CHAPTER I
INTRODUCTION

1.1 Background to the Study

In recent years, the need for sustainable business practices has gained significant attention due to the impact of industrialization on the environment (S. Khan et al., 2022). With the increasing concern for environmental sustainability, organizations are now adopting green logistics management practices and supply chain traceability to reduce their carbon footprint and enhance their sustainability performance. Green logistics management practices refer to the integration of environmental concerns into logistics activities such as transportation, warehousing, and inventory management (Trivellas et al., 2020). On the other hand, supply chain traceability refers to the ability to track and trace products and materials throughout the supply chain, from the point of origin to the point of consumption (Garcia-Torres et al., 2019). In developing countries like Ghana and Indonesia, where the manufacturing sector is a key contributor to economic growth, the adoption of green logistics management practices and supply chain traceability is still in its infancy (Khan & Ali, 2022). While some firms have begun to adopt these practices, many are yet to fully embrace them due to various factors such as lack of awareness, limited resources, and poor regulatory frameworks (Maji et al., 2023). Therefore, there is a need to investigate the effect of green logistics management practices and supply chain traceability on sustainability performance in these countries.

Logistics is the major offender when it comes to the detrimental consequences of the supply chain on the environment (S. Khan et al., 2022; Khan et al., 2017). In Ghana, which depends largely on cars for its logistics, automotive exhaust is one of the leading causes of air pollution (Agyabeng-Mensah, Afum, et al., 2020). Ghana and Indonesia are presently one of the fastest-growing economies in Africa and Asia due to urbanization and industrialization; yet, the logistical operations of manufacturing enterprises represent a substantial danger to human life and the environment (Agyabeng-Mensah, Afum, et al., 2020; Mwamba et al., 2021). Operational efficiency refers to the ability of a manufacturing firm to

optimize its production processes and reduce waste generation while minimizing costs (Reyes et al., 2021).

The adoption of sustainable practices such as the use of renewable energy sources and the reduction of waste generation can improve operational efficiency and contribute to sustainability performance. Previous studies have demonstrated a positive correlation between operational efficiency and sustainability performance in various industries (Bhattacharya et al., 2019; Liu et al., 2020) .

The implementation of green logistics management practices (GLMPs), whose primary objective is the reduction of negative impacts that commercial operations have on public health, safety, and the natural environment, has been accelerated by the enactment of the legislation, the opening of international markets, and the demands of a diverse group of stakeholders (Gao et al., 2021). Extensive research has been undertaken on the environmental, social, and economic concerns caused by supply chain activities, and the results show that incorporating environmentally friendly techniques and policies into logistics operations is a viable solution (Agyabeng-Mensah, E. Afum, et al., 2020). GLMPS-related research has been done in many developed countries. Tseng et al. (2019) conducted a metaanalysis by suggests that academics have not paid nearly enough attention to the research on green logistics practices and sustainable performance in Africa and Ghana.

Moreover, logistics eco-centricity, which refers to the extent to which a firm considers the environmental impact of logistics activities, has been identified as an important factor in enhancing sustainability performance. LE refers to the extent to which logistics operations are designed with the environment in mind, rather than just focusing on efficiency and cost savings (Y. Agyabeng-Mensah, E. Ahenkorah, E. Afum, & D. Owusu, 2020). LE can lead to more sustainable logistics practices and better environmental outcomes (Seuring & Müller, 2008)). In addition to GLMPs and LE, supply chain traceability (SCT) can also play a role in achieving sustainability performance Firms that are eco-centric in their logistics operations tend to have a more positive impact on the environment, compared to those that prioritize economic gains at the expense of the environment (Sun et al., 2022). However, the relationship between logistics eco-centricity, green logistics management practices, operational efficiency, supply chain traceability, and

sustainability performance in the manufacturing sector in Ghana and Indonesia remains largely unexplored (Acquah, 2024; Martínez-Falcó et al., 2023).

In addition to GLMPs and LE, supply chain traceability (SCT) can also play a role in achieving sustainability performance. SCT refers to the ability to track products and materials throughout the supply chain from sourcing to delivery (Seuring & Müller, 2008). It is important to note that previous research has established that all the key variables GLMPs, LE, SCT, and operational efficiency are predictive of supply chain performance, influencing sustainability outcomes across environmental, economic, and social dimensions (Craig R Carter & Dale S Rogers, 2008; Sarkis et al., 2010). SCT can help firms identify and address environmental and social risks in their supply chains, which can ultimately lead to better sustainability performance. Despite the potential benefits of GLMPs, LE, and SCT for sustainability performance, there is limited research on how these practices affect sustainability performance in developing countries such as Ghana and Indonesia. These countries are facing increasing pressure to balance economic growth with environmental protection and social responsibility (Luthra et al., 2017). Therefore, it is important to investigate the role of GLMPs, LE, and SCT in sustainability performance in these countries.

