UNIVERSITY OF CAPE COAST

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ISAAC MENSAH

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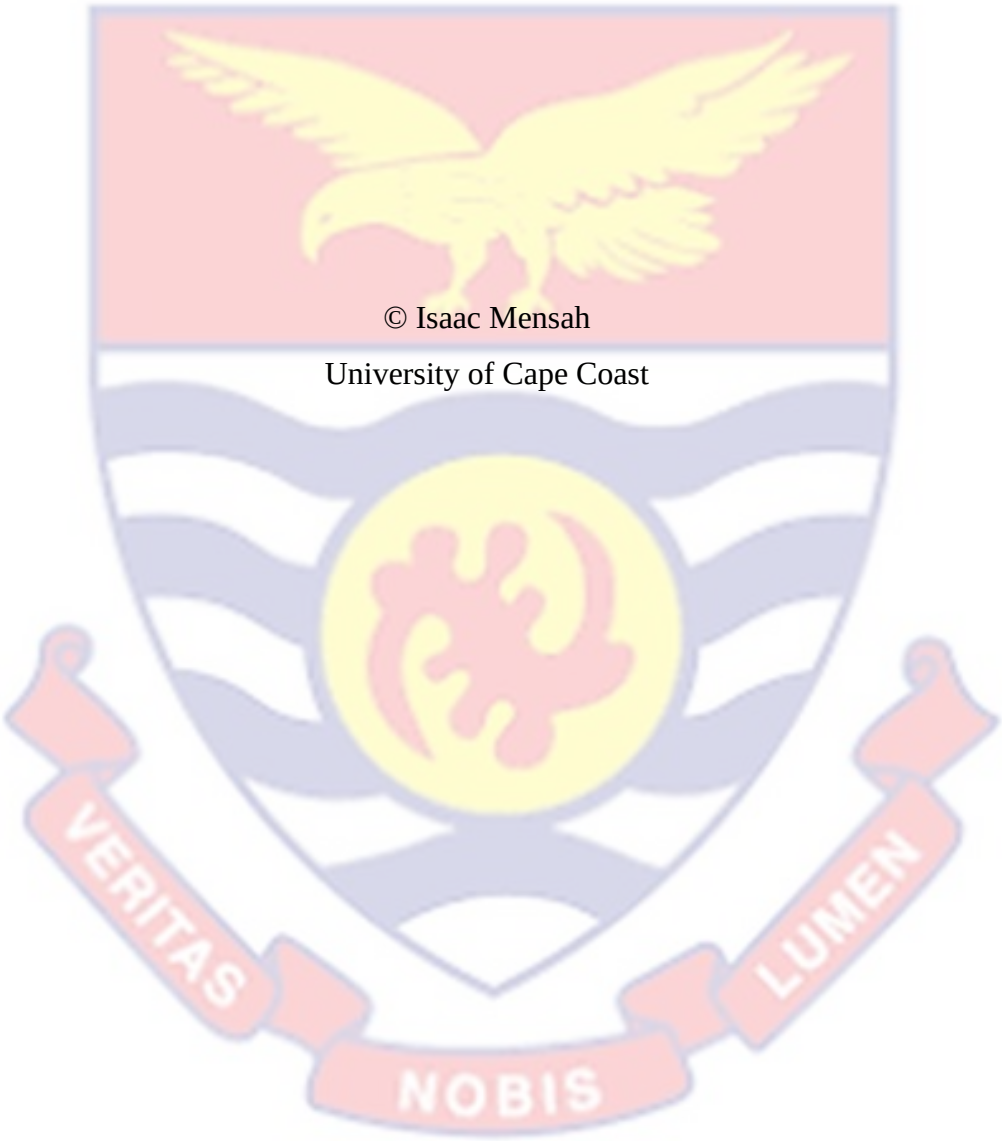

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SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICES IN THE UPSTREAM OIL AND GAS INDUSTRY: DRIVERS AND PERFORMANCE OUTCOMES

BY
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Thesis submitted to the Department of Marketing and Supply Chain Management of the School of Business, College of Humanities and Legal Studies, University of Cape Coast, in partial fulfilment of the requirements for the award of Master of Commerce Degree in Procurement and Supply Chain Management.

NOVEMBER 2022

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature …… Date……

Name: Isaac Mensah

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature …… Date……....

Name: Prof. John Gartchie Gatsi

Co-Supervisor's Signature ……..…… Date …….

Name: Dr. Innocent Senyo Kwasi Acquah

ABSTRACT

Considering the increased importance of social consequences, economic advantages, and safeguarding the nature, sustainable supply chain management has emerged as theme relevant to corporate managers, researchers and policy advocates in most transitioning countries like Ghana. The dynamics driving sustainably managed supply chains, as well as the sequel of these Sustainable supply chain management techniques on performance results were thoroughly explained in this study. Bringing to play the resource based view and the institutional theory, the study factually explored the effects of internal drivers of Sustainable supply chain (i.e., managerial attitude, support from top management, and employee levels of motivation) and external drivers of sustainable supply chain (i.e., mimetic, normative and coercive pressures) on the one hand, and associated influences on sustainable supply chain management practices on the other, as well as the link between Sustainable supply chain management practices (with regards to social, environment and economic) and firm performance outcomes (in terms of operational, financial and environmental) on the other. Based on a heuristic analysis of data from 261 upstream oil and gas supply chain firms, the study results show that internal and external sustainable supply chain drivers concurrently and collectively promote the adoption of sustainable supply chain management practices and Sustainable supply chain management practices demonstrating a remarkable positive causative link with firm performance facets.

KEY WORDS

External Drivers

Internal Drivers

Performance

Sustainability

Sustainable Supply Chain Management Practices

Upstream Oil and Gas

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DEDICATION

To my madam: Mrs. Shirley Aboagye Aniagyei Amoah, Sustainability – Ghana National Petroleum Corporation (GNPC).

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AVE –	Average variance extracted
CA –	Cronbach alpha
CI –	Confidence interval
COP –	Coercive pressure
CR –	Composite reliability
DEP –	Dependent variable
DV –	Discriminant validity
ECP –	Economic management practice
ED_SSC –	External drivers of sustainable supply chain
EM –	Employee motivation
ENP –	Environmental management practice
EP –	Environmental performance
FP –	Financial performance
HTMT -	Heterotrait-monotrait ratio
ID_SSC –	Internal drivers of sustainable supply chain
IND –	Independent variable
MA –	Managerial attitude
MIP –	Mimetic pressure
NOP –	Normative pressure
OP –	Operational performance
PLS-SEM –	Partial least square-Structural equation modeling
RBV –	Resource-based view
SDGs –	Sustainable development goals
SMP –	Social management practice

SSC –	Sustainable supply chain
SSCM –	Sustainable supply chain management
TMS –	Top management support
VIF –	Variance inflation factor

CHAPTER ONE

INTRODUCTION

The petroleum sphere is exceptionally vital in today's economy and literature, yet substantial and rigorous exploitation of crude supplies commonly stems an environmental mangle, advancing worries about ongoing viability (sustainability) (Florescu et al., 2019; Ceptureanu et al., 2018). The "World Commission on Environment and Development (1987) defines sustainable evolution as development that meets the demands of the present generation without jeopardizing future generations' ability to meet their own needs"; guaranteeing "unending existence for the human race in the universal ecological system". Sustainability, therefore, presupposes the fraternization of man, pecuniary, and environmental controversies (Raut et al., 2017).

Background to the Study

Over the years, management of supply chains (SCM) predominantly tackled sensitive and well-planned production processes and carriage of goods, from the raw inputs to valued artefact (Raut et., 2017). However, contemporarily, the environmental upshot in a supply chain is feigned to have colossal noteworthiness (Seitz & Wells, 2006; Raut et., 2017). In a quintessential petroleum purlieu, the argot "sustainable development" does not bracket with the exploration of petroleum resources in perpetuity (Raut et al., 2017) but rather epitomizes the viability of the existence of humankind by cautiously nullifying societal, commercial, and ecological investment in a repeatedly dynamic universe.

The UN, at its assembly collectively upheld the "2030 Development Agenda" in 2015, which bonds every member sovereign state and corporation

to work jointly to expunge penury and ravenousness, as well as to conserve the environment from devastation so that it can meet the prerequisite of forthcoming generations (Marino & Banga, 2016). The agenda 2030 covers "17 Sustainable Development Goals (SDGs), with 169 goals to be accomplished before 2030, were operationalized in January 2016, petitions various member states, notwithstanding their level of economic progress" (Marino & Banga, 2016). The SDGs amalgamate intents from supplemental concepts such as "the UN Convention on Biological Diversity and Aichi Biodiversity Targets" (Stock, 1992), as well as leaning on many years of multiple stakeholder deliberation, which includes private, and intergovernmental establishment (Tosun & Leininger 2017).

Plinth documentation proves that effectively organised activities that rely on combined effort across copious SDGs can proffer considerable economic, social, and environmental gains. Focusing on "energy security (SDG 7) with changes in climate (SDG 13) and air pollution (SDG 3, 11, 12) in the energy framework", for instance, might meet all three objectives for just slightly more money than focusing solely on the climate change goal (McCollum et al., 2011). Fuel cooking stoves may be phased out by 2050, reducing global warming by 0.08°C and eliminating 260,000 untimely deaths each year due to smog in societies, advancing 13 and 3 SDGs respectively (Lacey et al., 2017). Given that there are barely 8 yrs left to fulfil all SDGs internationally, and has made paltry headway thus far, "there is a proliferating call to foster the potency and orderliness of action by accentuating the diverse SDGs (Independent Group of Scientists Appointed by the Secretary-General, 2019)".

The oil and gas trade has made notable headway in terms of long-term viability in realizing these development goals by the UN. The word "sustainability refers "to the human race's continued survival in a highly dynamic market setting by balancing three pillars of sustainability (environmental, economic, and social)" (Raut et al., 2019). This postulation (sustainable development) has been deemed glaring about stratagem and inquiries and anticipated to become one of the most remarkable commercial accomplishments for extractive companies, including crude extraction enterprises (Raut et al., 2017; Lehtonen, 2004). Sustainable practices in critical strategic business processes such as supply chain are more likely to be implemented if there are visible motivators and rewards, like government edict, forces, cost frugality, or market divergence, as well as risks from inaction, such as reputational vandalization and decrease in market dominance (Baah et al., 2021).

On the grounds of edict and oversight of the crude industry in Ghana to corroborate strict devotion to the SDGs, the sector has been cleaved into three streams embodying the upstream, midstream, and downstream (Acquah, 2020; Appiah et al., 2019). Congressionally, the bustle of all the three streams is superintended by the Parliament of Ghana. The Ministry of Energy (MoE) clutches the administrative authority to enliven compliance with Parliament's legislation. The Ghana National Petroleum Corporation is sanctioned by the legislation of Parliament (PNDC Law 64 and 84) to govern the day-to-day running of the upstream segment (Appiah et al., 2019). The supplemental unearthing of commercialized quantum of hydrocarbons ensued in the inception of the "Petroleum Commission by an Act of Parliament in 2011 (Act

821) to handle and modulate the utilization of petroleum resources and coordinate, formulate, and implement sustainable strategies such as the local content policy in the upstream segment and also inspects the pursuits of the subordinate companies" (Boateng, 2022).

Despite the ratification of laws and the inauguration of state agencies to oversee the stern conformance to sustainable exploration and derivative of crude in Ghana by the upstream oil and natural gas corporations, dubiety and hesitation about sustainable development exist in the sector, which demands critical scrutiny (Boateng, 2022). This is ascribable to the convolution of networks of oil and gas businesses undertaking distinctly paranormal "activities in some of the world's most arduous and endangered bearings" (Ahmad et al., 2016), thus rendering it practically impossible for these despotic bureaus to perform their mandates constructively. This has led to a supply chain simulation study intended to improve logistics modes, production, and operation designing, among other things, with the sustainability facet of the chain enduring sparse consideration (Hussein et al., 2021). Thence, an utter grasp of the entanglement of the Oil and Gas pursuits is indispensable to weighing up the factors that could propel the actualization of sustainable exploration and production through a supply chain management context (Czachorowski, 2022; Kumar & Barua, 2022), especially in developing economy like Ghana.

Statement of the Problem

The multiple presumptive interpretations of SSCM in the literature bespeak the personalized assessment and endorsement of the array of constructs by academic investigators. It is only rational to grasp and assume

various notions in an emerging sphere such as SSCM (Touboulic & Walker, 2015). Rehman & Shrivastava (2011) expounded the term sustainable supply chain management to enjoin the reduction of long-term hazards related to using of the resource, utilization of energy and associated costs, product design, pollution, and waste management in a supply chain. Raut et al. (2017) culminated that Sustainable supply chain management (SSCM) is a management method that incorporates environmental, social, and economic issues, therefore arrogated for this study. This exposition is regarded as a furtherance of the interpretation by Beamon (1999), which has been censured for being insubstantial in purview; that is, it only communicates the environmental aspect of sustainability, leaving all other aspects of sustainability unattended (Johnsen et al., 2018)

According to Dhiman (2008), as cited by Raut et al. (2017) and Baah et al. (2021), firms have now championed the abstraction of organizational rethinking in acknowledgement of escalating concerns about climate change, unsustainable natural resource usage, and the global economic recession. Many implement the sustainability agenda into their operations without controlling the triple-bottom line (TBL), economic, environmental, and social management practices (Dhiman, 2008). Elkington (2004) first introduced the TBL concept of measuring sustainability, highlighting the need of balancing the social and economic components of sustainable development in a more integrated manner to achieve significant environmental improvement. According to Michelsen et al. (2016), microeconomic outlook of sustainability has been used frequently in scholarly investigations than macroeconomic outlook, and might be because it is extremely challenging to figure out the best

efficient method of dealing with sustainability when several, often contradictory concerns must be evaluated simultaneously; hence macro-economic analysis of sustainability being essential (using the TBL concept).

