. In the context of this study, primary data is obtained from one hundred employees working in logistics firms situated in the regional capital. This approach ensures that the information collected is both current and directly related to the study's focus, thereby enhancing the validity and reliability of the research findings.

#### 3.5.1 Questionnaire Design

The questionnaire designed for this study is structured into four main sections. Section A collects data on the respondents' background information. Section B targets the predictor variable, specifically sustainable logistics practices. Section C examines the moderating variable, which is environmental awareness in this context. Finally, Section D concentrates on the dependent variable, organizational performance. Table 3.1 outlines the items used for measurement in each section.

**Table 3.1 Summary of Measurement Items**

Variables	No. of Items	Sources
<b>SUSTAINABLE LOGISTICS PRACTICES</b>		
✚ SUSTAINABLE TRANSPORT	5	Baah et al. (2021)
✚ REVERSE LOGISTICS	5	Baah et al. (2021)
✚ WASTE MANAGEMENT	5	Baah et al. (2021)
✚ SUSTAINABLE PACKAGING AND DISTRIBUTION	5	Baah et al. (2021)

<b>ENVIRONMENTAL AWARENESS</b>	5	Noordin and Sulaiman (2010)
<b>ORGANISATIONAL PERFORMANCE</b>	6	Selvam et al. (2016)

Source: Researcher's construct (2023)

### 3.6 Data Analysis

The study makes use of quantitative data analysis using IBM SPSS version 26 and SmartPLS version 4. The data analyses include descriptive, inferential and structural equation modelling. Descriptive statistics include mean, skewness, standard deviation and kurtosis. Inferential statistics include exploratory factor analysis, test of normality, common method bias, average variance extracted, composite reliability, Cronbach Alpha, Fornell-Larcker Criterion and confirmatory factor analysis. The model for the study is tested using PLS-SEM.

### 3.7 Validity and Reliability

According to Gabriel et al. (2019), the important features in quantitative research that show quality and rigour in design are validity and reliability. A well-written study report will explain how validity and reliability were determined. In quantitative research, validity refers to the accuracy and truthfulness of the data and results generated. It also relates to the ideas being researched, the persons or things being studied, the procedures used to gather data, and the results that are generated (Gabriel *et al.*, 2019). In this research, the average variance explained, confirmatory factor analysis, exploratory factor analysis, and the Fornell-Larcker Criterion are used to evaluate validity. Gabriel et al. (2019) defined reliability as a measuring instrument's consistency and dependability, i.e., the degree to which it produces the same answers over time, across comparable groups, regardless of who administers it. A reliable measuring equipment will always provide the same result on multiple occasions, given that the object being measured

has not changed in the meantime. In this research, reliability is measured using composite reliability and Cronbach Alpha.

### **3.8 Ethical Considerations**

This study was undertaken with sufficient weight being given to pertinent ethical considerations such as plagiarism and copyright issues in consideration of proper conduct and method for carrying out any such study or research. In that spirit, no data or information received and utilized in this investigation was forced or coerced from relevant sources, but all data and information used in this study were gathered via publicly accessible methods. Furthermore, no responder was compelled to answer any of the questions. All participants and necessary authorities were informed about the nature of the study and its goal. That is, the study is conducted and used only for academic objectives.

### **3.9 Profile of the Study Area**

The Greater Accra region serves as the hub of Ghana's logistics industry and transportation infrastructure. As the capital region containing the city of Accra, it is home to the country's principal airport, seaport, and road/rail networks. Accra's role as a logistics hub is critical for Ghana's international trade and domestic commerce. However, the industry faces multiple challenges.

The seaport of Tema, about 30km east of Accra, is Ghana's largest and most important. It handles over 90% of Ghana's international maritime cargo traffic, with over 16 million metric tons passing through annually (Ghana Ports and Harbours Authority, 2021). The port has 29 berths and extensive breakbulk and container handling capability. Key imports include refined petroleum, foodstuffs, machinery, and manufactured goods. Exports include cocoa beans and products, minerals like gold and bauxite, timber, and crude oil (Obeng-Odoom, 2015).



While essential for Ghana's economy, Tema port suffers from congestion and capacity constraints. Cargo dwell times can stretch to weeks, causing delays and expenses for importers/exporters (Andoh, 2019). Contributing factors include inadequate storage space, poor port access roads, limited berthing space for large vessels, and a lack of modern cargo handling equipment. Plans are underway for a \$1 billion expansion, but corruption and funding issues pose challenges (Asiamah, 2022).

Ghana's main international airport, Kotoka International Airport in Accra, serves as a critical air cargo hub. Major carriers like KLM, Lufthansa, Emirates SkyCargo, and Ethiopian Airlines offer all-cargo and bellyhold freight services. Products exported include fresh produce, seafood, flowers, pharmaceuticals, and high-value manufactures (GLC, 2021). The airport faces infrastructure limitations, however, including inadequate cooling facilities for perishable exports.

Regarding domestic connectivity, Accra is linked by road and rail to other major cities like Kumasi, Takoradi, and Tamale. But poor road conditions, overloaded trucks, and crumbling rail infrastructure impede transport reliability and transit times for cargo (Andoh, 2019). For example, the train journey from Accra to Kumasi, a distance of about 270km, takes 15+ hours when it should take less than half that time.

Urban logistics within Accra itself suffers from severe road congestion, with chronic traffic jams. This is due to rapid population growth, increased vehicle ownership, poorly maintained roads, and unregulated street vendors coupled with inadequate traffic management (OseiAmponsah et al., 2018). Delivery truck drivers routinely struggle to meet schedules and service times. There is minimal use of logistics optimization technology by firms to improve efficiency.

## CHAPTER FOUR

### DATA PRESENTATION, ANALYSIS AND DISCUSSION OF RESULTS

#### 4.1 Introduction

In this chapter, the heart of the research is explored by presenting a comprehensive analysis of the data collected from respondents. The objective is to understand the underlying patterns and relationships among variables that inform the development of robust conclusions and recommendations. To achieve this, the chapter is structured into five main sections:

Demographic Characteristics of Respondents, Reliability and Validity Test, Descriptive Statistics, Model and Hypotheses Testing, and Discussion of Results. A total of one hundred (100) questionnaires were issued out to respondents and ninety-six (96) were responded to, giving a response rate of 96%.

#### 4.2 Data Cleansing

Out of the 96 responses received, only 90 were useable: six (6) of the responses that had standard deviation of below 0.50 were eliminated. Furthermore, two items (CS4 and CS5) and one item (OP5) were also removed from the SEM analysis. The correlation between CS4, CS5 and OP were 0.83 and 0.80 respectively. Furthermore, the correlation between OP5 and CS was 0.83. These items were therefore eliminated from the study because they loaded higher on other variables, affecting the discriminant validity of the study.

### 4.3 Demographics of the Respondents

In the Demographic Characteristics section, a detailed overview of the sample population is provided, shedding light on the context in which the research is conducted. This section examines essential demographics such as number of employees, Firm age, Estimated Annual Revenue (GHS), , Age, Highest Qualification, position, and type of organisation. By exploring these characteristics, a more comprehensive understanding of the study's participants is achieved, which can help inform the interpretation of subsequent findings and contribute to the generalizability of the research results.