Firm size and environmental dynamism have been employed as control variables in this study. Firm size refers to the size of a manufacturing firm in terms of its workforce and revenue. Previous studies have suggested that firm size may influence the adoption of sustainable practices (Bhattacharya et al., 2019; Liu et al., 2020). Environmental dynamism refers to the degree of change and uncertainty in the business environment, including changes in regulations, consumer preferences, and technological advancements. Previous studies have suggested that environmental dynamism may influence the adoption of sustainable practices (Dou et al., 2018). There has been a meteoric increase in the number of persons interested in green logistics and supply chains over the last two decades. There has been an increase in the number of researchers, managers, and politicians interested in how to confront the "historical dilemma" of adapting to a dynamic corporate, economic, social, and physical environment.

Therefore, this study aims to investigate the effect of green logistics management practices, supply chain traceability, and logistics eco-centricity on the sustainability performance of manufacturing firms in Ghana and Indonesia.

Manufacturing sectors in Ghana and Indonesia play crucial roles in their respective economies, contributing significantly to GDP, employment, and industrial growth. However, these industries also face substantial sustainability challenges due to high levels of resource consumption, emissions, and waste generation (Al-Shetwi, 2022). In recent years, both countries have experienced rising pressures to address environmental issues, partly driven by international commitments, such as the UN Sustainable Development Goals (SDGs) and national policies aimed at reducing carbon emissions.

Ghana's manufacturing sector relies heavily on traditional energy sources and resource-intensive processes, contributing to carbon emissions, air pollution, and waste management issues (Kindo et al., 2024). A significant portion of the sector's logistics operations rely on road transportation, exacerbating air pollution, particularly in urban centers. The sector faces regulatory limitations and limited adoption of sustainable practices, partly due to insufficient infrastructure and financial constraints for implementing green logistics and traceability measures. Studies indicate that while some Ghanaian firms are beginning to adopt sustainability practices, overall sustainability performance remains low. The Ministry of Environment and other agencies report that only a minority of firms actively track emissions or utilize eco-centric logistics solutions.

Indonesia's manufacturing industry is one of the largest in Southeast Asia, yet it remains highly dependent on non-renewable energy sources and has a significant carbon footprint (Sharvini et al., 2018). The nation is committed to reducing greenhouse gas emissions by 29% by 2030, emphasizing the need for sustainable practices across its industrial sectors (Zheng et al., 2019). Many firms lack the resources and technological infrastructure needed to implement eco-centric and traceability practices. Regulatory requirements are increasingly stringent, but enforcement remains a challenge, leading to inconsistencies in sustainability performance. Empirical data suggests that Indonesian manufacturers perform variably in sustainability practices, with a limited number effectively implementing green logistics practices (Santoso et al., 2022). Research shows that while some firms achieve operational efficiencies, a gap remains in the integration of eco centricity logistics and supply chain traceability.

Specifically, the study examines the individual effects of green logistics management practices and logistics eco-centricity on sustainability performance,

and the mediating effect of supply chain traceability on the relationship between green logistics management practices and sustainability performance. The RBV and N-RBV theories serve as the basis for developing a theoretical framework in this study. The framework suggests that green human capital has a positive effect on the adoption of Green Logistics Practices (GLPs). This phenomenon leads to improved financial performance, social performance, and environmental competitiveness. The N-RBV theory emphasizes the importance of green logistics practices (GLPs) in relation to an organization's green competitiveness and social and financial performance.

The study also investigates the mediating effect of logistics eco-centricity on the relationship between green logistics management practices and sustainability performance. SCT refers to the ability to track products and materials throughout the supply chain from sourcing to delivery (Seuring & Müller, 2008). Previous research has revealed that logistics eco-centricity (LE) not only influences sustainability outcomes directly but can also serve as a mediating variable between green logistics management practices (GLMPs) and sustainability performance. Studies have demonstrated that the incorporation of eco-centric logistics can amplify the effects of green logistics initiatives on environmental and operational outcomes, thereby improving sustainability performance (Wang et al., 2016; Q. Zhu, Y. Geng, et al., 2013).

Environmental sustainability has become an increasingly important issue in today's global economy, and manufacturing firms have a significant role to play in achieving sustainable development goals (Sachs, 2012). The logistics sector has been identified as one of the key areas that have a substantial impact on the environment. Green logistics management practices, supply chain traceability, and logistics eco-centricity are critical factors that can help manufacturing firms improve their sustainability performance. However, limited empirical research has been conducted to explore the relationship between these variables and sustainability performance in the context of developing countries.