The primary focus of SSCM research has been mainly centered on environmental challenges, with social and economic issues virtually ignored both in the theoretical foundation and empirical studies (Zhang et al., 2021) and in the analytical modelling (Bai & Satir, 2022). Therefore, this research integrates the social and economic factors, together with ecological concepts into the SC sustainability equation. According to Banasik et al. (2012), multi-criteria decision making (MCDM) approaches for green logistics are few. Optimization techniques such as fractional simulation, probabilistic reasoning, optimization programming, and combined linear regression, according to the authors, have been identified as desirable modeling approaches for remanufacturing and product recovery (Chan et al., 2017; Ilgin & Gupta, 2010). Quantitative exploration is essential to validate strategic decision process while combining SCM and sustainability, according to Tseng et al. (2019) findings. Thus, this study adopted a quantitative research design in the quest to solve this gap. This agrees with Ansari and Kant's (2017) argument to determine the present state of the field to be investigated and whether qualitative or quantitative processes drive it. Empirically, studies such as Shahi, Shiva and Dia (2020), Govindan et al. (2020), Das (2018), Wang and Dai (2018), and Junaid, Zhang and Syed (2022) have proved that SSCM strategies have an influence on corporate performance. Many of these study findings imply that implementing the idea of SSCM improves organizations' environmental and financial efficiency.

Contrary to these studies, Demirel and Kesidou (2019), Dania et al. (2018), and Khan and Qianli (2017), concluded that ecologically friendly operations have no correlation with economic impact. According to their findings, environmentally sustainable practices have been viewed as a burden on firm profitability (Sharma, 2020), protocols, and personnel training to ensure sustainable practices throughout product manufacturing. Sharma (2020) asserts that how a firm generates its products determines its economic performance. The preponderance of these publications aimed to uncover the relationship between the enablers of SSCM and firm performance were primarily conducted from a micro perspective in advanced economies; resulting in a significant gap in the body of knowledge in the field of SSCM activities of oil and gas firms in most developing countries, particularly Ghana (Geng et al., 2017).

Pagell and Shevchenko (2014) argue for the relevance of theory-based observations to deepen the discernment of sustainability in supply chain and its adopted constructs since organisational philosophies are concerned with the planned corporation and underlying methodic principles to improve effectiveness (Johnsen & Caniato, 2022). As a result, institutional theory (IT) and resource-based view (RBV) theory are employed in this study to grasp the connection of sustainability determinants and overall organisational results. In accordance with the RBV theory of reasoning behind SSCM, concentrating on achieving sustainability in value chain may offer a business with a competitive edge through the assembly and application strategic initiatives (Touboulic & Walker 2015). As a result, this study contends that RBV logic provides insights into the development of resource capabilities and the economic side of

the firm. Thus, in this setting, RBV may be the most appropriate to serve as a foundation for the conceptual considerations on the economical, societal, and ecologic components of sustainability in supply chains.

Despite its widespread acceptance, RBV detractors claim that the model does not transcend the features of supplies and resource trades to justify the corporation's long-term variability. (Oliver, 1997). RBV reasoning, according to Oliver (1997), failed to account for the social context in which resource deployment choices are made, therefore, establishing a theoretical background based on a mix of RBV and institutional theory (IT) to address the shortcomings of RBV. Institutional philosophy has been extensively used in the development of long-term distribution network models (Sarkis et al., 2011; Acquah et al., 2021) and adoption of high-quality systems and technological capabilities (Kouhizadeh et al., 2021; Dubey & Gunasekaran 2015). IT provides a better rationale when the incentive for adopting sustainable practices or technology comes from a sense of legitimacy (DiMaggio & Powell, 1983). Institutional pressures are divided into three categories: mimetic pressures (MP), normative pressures (NP) and coercive pressures (CP), which collectively form the driving factor behind institutional isomorphism (DiMaggio & Powell, 1983; Acquah et al., 2021).

Therefore, this research is essential in ascertaining the degree toward which sustainability factors influence the implementation of SSCM policies and their effects on a company's specific goals. This study aimed to assess, firstly, how supply chain sustainability enablers encourage the use of responsible methods of managing a supply chain and further, how SSCM practices shape the overall targets of companies operating in Ghana's

upstream crude chain, from a broader outlook (using the TBL concept of sustainability), and the institutional, resource-based view theories as its philosophical rationale.

Purpose of the Study

The study is generally targeted at how the activities of the drivers of SSC affect sustainable supply chain management (SSCM) practices and how these SSCM practices affect specific performance outcomes of companies in Ghana's upstream oil and gas segment.

Research Objectives

Generally, this study seeks to determine the effect of the drivers of the sustainable supply chain on Sustainable supply chain management practices on the one hand and the influence of Sustainable supply chain management practices on the specified performance targets of businesses in the upstream on the other hand.

Notably, this research attempted to;

1. Ascertain the effect of internal drivers of SSC on SSCM practices.
2. Assess the effect of external drivers of SSC on SSCM practices.
3. Determine the effect of SSCM practices on operational performance.
4. Evaluate the effect of SSCM practices on financial performance.
5. Investigate the effect of SSCM practices on environmental performance.

Research Questions

The succeeding pertinent exploratory questions were formulated depending on the breadth of the precise study aims.

1. How do internal drivers of SSC affect SSCM practices?

2. How do external drivers of SSC affect SSCM practices?
3. What is the effect of SSCM practices on operational performance?
4. What is the effect of SSCM practices on financial performance?
5. What is the effect of SSCM practices on environmental performance?

Research Hypotheses

H_1: Internal drivers of SSC have a favourable impact on adopting sustainable supply chain management practices.

H_2: External drivers positively impact the adoption of sustainable supply chain management practices.

H_3: Implementing sustainable supply chain management practices results in improved financial performance.

H_4: Implementing sustainable supply chain management practices results in improved operational performance.

H_5: Sustainable Supply Chain Management Practices lead to improved Environmental Performance.

Significance of the Study

Comparatively, as previously examined by Baah et al. (2021) and Raut et al. (2017), the notion of sustainability in Ghana and Africa remains grey to policy makers and companies operating within these geographical areas. Thus, this study will benefit the stakeholders, as mentioned above, and even other stakeholders in the crude oil industry. The major upstream operators, for instance, may consider this study useful in their quest to achieve sustainable objectives as the findings provide more insightful information for policy formulation and direction in the area of SSCM practices in Ghana. The appropriate government institutions can also act up this information to ensure

proper and healthier exploration production practices in the upstream oil and gas sector through supply chain management. The findings from this may also contribute significantly to the creation and building of knowledge in SSCM practices in the upstream oil and gas sector and can therefore provide enough proof to support research arguments from other empirical studies conducted in emerging economies in the field of SSCM.

Delimitations

The basic concepts examined in the title through the introductory chapters, such as drivers of supply chain sustainability, SSCM practices, and firm performance outcomes, suggest that this study is primarily conducted in the domain of supply chain and how the activities of the enablers of supply chain sustainability influence the formulation and effectuation of supply chain sustainability schemes, together with their effect on selected firm performance outcomes (operational, financial and environmental). The study did not cover all the firms involved in the upstream oil and gas supply chain and was thus limited to only firms registered with the Petroleum Commission at the end of the last quarter of 2021. Geographically, the study was limited to Ghana's Western region as it is considered the hub for upstream oil and gas in Ghana.

Limitations

An explanatory research methodology was applied in this investigation and employed a seven-point Likert scale measure questionnaire made up of closed-ended questions to collect data about the variables used in this study adequately. Respondents risk not giving truthful and accurate answers to the questionnaire items, especially when asked sensitive but relevant questions about the study's objectives. Again, some respondents did not perceive the

need for this study and were thus unwilling to provide the audience with the opportunity to reply to the administered questionnaire. However, the use of a closed-ended questionnaire precluded respondents from giving their ideas outside of the items supplied by the researcher, limiting the study's ability to be further enhanced.

Definition of Terms

Sustainability: alludes to a prudent compromise of industrial prosperity, environmentalism, and social equity from a macro-perspective that encompasses societal, natural, and commercial considerations.

Sustainable supply chain management (SSCM): relates to the mechanisms of managing stocks, communication, investment flows, and coordination among organizations throughout the distribution network while achieving targets for sustainable business across all three aspects.

Drivers of Sustainable supply chain: describes the extrinsic and intrinsic causes or conditions that begin, energize, and encourage firms to carry out specialized supply chain sustainability actions.

Firm Performance Outcomes in the context of this work, represents a corporation's functional, ecological, and financial outcomes.

Organization of the Study

This study is divided into five major interdependent chapters: introduction, literature review, research methods, result and discussion and summary, conclusion, and recommendations. The background to the study, statement of the problem, purpose of the study, research objectives, research questions, significance of the study, delimitations, limitations, operational definitions of words, and study organization are all outlined in Chapter one

(Introduction). The second chapter (Literature Review) provides an overview of significant literature on sustainable supply chain management practices (i.e., environmental, social, and economic management practices), their drivers (internal and external), and performance outcomes (i.e., operational, environmental and financial). This chapter also examines relevant presumptions by discussing link and effects on sustainable supply chain management, drivers, and associated performance outcomes. It serves as the basis for the study's conceptualization framework.

The third chapter (Research Methods) describes the research methodology used to answer the study's questions and targets. It includes information on the study's outline, philosophy, study region, population, sampling technique, data collection instrument, data collection procedures, and the data processing and analysis technique used in the study. The fourth chapter (results and discussion) presents an overview of the variables investigated. These include descriptive assessment, measurement evaluations, and structural models. The results of the test hypotheses are discussed in this chapter. The study's conclusions and recommendations based on the findings are presented in the fifth and last chapter (i.e., summary, conclusions, and recommendations). It also included an overview of the significant responses to the research questions and relevant comments and proposals for further research.

CHAPTER TWO

LITERATURE REVIEW

Introduction

This systematic literature review is done to tackle the study's research questions. Steward (2004) explains literature review as a systematic, explicit, and reproducible design for identifying, evaluating, and interpreting the existing body of recorded documents. Tranfield et al. (2003) suggest that to manage the diverse knowledge about a specific research topic, a literature review is a decisive tool that supports researchers in diverse ways. This part of the report described the philosophical, empirical, and conceptual underpinnings that place this inquiry in perspective (Saunders et al., 2007). The theoretical configuration examines the hypotheses that optimally explain the relationship between the variables. On the other hand, the empirical framework outlines what previous researchers have done in this area. The conceptual framework depicts the visual relationship between the variables used.

Theoretical Review

The theoretical framework balances inductive and deductive reasoning, laying the groundwork for research methodologies that will additionally steer and assist academics to the prime managerial undertakings (DePoy & Gitlin, 2019). Scholars in supply chain management have long recognized the necessity for adequately expressed and apparent models and a theoretical configuration to understand better the multiplex scenarios in managing supply chains (Eckstein et al., 2015). The IT and RBV are the theories underpinning this study.

Resource Based View (RBV) Theory

According to RBV theory, by building a combination of strategic assets and talents, a corporation may obtain a commercial edge. Organizational capital, human capital and physical capital are the three dimensions of internal resources, according to Barney (2001), which have been expanded to include reputational capital, financial capital, and technological capital (Grant, 2003). As a result, they might be both tangible and intangible internal resources, like infrastructure or information or knowledge sharing (Attia & Salama, 2018). Thus, SSCM can establish competitive advantages by combining resources from multiple supply chain members (Acquah et al., 2020; Baah et al., 2020; Sarkis et al., 2011). The RBV viewpoints in responsibly managing a chain of suppliers are that sustainability-related drives, expertise and knowledge, and its implementation leads to a company's economic well-being (Walker &Touboulic, 2015). RBV relies on the amassing and use of tactical materials to carry out strategic initiatives such as SSCM, which aid in explaining changes in business performance (Nadalin et al., 2019).

This theory, therefore, serves as the foundation for the study's constructs, which links internal drivers, SSCM practices, and performance outcomes. The RBV as the theoretical bedrock illustrates how resources and skills can account for more incredible performance (Barney, 2001). Incorporating TBL in strategic business procedures necessitates proactive integration of societal, ecological and commercial considerations across network of suppliers (Kumar & Rodrigues, 2020). Consequently, resource accessibility and prioritization to combine SCM and sustainable management

tactics result in comprehensive supply chains that embrace all components of the TBL holistically and methodically (Singh & Chan, 2022; Dehghanian & Mansour, 2009). This evinces the potential to stimulate the transformation of sustainability-related supplies into value added to support supplier network activities (Arda et al., 2021).

According to Oliver (1997), RBV reasoning has not adequately considered the social environment (external environment) in which resource selection decisions are made. It thus provides a suppositional configuration based on the combination of institutional theory to solve the RBV's weaknesses, which have been thoroughly discussed in the following paragraphs.