**Table 4.1 Demographics of Respondents**

Variables		Frequency	Valid Percentage
Firm Age	Less than 3 years	6	6.3%
	3 - 6 years	19	19.8%
	7 - 9 years	17	17.7%
	10 - 12 years	23	24%
	More than 12 years	16	16.7%
Estimated Annual Revenue (GHS)	Below 10,000	11	11.5%
	10,001-30,000	19	19.8%
	30,001-100,000	17	17.7%
	100,001-500,000	23	24%
	500,001-1,000,000	16	16.7%
	Above 1,000,000	10	10.4%
Number of employees	Less than 50	29	30.2%
	50-100	19	19.8%
	101-150	13	13.5%
	151-200	15	15.6%
	201-250	5	5.2%
	251-300	7	7.3%
	301-350	2	2.1%
	351-400	1	1%
	401-450	-	-
	451-500	-	-
	501-550	1	1%
	551-600	-	-
	More than 600	4	4.2%
Gender	Male	51	54.3%
	Female	43	45.7%
Highest qualification	Secondary	4	4.2
	Diploma/HND	13	13.5%
	1 <sup>st</sup> Degree	51	53.1%
	2 <sup>nd</sup> Degree or more	28	29.2%

Position with the organisation	Supervisor	37	38.5%
	Middle manager	50	52.1%
	Top	9	9.4%
Type of Organisation	Public	32	34%
	Private	62	66%

Source: Field Study (2023)

This analysis is based on the demographic results presented in the table. The table provides information on the frequency and valid percentage of the variables such as firm age, estimated annual revenue, number of employees, gender, highest qualification, position with the organization, and type of organization.

**Firm Age:** The results show that the majority of the firms (24%) are between 10 to 12 years old, followed by 19.8% in the 3-6 years age group. The least represented group is firms over 12 years, accounting for 16.7% of the sample.

**Estimated Annual Revenue:** The results indicate that most firms have an annual revenue of between GHS 100,001 to GHS 500,000 (24%).

**Number of Employees:** The majority of the firms have less than 50 employees (30.2%), and the second-largest group has 50 to 100 employees (19.8%).

**Gender:** The results show that 54.3% of the sample are male, while 45.7% are female. The implication for the study is that there is a balanced representation of gender in the sample, and the study can reflect the experiences of both men and women in the industry.

**Highest Qualification:** The majority of the respondents have a 1st degree (53.1%), followed by those with 2nd degree or more (29.2%). The implication for the study is that most of the respondents have a higher education qualification, and are able to provide reliable responses for the study.



**Position with the Organization:** The results show that the majority of the respondents are middle managers (52.1%), followed by supervisors (38.5%).

**Type of Organization:** The majority of the sample (66%) work in private organizations, while the remaining 34% work in public organizations.

#### 4.4 Descriptives

The descriptive analytics section of Chapter Four provides a detailed analysis of the data collected for this study. This section employs descriptive statistics, including mean, kurtosis, standard deviation, and skewness, to describe the sample population's characteristics and the variables under investigation. The purpose of this analysis is to provide a clear and concise understanding of the data's distribution, variability, and central tendency.

##### 4.4.1 Sustainable Logistics Practices

The predictor variable for this study, Sustainable Logistics Practices, was operationalized using a set of twenty items adopted from Baah et al. (2021). These items were carefully selected to ensure that they accurately measure the construct of Sustainable Logistics Practices in the context of this study. To provide a comprehensive understanding of the Sustainable Logistics Practices variable, descriptive statistics were computed and are presented in Table 4.2.

**Table 4.2 Descriptive Statistics on Sustainable Logistics Practices**

Latent variables	Mean	SD	Skewness	Kurtosis
Adopting and implementing new energy sources to replace the use of fossil fuels	3.95	1.713	-0.11	-0.831
Promotes the reduction of driving time to minimize congestion, oil usage and pollution	3.99	1.867	-0.064	-1.241

Regularly engages in vehicle maintenance to reduce carbon footprints	4.39	2.104	-0.296	-1.28
Improves travel routes and schedules to reduce transport distance and time	4.5	2	-0.395	-1.073
Encourages sharing of traffic information to ensure transparency with stakeholders	4.58	1.945	-0.453	-0.954
Collects unwanted or used products for remanufacturing, thus ensuring quality	4.3	2.068	-0.321	-1.187
Retrieves used packaging for reuse or recycling	4.44	1.935	-0.509	-0.89
Improves ecological material usage to reduce waste	4.44	1.994	-0.48	-0.967
Retrieves used or unwanted products for waste management purposes	4.53	1.93	-0.421	-0.964
Improves quality and timeliness of e-work and repair	4.56	1.834	-0.468	-0.801
Source reusable production materials	4.44	1.935	-0.313	-1.133
Engages in reverse logistics to increase waste reuse	4.67	1.775	-0.483	-0.817
Engages in waste reduction campaigns	4.43	1.951	-0.275	-1.207
Available facilities for solid waste collection and processing	4.44	1.951	-0.308	-1.112
Suitability of infrastructure to manage waste	4.53	1.829	-0.362	-0.769
Reduces product waste	4.49	1.947	-0.474	-0.836
Improves distribution and logistics efficiency	4.52	1.858	-0.436	-0.844
Increases the use of ecological materials	4.37	1.915	-0.268	-1.113
Reduces toxicity and litter impacts of packaging materials	4.45	1.897	-0.386	-1.017
Minimizes distribution time through efficient routing systems	4.54	1.729	-0.521	-0.566
<b>Overall</b>	<b>4.4276</b>	<b>1.63715</b>	<b>-0.438</b>	<b>-0.901</b>

Source: Field Study (2023)

The table provides descriptive statistics of sustainable logistics practices, including the mean, standard deviation (SD), skewness, and kurtosis. The overall mean of all the variables is 4.4276, indicating that sustainable logistics practices are relatively high among the participants. The skewness value of -0.438 indicates that the data is slightly skewed to

the left. The kurtosis value of -0.901 indicates that the distribution is platykurtic, meaning it is flatter than the normal distribution. Looking at the highest and lowest means, it appears that the logistics practices related to waste management, such as engaging in reverse logistics to increase waste reuse (mean = 4.67), and improving ecological material usage to reduce waste (mean = 4.44), are the most favored sustainable logistics practices. On the other hand, reducing toxicity and litter impacts of packaging materials (mean = 4.45) and adopting and implementing new energy sources to replace the use of fossil fuels (mean = 3.95) have the lowest means, indicating that these areas may need more attention in terms of sustainable logistics practices. The SD values range from 1.729 to 2.104, suggesting that there is some variability in the participants' responses for each variable. In conclusion, the results suggest that sustainable logistics practices are relatively high among the participants, with waste management practices being the most favored.