The manufacturing sector is crucial for the economic development of Ghana and Indonesia. Both countries have set ambitious sustainability goals in their national development plans. Ghana has committed to reducing its greenhouse gas emissions by 15% by 2030 (Dawood et al., 2021), while Indonesia aims to reduce its emissions by 29% by 2030 (Anderson et al., 2016). Achieving these goals

requires manufacturing firms to adopt environmentally sustainable practices in their logistics and supply chain management. Despite the importance of this issue, there is a lack of empirical evidence on the relationship between green logistics management practices, supply chain traceability, logistics eco-centricity, and sustainability performance in the context of Ghana and Indonesia.

This study addresses the research gap surrounding the combined effects of green logistics management practices, operational efficiency, logistics eco centricity, and supply chain traceability on sustainability performance in Ghanaian and Indonesian manufacturing sectors. While these industries play vital economic roles, they face significant sustainability challenges such as high emissions and waste from reliance on traditional logistics and energy sources. Unlike developed economies with established support for eco-centric logistics, Ghana and Indonesia present unique constraints that remain underexplored in the literature. Past studies show inconsistent results regarding GLMPs, LE, SCT, and OE impacts on sustainability, with evidence varying across firm size and environmental contexts, indicating a need for research tailored to emerging economies. This study's inclusion of LE and SCT as mediators and consideration of firm size and environmental dynamism as controls offers a comprehensive model to address these gaps. Applying the Triple Bottom Line and Lean Management frameworks within these regions, the research contributes new insights to sustainable logistics management, aiming to inform practices suited to the socio-economic landscapes of Ghana and Indonesia.

For instance, Sahoo and Vijayvargy (2021) examined the impact of green supply chain management practices on sustainability performance in Indian manufacturing firms but did not consider logistics eco-centricity or supply chain traceability. Similarly, Hervani et al. (2005) studied performance measurement for green supply chain management but did not include logistics eco-centricity or supply chain traceability. Rizos et al. (2016) reviewed the literature on traceability in the context of the circular economy but did not examine its role in mediating the relationship between green logistics management practices and sustainability performance. Furthermore, while some studies have examined the effect of green supply chain management practices on sustainability performance in the context of Ghana and Indonesia, there is a need to consider the role of firm size and environmental dynamism as control variables. For example, Ahmed et al. (2019)

explored the pressures, practices, and performance of green supply chain management in China, but did not consider the influence of firm size and environmental dynamism on sustainability performance.

The novelty of this study lies in its unique, integrative research model examining green logistics management practices, operational efficiency, logistics eco-centricity, and supply chain traceability in a single framework to assess their combined effects on sustainability performance, specifically in the developing country contexts of Ghana and Indonesia. While prior research has explored each variable independently, this study's model introduces a novel synthesis by incorporating these elements together and examining them through the moderating roles of firm size and environmental dynamism factors particularly relevant to emerging economies where regulatory and resource conditions vary widely. The study further advances the field by testing the mediating effects of LE and SCT in the relationship between GLMPs and sustainability performance, providing fresh insights into how these mediators may amplify or dampen sustainability impacts.

Therefore, supply chain traceability being the mediating between green logistics management practices and sustainability performance being proposed and new theory is being justified by the study as the novelty model. This is because the previous study has shown that green logistics management practices had a direct impact on sustainability performance. The comparative analysis of two distinct developing countries, each with its own economic, cultural, and regulatory landscapes, adds another layer of originality, enabling a cross-continental perspective on sustainable practices that highlights both universal and context specific insights. Using path analysis with SmartPLS 4, this methodological approach ensures rigorous, replicable insights into direct and indirect variable interactions, setting a foundation for future studies in diverse regions.

Firm size relates to the scale of a manufacturing firm, typically measured by the number of employees or revenue, and is significant because larger firms often have more resources and capabilities to adopt sustainability practices like green logistics. Environmental dynamism, on the other hand, refers to the volatility and changes in a firm's external environment, such as shifting regulations, market demands, or technological advancements. These external pressures can influence a firm's decision to adopt eco-centric logistics and sustainable practices. By including these variables as controls, the study aims to examine the relationship between

green logistics management practices, logistics eco-centricity, supply chain traceability, and sustainability performance, while accounting for the possible effects of firm size and environmental changes, ensuring a more accurate analysis of the core variables' impacts.

The study indicates that it will examine the interactions and potential influences of the manufacturing firm's size and external environmental conditions on the relationships among supply chain traceability, eco-centricity, operational efficiency, and green logistics management practices. This level of analysis recognizes the complex and multifaceted nature of sustainability performance in manufacturing and gives the study more depth and context. While previous studies have examined the individual effects of these practices on sustainability performance, this study seeks to explore their combined effect, which has not been extensively studied in the context of these two countries. Additionally, this study aims to examine the mediating role of supply chain traceability and logistics eco centricity on the relationship between green logistics management practices and sustainability performance, which has not been extensively explored in the literature. While prior research has focused on the direct effects of green logistics practices on sustainability outcomes, the inclusion of logistics eco-centricity and supply chain traceability as mediating variables is relatively novel, particularly in the context of manufacturing firms in developing countries like Ghana and Indonesia. By examining these interrelationships, this study introduces a more nuanced understanding of how these variables interact, contributing to the body of knowledge on the mechanisms through which green logistics management practices can enhance sustainability performance. This approach offers fresh insights, as these mediating variables have not been comprehensively applied in previous research, especially within these specific regional and industry contexts.