Institutional Theory

By explaining homogeneity among organizational types and why organizations copy one another in their search for acceptability, institutional theory explains the strategies and programs that propagate sustainable supply chain functions among organizational groupings (Grob & Benn, 2014). Since its inception, the tendency of organizations to imitate one another has been a primary focus of institutional theory. The notion is that organizations do so to increase their conformance and, consequently, their odds of surviving (DiMaggio & Powell, 1983; Meyer & Rowan, 1977), which is a measure of firm success. Coercive pressures (CP), normative pressures (NP), and mimetic pressures (MP) are the major dimensions of institutional pressures identified by DiMaggio and Powell (1983) and Acquah et al. (2020). These three pressures signify three diverse means of institutionalization.

According to Scott (2008), institutional theory indicates that corporations are motivated to pursue strategic decisions, such as sustainable supply chain by external pressures. Secondary stakeholders who exert pressure on value chain to be more conscientious include federal agencies, laws, major customers or suppliers, competing enterprises, industry bodies, special purpose parties, as well as the mainstream press (Delmas & Toffel, 2004). Thus, this theory acts as the foundation for the study's constructs, which links external drivers of SCC, SSCM practices, and performance outcomes. This study exploits institutional theory as an alternative theory because it establishes a theoretical prism by which investigators can categorize and examine external facets that boost the viability and authenticity of organizational strategies, such as way of life, society, control (including the legal environment), customs and origins, and commercial incentives, while noting the relevance of supplies (Glover et al., 2014). The table below summarises the various theories used to explain the conceptualization of sustainable management of supplier network, its drivers and performance outcomes.

Table 1: Theoretical applications in sustainable supply chain management research

Author(s) and Date	Title	Theory	Usage
Arda et al., (2021)	"Toward a holistic understanding of sustainability incorporations: Resource-based view of sustainable supply chain management."	Resource-based view	RBV was used as a theoretical foundation of the study to explain how an organization's capabilities and resources lead to superior performance, using the TBL aspect of sustainability.
Baah et al., (2020)	"Examining the correlations between stakeholder pressures, green production practices, firm reputation, environmental and financial performance: Evidence from manufacturing SMEs."	Stakeholder theory, Institutional theory, and Resource-based view	The stakeholder and Institutional theories were to link stakeholders and regulatory pressures and the adoption of the green production practices, respectively, while the Resource-based view is used to explain financial and economic performance variables
Afum et al., (2021)	"The missing links of sustainable supply chain management and green radical product innovation between sustainable entrepreneurship orientation and sustainability performance"	The natural resource-based view and Stakeholder theories	This study used a natural resource-based perspective and stakeholder theories to examine the mediating role of sustainable supply chain management and green radical product innovation in the relationship between sustainable entrepreneurial approach and sustainability performance.
Baah et al., (2021)	"Examining the Interconnections Between Sustainable Logistics Practices, Environmental Reputation and Financial Performance: A Mediation Approach"	Institutional theory	The IT was employed to elucidate the link or relation between institutional isomorphism and organizational legitimacy in sustainable management of chain of suppliers.
Acquah et al., (2021)	"Investigating the efficacy of isomorphic pressures	Institutional and Stakeholder	These theories were used to explain why specific institutional practices were

	on the adoption of green manufacturing practices and its influence on organizational legitimacy and financial performance."	theory	implemented, primarily because of societal influence, norms, and values and a desire to attain organizational legitimacy.
Glover et al., (2014)	"An Institutional Theory perspective on sustainable practices across the dairy supply chain"	Institutional theory	This study uses Institutional Theory to describe how changes in social ideals, technology improvements, and legislation (drivers) influence decisions about sustainable activities.

Source: Researcher (2022)

Conceptual Review

This part lays the conceptual groundwork for this research. The discussion focuses on how the framework fits into the larger picture of Ghanaian SSCM and crude exploration and production studies, thus covering the fundamentals of SSCM and its knowledge transferability in the oil and gas sector. A rigorous empirical assessment leading to the formulation of hypotheses and the diagrammatic depiction of the framework used in this research.

Sustainable supply chain management (SSCM)

To adequately fathom the problem, several academic philosophers have afforded numerous viewpoints of SSCM (Khan et al., 2021). Like Khan et al. (2021), SSCM is associated with the exploitation of materials and waste axing from start to finish after shelf life with the correction of ecological and social consequences - be especially regarded (Khan et al., 2021). Furthermore, the premise intended that the production company, in conjunction with intense remanufacturing, revamping, and disposal mechanisms, reinforces a firm's sustainability progression (Raut et al., 2019).

SSCM is commonly claimed to have three main elements, which include ecological, societal, and economic issues (TPL) for human advancement and influence firm direction and activities (Dwivedi et al., 2019a; Dyllick & Hockerts, 2002). Sikdar (2003) related sustainability to a wise balance among economic development, environmental stewardship, and social fairness, taking a macro-viewpoint, which covers social, environmental, and economic factors. Regardless of the fact that SSCM is a comparatively new field, its prominence has grown over time. SSCM has been linked to inventory management, production planning and control for remanufacturing, green design, product recovery, reverse logistics, waste management, energy consumption, and emissions reduction, according to reviews of numerous factors relevant to supply chain sustainability (Khan et al., 2021). The table below (Table 2) presents different scholarly definitions of managing supply network.

Table 2: Definitions of Sustainable supply chain management

	Authors	Definitions
1	Khan et al. (2021)	"SSCM and GSCM are referred to the management of raw materials and reduction of waste from upstream to downstream, and after shelf life back to the upstream with the improvement of the environmental and social impact."
2	Turker & Altuntas (2014)	"SSCM is the addition of sustainability to traditional SCM processes, taking financial, environmental, and social impacts of firm activities into consideration."
3	Giannakis & Papadopoulos (2016)	"SSCM is considered a sophisticated process by which firms organize their CSR (corporate social responsibility) activities across dislocated manufacturing processes spanning organizational and geographical boundaries."
4	Wittstruck & Teuteberg (2012)	"SSCM is an extension to the existing ideology of SCM by adding social and environmental aspects."
5	Wolf & Seuring (2010)	"SSCM means producer collaborates with its SC members and collaboratively manages inter-and intra-firm processes for sustainable development."

Source: Researcher (2022)

The execution of SSCM is dependent on a set of activities known as SSCM practices. Environmental management practices, social management practices,

and economic management practices are all included in the SSCM practices, which cover all three facets of sustainably managing distribution network (Shamar et al., 2021). As a result, the three SSCM methodologies from the literature are discussed in this study, as well as the vital link between SSC drivers and their effect on performance results.

Sustainable supply chain management (SSCM) practices

SSCM practices, according to Seuring and Müller (2008), is the management of material, information, and capital flows, as well as cooperation among enterprises along the supply chain, with goals drawn from all three dimensions; of sustainable development. The desire to incorporate three elements of sustainability into SSCM activities stems from Elkington's (2004) idea of TBL, environmentally dominant logic, and ultimately the conceptualization of SCM. Hitherto, the fundamentals of sustainability coupled with the idea of managing chains of suppliers and the SSCM strategies examined have been classified into three categories: environmental, social, and economical (Montabon et al., 2016). These three essential components are intended to cover the core of SSCM procedures and are detailed in the succeeding paragraphs.

Environmental sustainable supply chain management practices

The grounds for desiring environmental sustainable supply chain management practices (EMP) as a crucial influencing strand on an organization’s achievable target can be drawn from the inference of Porter and van der Linde (1995), Klassen and Whybark (1999), and Das (2018). The results have prompted some scholars to take up scientific inquiries in the spheres of ecology and SCM to uncover apposite components that could

represent activities necessary to ecological or green terms (Das, 2018). Zhu et al. (2012) found several articles about green practices throughout the supply chain.

According to Das (2018), a part of several items: the application of ISO 14001 regulations or analogous ecological preservation mechanisms; delivering design specifications to suppliers for disbursed inputs that incorporate environmental accession; cooperation with users for ecological preservation and greener manufacturing procedures. The majority of the above EMP items are also represented in the findings of Laosirihongthong et al. (2013), Mitra and Datta (2014) and Marshall et al. (2015).

Economic sustainable supply chain management practices

Economic management approaches entail implementing operations management strategies to increase efficiency, improve quality, reduce inventory, and reduce waste across the full value chain, TQM, six sigma, value engineering, JIT, lean production, inventory management, etc. (Das, 2018). Definite quality assurance make-up discussed in previous works include installation of a quality control tools to enhance quality of offerings, the choosing of suppliers rooted in quality, preferably to cost, assisting suppliers in implementing lean methodologies, and so on (Kannan & Tan, 2005; Chen & Paulraj, 2004; Kaynak, 2003; Flynn et al., 1994).

Some studies (McBride et al., 2014; Ibusuki & Kaminski, 2007) suggested that the focal company assist suppliers in using value engineering to reduce component costs. Many other researchers (Yang et al., 2011; Kannan and Tan, 2005) considered introducing JIT in the supply network and applying empirical material handling approaches to boost productivity and minimize

cost. And to improve transportation efficiency, Sheu (2014), Wu et al. (2015) and Das (2018), reasoned in favor of logistics scale savings.

Social sustainable supply management practices

The research findings that link a firm's social management practices to its success are scanty. The prior discovery may be attributed to the key observations of McGuire et al. (1988), which indicated that enterprises exhibiting poor social investment would have a poorer yield on investment. According to Das (2018), there are two types of social engagement strategies: holistic and integrated strategies for workers (SPE) and inclusive societies strategies for the people (SPC). SPE includes guarantees for decent benefits and compensation; a good and conducive workspace; health insurance policies; leave and other avenues for development (Mani et al., 2016; Zhu et al., 2016; Lu et al., 2012; Marshall et al., 2014).

Additionally, laws against infant labour and protection of employee rights (Mani et al., 2016; Zhu et al., 2016) are mostly investigated using SPE. SPC on the other hand, alludes to "a firm's investments in developing possibilities for the surrounding community in terms of job creation and economic development, as well as in providing education, training, and healthcare facilities to position the firm as progressive in the eyes of stakeholders" (Lu et al., 2012).

Oil and gas supply chain

Oil is considered among the most important raw commodities worldwide, and has been regarded as the most vital energy source from the mid-20th century, and it is among the crucial components of the global commerce (Aslam et al., 2021). As expressed by Ahmad et al. (2017) and

Aalsalem et al. (2018), the oil distribution chain contains complicated characteristics similar to those of consumables. The operations of the crude supply network are categorised into three practical streams: downstream, midstream, and upstream. Exploration and production activities in the upstream oil supply chain are dedicated to identifying crude-oil deposits (Fazli et al., 2015). The midstream crude supply network entails the processing, preservation, and transfer of crude oil to refineries, where the oil is refined and transformed into petroleum products; finally, the downstream is a profitable venture, as their operation adds value to the refinery process and supply a diverse range of products (Aslam et al., 2021), but in Ghana, the midstream and downstream are mostly seen as one stream (Boateng, 2022)

Ghana's oil and gas supply network is composed of a number of actors who have varying levels of exposure to resources, equipment, marketing channels, money, and experience (Amponsah & Opei, 2014). The chain classified into operators (oil companies), main contractors, sub-contractors and suppliers (Boateng, 2022). Though the commerce is frequently considered as an entity and consists of a broad group of enterprises representing numerous organizational practices and scope of competence (Dauda & Yusuf, 2009). According to Fazli et al. (2015), this procedure necessitates a coordinated supply network approach to handle the chain's sustainability issues and increase the quality of complicated distribution networks. Ghana's oil supply chain streams are depicted in the diagram below (Figure 1). This research, however, focuses on the SSCM in the upstream portion, described as exploration and production (E&P), which is associated with the discovery and production of crude oil.

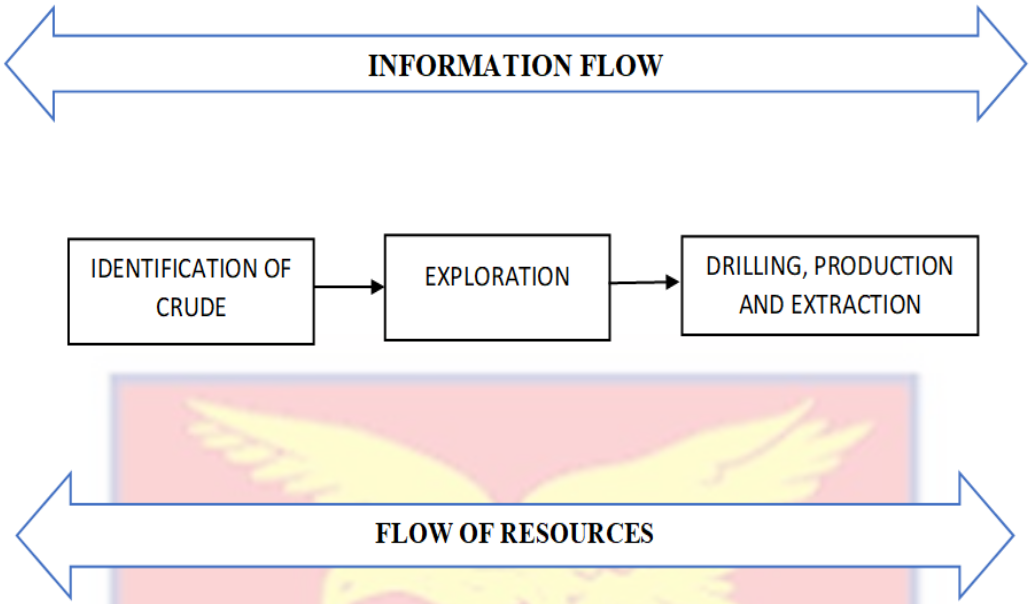


Figure 1: Upstream oil and gas supply chain

Drivers of sustainable supply chain (SSC)

Drivers of SSCM, as postulated by Caniato et al. (2012), are factors that encourage institutions to carry out certain sustainability efforts. Therefore, organisations are urged to practice sustainable supply efforts that are predisposed by intrinsic and extrinsic factors (Saeed & Kersten, 2019; Sajjad et al., 2015; Zhu et al., 2013). The literature refers to these impacting factors as tensions, triggers, enablers, and drives interchangeably. (Hsu et al., 2016; Caniato et al., 2012; Köksal et al., 2017). Intrinsic and extrinsic variables that bring about and inspire focus businesses in executing SSCM practices are identified as drivers of SSCM by Köksal et al. (2017).