#### 4.4.2 Environmental Awareness

The mediator variable for this study, environmental awareness, was operationalized using a set of five items adopted from Noordin and Sulaiman (2010). These items were carefully selected to ensure that they accurately measure the construct of environmental awareness in the context of this study. To provide a comprehensive understanding of the environmental awareness variable, descriptive statistics were computed and are presented in Table 4.3.

**Table 4.3 Descriptive Statistics on Environmental Awareness**

Latent variables	Mean	SD	Skewness	Kurtosis
My firm keeps updated on environmental issues in the mass media	4.17	1.822	-0.061	-1.021
My firm trains and educates employees on environmental protection	4.22	1.921	-0.091	-1.252
My firm scans the environment continuously for trends and changes	4.03	1.762	-0.013	-1.01

My firm invest in technologies to help keep pace with environmental changes	4.06	1.782	0.041	-1.067
My firm works closely with other firm to identify environmental trends	4.16	1.791	-0.027	-0.983
<b>Overall</b>	<b>4.1271</b>	<b>1.61418</b>	<b>0.05</b>	<b>-0.952</b>

Source: Field Study (2023)

The table presents the descriptive statistics of latent variables related to environmental awareness of a firm. The overall mean of all the variables is 4.1271, indicating that the participants perceive their firms as having moderate to high environmental awareness. The skewness value of 0.05 indicates that the data is relatively symmetrical, with a slight positive skew. The kurtosis value of -0.952 indicates that the distribution is platykurtic, meaning it is flatter than the normal distribution. Looking at the means of the individual variables, the participants perceive their firms to have a relatively high level of environmental awareness and management practices. The highest mean is for training and educating employees on environmental protection (mean = 4.22), followed by keeping updated on environmental issues in the mass media (mean = 4.17). This suggests that the participants' firms are proactive in staying informed about environmental issues and training their employees to contribute to environmental protection. The SD values range from 1.614 to 1.921, suggesting that there is some variability in the participants' responses for each variable. In conclusion, the results suggest that the participants perceive their firms to have moderate to high environmental management practices. The firms prioritize employee education and environmental issue awareness, indicating a positive trend towards sustainability.

#### 4.4.3 Organisational Performance

The outcome variable for this study, Organisational Performance, was operationalized using a set of fifteen items adopted from Selvam et al. (2016). These items were carefully



selected to ensure that they accurately measure the construct of Organisational Performance in the context of this study. To provide a comprehensive understanding of the Organisational Performance variable, descriptive statistics were computed and are presented in Table 4.5.

**Table 4.5 Descriptive Statistics on Organisational Performance**

Latent variables	Mean	SD	Skewness	Kurtosis
Our organization has strong revenue growth.	4.17	1.856	-0.067	-1.112
Our organization has high profit margins.	3.96	1.852	-0.039	-0.986
Our organization manages its expenses effectively.	4.36	1.795	-0.22	-0.928
Our organization generates strong cash flow.	4.17	1.839	-0.178	-1.06
Our organization has a strong return on investment.	4.18	1.852	-0.093	-1.08
Our customers are loyal to our brand.	4.18	1.897	-0.298	-1.015
Our organization has a strong reputation in the market.	4.25	1.858	-0.274	-1.007
Our organization's products/services are highly valued by our customers.	4.3	1.887	-0.285	-1.034
Our organization effectively meets or exceeds customer expectations.	4.3	1.79	-0.333	-0.841
Our organization is responsive to changing customer needs.	4.36	1.778	-0.306	-1.044
Our organization has efficient and effective processes in place.	4.36	1.748	-0.324	-0.958
Our organization delivers high-quality products/services.	4.57	1.845	-0.477	-0.789
Our organization is able to respond quickly to changing customer needs.	4.39	1.855	-0.321	-1.022
Our organization has good inventory management practices.	4.59	1.81	-0.47	-0.724
Our organization meets or exceeds production targets.	4.31	1.755	-0.17	-0.904
<b>Overall</b>	<b>4.2972</b>	<b>1.5218</b>	<b>-0.225</b>	<b>-0.713</b>

Source: Field Study (2023)

The table presents descriptive statistics on organizational performance, with latent variables related to revenue growth, profit margins, expenses management, cash flow, return on

investment, customer loyalty, market reputation, product/service value, customer expectations, process efficiency, product/service quality, inventory management, and production targets. The overall mean of all the variables is 4.2972, indicating that the participants perceive their organizations as having moderate to high levels of organizational performance. The skewness value of -0.225 indicates that the data is slightly skewed to the left. The kurtosis value of -0.713 indicates that the distribution is platykurtic, meaning it is flatter than the normal distribution. Looking at the means of the individual variables, the participants perceive their organizations to have relatively high levels of organizational performance. The highest means are for good inventory management practices (mean = 4.59) and high-quality products/services (mean = 4.57). This suggests that the participants' organizations are effective in managing inventory and delivering high-quality products/services to customers. Other high means are for effective expense management (mean = 4.36), efficient and effective processes (mean = 4.36), and meeting or exceeding customer expectations (mean = 4.3). The SD values range from 1.521 to 1.897, suggesting that there is some variability in the participants' responses for each variable. In conclusion, the results suggest that the participants perceive their organizations as having moderate to high levels of organizational performance. The organizations prioritize good inventory management practices, high-quality products/services, effective expense management, efficient and effective processes, and meeting or exceeding customer expectations

#### **4.5 Reliability and Validity Test**

Reliability and validity stand as essential criteria in any scholarly inquiry that seeks to generate dependable and credible findings. Reliability denotes the measure's stability and consistency over time, whereas validity signifies the degree to which the instrument accurately captures the construct it purports to measure.

#### 4.5.1 Cronbach Alpha, Composite Reliability, and Average Variance Extracted

To assess the reliability of the constructs, both the Cronbach alpha coefficient and composite reliability were employed. These metrics evaluated the internal consistency in gauging the designated variables, with acceptable threshold values set at 0.7, as established by Hair et al., 2013. In parallel, Average Variance Extracted (AVE) was utilized within the framework of structural equation modeling (SEM) to scrutinize the convergent validity of a given construct. An AVE score of 0.5 or above serves as a widely accepted benchmark, signaling satisfactory convergent validity. On the contrary, a diminished AVE value indicates that the construct lacks clear definition, or that the indicators fall short in adequately measuring the construct. Table 4.6 furnishes the outcomes of tests for Cronbach Alpha, Composite Reliability, and Average Variance Extracted.