This study examines the combined effect of green logistics management practices, operational efficiency, logistics eco-centricity, and supply chain traceability on the sustainability performance of manufacturing firms in Ghana and Indonesia, using firm size and environmental dynamism as control variables. The research seeks to offer a nuanced understanding of how sustainability practices can be effectively tailored to different organizational contexts and environmental conditions, addressing existing gaps in the literature.

1.2 Research Problem

The lack of empirical evidence on the combined effects of green logistics management practices, operational efficiency, supply chain traceability, and logistics eco-centricity on sustainability performance, specifically within the manufacturing sectors of developing countries like Ghana and Indonesia. Despite the critical role of these industries in economic growth, they face considerable sustainability challenges due to high emissions, resource consumption, and environmental impact from traditional logistics and energy usage (Panel et al., 2011). In Ghana and Indonesia, manufacturing firms have been slow to adopt these practices due to limited resources, regulatory constraints, and infrastructure challenges. Previous studies have examined green logistics practices and sustainability in developed regions but haven't adequately addressed these dynamics in emerging economies, where the industry context and regulatory environment differ significantly (Hassini et al., 2012; Jazairy, 2020).

The research problem also underscores the importance of understanding how factors like firm size and environmental dynamism influence sustainability practices in these settings. There’s a noted gap in examining the mediating effects of logistics eco-centricity and supply chain traceability, as well as their interactions with green logistics and operational efficiency, to determine their impact on sustainability (Moreira et al., 2022). This highlights a need to investigate these variables holistically in order to inform sustainable strategies tailored to the specific socio-economic and regulatory landscapes of Ghana and Indonesia. Although sustainability practices such as green logistics management, operational efficiency, supply chain traceability, and logistics eco-centricity have been well-studied independently, there is limited research on their combined impact in developing countries. In industrialized nations, numerous studies have shown that these factors positively influence sustainability outcomes (Fatima et al., 2021). However, emerging economies like Ghana and Indonesia differ significantly in terms of their regulatory frameworks, economic conditions, and industrial challenges. This creates a gap in understanding how these elements interact and contribute to sustainable development within these distinct environments Green Logistics Management Practices focus on reducing environmental impact through logistics strategies that minimize resource use, pollution, and waste. Key elements include

eco-friendly transportation, energy-efficient warehousing, and reverse logistics (Ariff et al., 2022). This involves using low-emission or alternative fuel vehicles and optimizing delivery routes to lower fuel consumption and emissions. In Ghana and Indonesia, the adoption of eco-friendly transportation is hampered by high costs for green vehicles and infrastructure, such as charging stations. Most logistics operations rely on traditional, high-emission vehicles, which are affordable in the short term but environmentally unsustainable in the long term (Lindkvist & Melander, 2022). Energy-efficient warehousing focuses on reducing energy use through design and operational strategies, including LED lighting, improved insulation, and solar energy installations (Korra & Valaboju, 2024). However, many firms in these countries face capital constraints that prevent them from investing in these technologies. Additionally, there is often limited awareness of the long-term cost savings and benefits of energy-efficient practices. Reverse logistics involves managing product returns, recycling, and remanufacturing to extend product life cycles (Wilson & Goffnett, 2022). In Ghana and Indonesia, firms face barriers in implementing reverse logistics due to limited recycling facilities, inadequate waste management systems, and a lack of consumer participation. Reverse logistics also requires technological investment and expertise that many firms currently lack (Abdulrahman et al., 2014). Logistics Eco-centricity reflects the extent to which firms incorporate environmental considerations into logistics operations, striving for eco-friendly methods in transportation, storage, and supply chain management. LE can create a logistics framework focused on reducing carbon emissions, waste, and pollution, and using sustainable resources (Sarkar et al., 2019). This holistic approach helps firms align logistics with environmental goals, yet it requires advanced technology, financial investment, and infrastructure to be fully effective. Ghana and Indonesia face infrastructure gaps that limit their ability to implement LE effectively. LE practices, such as eco-friendly packaging and sustainable warehousing, often demand financial resources and technological capabilities that are beyond the reach of many firms in these regions. LE could amplify the effects of GLMPs by creating an environmentally conscious logistics ecosystem. However, its role as a mediator between GLMPs and sustainability outcomes remains underexplored, particularly in contexts where firms face financial and technological constraints. Supply Chain Traceability (SCT) involves tracking and documenting product movement from origin to end-user to ensure transparency, accountability,