Sustainable supply chain drivers facilitate successful operational, environmental, and financial performance outcomes, risk management, swift reactions to uncertain situations, sustainability expectations fulfilment, and sustainable practices implementation (Tseng et al. 2019). Nonetheless, important sustainability factors for the profitable rollover of SSC have received insufficient attention in rising economies such as Ghana (Munny et

al., 2019). As a result, it is critical to investigate the determinants of responsible supply network, particularly in Ghana's exploration of oil and gas supply chains. Companies can use such drivers to boost their sustainability initiatives and overall performance outcomes. Due to enormous stressors and consciousness, variations in consumption patterns and perception enhanced regulations, and institutional values and guidelines, many corporations have begun accept the notion of responsible business (Kim et al., 2021; Luthra et al., 2017; Zeng et al., 2017).

Table 3: Operationalization of the drivers of SSC

Sustainability Drivers	Definition	Authors
External drivers	"These factors influence the organization from the external environment, and the organization should respond to these drivers, considering the situation."	Zsidisin et al. (2005); Ketokivi and Schroeder (2004), DiMaggio and Powell (1983); Teo et al. (2003), Perez-Batres et al. (2011); Liu et al. (2010) and (Emamisaleh & Rahman, 2017)
Mimetic pressures	"The demands that arise when main competitors successfully adopt sustainability initiatives."	
Coercive pressures	"Sustainability-related political influences exerted by governmental regulations and firms on which the focal firm depends, such as important customers and a parent company."	
Normative pressures	"The demands stem from collective societal expectations, such as important suppliers, local communities, and NGOs about sustainability."	
Internal Drivers	"These are actors within the organisation's internal environment based on which the organization moves towards sustainability."	Clifford Defee et al. (2009); McFadden et al. (2009); Reed (2002); Aragon-Correa and Sharma (2003); and (Emamisaleh & Rahman, 2017)
Managerial attitude	"The attitude of managers to the issue of sustainability that can be positive or negative."	
Top	"Support from senior	

management support	management for sustainability activities of the organization."
Employee motivation	"Motivation of employees to participate in sustainability activities of the organization."

Source: Researcher (2022)

Performance outcomes and dimensions

It is important to differentiate between the firm performance and the larger concept of organizational effectiveness (George et al., 2019). Venkatraman and Ramanujan (1986) proposed a context illustration of three intersecting circles, the greatest of which represented operational performance. The largest domain of organizational accomplishments is represented by the mid circle, which reflects environmental achievement, and the close circle, which symbolizes financial results (Ferasso et al., 2020; Carton & Hofer, 2006). The term corporate performance mostly connotes to the operational, eco-friendly, and financial outcomes of a company (Baah et al., 2021; Acquah et al., 2020). These three dimensions of performance outcomes are addressed in the succeeding sub-sections.

Financial performance

This refers to a company's performance indicators that can be represented in monitory terms" (Gebremariam, 2016). Financial achievement indicators have been chastised for possessing merely a past perspective and a bias toward the interim (Nikolchenko & Lebedeva, 2017). In supply chain research, financial metrics such as "return on assets, asset returns, capital gains, return on equity, improvement in sales, greater market share, and gross profit margin" are prevalent (Acquah, 2020; Nikolchenko & Lebedeva, 2017; Gebremariam, 2016).

Operational performance

This refers to a company's capacity to accomplish its operational goals. These include, but are not limited to, order fulfilment time, customer satisfaction, inventory turnover, and lead-time (Vitari & Raguseo, 2020; Acquah, 2020). Gebremariam (2016) states that operational performance is crucial to businesses since it is the silver bullet for better efficiency and effectiveness, which leads to increased profitability. On-time delivery, inventory turnover, customer happiness, minimal damage levels, and order cycle variability are all metrics for operational performance (Nikolchenko & Lebedeva, 2017).

Environment performance

It is also associated with energy conservation, waste reduction and the use of dangerous materials (Zahoor & Gerged, 2021). Environmental achievement is often evaluated using green activities such as green sourcing and design, product recycling and reverse logistics, energy conservation, waste reduction, and using hazardous materials (Baah et al., 2021; Zahoor & Gerged, 2021).

Financial success was frequently viewed as a byproduct of other performance gains provided by SSCM in the sample studies. Roscoe et al. (2019), for example, show that SSCM can significantly influence company environmental performance by applying green SCM, which enhances financial performance outcomes in the long run. The table below shows how various authors examined the types of firm performance outcome and their measurements in supply chain studies.

Table 4: Past literature on the dimensions and measurements for performance outcomes

Authors	Types of Performance Outcomes	Measurements
Baah et al. (2021), Prasad et al. (2018) and Akhtar et al. (2016)	Financial Performance	"Profit, market share, sales volume, and organizational health are used to assess to determine the financial prospect of the firm."
Harun et al. (2019)	Operational Performance	"It is determined by a company's operational efficiency and accuracy, product quality, process transparency, delivery speed and punctuality, resource utilization efficiency, and customer happiness."
Baah et al. (2021); Akhtar et al. (2016).	Environmental Performance	"It is measured by green activities such as green sourcing and design, product recycling and reverse logistics, energy conservation, waste reduction, and the use of hazardous materials."

Source: Researcher (2022)

Empirical Review

This section highlights empirical studies on Sustainable supply chain management strategies (SSCM), stressors, and performance targets. This study first seeks to investigate, on the one hand, how sustainability factors affect the use of SSCM practices and, on the other hand, how SSCM practices influence firm performance. As a result, this empiric is on the drivers (internal and external), expected outcomes (financial, operational, and environmental), and

SSCM practices (environmental management practice, social management practices and economic management practices) as composites.

Internal drivers of SSC and sustainable supply chain management practices

Internal drivers influence how firms and their strategies evolve toward sustainability. Signori et al. (2015) argue that, managers' understanding and behaviours toward the abstraction of sustainability can influence the successful implementation of sustainability measures such as SSCM. Sustainable initiatives can strengthen competition and establish relevant commercial opportunities. Cagliano et al. (2016) demonstrated that in building sustainability as an organization, it is important to ensure sustainable product planning. Ultimately, these plans must be administered in the organization with support from highly experienced staff and managers as well as innovation. Similarly, employee motivation might be critical to the success of sustainability measures (Emamisaleh & Rahman, 2017).

According to Tachizawa et al. (2015), cooperation and coordination based on the support of top supply chain managers are beneficial in creating long-term strategies. According to Chan et al. (2012), internal drivers encompass staff perceptions of the importance of sustainability, employee engagement, and top management support. They feel that these drivers are useful in increasing the organisation's long-term performance. Similarly, Green et al. (2012) consider internal organizational manager efforts and executive support of sustainability procedures useful in developing sustainability strategies. They contend that managerial assistance at all echelons of the business and making appropriate judgments on division of

assets among functional levels contribute to improved long-term achievement in commerce, corporate, and operational domains.

Hanna et al. (2000) explored the need of worker participation and motivation in an organization's long-term processes. They demonstrate that staff involvement in sustainability leads to enhanced performance in the surroundings and operational targets of the business, allowing the companies' sustainability goals and objectives to run smoothly. The table (Table 5) summarizes some previous studies on the internal drivers of SSC and SSCM practices.

Table 5: Sampled literature on Internal drivers of SSC and SSCM practices

Year	Author(s)	Title
2019	Broccado, Truant & Zicari	"Internal corporate sustainability drivers: What evidence from family firms? A literature review and research agenda."
2017	Leonidou, Christodoulides & Kyrgiou	"Internal drivers and performance consequences of small firm green business strategy: The moderating role of external forces."
2018	Yadav, Rani & Rawat	"Drivers of sustainability practices and SMEs: A systematic literature review."
2019	Saeed & Kersten	"Drivers of sustainable supply chain management: identification and classification."
2017	Emamisaleh & Rahmani	"Sustainable supply chain in food industries: Drivers and strategic sustainability orientation."
2017	El-Baz & Laguir	"Third-party logistics providers (TPLs) and environmental sustainability practices in developing countries: the case of Morocco."
2020	Zimon, Tyan & Sroufe	"Drivers of sustainable supply chain management: Practices to alignment with un sustainable development goals."

Source: Researcher (2022)

As a result, based on the empirical evidence provided, it is postulated that;

H_1: *Internal drivers of SSC have a favourable impact on adopting sustainable supply chain management practices.*

External drivers of SSC and sustainable supply chain management practices

In complement to internal impulses, external forces, can play an essential role in the acceptance and implementation of sustainable paradigms such as SSCM practices; thus, previous research diving into this concept (SSCM) (Emamisaleh & Rahman, 2017). According to Delmas and Toffel (2004), a firm's external drivers that develop environmental-based strategies are competitors, customers, government laws, and trading partners. Furthermore, Tachizawa et al. (2015) identified external drivers which includes customers, society, suppliers, and local organizations as influences on the development of environmental-based initiatives. According to Yücer and Kudak (2017), external drivers as a force behind the effective use of techniques based on sustainability include brand image, societal expectations, local organizations, and supplier needs.

External factors such as competitors, vendors, customers, and current norms and guidelines, according to Roehrich et al. (2017), are effective in executing sustainable initiatives. They posited that among the impacts of sustainability measures is increased market share and reduced organizational costs. Furthermore, Lee (2008) identified vendors, suppliers, and governmental agency participation as factors influencing organizations' participation in sustainable operations. In their study, Teo et al. (2003) presented normative, mimetic, and coercive pressures as external drivers

affecting an organization's interaction with the community. According to Liu et al. (2015), external factors such as normative, mimetic, and coercive drives effectively create organizational familiarization to sustainable supply chain management. The table below (**Table 6**) summarizes some previous materials on the external drivers of SSC and SSCM practices.

Table 6: Sampled literature on External drivers of SSC and SSCM practices

Year	Author(s)	Title
2018	Wang, Wang, Zhang & Zhao	"Effects of customer and cost drivers on green supply chain management practices and environmental performance."
2017	Emamisaleh & Rahmani	"Sustainable supply chain in food industries: Drivers and strategic sustainability orientation."
2017	Ahmad, Rezaei & Sadaghiani	"Evaluation of the external forces affecting the sustainability of oil and gas supply chain using Best Worst Method."
2018	Aboelmaged	"The drivers of sustainable manufacturing practices in Egyptian SMEs and their impact on competitive capabilities: A PLS-SEM model."
2018	Jia, Zuluaga-Cardona, Bailey & Rueda	"Sustainable supply chain management in developing countries: An analysis of the literature."

Source: Researcher (2022)

Thus, relying on the facts revealed thus far, it is predicted that;

H_2: *External drivers positively impact the adoption of sustainable supply chain management practices.*

Sustainable supply chain management practices and financial performance

According to institutional theory, committing to strong environmentally sustainable management practices (GSCM) can improve firms' operational efficiency by lowering operational costs and optimizing energy and resource consumption, which can improve financial performance

(Ntim & Soobaroyen, 2013; Famiyeh et al., 2018; Alhossini, Ntim, & Zalata, 2020). Similarly, resource-based theoretical perspective, vibrant sustainable management practices (SSCM) can improve firms' competitive advantage and growth opportunities by improving their reputation/image and providing better connections with key stakeholders, and thus can improve their financial performance (Russo & Fouts, 1997).

Few empirical research has found that sustainable management practices, including SSCM practices, can influence corporate eco-efficiency (Laari, Töyli, & Ojala, 2018; Kruk et al., 2018). Florida (1996), for instance, was one of the first experts to experimentally study the link between SMP and financial outcomes and proved that sustainable management practices led to significant environmental and economic achievements. Theyel (2000) suggests that implementing practical, sustainable management principles such as SSCM practices can increase company optimisation and margins by cutting operating expenses, together with waste generated in industrial operations. Dahlmann et al. (2019) further show that in the long run, corporate aspirations for sustainable developments can improve performance by networking with relevant stakeholders and acquiring competitive advantages. This commensurates with Li et al. (2017)'s findings, which indicate that the impact of green supply chain management practices on financial performance is not immediate, and firms should incorporate green initiatives and policies into their long-term strategies to achieve competitive advantages and survive.

However, Xie et al. (2019) discovered an inverse relationship between dedicating to increased levels of sustainable management activity and financial targets in a representative of 6631 enterprises from 74 countries.

Nonetheless, Ghana is regarded as a worldwide oil and gas conversion economy that is attempting to position its economy toward a negligible emission society and a prosperous economy; thus, upstream oil and gas businesses should participate in practical, sustainable management practices such as SSCM to ascertain the requirements of prominent partners while also surviving. Table **7** summarizes previous SSCM practices and financial performance material.