**Table 4.6 Cronbach Alpha, Composite Reliability, and Average Variance Extracted**

##### Results

Construct	CODES	Loadings	Cronbach Alpha (CA)	Composite Reliability (CR)	AVE
<b>Sustainable Logistics Practices</b>	SLP1	0.73	0.98	0.98	0.72
	SLP2	0.75			
	SLP3	0.79			
	SLP4	0.83			
	SLP5	0.85			
	SLP6	0.86			
	SLP7	0.83			
	SLP8	0.90			
	SLP9	0.82			
	SLP10	0.84			
	SLP11	0.88			
	SLP12	0.92			
	SLP13	0.93			
	SLP14	0.87			
	SLP15	0.88			
	SLP16	0.87			
	SLP17	0.75			
	SLP18	0.79			
	SLP19	0.83			
	SLP20	0.78			
<b>Environmental Awareness</b>	EA1	0.75			
	EA2	0.89			

	EA3	0.94	0.92	0.94	0.77
	EA4	0.90			
	EA5	0.89			
<b>Financial Performance</b>	FP1	0.86	0.92	0.94	0.76
	FP2	0.88			
	FP3	0.85			
	FP4	0.88			
	FP5	0.90			
<b>Customer satisfaction</b>	CS1	0.94	0.92	0.95	0.87
	CS2	0.94			
	CS3	0.92			
<b>Operational Performance</b>	OP1	0.86	0.91	0.94	0.79
	OP2	0.93			
	OP3	0.89			
	OP4	0.88			

Source: Field Study (2023)

The Table 4.6 provides Cronbach Alpha, Composite Reliability, and Average Variance Extracted results for five different constructs in a study. These measures are essential to assess the reliability and validity of a measurement model in research. The first construct, Sustainable Logistics Practices, consists of 20 items. It has a Cronbach Alpha of 0.98, indicating a high level of internal consistency among the items. The Composite Reliability is also 0.98, showing that the construct is reliable. The Average Variance Extracted (AVE) for this construct is 0.72, which is above the acceptable threshold of 0.5, indicating convergent validity. The second construct, Environmental Awareness, includes five items. It has a Cronbach Alpha of 0.92 and a Composite Reliability of 0.94, both suggesting good internal consistency and reliability. The AVE for this construct is 0.77, demonstrating adequate convergent validity. The third construct, Financial Performance, has five items as well. With a Cronbach Alpha of 0.92 and a Composite Reliability of 0.94, the construct displays strong internal consistency and reliability. Its AVE is 0.76, signifying satisfactory convergent validity. The fourth construct, Customer Satisfaction, also comprises five items. It has a Cronbach Alpha of 0.92 and a Composite Reliability of 0.95, indicating high internal consistency and reliability. The AVE for this construct is 0.87, which is well above the acceptable threshold, highlighting strong convergent validity. Lastly, the fifth construct, Operational Performance, contains five items. Its Cronbach Alpha is 0.91, and the



Composite Reliability is 0.94, both reflecting good internal consistency and reliability. The AVE for Operational Performance is 0.79, ensuring adequate convergent validity. In summary, all five constructs demonstrate good reliability and validity based on their respective Cronbach Alpha, Composite Reliability, and AVE values.

#### 4.5.2 Heterotrait-Monotrait Ratio Test

The Heterotrait-Monotrait Ratio (HTMT) serves as a metric for evaluating discriminant validity in the milieu of structural equation modeling as well as other multivariate analytical methodologies. Discriminant validity measures the distinctiveness of a construct in relation to other constructs within the measurement model, thereby certifying its uniqueness in capturing a specific facet of the investigated phenomenon. The HTMT ratio juxtaposes the correlations across different constructs, referred to as heterotrait, with the correlations among items of the same construct, known as monotrait. A reduced HTMT ratio is indicative of superior discriminant validity, as it implies that inter-construct correlations are less pronounced compared to intra-construct correlations. Conventionally, an HTMT value that falls below the thresholds of 0.85 or 0.90 is regarded as sufficient evidence of satisfactory discriminant validity. Table 4.7 provides a comprehensive account of the outcomes derived from the HTMT evaluations.

**Table 4.7 HTMT Results**

	CS	EA	FP	OP	SLP
EA	0.65				
FP	0.76	0.70			
OP	0.89	0.75	0.74		
SLP	0.58	0.46	0.32	0.68	
EA x SLP	0.19	0.13	0.04	0.18	0.33

Source: Field Study (2023)

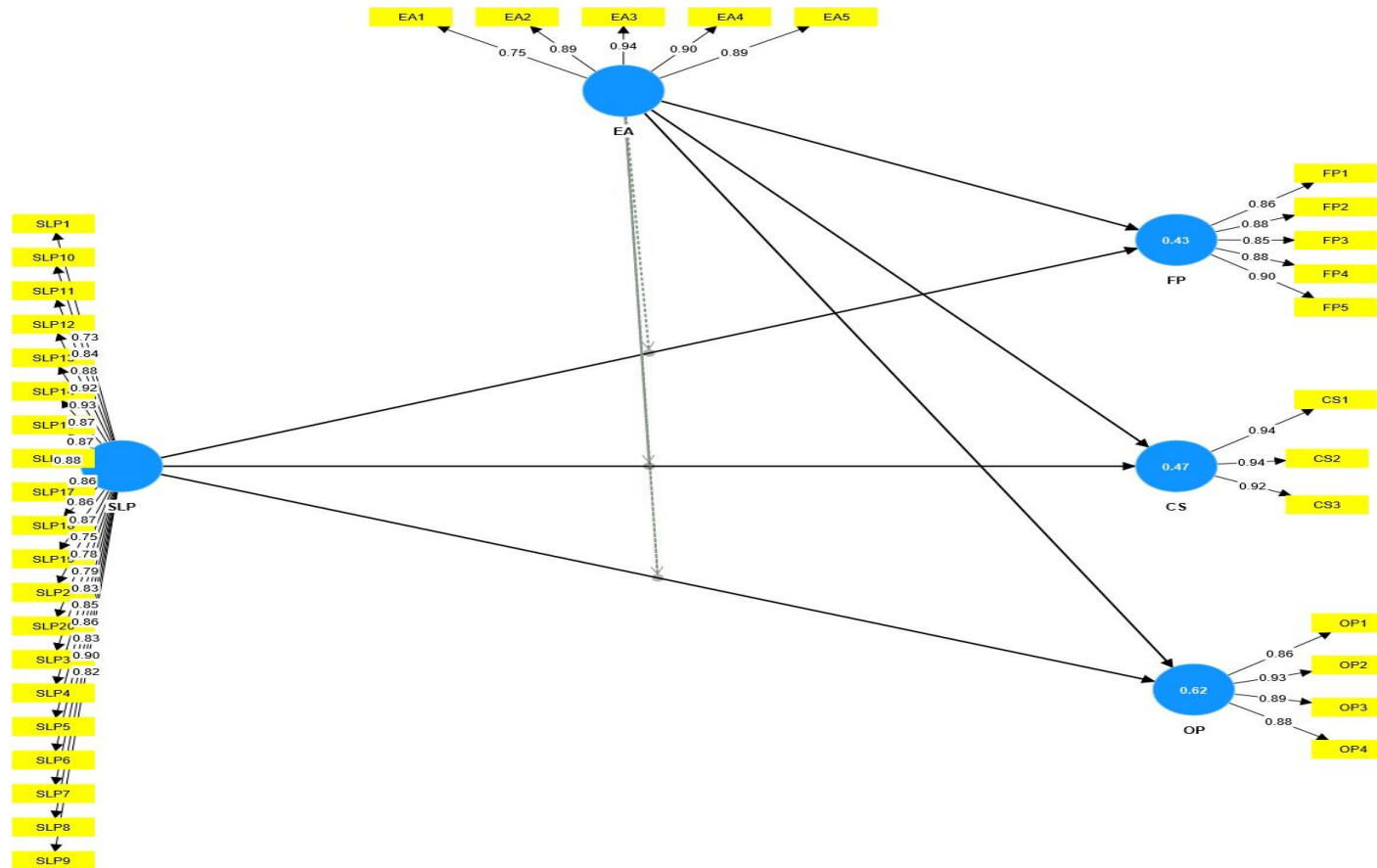
Table 4.7 provides the Heterotrait-Monotrait (HTMT) Ratio results for the five constructs (CS, EA, FP, OP, and SLP) and an interaction term (EA x SLP). The HTMT is used to assess the discriminant validity between these constructs, ensuring that they are distinct from one another. Customer Satisfaction (CS) and Environmental Awareness (EA) have an HTMT value of 0.65, which is below the threshold of 0.90, indicating adequate discriminant validity between these two constructs. This suggests that they are measuring distinct aspects of the phenomenon under investigation. Customer Satisfaction (CS) and Financial Performance (FP) show an HTMT value of 0.76, which also falls below the threshold, confirming that these constructs are distinct and have adequate discriminant validity. Customer Satisfaction (CS) and Operational Performance (OP) have an HTMT value of 0.89. This value is close to or slightly above the commonly accepted threshold, indicating that the discriminant validity between these constructs might be weak, but still below 0.90. Customer Satisfaction (CS) and Sustainable Logistics Practices (SLP) have an HTMT value of 0.58, demonstrating adequate discriminant validity between these constructs. Environmental Awareness (EA) and Financial Performance (FP) have an HTMT value of 0.70, which is below the threshold, indicating that these constructs are distinct and have good discriminant validity. Environmental Awareness (EA) and Operational Performance (OP) show an HTMT value of 0.75, also suggesting adequate discriminant validity between these constructs. Environmental Awareness (EA) and Sustainable Logistics Practices (SLP) have an HTMT value of 0.46, further confirming discriminant validity between these constructs. Financial Performance (FP) and Operational Performance (OP) have an HTMT value of 0.74, indicating good discriminant validity between these constructs. Financial Performance (FP) and Sustainable Logistics Practices (SLP) show an HTMT value of 0.32, which demonstrates strong discriminant validity between these constructs. Operational Performance (OP) and Sustainable Logistics Practices (SLP) have an HTMT value of 0.68, suggesting adequate discriminant validity between these constructs.