and adherence to environmental and ethical standards (Ab Rashid & Bojei, 2020). SCT allows firms to monitor environmental and social risks across the supply chain, identifying sources of waste, emissions, and potential violations of ethical standards. SCT depends on technologies such as blockchain, RFID, and IoT sensors, which are often too costly or unavailable in these regions (Sharma et al., 2020). As a result, firms lack the technological infrastructure to track products accurately across their supply chains. Weak or fragmented regulatory frameworks mean that firms are not compelled to adopt traceability systems. This lack of enforcement reduces accountability and makes it challenging for firms to justify the additional costs of SCT. SCT could mediate the impact of GLMPs on sustainability by ensuring firms track and manage their environmental impacts across the supply chain. However, research has not fully explored how SCT mediates sustainability outcomes in Ghanaian and Indonesian manufacturing sectors, where adoption challenges persist. Operational Efficiency (OE) refers to optimizing resource use, minimizing waste, and streamlining processes to achieve both cost savings and environmental benefits (Nižetić et al., 2019). Many firms in these countries face resource constraints, limiting their ability to implement efficient processes. For instance, a lack of modern equipment or skilled personnel can make it challenging to achieve OE. This makes it harder to achieve OE goals that align with sustainability objectives. Firms in developing countries often prioritize immediate economic gains over environmental considerations, which can hinder efforts to implement environmentally aligned OE practices (Rodríguez-Espíndola et al., 2022). The manufacturing sectors in Ghana and Indonesia face unique barriers that differentiate them from developed economies. The heavy reliance on road transportation contributes to urban air pollution and carbon emissions (Nieuwenhuijsen, 2020). Public and private investments in sustainable transportation are limited, which exacerbates the environmental impact.

Previous studies have analyzed individual effects, the interactions and mediating roles of these factors have received less attention, Logistics Eco centricity (LE) as a Mediator (Bin Zhou et al., 2023). LE could create an overarching framework that aligns logistics practices with sustainability. Exploring how LE mediates the effect of GLMPs on sustainability outcomes could highlight its role in fostering a greener logistics ecosystem (Yaw Agyabeng-Mensah et al., 2021; Hu & Chen, 2023). SCT could ensure that sustainable practices are applied

across all stages of the supply chain (Yaw Agyabeng-Mensah et al., 2021; Javed et al., 2024). By acting as a mediator, SCT can strengthen the effect of GLMPs on sustainability, but this mediating role has not been fully explored in the manufacturing sectors of developing economies like Ghana and Indonesia. Firm size and market uncertainty (environmental dynamism) influence the adoption of sustainable practices. Larger firms typically have more resources to invest in green technologies, while smaller firms face budgetary constraints (Berrone et al., 2013). Environmental dynamism can also impact firms' willingness to adopt green practices, particularly in markets with regulatory or consumer-driven pressures. Adopting Green Logistics Management Practices, Logistics Eco-centricity, Supply Chain Traceability, and Operational Efficiency intersect with unique contextual factors in Ghana and Indonesia. highlights how challenges understanding how these factors interact and mediate sustainability outcomes, emphasizing the need for more comprehensive studies that consider these dynamic interactions, especially within the constraints of developing economies.

Sustainability in logistics and manufacturing has gained global attention due to increasing environmental, social, and economic pressures. Despite this momentum, the literature reveals significant theoretical and practical gaps, particularly in emerging economies like Ghana and Indonesia. These gaps highlight the need for an integrative framework to address the interplay between green logistics management practices (GLMPs), operational efficiency (OE), logistics eco-centricity (LE), supply chain traceability (SCT), and sustainability performance. This essay explores these gaps, offering a conceptual foundation for the study while drawing on evidence from previous research.

The notable gap is the fragmented understanding of how critical sustainability variables interact. Studies have extensively examined individual factors such as GLMPs, OE, LE, and SCT; however, their combined effects on sustainability performance remain underexplored (Bai et al., 2022; Wan Ahmad et al., 2016). For example, green logistics practices are known to improve environmental outcomes by reducing carbon emissions and energy consumption, while operational efficiency enhances resource optimization (Arya et al., 2020; Fu & Jacobs, 2022). Yet, the literature fails to capture how these practices collectively influence sustainability in the unique contexts of developing economies like Ghana

and Indonesia. This gap underscores the necessity for an integrated research approach that evaluates these factors in tandem rather than isolation.

The socio-economic and regulatory environments of emerging economies pose unique challenges that are inadequately addressed in existing frameworks. In developed nations, sustainability practices benefit from well-established infrastructures, regulatory incentives, and advanced technology. Conversely, Ghana and Indonesia face barriers such as weak enforcement of environmental regulations, lack of financial resources, and limited access to technology (Afum et al., 2022; Y. Agyabeng-Mensah, E. Ahenkorah, E. Afum, A. Nana Agyemang, et al., 2020). For instance, green logistics often requires significant investments in eco-friendly transportation and energy-efficient warehousing, which may not be feasible for resource-constrained firms (Korra & Valaboju, 2024; Seuring & Müller, 2008). This gap highlights the need for theoretical models that account for the specific constraints of emerging markets, thereby offering more realistic and actionable insights.