Table 7: Sample literature on SSCM practices and financial performance

Year	Author(s)	Title
2018	Feng, Yu, Wang & Wong	"Green supply chain management and financial performance: The mediating roles of operational and environmental performance."
2017	Miroshnychenko, Barontini & Testa	"Green practices and financial performance: A global outlook."
2018	Alshehhi, Nobanee & Khare	"The impact of sustainability practices on corporate financial performance: Literature trends and future research potential."
2019	Raut, Luthra, Narkhede & Mangla	"Examining the performance-oriented indicators for implementing green management practices in the Indian agro sector."
2019	Xie, Huo & Zuo	"Green process innovation, green product innovation, and corporate financial performance: A content analysis method."

Source: Researcher (2022)

From the findings of past literature on Sustainable supply chain management and financial performance above, the following hypothesis is advanced in this study:

H_3: *Implementing sustainable supply chain management practices results in improved financial performance.*

Sustainable supply chain management practices and operational performance

The institutional theory postulates that committing to strong, sustainable management practices can improve firms' operational efficiency by lowering operational costs and optimizing energy and resource consumption (Famiyeh et al., 2018; Alhossini et al., 2020). SSCM/ GSCM procedures have a variety of effects on performance outcomes. In general, industries' use of SSCM procedures influenced environmental, economic, and operational targets. Improving operational efficiency improves the organisation's overall achievement (Mallikarathna & Silva, 2019; Green et al., 2012). Similarly, Das et al. (2018) claim that SSCM methods improve operational performance in terms of cost, quality, and flexibility but have no effect on delivery time.

These researchers mostly employed the Pearson correlation coefficient to establish a statistically significant correlation between sustainability management methods and industry fluidity (Rha, 2010). Nyirenda and Ngwakwe (2014) state that environmental management strategies improve delivery time. Yang et al. (2015) also found that a company's participation in environmental management practices can help improve customer satisfaction while lowering costs and improving product quality. The table below (**Table 8**) summarizes previous material on SSCM practices and operational performance.

Table 8: Sampled literature on SSCM practices and Operational performance

Year	Author(s)	Title
2017	Truong & sameiro	"Supply chain management practices and firms' operational performance."
2018	Croom, Vidal, Spetic & Marshall	"Impact of social sustainability orientation and supply chain practices on operational performance."
2017	Dai, DE Cantor & Montabon	"Examining corporate environmental proactivity and operational performance: A strategy-structure-capabilities-performance perspective within a green context."
2019	Sinaga, Mulyati, Darrini & Galdeano	"Green supply chain management organizational performance."
2018	Famiyeh, Adaku & Amoako-Gyampah	"Environmental management practices, operational competitiveness and environmental performance: Empirical evidence from a developing country."

Source: Researcher (2022)

The succeeding hypothesis has been developed based on the empirical evidence to explain the relationship between SSCM practices and operational performance.

H_4: *Implementing sustainable supply chain management practices results in improved operational performance.*

Sustainable supply chain management practices and environmental performance

According to the Resource-Based View (RBV), achieving the targeted environmental outcomes can only be accomplished by apportioning materials

and adeptness to sustainable management activities (Alam et al., 2019). Advances in sustainable management methods and structures may promote company performance while minimizing the business operations' risk to the environment. Allocating resources to green technology is not only a requirement of today's corporate environment but also contributes to achieving the goal of eco-efficiency. Again, sound environmental management techniques, an aspect of sustainable management practice, shift the organization's policy toward clean and efficient energy (Aslam et al., 2020). As a result, it is essential to accept the continuous sustainable management practices program to lower the intensity of carbon emissions. Corporations are redesigning their approaches in this situation to achieve desired environmental performance by embracing the concept of responsible supply network management methodologies.

Prior empirical investigations on the connection between sustainable management of supply network (Environmental management practices) and business environmental targets have yielded conflicting upshots. Delmas and Blass (2010) and Delmas and Toffel (2004), for example, found that firms with robust sustainable supply chain management practices, particularly environmentally sustainable programs, do not place emphasis on environmental practices and higher levels of harmful releases, using participants of 15 US chemical firms. In contrast and consistent with past studies (Famiyeh et al., 2018; Chen et al., 2018; Hartmann & Vachon, 2018), the results of Li et al. (2017) indicate that the higher the level of sustainable initiatives, the higher the levels of green performance for a sample of 500 largest US-listed firms. Wang et al. (2018)'s findings in similar research imply

that implementing excellent environmental enactments, such as clean supply chain management methods, can counteract undesirable environmental repercussion. The table below (**Table 9**) summarizes reviewed literature on SSCM and environmental performance outcomes.

Table 9: Sampled literature on SSCM practices and Environmental performance.

Year	Author(s)	Title
2019	Al-Sheyadi, Muyldermans & Kuappi	"The complementarity of green supply chain management practices and the impact on environmental performance."
2018	Laari, Toyli & Ojala	"The effect of a competitive strategy and green supply chain management on logistics service providers' financial and environmental performance."
2017	Jabbour & Vazquez-Brust	"Green supply chain practices and environmental performance in Brazil: Survey, case studies, and implications for B2B."
2018	Khan, Zhan, Anees & Golpira	"Green supply chain management, economic growth and environment: A GMM based evidence."
2018	Famiyeh, Adaku & Amoako-Gyampah	"Environmental management practices, operational competitiveness and environmental performance: Empirical evidence from a developing country."

Source: Researcher (2022)

As a result, and informed by the preceding discourse, sustainable supply chain management methods are projected to affect company environmental performance positively. As a result, the notion that:

H_5: *Sustainable Supply Chain Management Practices lead to improved Environmental Performance.*

Conceptual Framework

The conceptual framework below (Figure 2) shows the model proposed to tackle the research hypotheses in this study. The model incorporates three broad constructs (Drivers of SCC, SSCM practices and performance outcomes) measured by eight variables and five hypotheses. The measurements of the Drivers of SCC are modelled as a causal variable, while SSCM practices and the performance measurements are modelled as causative variables. The framework explores the predicted correlations between the parameters. The design makes it possible to investigate the isolated and cumulative effect of SCC drivers on SSCM practices on one hand and SSCM practices on performance outcomes (operational performance, environmental performance and financial performance) on the another.

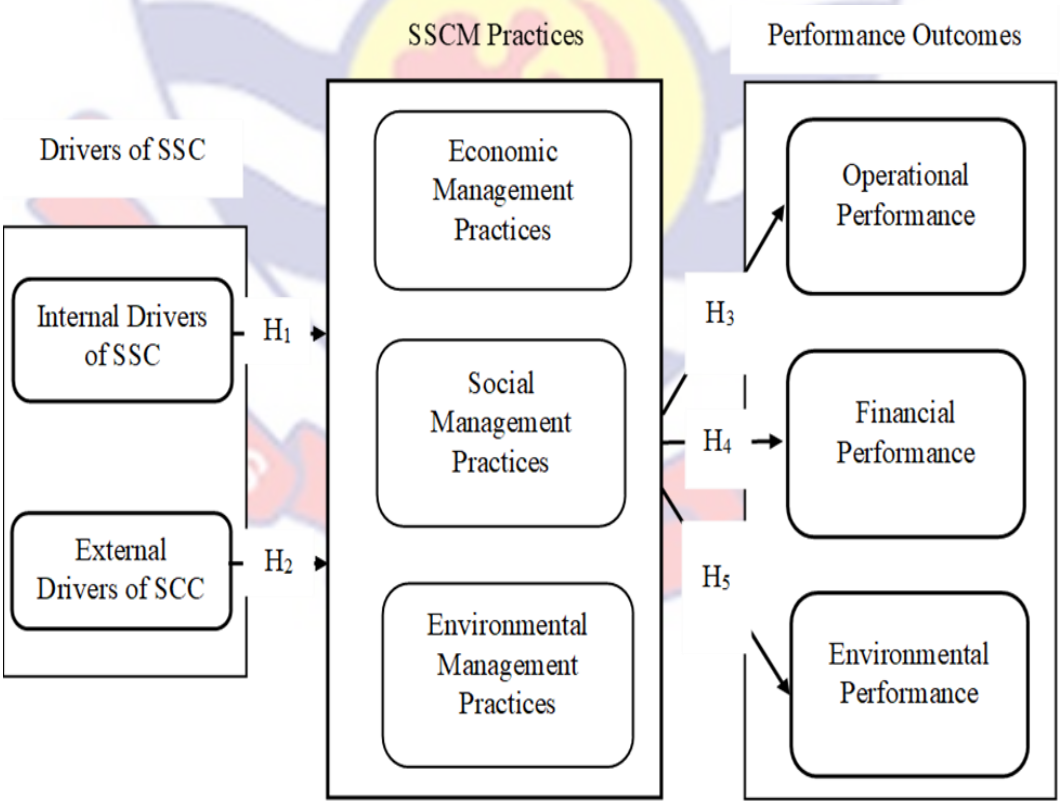


Figure 2: Conceptual Model

Source: Researcher's Construction (2022)

Chapter summary

This chapter presents the theories that form the basis and explain sustainable methods of managing supply network, their drivers, and specific expected outcomes, as well as the induced hypotheses that guide the quantitative phase of the study to address gaps in past scholarly work and superior understanding on the subject. This chapter also presented various concepts on the drivers of supply chain sustainability (internal and external), the implementation of SSCM practices (economic, social, and environmental management practices), and performance outcomes and their dimensions. In addition to the various conceptual interpretations, the section extensively covered the relevant available literature. Finally, the chapter emphasizes the relevance of model development that explains how, on the one hand, SSC drivers (internal and external) improve the implementation of sustainable methods of managing supply chain and, on the other hand, SSCM methods improve the individual dimensions of performance outcomes (financial, operational, and environmental).

CHAPTER THREE

RESEARCH METHODS

Introduction

This chapter examines the systematic techniques applied to meet the study's objectives. This chapter will look at how the drivers of SSC effect SSCM practices on the one hand and how those SSCM practices, in turn, affect the performance of firms in Ghana's upstream oil and gas sector, on the other hand, using the TBL concept of sustainability. This chapter discusses the research methodology, design of the study, research strategy, focus of the study, population, sampling and sample size, instruments, validity, and reliability. The chapter also discusses datasets, data collection, analytics, and presentation methodologies.

Research Paradigm

This inquiry uses a positivist research perspective, which allows the researcher to grasp the concepts within explanatory casual boundaries (Rahi, 2017; Orsini, 2002). This approach, according to advocates of the positivism philosophy, comprises performing investigations into a content and social phenomenon and generating inferences and analogies (Cooper & Schindler, 2008). The positivist philosophy, specifically, comprises data gathering, data analysis employing statistical tests of significance, and the presenting quantitatively articulated findings. These data are then extensively examined to see whether they are meaningful enough to either approve or oppose the study's propositions.

The positivist research philosophy was chosen over other research philosophies such as the interpretive, realistic, and pragmatist because

positivism holds that only factual knowledge gained through observation, including measurement, is trustworthy (Kankam, 2019: Taylor & Medina, 2011). That is, it asserts the existence of broadly accepted realistic objectives governed by universally recognized laws and methodologies, and as such, these objectives are factual. As a result, the study assumes that objective answers to specific questions will be produced by employing scientific and technical methodology, resulting in scientific and evidence-based decision making.

Research Approach

According to Saunders et al. (2007), the quantitative research method is used in the positivism research paradigm so this research approach will be used in this study. As expressed by Creswell (2014), quantitative research entails studying the state of phenomena and interactions among variables to evaluate objective theories. The data should be measured quantitatively because examining links between variables necessitates statistical procedures (Creswell, 2014). Quantitative researchers construct models based on assumptions, build bias safeguards, control for alternative explanations, and eventually generalize and replicate findings (Creswell, 2014).

The quantitative nature of the collected data (Kumar, 2012), the processing and analysis of the collected data using statistical tools (Shiau et al., 2019), and the nature of research aims, theoretical presumptions, and the adopted methodological approaches all influenced the choice of this approach (Viotti & Kuappi, 2019; Qian et al., 2020). According to Zyphur and Pierides (2020), quantitative research uses deductive reasoning to draw inferences

about the population based on statistical tests of hypotheses from sampled participants.