Lastly, the interaction term (EA x SLP) has HTMT values ranging from 0.04 to 0.33 when compared with other constructs, indicating that it is distinct and has good discriminant validity.

#### 4.5.3 Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) constitutes a statistical method employed to validate the factor structure inherent in a set of observed variables. Subsumed under the broader framework of Structural Equation Modeling (SEM), CFA aims to scrutinize the congruence between the data and a predetermined measurement model. Through this technique, the compatibility between empirical data and a hypothesized model is rigorously assessed. This model is based on a priori knowledge or theory and aims to confirm if the observed variables (also known as indicators) are good representatives of the latent variables (also called factors or constructs). Figure 4.1 illustrates the CFA for the study. The figure shows that all thirty-seven items loading onto sustainable logistics practices, environmental awareness, financial performance, operational performance and customer satisfaction loaded above 0.70. This implies that all items load strongly onto their latent variables.

Figure 4.1 Confirmatory Factor Analysis



Source: Field Study (2023)





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## 4.6 Structural Equation Modelling

In this section of Chapter Four, the findings of the Structural Equation Modeling (SEM) analysis are presented. SEM is a powerful multivariate technique employed to examine the relationships between latent variables (constructs) in the research model. By combining the strengths of Confirmatory Factor Analysis (CFA) and path analysis, SEM allows for the simultaneous assessment of the measurement model and the structural model. Table 4.8 presents the results from the SEM analysis.

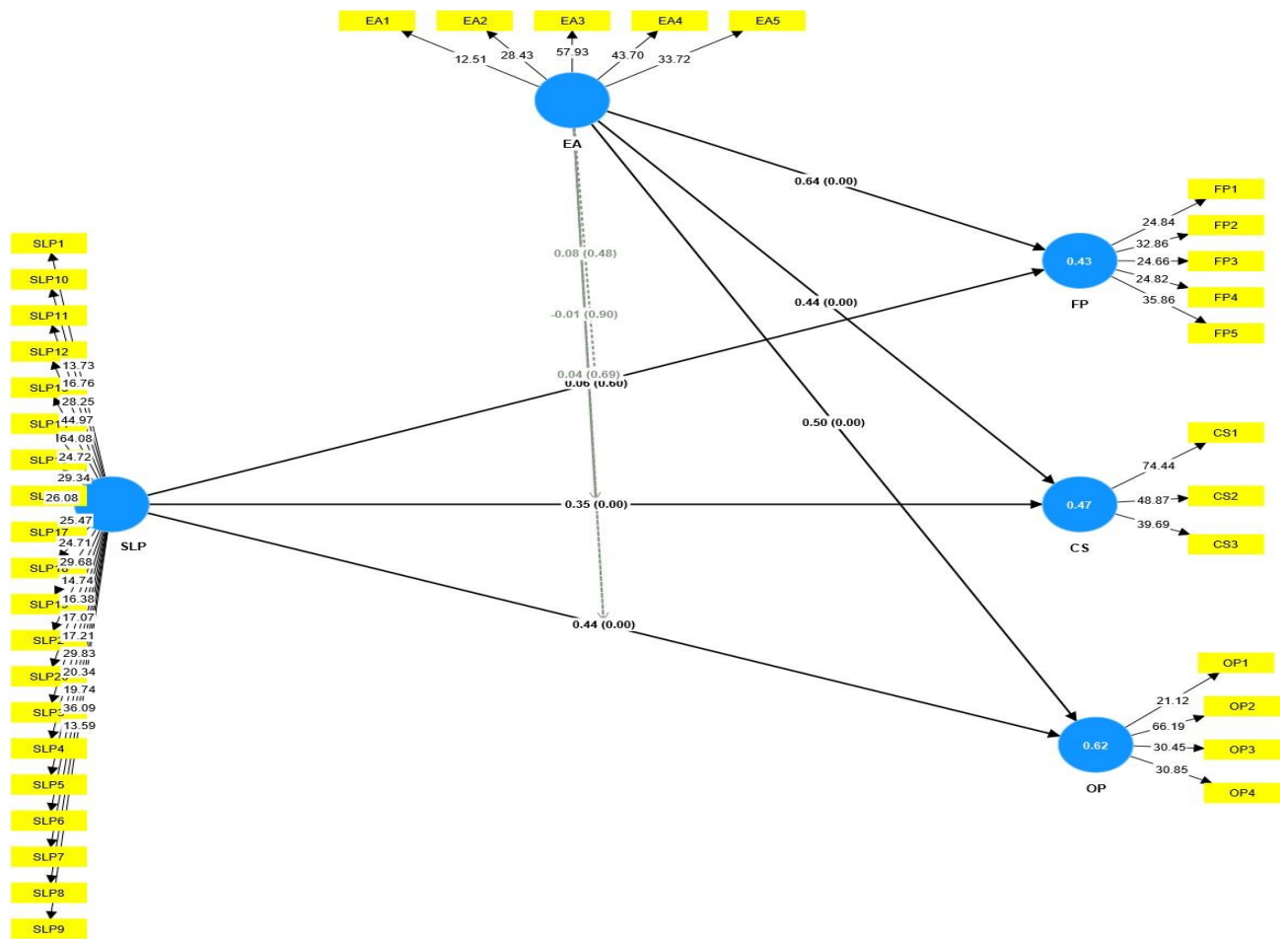
**Table 4.8 Structural Equation Model (SEM) Result**