Supply chain traceability and logistics eco-centricity have emerged as crucial mediators that could amplify the effectiveness of sustainability initiatives. Traceability systems enable firms to track and monitor environmental and social risks, promoting responsible sourcing and compliance with sustainability goals (Dasaklis et al., 2022; Pomponi et al., 2019). Similarly, logistics eco-centricity fosters the adoption of environmentally conscious logistics strategies, such as reverse logistics and green transportation (Moreira et al., 2022; Zailani, Shaharudin, et al., 2017). However, their mediating roles in the relationship between GLMPs and sustainability outcomes remain underexplored in the context of Ghana and Indonesia. This gap calls for research that investigates how these mediators bridge the gap between sustainable practices and performance.

Another critical gap lies in the influence of firm size and environmental dynamism on sustainability practices. Larger firms often possess greater financial and technological resources to implement green logistics and operational efficiency, whereas smaller firms face significant constraints (Berrone et al., 2013; Bhattacharya et al., 2019). Furthermore, environmental dynamism characterized by regulatory changes, market volatility, and technological shifts can either catalyze or

hinder sustainability adoption (Dou et al., 2018). Despite their importance, these moderating variables are seldom incorporated into theoretical models, leaving a gap in understanding how they shape sustainability outcomes in dynamic business environments.

Comparative studies between different regions are essential for identifying universal and context-specific factors influencing sustainability. The dissertation highlights the distinct regulatory, cultural, and industrial landscapes of Ghana and Indonesia, emphasizing the importance of a comparative approach (Santoso et al., 2022; Sharvini et al., 2018). For instance, Indonesia's manufacturing sector faces stringent emission reduction targets but struggles with inconsistent enforcement, while Ghana's sector is constrained by infrastructural deficits (Agyabeng-Mensah, E. Afum, et al., 2020; Zheng & Suh, 2019). This underscores the need for cross regional studies that explore the interplay of sustainability practices within varied socio-economic contexts.

Thereby inform policymakers, businesses, and stakeholders in crafting targeted strategies to overcome barriers and encourage sustainable practices in logistics and manufacturing.

Thus, the study explores the following research questions:

1. What is the effect of green logistics management practices on the sustainability performance of manufacturing firms in Ghana and Indonesia?
2. What is the effect of logistics eco-centricity on the sustainability performance of manufacturing firms in Ghana and Indonesia?
3. What is the effect of operational efficiency on the sustainability performance of manufacturing firms in Ghana and Indonesia?
4. How does supply chain traceability mediates the relationship between green logistics management practices and the sustainability performance of manufacturing firms in Ghana and Indonesia?
5. What is the mediation effect of logistics eco-centricity on the nexus between green logistics management practices and the sustainability performance of manufacturing firms in Ghana and Indonesia?
6. What is the relative effect of importance and performance of green logistics management practices, operational efficiency, supply chain traceability, and

logistics eco-centricity in enhancing sustainability performance of manufacturing firms in Ghana and Indonesia?

1.3 Research Objectives

The purpose of the study is to examine the effect of green logistics management practices, operational efficiency, supply chain traceability, and logistics eco-centricity on the sustainability performance of manufacturing firms in Ghana and Indonesia. The study examines into a critical and underexplored area in the field of supply chain and sustainability studies. With growing global awareness of sustainability issues, the research aims to address the need for a deeper understanding of how green logistics practices and related factors can enhance sustainability performance in developing countries, where the challenges are multifaceted and distinct from those faced by developed nations. The overarching objective of this study is to examine the complex relationships among green logistics management practices (GLMPs), operational efficiency (OE), supply chain traceability (SCT), and logistics ecocentricity (LE), and their combined effects on sustainability performance in the manufacturing sectors of Ghana and Indonesia.

The study explores the following specific objectives with Ghana and Indonesia as follow:

1. To examine the effect of green logistics management practices on the sustainability performance of manufacturing firms in Ghana and Indonesia;
   a. Assess how green logistics management practices influence sustainability performance.
2. To ascertain the effect of logistics eco-centricity on the sustainability performance of manufacturing firms in Ghana and Indonesia;
   a. Explore how logistics eco-centricity mediates the connection between green logistics practices and sustainability outcomes.
3. To examine the effect of operational efficiency on the sustainability performance of manufacturing firms in Ghana and Indonesia,
   a. To assess operational efficiency, contribute to the sustainability performance in the manufacturing sectors of these countries.
4. To examine how supply chain traceability mediates the relationship between green logistics management practices and the sustainability performance of manufacturing firms in Ghana and Indonesia;

a. Investigate the mediating effect of supply chain traceability on the relationship between green logistics management practices and sustainability performance.