Research Design

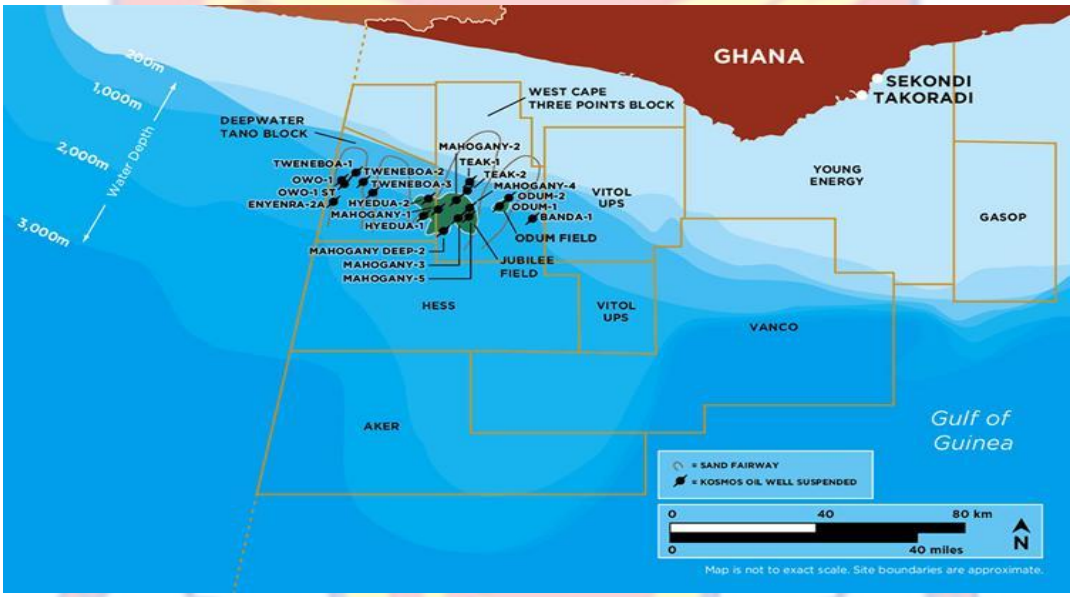
The explanatory research design was used to evaluate the statistical effect of SSC drivers on SSCM practices implementation on the one hand and SSCM practices on Performance outcomes on the other of firms operating in Ghana's upstream oil and gas sector. According to Bakhsh et al. (2019), it is a typical predictive-oriented experimental study in which changes in one phenomenon are credited to changes in another. Because the study is quantitative, the constructs had to be numerically measured to be subjected to statistical alteration via structural equation modelling (SEM).

On the one hand, the study treated SSCM practices as a dependent variable in the relationship between the drivers of SSC, with the drivers of SSC as the independent variable. On the other hand, the study treated performance outcomes as a dependent variable in the relationship between SSCM practices, with SSCM practices as the predictor variable. According to Birru et al. (2019), hypotheses in descriptive studies are specified in terms of the nature, direction, and significance of the relationship among the constructs being studied.

Study Area

Geographically, the western region was chosen for this study. The Western Region, which stretches from the Ivory Coast (Comoé District) in the west to the Central Region in the east, is located in southern Ghana. This region includes Cape Three Points, home to substantial upstream oil and gas operations, making it a suitable research location for the study. Because of the

discovery of oil, Ghana's Western Region has gained local and international recognition. It is made up of three parts: the capital and enormous twin metropolis of Sekondi-Takoradi on the coast, Axim just on coast, and a steep inland territory that includes Elubo. Within a 5,344-square-mile enclave, the region is divided into 22 administrative districts. The map below shows where significant upstream oil and gas activities occur.



F*igure 3*: Map showing the Area of Study

Source: Ghanaweb (2019)

Study Population

According to Creswell (2014), a research population is a full set of entities with specific attributes or characteristics. The participants for this study are the procurement and supply chain officers and or managers or individuals who serve in the capacity of procuring materials in cases where there are no permanent procurement officials of the firms operating in the upstream oil and gas sector in Ghana and their logistics and supply partners registered with the Petroleum Commission of Ghana. According to the petroleum register prepared by Petroleum Commission, there are currently 849

firms operating in the upstream oil and gas industry, consisting of 16 Operators with Petroleum Agreements over 18 Contract Areas and 833 subcontracting firms. These Operators are in varying stages of their respective agreements ranging from exploration to production and supportive services.

Table 10: Target population of the study

Activity	Number of Firms
Major Operators	16
Subcontractors	833
Total	849

Source: (Petroleum Commission Register, 2021)

Sampling Procedure

Before actually finding and interviewing respondents for the study, a suitable and reflective sample size had to be ascertained based on the sampling frame. Since the population under study is seen as a single unit (homogeneous), the study employed a simple random sampling technique. This strategy was used to ensure that all respondents had an equal chance of being chosen for the research, avoiding bias and guaranteeing that the data acquired is of high quality, i.e., the informant's dependability and competency (Zhao, Liang & Dang, 2019). The study employed a sample size of at least 260 firms (mostly supply chain managers, owners or any other official mandated to undertake the function of procurement and supply on behalf of these firms) out of the 846 firms on the PC register as of November 2021, using Adam (2020) sample size determination table determination at a confidence interval of 95%, a significant level of 5% and an estimated effect size of 0.05.

The sample size for PLS-SEM was also examined to ensure that it corresponded to the suggested research model. Acquah (2020) and Hair et al. (2012) established the fundamental conditions for assuring sample adequacy in a PLS-SEM model; that is, the minimal sample size, according to these authors, should be equal to ten (10) times the maximum number of structural routes aimed towards a particular dependent variable(s) in a given model. The maximum number of structural routes aimed towards a specific dependent variable in the structural framework for this study is 5. As a result, the minimal sample size is $5 \times 10 = 50$, implying that 261 respondents used to make the model correct and statistically meaningful.

Data Collection Instrument

In this study, a structured survey questionnaire was the only tool used for collecting data. The use of a survey questionnaire allowed the study to obtain more accurate information for answering the research questions and deciding whether to reject or not reject the research hypothesis, which is consistent with Cln (2013) opinion that questionnaires permit wider coverage for a minimum expense both in money and effort. This study adopted and modified the survey questionnaire from a few authors, using the research objectives as a guide and some findings from the literature. The table below (Table 11) presents the various sources.

Table 11: Sources of questionnaire data

Constructs	Measurement	Source
Internal Drivers of Sustainable supply chain	Managerial Attitude, Top Management Support and Employee Support	(Emamisaleh & Rahmani, 2017; McFadden et al. 2009 Defee et al., 2009; Paulraj, 2004.
External Drivers of Sustainable supply chain	Mimetic Pressure, Coercive Pressure and Normative Pressure	Zsidisin et al., 2005; DiMaggio & Powell, 1983; Emamisaleh & Rahmani, 2017; Acquah et al., 2020)
Sustainable supply chain management practices	Environmental management practices, Social management practices and Economic management practices	(Das, 2017)
Performance outcomes	Financial performance, Operational performance and Environmental performance	(Inman & Green, 2018; Das, 2018; Çankaya & Sezen, 2019; Acquah et al., 2020; Agyabeng-Mensah et al., 2020; Baah et al., 2020)

Source: Researcher (2022)

The questionnaire was divided into four (4) sections, with Section A gathers the data on the company parameters and demographic aspects of the participants. Section B included queries regarding the first and second goals regarding SSC drivers (internal and external). Section C included question items on the third, fourth, and final objectives in connection to SSCM practices, and finally, Section D had questions about firm performance metrics. On a 7-point Likert scale, participants were requested to rate their

level of agreement with each query item, with 7 (Strongly Agree) as the greatest degree of agreement and 1 (Strongly Disagree) as the minimum level of consensus (See Appendix A). The utilization of a structured questionnaire simplified, facilitated, and increased the statistical power of data gathering and analysis (Nyarku et al., 2018). The table below (**Table 12**) summarizes the constructs, their dimensions, and the number of objects used to measure them.

Table 12: Summary of constructs, dimensions, measurement items and the number of questions used in measuring the items.

Constructs	Dimensions	Measurement items	Number of questions
Drivers of SCC	Internal drivers	Managerial Attitude	4
		Top Management Support	3
		Employee Motivation	3
	External drivers	Mimetic Pressures	3
		Coercive Pressures	5
		Normative Pressures	5
SSCM Practices	Environmental	Environmental Management Practices	5
	Social	Social Management Practices	4
	Economic	Economic Management Practices	5
Performance Outcomes	Operational	Operational performance	5
	Financial	Financial performance	5
	Environmental	Environmental performance	5
Total Questions			52

Source: Researcher (2022)

Data Collection Procedure

An introduction letter and ethical clearance letter were acquired from the Department of Marketing and Supply Chain Management and UCC IRB, respectively, prior to the data collecting effort, which was then delivered to the Petroleum Commission (Takoradi Office) and the different upstream oil and gas enterprises registered with the Petroleum Commission. This was done to secure approval from the necessary authorities to conduct the data gathering activity. The survey questionnaire targeted the supply chain professionals or persons in charge of procurement within the individual firms operating in the upstream oil and gas industry, from junior to top management levels. The researcher personally distributed the printed survey questionnaires or emailed them to responders upon request by the respondents' firms. The suitability and cost-effectiveness of these methods were factors in their selection.

This exercise commenced on 25th May 2022 and ended on 8th July 2022, from GMT 9:30 through to GMT 16:00, to achieve a high and timely response rate. However, the study encountered significant problems, including the unwillingness of certain respondents to participate in the research for various reasons, such as confidentiality concerns, restrictive work schedules, and the covid-19 restrictions. In addition, some respondents flatly refused to participate in the exercise, citing strong organizational standards and ethical codes of behaviour.

Data Processing and Analysis

The data acquired during the data collecting activity was subjected to thorough verification to ensure that any errors caused by incomplete or incorrectly answered questionnaires were deleted. Microsoft Excel 2019 was

used for data preparation and capturing, and unique codes were thoroughly assigned to the reviewed data to eliminate missing values. To experimentally validate the suggested research model (Kendal's Coefficient of concordance), partial least squares structural equation modelling (PLS-SEM) was used through Smart PLS 3.3.3 computer software program and Statistical Package for Social Sciences (SPSS). The collected data was analyzed using descriptive and inferential statistical tools, and the findings were presented in tables and figures.

The descriptive statistics, which included "means, standard deviations, and item loadings," were analyzed using the SPSS Software, whilst the inferential statistics, which included multiple regressions, were analyzed using the Smart PLS Software. It is worth mentioning that PLS-SEM was used to examine all of the study goals, considering the nature of the research questions. According to Acquah (2020), SEM is a second-generation multivariate data analysis technique that allows a researcher to determine the relationships that exist not only between several independent variables and a dependent variable but also between an independent variable and a dependent variable or several dependent variables. As a result, structural equation modelling was chosen for this study's analysis. In this study, data were analyzed using SEM and are further explained in the assessment method.

Assessment Method

The reflective measurement model is used in this study because the latent variables in this model are regarded as fundamental causes of the observable variables (Hair et al., 2012). For example, the latent construct - SSC drivers may lead to the formation of seen constructs such as the

implementation of SSCM practices, which accounts for variations in overall performance. As a result, the PLS-SEM approach is currently used in various social science domains. Recent research has sought to use SEM approaches in Consistent PLS-SEM estimation to preserve PLS-SEM's flexibility in defining the appropriate and processing complicated models while producing comparable results to CB-SEM (Cheah et al., 2018). As a result, for the path analysis of the research model, this study employs a Consistent PLS-SEM technique with SmartPLS software. Using consistent PLS-SEM aligns with a solid theoretical foundation and valid prior empirical data. Using the critical indicators, the construct reliability and validity are first assessed.

Validity and Reliability

A study must collect empirical findings that reflect the reality of the issue. Researchers must ensure that data is readily available and relevant to the study topics (Saunders & Lewis, 2009). As a result, using the concepts of validity and reliability is the best method to analyze a primary data source. The validity, on the one hand, deals with trustworthiness, or how well a study's results match with reality, and reliability, on the other hand, assesses the amount to which data collecting can be trusted (Ronkko & Evermann, 2013).

The following analytical validity and reliability checks were used to confirm the robustness of the results. Harman's (1967) single-factor approach using SPSS was employed to examine Common Method Variance (CMV) and the use of Structural Equation Modelling (SEM) to examine Variance Inflationary Factor (VIF). Confirmatory Factor Analysis (CFA) and cross-loadings were used to assess content validity. The average variance extracted

(AVE) was used to test convergent validity. The Heterotrait-Monotrait (HTMT) ratio of correlations was used to test discriminant validity. In addition, the model's predictive significance was assessed using PLS- SEM's Goodness of Fit (GoF) (Tenenhaus et al., 2005). The table below (**Table 13**) presents the study's specific objectives, the analysis tool used for measuring these objectives, and the data source for the analysis.

Table 13: Summary of Objectives and measurements

Objectives	Measurement	Data Source
1. Ascertain the extent to which of internal drivers of SSC affect SSCM practices.	Structural Equation Modeling	Administered questionnaire
2. Ascertain the extent to which external drivers of SSC affect SSCM practices.	Structural Equation Modeling	Administered questionnaire
3. Assess the effect of SSCM practices on operational performance	Structural Equation Modeling	Administered questionnaire
4. Assess the effect of SSCM practices on financial performance.	Structural Equation Modeling	Administered questionnaire
5. Assess the effect of SSCM practices on environmental performance	Structural Equation Modeling	Administered questionnaire

Source: Researcher (2022)

Ethical Consideration

Patten and Newhart (2017) posit that the primary ethical considerations that must be considered in every research are voluntary involvement, the right to privacy, anonymity, and information secrecy. As a result, all efforts were directed toward ensuring that these ethical concerns were adequately addressed. Before beginning the data gathering process, all necessary approvals were obtained from all competent authorities. For voluntary participation, all respondents could participate in the data gathering process without being coerced freely. Furthermore, the privacy problem was addressed by enabling respondents to complete the surveys independently and asking them to leave unanswered comments unaddressed until additional explanations and clarifications were provided through their convenient medium.

Anonymity was addressed by prohibiting respondents from revealing personal bio information on the questionnaire, such as name, age, contact numbers, and so on. The study secured information confidentiality by ensuring that the information supplied was kept secret. None of their names or information submitted would be leaked to the public domain or used for any reason other than the study's aims. Finally, to prevent an ethical issue of plagiarism, all relevant documents accessible and used for this study were correctly referenced. Considering these, the study addressed all vital ethical concerns.