Path	Coefficients	T-value	P-value
<i>Direct Effects</i>			
SLP → CS	0.35	3.39	0.00
SLP → FP	0.06	0.52	0.60
SLP → OP	0.44	4.49	0.00
EA → CS	0.44	3.98	0.00
EA → FP	0.64	7.28	0.00
EA → OP	0.50	5.27	0.00
<i>Moderation Effect</i>			
EA × SLP → CS	-0.01	0.13	0.90
EA × SLP → FP	0.08	0.71	0.48
EA × SLP → OP	0.04	0.40	0.69

**Source: Field Study (2023) Note:** Sustainable Logistics Practices (SLP); Environmental Awareness (EA);

Organisational Performance (OP); Financial performance (FP); Customer Satisfaction (CS); Operational Performance (OP)

Figure 4.2 Structural Equation Modelling



Source: Field Study (2023)



Table 4.8 presents the results of the Structural Equation Modelling (SEM) analysis for the hypothesized relationships between Sustainable Logistics Practices (SLP), Environmental Awareness (EA), Customer Satisfaction (CS), Financial Performance (FP), and Operational Performance (OP), as well as the moderation effect of the interaction term ( $EA \times SLP$ ). Examining the direct effects, the following results are observed:

SLP has a significant positive effect on CS (coefficient = 0.35, t-value = 3.39, p-value = 0.00). Since the p-value is less than the commonly accepted significance level of 0.05, it can be concluded that SLP has a significant positive impact on CS.

SLP does not have a significant effect on FP (coefficient = 0.06, t-value = 0.52, p-value = 0.60). With a p-value greater than 0.05, there is no evidence to suggest a significant relationship between SLP and FP.

SLP has a significant positive effect on OP (coefficient = 0.44, t-value = 4.49, p-value = 0.00). The p-value is less than 0.05, indicating that SLP significantly influences OP.

EA has a significant positive effect on CS (coefficient = 0.44, t-value = 3.98, p-value = 0.00). With a p-value less than 0.05, it can be concluded that EA significantly impacts CS.

EA has a significant positive effect on FP (coefficient = 0.64, t-value = 7.28, p-value = 0.00). The p-value is less than 0.05, indicating a significant relationship between EA and FP.

EA has a significant positive effect on OP (coefficient = 0.50, t-value = 5.27, p-value = 0.00). Given the p-value is less than 0.05, it can be concluded that EA significantly influences OP.



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Regarding the moderation effects, the following results are observed:

The interaction between EA and SLP does not have a significant moderating effect on CS (coefficient = -0.01, t-value = 0.13, p-value = 0.90).

The interaction between EA and SLP does not have a significant moderating effect on FP (coefficient = 0.08, t-value = 0.71, p-value = 0.48).

The interaction between EA and SLP does not have a significant moderating effect on OP (coefficient = 0.04, t-value = 0.40, p-value = 0.69).

In summary, the SEM analysis reveals that both Sustainable Logistics Practices (SLP) and Environmental Awareness (EA) have significant positive effects on Customer Satisfaction (CS) and Operational Performance (OP), while only EA has a significant positive effect on Financial Performance (FP). However, the moderation effect of the interaction between EA and SLP on CS, FP, and OP is not significant.

#### 4.7 Hypotheses Confirmation

Based on the comprehensive review of existing literature, this study formulated nine hypotheses. The collected data underwent rigorous analysis to either confirm or reject each of these hypotheses. Out of the total nine hypotheses, five received empirical support. A summary outlining the confirmation status of each hypothesis is encapsulated in Table 4.9.

**Table 4.9 Hypothesis Confirmation**

Hypothesis	Path	T-value	Coefficient (P-value)	Decision
H <sub>1A</sub>	SLP → FP	0.52	.06; p > 0.01	Not Supported
H <sub>1B</sub>	SLP → CS	3.39	0.35.; p < 0.01	Supported
H <sub>1C</sub>	SLP → OP	4.49	0.44.; p < 0.01	Supported

<b>H<sub>2a</sub></b>	EA → FP	7.28	0.64.; p < 0.01	<b>Supported</b>
<b>H<sub>b<sub>a</sub></sub></b>	EA → CS	3.98	0.44.; p < 0.01	<b>Supported</b>
<b>H<sub>2c</sub></b>	EA → OP	5.27	0.50.; p < 0.01	<b>Supported</b>
<b>H<sub>3A</sub></b>	SLP × EA → FP	.13	-.01; p > .05	<b>Not Supported</b>
<b>H<sub>3B</sub></b>	SLP × EA → CS	.71	.08; p > .05	<b>Not Supported</b>
<b>H<sub>3C</sub></b>	SLP × EA → OP	.40	.04; p > .05	<b>Not Supported</b>

**Source: Field Study (2023) Note:** Sustainable Logistics Practices (SLP); Environmental Awareness (EA);

Organisational Performance (OP); Financial performance (FP); Customer Satisfaction (CS); Operational Performance (OP)

## 4.8 Discussion of Results

The results obtained in this study are deliberated in light of the previously reviewed literature as well as the theoretical frameworks employed for the investigation. A thorough discussion of the findings unfolds subsequently, structured in alignment with the objectives initially set for the research.

### 4.8.1 Sustainable Logistics Practices and Organisational Performance

The findings from the hypotheses testing reveal mixed results for the relationships between sustainable logistics practices (SLP) and various dimensions of organisational performance. The results support the hypothesis that SLP has a positive and significant effect on both operational performance (H1a) and customer satisfaction (H1b), which is in line with the literature (Shashi et al., 2019; Chhabra et al., 2017; Baah and Jin, 2019). These findings suggest that implementing sustainable logistics practices, such as efficient transportation routing, green warehouse practices, and adopting green products, can lead to improved inventory management, reduced waste, and better supply chain resilience, which in turn enhances operational performance and customer satisfaction. Efficient transportation routing can help minimize fuel consumption and emissions, while also reducing transportation costs

and delivery times, thus improving operational performance and customer satisfaction (Cherrett et al., 2017). Green warehouse practices, such as optimizing storage space, implementing energy-efficient lighting and heating systems, and using eco-friendly packaging materials, contribute to reducing energy consumption, waste generation, and overall environmental impact, while simultaneously improving operational efficiency and customer experience (Wichaisri and Sopadang, 2013). Moreover, adopting green products and sustainable sourcing practices can contribute to attracting environmentally conscious customers, enhancing an organization's reputation, and increasing the marketability of its products and services (Bag, 2017). Additionally, sustainable logistics practices can improve workforce engagement and retention by demonstrating an organization's commitment to social and environmental responsibility, which in turn can positively impact operational performance (Grabara, 2013). However, the relationship between SLP and financial performance (H1c) was not supported by the findings. This result contradicts the argument made by Bag (2017), who suggested that adopting green products could increase the marketability of an organization's products and services, leading to increased revenue. The nonsignificant relationship between SLP and financial performance indicates that, in this particular context, SLP may not have a direct impact on financial outcomes. This result calls for further research to explore the underlying factors that could explain the lack of a direct relationship between SLP and financial performance. Factors such as the costs associated with implementing sustainable logistics practices, the degree to which customers value sustainability, and the competitive landscape within the industry could all play a role in shaping the relationship between SLP and financial performance.