5. To determine the mediation effect of logistics eco-centricity on the nexus between green logistics management practices and the sustainability performance of manufacturing firms in Ghana and Indonesia.

a. Explore how logistics eco-centricity mediates the connection between green logistics practices and sustainability outcomes

6. To evaluate the relative importance and performance of green logistics management practices, operational efficiency, supply chain traceability, and logistics eco-centricity in enhancing sustainability performance of manufacturing firms in Ghana and Indonesia.

a. To explore the relative importance and performance of green logistics practices, operational efficiency, supply chain traceability, and logistics eco centricity in achieving sustainability.

1.4 Significance of Research

The study made significant academic theoretical, practical and policy contributions to the field of study: This research contributes to the academic literature by providing empirical evidence on the relationship between green logistics practices, supply chain traceability, logistics eco-centricity, operational efficiency, and sustainability performance. It enriches existing knowledge in the fields of supply chain management, sustainability, and environmental studies. The comparative analysis of manufacturing firms in Ghana and Indonesia offers a unique academic opportunity. It provides insights into how cultural, economic, and contextual factors influence the adoption and impact of sustainable practices. This cross-cultural perspective can enrich academic discussions on the global applicability of sustainability strategies.

The study's framework, which integrates green logistics, operational efficiency, supply chain traceability, logistics eco-centricity, and sustainability performance, can serve as a valuable theoretical foundation for future research in this area. It offers a structured approach to examining the interplay between these variables in manufacturing contexts. Researchers can benefit from the study's research methods and data collection techniques. It sets an example of how to

conduct cross-country empirical studies in the field of sustainability, providing insights into data gathering, analysis, and interpretation.

From a practical perspective, the study offers tangible benefits for manufacturing firms and practitioners: Manufacturing firms in Ghana and Indonesia can derive practical guidance from the study's findings. It outlines how adopting green logistics practices, enhancing supply chain traceability, and embracing logistics eco-centricity can lead to operational efficiencies while concurrently improving sustainability performance. These insights can inform real world decision-making. The research highlights the potential for cost savings through sustainable practices. Practical recommendations stemming from the study can assist firms in identifying areas for cost reduction, waste minimization, and resource optimization in their supply chains.

Firms can gain a competitive edge by aligning with sustainable supply chain principles. Implementing the study's recommendations can enhance firms' reputations, attract environmentally conscious customers, and foster partnerships with stakeholders who prioritize sustainability. The study emphasizes the importance of supply chain traceability for risk management. Firms can use this knowledge to better manage supply chain risks related to ethical sourcing, quality control, and environmental compliance.

For policymakers and regulators, the study carries significant implications: The research can inform the development of policies and regulations related to sustainability in the manufacturing sector. Policymakers can use the study's findings to design initiatives that encourage and support the adoption of green logistics practices and supply chain traceability. Regulators can leverage the insights from the study to strengthen environmental compliance standards in manufacturing. This can lead to improved environmental protection and reduced ecological impact. By promoting sustainability in manufacturing, policymakers can foster economic development, job creation, and international competitiveness. Sustainable practices can attract foreign investments and improve the overall business environment. The study's cross-country analysis can assist policymakers in both Ghana and Indonesia in benchmarking their sustainability efforts against each other and against global best practices, facilitating knowledge exchange and collaboration.

1.5 Structure of Dissertation

The proposed dissertation will be structured as follows:

Chapter I

Chapter I of the dissertation introduces the study, highlighting the importance of sustainability in the modern business environment and the role of logistics in achieving sustainable outcomes. The research problem focuses on the complex relationship between green logistics practices, operational efficiency, logistics eco-centricity, supply chain traceability, and sustainability performance. The study's objectives are outlined, and research questions are formulated for a focused and methodical investigation. The chapter concludes by emphasizing the research's contribution to existing knowledge and providing a concise overview of the research methodology to be employed.

Chapter II

The second chapter will conduct a comprehensive analysis of the relevant scholarly works. The objective of this course is to provide a comprehensive understanding of the fundamental principles and theoretical frameworks relating to green logistics management practices, operational effectiveness, logistics eco centricity, supply chain traceability, firm size, environmental dynamism, and sustainability performance. Through critical analysis and synthesis, this chapter will establish the theoretical foundation for the investigation. Through a comprehensive analysis of extant research and academic literature, this study will provide valuable insights into the current state of knowledge in the field as well as pinpoint specific areas in need of further study and attention.

Chapter III

Chapter III of this dissertation will provide a comprehensive account of the research methodology employed. This section will explain the selected study design, which includes surveys, interviews, and data acquisition from Ghanaian and Indonesian industrial enterprises. The following chapter will elaborate on the techniques used for data collection, including topics such as sample selection, data collection instruments, and data collection procedures. In addition, this research will elucidate the methods of data analysis that will be used to comprehend the collected data. This chapter functions as the foundation for the empirical investigation and ensures the research's rigour and methodological precision.