Chapter Summary

This chapter covered the study technique and methodologies used to empirically investigate the linkages between sustainable supply chain management practices, its antecedents, and the performance outcomes

connected with its implementation. It covered, among other things, the research philosophy, research design, study area, population, sampling procedures and sample size, data collecting instruments, and data analysis tools and methodologies. The nature of the measurement method used for measuring the items that tested the "constructs and variables" alike was discussed in terms of the data analytical tools suited for the study. These were carefully chosen to guarantee that appropriate procedures and methodologies were chosen coherently, ensuring not just conformity with the research goals but also avoiding the use of inappropriate and inconsistent approaches for the study.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

Introduction

On the one side, the study looks at the relationship between the Drivers of SSC and SSCM Practices, and on the other, the link between SSCM Practices and Performance Outcomes. This chapter summarizes the research findings derived from a statistical assessment of the study's objectives using SPSS and PLS-SEM, as well as the methods used in the previous chapter. The response rate, demographic features of the respondents, and descriptive analysis are all discussed in this chapter.

Response Rate

All procurement officials, owners/CEOs/MDs, or any other officer in charge of procurement of companies operating in Ghana's upstream oil and gas supply chain provided responses that were used for the study's analysis. The sample size was minimum of 260 people, which was kept above for adequate representation. Thus, 265 questionnaires were distributed, with 261 being filled and received, representing a 98.5% response rate. This response rate was deemed adequate based on Mugenda and Mugenda (2008)'s claim that a response rate of 50% is sufficient for quantitative analysis. This percentage might be attributable to the data collection instrument being self-administered (Drop-and-pick technique). The success rate is shown in the table (Table 14) below.

Table 14: Summary of Response Rate

Questionnaire	Count	Percentage (%)
Filled	261	98.5
Unreturned	4	1.5
Issued	265	100

Source: Fieldwork (2022)

Descriptive Results of Respondents

The nature of the respondents for this survey is described in this section. Because of the sensitive nature of the industry and to maintain anonymity, the survey questionnaire did not ask for personal information from respondents but attempted to get some basic information about the respondents' companies. Thus, the data collected few socio-demographic responses from the respective respondents. The succeeding table (Table 15) illustrates the outcomes of the socio-demographic information obtained from the respondents.

Table 15: Respondents' and Business properties

		Frequency	Percentage (%)
Gender	Male	158	60.5
	Female	103	39.5
	Total	261	100
Position	Owner/CEO/MD	60	23.00
	Procurement Officer	155	59.00
	Any other Official	46	18.00
	Total	261	100
Ownership Structure	Joint Venture	127	48.6
	Limited Liability Company	61	23.4

	Sole Proprietorship	47	18.00
	Others	26	10.00
	Total	261	100
Years of Existence	Below 5 years	61	23.4
	5 – 10 years	118	45.2
	11 – 15 years	51	19.5
	Above 15 years	31	11.9
	Total	261	100
Nature of Business operations	Exploration works	27	10.3
	Production works	37	14.2
	Supporting works and services	197	75.5
	Total	261	100

Source: Fieldwork (2022)

According to the table above (Table 15), 158 out of the total 261 respondents were males, accounting for 60.5% of the research participants, while the remaining 103 were females, accounting for 39.5%. These figures depict a male-dominated industry, which is common in previous research (cite some of these works). Again, the table summarises the respondents' current employment roles. It was shown that 60 (23.0%) of the respondents held the position of CEO, Manager, or Owner of their respective organizations. 155 participants or 59%, were stated to be Procurement Officers of their enterprises. In comparison, 46 participants or 18.00%, held positions other than the aforementioned job responsibilities but are responsible for purchasing and supplying for their respective businesses.

The table (Table 15) also included information about the participants' businesses. According to the table, 127 (48.6%) participants worked in commercial business, where two or more firms pool their resources to acquire

an operational and strategic advantage in the industry (Joint Venture). 61 (23.4%) of all participants work for corporations that are limited by liability (Limited Liability Company), whereas 47 (18.00%) work in "commercial organizations that are owned, managed, and controlled by a single owner (Sole Proprietorship)." Moreover, 26 (10.00%) out of the 261 respondents worked in other forms of business ownership not captured in this study (Wholly-State Owned). Again, as presented in table (Table 2), the significant proportion of 118 firms, indicating 45.2% of the participants, has been established for the past 5 to 10 years; 61 (23.4%) have been in operation for less than five years, 51 (19.5%) have been in action for 11 to 15 years, and the remaining 31 (11.9%) have been in survival for 15 years or more.

Finally, the table (Table 15) highlights the types of business activities carried out by participants' entities in the form of numbers and percentages. The summary, as presented in the table, revealed that 197 (75.5%) of the 261 firms undertake various supportive and servicing works in the upstream oil and gas industry, and 37 (14.2%) of these firms undertake multiple activities associated with the production of crude, while 27 firms, representing 10.3% of the total firms carry out the various exploratory works in the upstream oil and gas supply chain.

Descriptive Statistics of Constructs

This section discusses the variables by examining the accuracy of items measuring each of the constructs investigated, using the Seven-Likert Scale to measure the constructs. A numerical value of 3.5 would depict an average or neutral level of agreement. Confirmatory Factor Analysis was employed to examine the measurements of the constructs used in the study.

Descriptive Statistics of Internal Drivers of Sustainable Supply Chain (SSC)

As the sampling adequacy measure of Kaiser-Meyer-Olkin (KMO) was 0.929 with a total variance explained of 75.405% encompassing the whole variance accounted for by all factors (Williams et al., 2010), the sample size was therefore statically appropriate for factor analysis to be conducted. All ten items that measured Internal Drivers of SSC loaded over the limit of 0.70, with a mean more than 5.5 and Overall Mean = 6.056, indicating that the effect of internal drivers of SSC is substantial in general. Likewise, Bartlett's test indicated a statistically substantial result ($p=0.00 < 0.05$), indicating that the correlations between the items were insignificant. The factor analysis results for the internal drivers of SSC are presented in the table 16.

Table 16: Descriptive Statistics of Internal Drivers of SSC

Statement	Mean	Standard Deviation	Item Loadings
Managerial Attitude (MA)			
MA1	5.97	1.478	0.813
MA2	6.08	1.285	0.848
MA3	6.15	1.196	0.896
MA4	6.18	1.181	0.867
Top Management Support (TMS)			
TMS1	5.96	1.356	0.890
TMS2	5.99	1.358	0.864
TMS3	6.17	1.154	0.871
Employee Motivation (EM)			
EM1	5.91	1.399	0.908
EM2	6.00	1.399	0.878
EM3	6.15	1.195	0.839
Overall mean score			6.056
Total Variance Explained			75.407%
KMO			0.929
Sig. Value			0.000

Source: Fieldwork (2022)

Descriptive Statistics of External Drivers of Sustainable Supply Chain (SSC)

Bartlett's Test of Sphericity with p 0.000 is shown in Table 17. The results indicate that "the correlation matrix is not an identity matrix." The sample size was enough for factor analysis because the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.940 with a total variance explained of 70.96%, which includes the total variance explained by all other factors. All 13 items that tested External SSC Drivers loaded beyond the limit of 0.70, with a mean well over 5.5 and an Overall Mean = of 5.90, demonstrating that the influence of internal SSC Drivers is strong in general terms. Similarly, Bartlett's test yielded a statistically significant result ($p=0.00 < 0.05$), suggesting that the correlations between the items were not very substantial. The factor analysis results for External Drivers of SSC are seen in the table 17.

Table 17: Descriptive Statistics of External Drivers of SSC

Statement	Mean	Standard Deviation	Item Loadings
Mimetic Pressures (MIP)			
MIP1	5.94	1.237	0.758
MIP2	5.81	1.230	0.849
MIP3	5.93	1.140	0.868
Coercive Pressures (COP)			
COP1	5.86	1.237	0.796
COP2	5.80	1.285	0.855
COP3	5.84	1.146	0.855
COP4	5.87	1.127	0.871
COP5	5.93	1.092	0.845
Normative Pressures (NOP)			
NOP1	5.97	1.200	0.841

NOP2	5.87	1.206	0.859
NOP3	5.89	1.150	0.873
NOP4	5.94	1.120	0.856
NOP5	6.00	1.159	0.817
Overall mean score			5.90
Total Variance Explained			
70.96%			
KMO Measure			0.940
Sig. Value			
0.0000			

Source: Fieldwork (2022)

Descriptive Statistics of Sustainable Supply Chain Management (SSCM) Practices.

The table below (Table 18) summarizes the factor analysis findings for the constructs of sustainable supply chain management techniques. Abdi (2003) opines that proving that the correlation matrix is not an identity matrix signifies that all measuring items can form a construct since they have some type of a linear relationship with Bartlett's Test of Sphericity (Sig. =0.00 < 0.05). The sample size was adequate for factor analysis because the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.959 with a total variance explained of 75.172%, which contains the total variance estimated to account for by all elements, with all items measuring the construct loading above the critical amount of 0.7, mean higher than 5.5, and Overall Mean = 5.994 indicating that, the sustainable supply chain management practices measuring items are strong for further statistical analysis.

Table 18: Descriptive Statistics of SSCM

Statement	Mean	Standard Deviation	Item Loadings
Environmental Management Practices (ENP)			
ENP1	6.01	1.117	0.892
ENP2	5.95	1.132	0.845
ENP3	5.97	1.140	0.879
ENP4	6.01	1.102	0.858
ENP5	6.06	1.059	0.872
Social Management Practices (SMP)			
SMP1	6.02	1.194	0.870
SMP2	6.04	1.119	0.897
SMP3	6.03	1.134	0.893
SMP4	6.05	1.083	0.924
SMP5	6.12	1.090	0.897
Economic Management Practices (ECP)			
ECP1	5.89	1.180	0.808
ECP2	5.90	1.184	0.845
ECP3	5.96	1.082	0.852
ECP4	5.98	1.092	0.864
ECP5	5.92	1.182	0.782
Overall mean score			5.994
Total Variance Explained			75.172%
KMO Measure			0.959
Sig. Value			0.000

Source: Fieldwork (2022)

Descriptive Statistics of Operational Performance (OP)

The table (Table 19) reveals that the correlation matrix is unidentical with $p=0.00 < 0.05$, indicating that the elements can form an operational performance construct since they have some linear connection. The sample size was enough for factor analysis because the Kaiser-Meyer-Olkin measure

of sampling adequacy was 0.908, with a total variance explained of 86.291%, which includes the total variance accounted for by all factors. All indicators testing the concept loaded above the 0.7 minimum standard, with all means more than 5.5 and Overall Mean = 6.032, suggesting that the operational performance measuring indicators are robust enough for further statistical analysis.

Table 19: Descriptive Statistics of Operational Performance

Statement	Mean	Standard Deviation	Item Loadings
OP1	5.91	1.437	0.904
OP2	5.99	1.380	0.938
OP3	6.03	1.239	0.930
OP4	6.06	1.168	0.948
OP5	6.17	1.075	0.924
Overall mean score			6.032
Total Variance Explained			86.291%
KMO Measure			0.908
Sig. Value			0.000

Source: Fieldwork (2022)

Descriptive Statistics of Financial Performance (FP)

The table (Table 20) reveals that the correlation matrix is unidentical with $p=0.00 < 0.05$, indicating that the elements can form a financial performance construct since they have some type of a linear connection. The sample size was enough for factor analysis because the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.836, with a total variance explained of 86.90%, which includes the total variance accounted for by all factors. All indicators testing the concept loaded above the 0.7 minimum standard, with all means more than 5.5 and Overall Mean = 6.00, suggesting that the financial

performance measuring indicators are robust enough for further statistical analysis.

Table 20: Descriptive Statistics of Financial Performance

Statement	Mean	Standard Deviation	Item Loadings
FP1	5.76	1.659	0.909
FP2	6.01	1.317	0.943
FP3	6.04	1.198	0.958
FP4	6.19	1.165	0.918
Overall mean score			6.00
Total Variance Explained			86.90%
KMO Measure			0.836
Sig. Value			0.000

Source: Fieldwork (2022)

Descriptive Statistics of Environmental Performance (EP)

The table (Table 21) reveals that the correlation matrix is not identical, with $p=0.00 < 0.05$, indicating that the elements can form an environmental performance construct since they have some linear relationship. The sample size was enough for factor analysis because the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.912, with a total variance explained of 87.446%, which includes the total variance accounted for by all factors. All indicators testing the concept loaded above the 0.7 minimum standard, with all means more than 5.5 and Overall Mean = 6.21, suggesting that the financial performance measuring indicators are robust enough for further statistical analysis.

Table 21: Descriptive Statistics of Environmental Performance

Statement	Mean	Standard Deviation	Item Loadings
EP1	6.17	1.117	0.933
EP2	6.10	1.211	0.932
EP3	6.20	1.084	0.946
EP4	6.29	1.052	0.942
EP5	6.29	1.032	0.922
Overall mean score			6.21
Total Variance Explained			87.446%
KMO Measure			0.912
Sig. Value			0.000

Source: Fieldwork (2022)

Findings of the Study's Objectives

This section addressed the study's goal through critical analysis of the data obtained from the respondents. This was accomplished mainly through evaluating the PLS-SEM measurement model. The evaluation is a two-way process: firstly, providing the measurement model and then specifying the structural (Path) model (Hair et al., 2016).

Measurement model assessment

This entails evaluating the measuring items to confirm that they fulfil the primary metrics to ensure the robustness of the model (Hair et al., 2016).