#### 4.8.2 Environmental Awareness and Organisational Performance

The results of the hypotheses testing demonstrate that environmental awareness (EA) has a significant and positive effect on all dimensions of organisational performance, including financial performance (H2a), customer satisfaction (H2b), and operational performance (H2c). These findings are consistent with previous research, such as Baah et al. (2020), Afum et al. (2020), and Ba (2017), who argued that increased environmental awareness positively affects organisational performance. The significant relationship between EA and financial performance can be attributed to various factors. Organisations with heightened environmental awareness are more likely to invest in renewable energy sources, such as solar or wind power, which can reduce energy costs and increase profitability (Wijethilake, 2017). Furthermore, environmentally aware organisations may leverage their commitment to sustainability to improve their reputation and brand value, leading to increased revenue growth (Rahman and Reynolds, 2016). The positive relationship between EA and customer satisfaction can be explained by the increased importance of sustainability for customers. As customers become more environmentally aware, they demand sustainable products and services and may be more inclined to switch to competitors if their sustainability expectations are not met (Liu et al., 2014). Consequently, organisations with high levels of environmental awareness are more likely to prioritise sustainable logistics practices to meet customer demand, enhancing customer satisfaction (Baah et al., 2021a). Lastly, the significant relationship between EA and operational performance can be attributed to the increased focus on sustainability across the organisation's operations. Organisations with high levels of environmental awareness may be more likely to implement sustainable practices throughout their supply chains, reducing waste and increasing efficiency (Shashi et al., 2019). Moreover, environmentally aware organisations may be more likely to engage their workforce in

sustainability initiatives, which can improve employee morale, retention, and productivity (Graci and Dodds, 2008).

#### **4.8.3 The Moderating effect of Environmental Awareness**

The results of the hypotheses testing reveal that environmental awareness (EA) does not have a significant moderating effect on the relationship between sustainable logistics practices (SLP) and the three dimensions of organisational performance: financial performance (H3a), customer satisfaction (H3b), and operational performance (H3c). These findings indicate that the degree to which a firm's SLP enhances organisational performance does not significantly depend on varying levels of EA. While the results are contrary to the initial expectations, they suggest that SLP can still independently contribute to organisational performance without relying on the moderating influence of EA. This implies that organisations can achieve positive outcomes in their performance through the implementation of sustainable logistics practices, regardless of the level of environmental awareness. However, it is essential to consider that these results do not undermine the importance of environmental awareness in organisational performance. As discussed earlier, EA has a direct and positive effect on the different dimensions of organisational performance. Moreover, previous research has shown that organisations with higher levels of EA are more likely to prioritize sustainable practices and recognize their value in enhancing various aspects of performance (Rahman and Reynolds, 2016; Liu et al., 2014). It is possible that the moderating effect of EA may not have been significant in this study due to factors such as sample size, industry characteristics, or the specific measures used to assess the constructs. Future research should consider examining the moderating role of EA in different contexts or using alternative methodologies to provide further insights into the complex relationship between SLP, EA, and organisational performance.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter offers a summation of the research outcomes, inferences deduced from the investigation, guidance for supply chain managers, and prospective avenues for future scholarly endeavors. The principal aim of this research was to probe the nexus between sustainable logistics practices and organisational performance, taking into account the influence of environmental awareness.

#### **5.2 Summary of Findings**

The subsequent sections, as listed below, explain the study's key findings.

##### **5.2.1 Sustainable Logistics Practices and Organisational Performance**

The outcomes of the investigation reveal that sustainable logistics practices exert a considerable positive influence on customer satisfaction and operational performance. Conversely, no notable impact of sustainable logistics practices on financial performance was observed. These observations imply that the adoption of sustainable logistics practices allows organisations to augment customer satisfaction and operational efficacy, thereby contributing to the enhancement of their comprehensive organisational performance.

### **5.2.2 Environmental Awareness and Organisational Performance**

The study ascertains that environmental awareness significantly and positively affects organisational performance. This inference indicates that organisations amplifying their cognizance of environmental conservation stand to realize improved performance in financial, operational, and customer satisfaction dimensions.

### **5.2.3 Moderating role of Environmental Awareness**

The study reveals that environmental awareness does not serve as a moderating variable in the relationship between sustainable logistics practices and various dimensions of organisational performance, namely financial, operational, and customer satisfaction. This implies that the beneficial impacts of implementing sustainable logistics practices on these performance measures are not considerably affected by the degree of environmental awareness present within the organisation.

## **5.3 Conclusion**

This research was instigated by the escalating significance of sustainability across various domains of human activity, notably in the logistics sector. The primary objective was to scrutinize the potential moderating impact of environmental awareness on the nexus between sustainable logistics practices and organizational performance. Utilizing a quantitative methodological framework, the study surveyed logistics organizations functioning in the Greater Accra region of Ghana. The chief aims included identifying prevalent sustainable logistics practices, discerning the association between these practices and organizational performance, assessing the influence of environmental awareness on such performance, and probing its moderating role in the sustainable logistics-organizational performance relationship.



Upon conducting regression analyses, it is ascertained that sustainable logistics practices exert a favorable and statistically meaningful influence on organizational performance. Conversely, environmental awareness does not serve as a moderating factor in this relationship. Therefore, the study concludes that the incorporation of sustainable logistics practices can potentially enhance a firm's operational efficiency, thereby fortifying its competitive edge. It is imperative for organizations to duly consider and navigate environmental and sustainability issues for the efficacious deployment of sustainable logistics stratagems.

As practical implications, the study advocates for the sustained incorporation and execution of sustainable logistics practices. Such actions are indispensable for averting environmental calamities like climate change, resource exhaustion, escalating oil and raw material costs, as well as pollution and related atmospheric concerns. The outcomes of this investigation furnish a compelling rationale for logistics companies to bolster their environmental commitments as part and parcel of their sustainable logistics implementation strategies.