Chapter IV

Chapter IV represents the heart of the dissertation, where the results of the study are presented comprehensively. It will include descriptive statistics, regression analyses, and mediation analyses to offer a clear picture of the findings. The chapter will not only report the empirical results but also critically analysis them in the context of the research questions, drawing meaningful conclusions.

Chapter V

The final chapter, Chapter V, will provide a thorough analysis of the research findings and their implications for theory, practice, and public policy. It will identify the limitations encountered during the research process and suggest avenues for future research to build upon the current study. The chapter will conclude with a comprehensive summary of the key findings and their significance in the context of green logistics, sustainability, and manufacturing firms in Ghana and Indonesia.

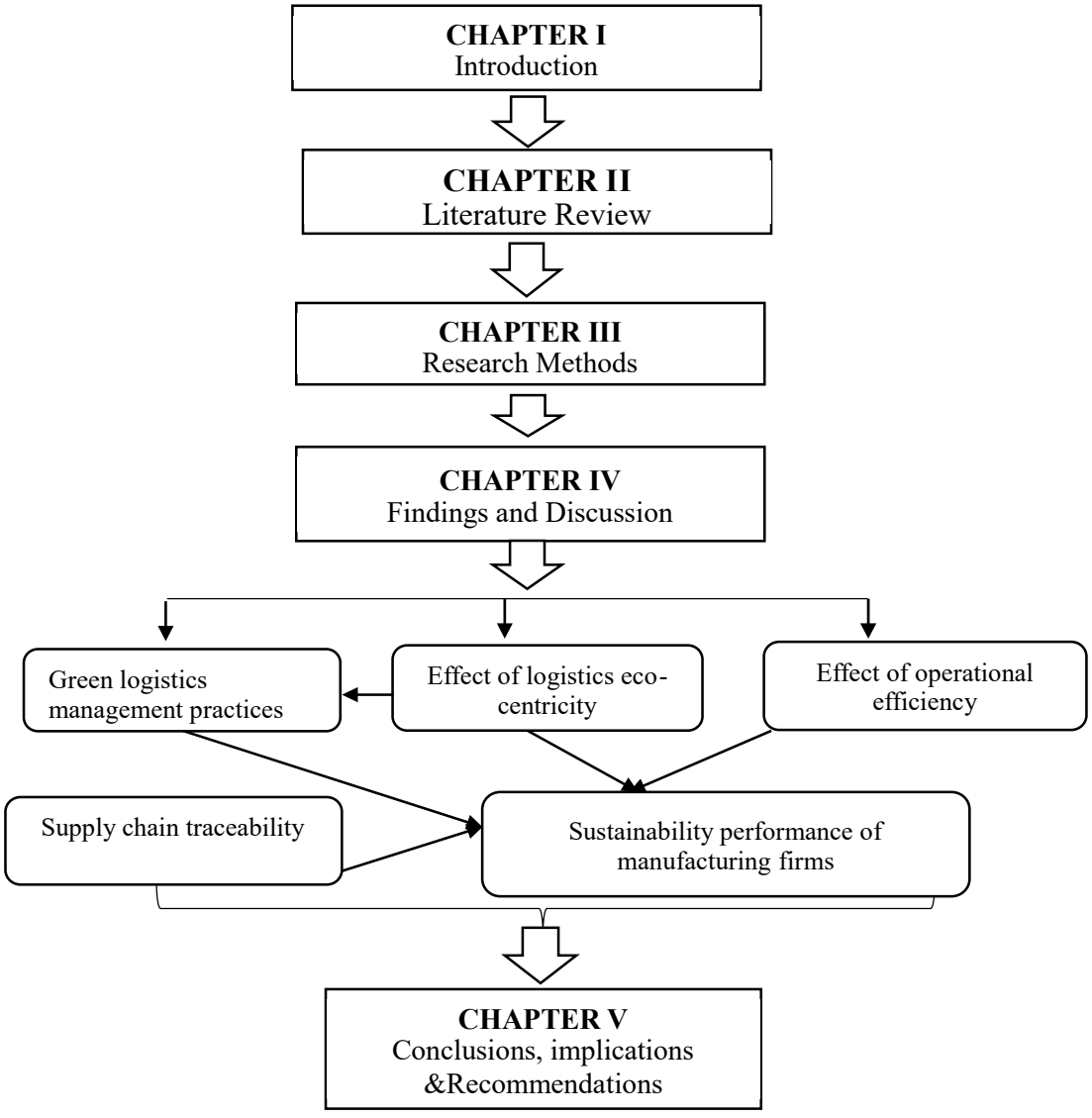

Figure 1.1Flow Chart of Structure of Dissertation