## **5.4 Recommendations**

The researcher, based on the findings of the study, makes the following recommendations

### **5.4.1 Recommendations for managers**

This research furnishes empirical substantiation that sustainable logistics practices significantly contribute to enhancing a firm's competitive edge, specifically in the realms of efficiency and effectiveness. Accordingly, it is advisable for supply chain managers to integrate and operationalize a range of sustainable logistics activities. These may encompass sustainable transportation modes, the introduction of reverse logistics mechanisms, waste management protocols, ecologically responsible packaging and distribution strategies, green monitoring and assessment systems, along with the sustainable exchange of information. Undertaking such

measures can profoundly optimize the internal processes of a company, thereby elevating its operational performance.

The study found that environmental awareness is an effective method for influencing public opinion and boosting public understanding of environmental problems. As such, supply chain managers should develop and implement strategies to promote environmental awareness among their employees, customers, and other stakeholders. This can be achieved through the use of various communication channels such as social media, company websites, and newsletters.

The study suggests that environmental awareness moderates the relationship between sustainable logistics practices and organizational performance. Supply chain managers should, therefore, take into consideration the moderating effect of environmental awareness when implementing sustainable logistics practices. This can be achieved by developing strategies to improve environmental awareness among stakeholders, which could lead to increased adoption of sustainable logistics practices and improved organizational performance.

#### **5.4.2 Suggestions for Future Research**

The current topic primarily focuses on the environmental aspect of sustainable logistics practices. However, sustainability involves three main dimensions: economic, social, and environmental. The study might not provide a comprehensive understanding of the overall impact of sustainable logistics practices on organizational performance. To provide a more holistic understanding of sustainable logistics practices, future research could explore the impact of all three dimensions of sustainability (economic, social, and environmental) on organizational performance. This could include examining the role of fair labor practices, community engagement, and economic efficiency, in addition to environmental awareness and practices. By exploring these dimensions, researchers can offer more comprehensive

recommendations to organizations looking to improve their performance through sustainable logistics practices.

The current topic examines the moderating role of environmental awareness and practices, but it does not consider the role of organizational culture in shaping and supporting these practices. Organizational culture can have a significant influence on the adoption and success of sustainable logistics practices. Future Suggestion 2: Investigating the role of organizational culture in sustainable logistics adoption. Future research could explore the impact of organizational culture on the successful implementation and effectiveness of sustainable logistics practices. This could involve examining the role of leadership, communication, and employee involvement in supporting and driving sustainability initiatives within the organization. Such research would provide valuable insights for organizations looking to foster a culture that promotes and supports sustainable logistics practices.



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## APPENDIX A

### SURVEY QUESTIONNAIRE

Dear respondent, I am a student at Kwame Nkrumah University of Science and Technology's School of Business, Department of Supply Chain and Information Systems, where I am working on a research project titled **the effect of sustainable logistics practices on organizational performance: the moderating role of environmental awareness/practices**.

Any information given will ONLY be used for academic purposes and will be regarded as HIGHLY CONFIDENTIAL.

#### SECTION A: PROFILE OF RESPONDENTS

1. **Number of employees:** Less than 50[ ]; 50-100[ ]; 101-150[ ]; 151-200[ ]; 201-250[ ]; 251-300[ ]; 301-350[ ]; 351-400[ ]; 401-450[ ]; 451-500[ ]; 501-550[ ]; 551-600[ ]; More than 600[ ]
2. **Firm age:** Less than 3 years[ ]; 3 to 6 years[ ]; 7 to 9 years[ ]; 10 to 12 years[ ]; More than 12 years [ ]
3. **Estimated Company's Annual Revenue (GHS):** < 10,000[ ]; 10,000-30,000[ ]; 30,001-100,000[ ]; 100,001 –500,000[ ]; 500,001 – 1,000,000[ ]; >1,000,000 [ ]
4. **Education level** ☐ Secondary school or related Certificate ☐ diploma/HND ☐ 1st Degree ☐ 2nd Degree or more
5. **Position with the organisation Managerial level** ☐ Supervisor ☐ Middle manager (e.g. head of the department) ☐ Top (e.g. CEO, managing director)
6. **Respondent's working experience with the firm** ☐ 1-5 years ☐ 6-10 years ☐ 11-15 years ☐ above 15 years\
7. **Respondents' age** ☐ 20-29years ☐ 30-39 years ☐ 40-50years ☐ Above 50 years
8. **Gender** Male ☐ female ☐
9. **Type of organisation** public ☐ private ☐

## SECTION B; SUSTAINABLE LOGISTICS PRACTICES

Please indicate your degree of agreement or disagreement with the following sustainable logistics practices statements about your company using the 7-point Likert scale below.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Somewhat	Neutral	Somewhat	Agree	
Strongly disagree		disagree	agree	agree		
<b>SUSTAINABLE TRANSPORT</b>						

1. Adopting and implementing new energy sources to replace the use of fossil fuels

2. Promotes the reduction of driving time to minimize congestion, oil usage and pollution

3. Regularly engages in vehicle maintenance to reduce carbon footprints

4. Improves travel routes and schedules to reduce transport distance and time

5. Encourages sharing of traffic information to ensure transparency with stakeholders

### REVERSE LOGISTICS

6. Collects unwanted or used products for remanufacturing, thus ensuring quality

7. Retrieves used packaging for reuse or recycling

8. Improves ecological material usage to reduce waste

9. Retrieves used or unwanted products for waste management purposes

10. Improves quality and timeliness of e-work and repair

### WASTE MANAGEMENT

11. Source reusable production materials

12. Engages in reverse logistics to increase waste reuse

13. Engages in waste reduction campaigns

14. Available facilities for solid waste collection and processing

15. Suitability of infrastructure to manage waste

### SUSTAINABLE PACKAGING AND DISTRIBUTION

16. Reduces product waste

17. Improves distribution and logistics efficiency

18. Increases the use of ecological materials

19. Reduces toxicity and litter impacts of packaging materials

20. Minimizes distribution time through efficient routing systems

Source: Baah et al. (2021)



## SECTION C: ENVIRONMENTAL AWARENESS

Please indicate your degree of agreement or disagreement with the following statements about your company's environmental awareness using the 7-point Likert scale below.

	1	2	3	4	5	6	7	
	Strongly	Disagree	Somewhat	Neutral	Somewhat	Agree		
	Strongly disagree		disagree	agree	agree			
<b>ENVIRONMENTAL AWARENESS</b>								
1. My firm keeps updated on environmental issues in the mass media								
2. My firm trains and educates employees on environmental protection								
3. My firm scans the environment continuously for trends and changes								
4. My firm invest in technologies to help keep pace with environmental changes								
5. My firm works closely with other firm to identify environmental trends								

Source: Noordin and Sulaiman (2010)

## SECTION D: ORGANISATIONAL PERFORMANCE

Please indicate your degree of agreement or disagreement with the following statements about your company's performance using the 7-point Likert scale.

	1	2	3	4	5	6	7	
	Strongly	Disagree	Somewhat	Neutral	Somewhat	Agree		
	Strongly disagree		disagree	agree	agree			
<b>Financial Performance</b>								
Our organization has strong revenue growth.								
organization has high profit margins.								
Our organization manages its expenses effectively.								
organization generates strong cash flow.								
organization has a strong return on investment.								
<b>Customer Satisfaction</b>								
Our customers are loyal to our brand.								

[illegible]