Item loadings

Factor loadings indicate how closely items in a particular correlation matrix are related to a specific main component (Pett et al., 2003). Hair et al. (2014) state that all factor loadings must be 0.70 or above to ensure indication reliability. The indicators used in measuring the constructs all loaded over the acceptable minimum standard of 0.7 (ranging from 0.743 to 0.999), reflecting

the quality measures of the model's reliability. Therefore, the final model presented below (Figure 4) served as the foundation for further evaluation of the PLS-SEM.

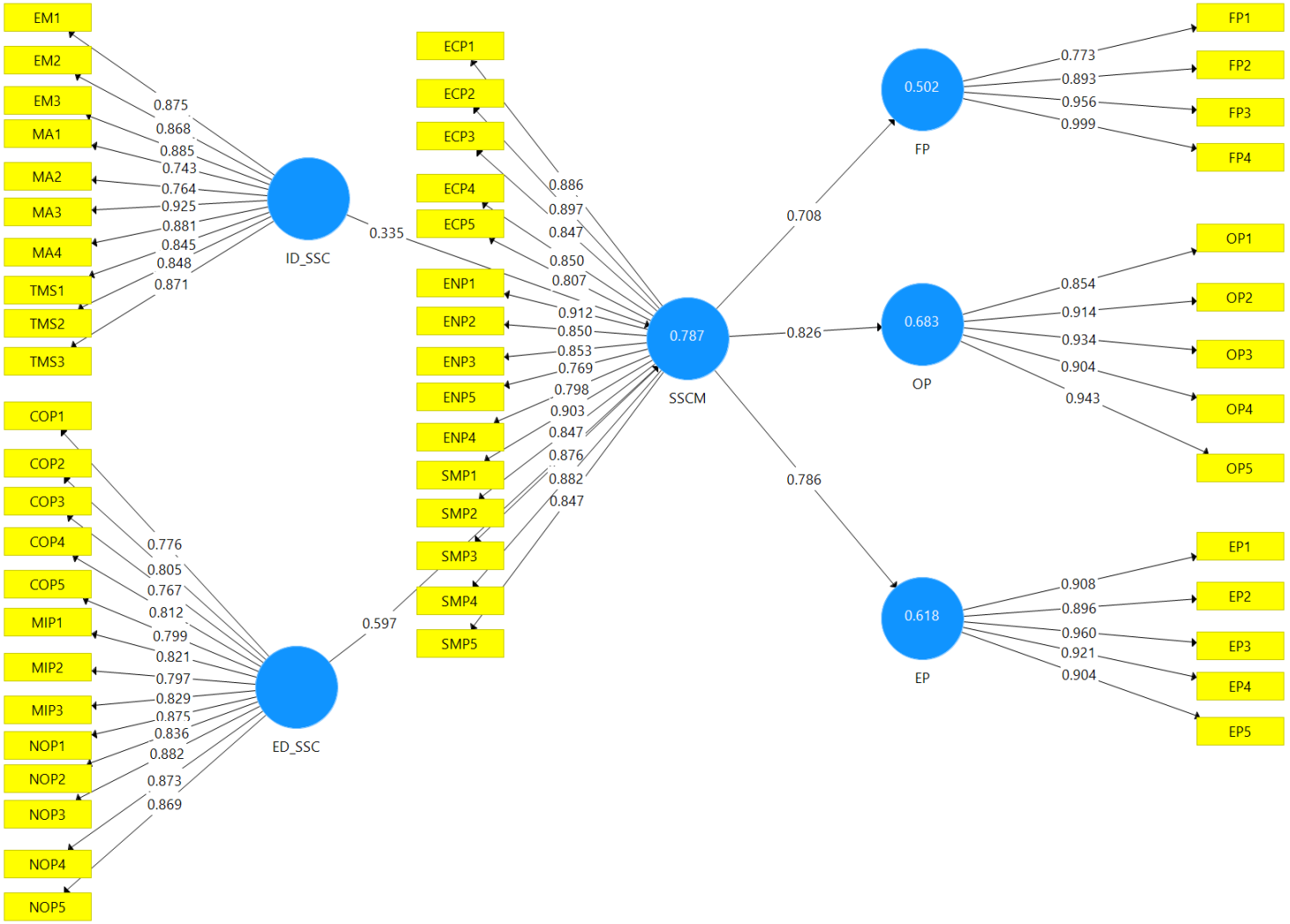


Figure 4: Measurement Model

Source: Fieldwork (2022)

Internal consistency reliability of constructs

A reliable indicator is consistent and can be replicated in multiple circumstances with the same results. The Cronbach Alpha (CA) and composite reliability (CR) are commonly used to determine the reliability of dependent variable, and they were utilized in this study. Table 22 displays the statistical results of the two-reliability metrics. The CA values varied from 0.950 to 0.976, while the CR scores ranged from 0.950 to 0.976. As a result, both dependability measures produced reliability statistics larger than the 0.70 indicated by Hair et al. (2014).

Reliability of indicators

A brief analysis of the item loading from the table (Table 22) revealed that the minimum cut-off of 0.7 was thus acceptable for the indicators (Henseler et al., 2009). All indicators used to measure the variables for this study loaded over the 0.7 minimal level as indicated by Hair et al. (2014), with the least item loading at 0.743 and 0.999 as the highest.

Convergent validity

Convergent validity refers to the degree to which different items agree or converge in their measurement of the same constructs (Mussel et al., 2018). The notion is that "there should be a large covariance between two or more indicators of a single construct for them to be valid measurement indicators for the construct", as defined by Bagozzi et al. (1991). The study used the technique proposed by Fornell and Larcker (1981) to test for convergent validity, which states that convergent validity is established when the AVE is at least 0.50. The convergent validity results based on the AVE are shown in Table 22. Convergent validity was not a problem in this research because all

AVE scores were greater than the suggested cut-off of 0.50. Table 22 shows the variables' AVE figures, ranging from 0.684 to 0.843.

Table 22: Validity and Reliability of Measurements Scale

Latent Variable	VIF (Outer)	Loadings	CA	rho_A	CR	AVE
Internal Drivers			0.964	0.965	0.964	0.726
Management Attitude (MA)						
MA1	4.460	0.743				
MA2	4.652	0.764				
MA3	5.349	0.925				
MA4	4.402	0.881				
Employee Motivation (EM)						
EM1	6.046	0.875				
EM2	4.937	0.868				
EM3	3.669	0.885				
Top Management Support (TMS)						
TMS1	5.002	0.845				
TMS2	4.405	0.848				
TMS3	4.589	0.871				
External Drivers			0.966	0.966	0.966	0.684
Mimetic Pressure (MIP)						
MIP1	3.152	0.821				
MIP2	4.160	0.797				
MIP3	4.347	0.829				
Normative Pressure (NOP)						
NOP1	4.224	0.875				
NOP2	4.275	0.836				
NOP3	6.241	0.882				
NOP4	5.464	0.873				
NOP5	6.290	0.869				
Coercive Pressure (COP)						
COP1	3.642	0.776				
COP2	4.806	0.805				
COP3	5.117	0.767				
COP4	7.044	0.812				
COP5	5.215	0.799				
SSCM Practices			0.976	0.977	0.976	0.732
Environmental Management Practices						
ENP1	5.019	0.912				

ENP2	4.341	0.850				
ENP3	5.718	0.853				
ENP4	5.101	0.798				
ENP5	4.892	0.769				
Economic Management Practices						
ECP1	3.657	0.886				
ECP2	4.601	0.897				
ECP3	5.819	0.847				
ECP4	5.251	0.850				
ECP5	3.028	0.807				
Social Management Practices						
SMP1	4.613	0.903				
SMP2	5.271	0.847				
SMP3	6.688	0.876				
SMP4	8.327	0.882				
SMP5	6.366	0.847				
Environmental Performance			0.964	0.965	0.964	0.843
EP1	5.403	0.908				
EP2	5.006	0.896				
EP3	6.478	0.960				
EP4	5.872	0.921				
EP5	4.490	0.904				
Financial Performance			0.950	0.958	0.950	0.826
FP1	3.898	0.773				
FP2	5.100	0.893				
FP3	6.891	0.956				
FP4	4.523	0.999				
Operational Performance			0.960	0.961	0.960	0.829
OP1	3.843	0.854				
OP2	5.483	0.914				
OP3	4.906	0.934				
OP4	6.466	0.904				
OP5	4.983	0.943				

Source: Fieldwork (2022)

Discriminant validity (DV)

Discriminant Validity analyzes the extent to which constructs differ statistically and substantially from other constructs in a given model (Acquah, 2020). As a result, constructs ought to be distinct since they assess diverse perspectives. Generally, there are three alternative criteria for evaluating a

model's discriminant validity: cross-loadings, the Fornell-Larcker criterion, and the HTMT ratio (Hair et al., 2019). It should be noted that the HTMT ratio is considered a consistent and robust quality metric of discriminant validity (DV) than the Fornell and Larcker (1981) criterion (Hair et al., 2014), and is therefore suggested for analyzing DV by Sarstedt et al. (2014). Thus, this study adopted the HTMT ratio in evaluating the discriminant validity. As shown by the HTMT estimates in Table 23, all of the correlations met the requisite values of 0.85 or 0.90, as indicated by Kline (2011) and Teo et al. (2008).

Table 23: Heterotrait-Monotrait Ratio (HTMT)

Constructs	EP	ED_SSC	FP	ID_SSC	OP
EP					
ED_SSC	0.725				
FP	0.849	0.676			
ID_SSC	0.785	0.796	0.817		
OP	0.850	0.760	0.887	0.869	
SSCM	0.785	0.862	0.704	0.808	0.825

Source: Fieldwork (2022)

It can be deduced from the table above (Table 23) that all of the values for each construct were less than the "HTMT.90 or value of 0.90". This strongly indicates that each construct was unique from the others, implying that no common method bias exists. Consequently, the measurement model findings support the PLS-SEM requirements of internal consistency reliability, convergent validity, and discriminant validity. The next paragraphs evaluate the structural model for analysing the research objectives.

Structural model assessment

The study analysed the hypothesised correlations between the predictor constructs and predicted constructs to validate the formulated hypotheses after assessing the measurement model to determine its efficacy. Hair et al. (2016) advocate collinearity evaluation, examination of the significance and relevance of the structural relationships, coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2) as the systematic strategy for evaluating structural model findings in PLS-SEM.

Common method variance assessment

The study used the variance inflation factor (VIF) statistic to assess indicator collinearity as prescribed by Hair et al. (2016) and Kock (2015). The VIF (outer) criterion is either claimed to be conservative, set at 5 (Hair et al., 2016), or excessive, set at 10. (Gomez et al., 2016; Asthana, 2020; Bossman & Agyei, 2022). According to Asthana (2020), multicollinearity exists when the VIF (outer) exceeds the rule of thumb value of 10. The indicator VIFs in the table (Table 22) above indicate that, given the limit of 10, none of the indicators suffered any form multi – collinearity, ranging between 3.028 and 8.327. Furthermore, Hair et al. (2016) state that VIF values (inner) greater than 5 in an independent variable should be regarded as important levels of collinearity.

This crucial degree of collinearity indicates multicollinearity among predictor variables, which makes assessing effective and robust PLS-SEM models difficult. The VIF values (inner) for the causative variables in this model range from 1.00 for SSCM practices to 2.728 for both internal and external drivers of SSC, as shown in the table below (Table 24). This verifies

that none of the independent variables in this model has a VIF score above the critical levels (VIF of 5.00), implying that the independent variables are not multicollinear.

Table 24: Collinearity of Constructs

Independent -> Dependent	VIF (INNER)
External Drivers -> SSCM Practices	2.728
Internal Drivers -> SSCM Practices	2.728
SSCM Practices -> Environmental Performance	1.000
SSCM Practices -> Financial Performance	1.000
SSCM Practices -> Operational Performance	1.000

Source: Fieldwork (2022)

Coefficient of determination (R^2)

PLS-SEM employs structural modelling to estimate the link between latent variables. The R^2 scores of a structural model are the often-used metric in analyzing its predictive potential. R Square (R^2) statistic represents the combined influence of the causative variables on the dependent variable. This number spans from 0 to 1, and the nearer the score is to 1, the higher the extraneous variable(s) predictive effect on the explained variable. The minimum acceptable level for the coefficient of determination is set at 10%, or 0.10 in numerical value (Chicco et al., 2021; Hair et al., 2016). The results presented in the table below (Table 25) indicate acceptable scores for R^2, that is 78.7% (0.787), 78.7% (0.787), 68.3% (0.683), 50.2% (0.502) and 61.6% (0.616) for the explained variables (SSCM practices, operational performance, financial performance and environmental performance) respectively, as displayed in table (Table 25).

Effect size (f^2)

The effect size is used to measure each external construct's impact on the indigenous construct's R^2 figures and mostly the Cohen (1992)'s f^2 is mostly used in calculating the effect size. The f^2 is calculated by measuring the variation in the coefficient of determination whenever a given explanatory construct is eliminated from the model. The effect size scores shown in table below (Table 25) indicated that internal drivers of SSC on SSCM practices (f^2 = 0.193), external drivers of SSC on SSCM practices (f^2 = 0.615), SSCM practices on operational performance (f^2 = 2.151), SSCM practices on financial performance (f^2 = 1.007) and SSCM practices on environmental performance (f^2 = 1.615), depicting a weak or small relationship between internal drivers of SSC and SSCM practices ($f^2 = 0.193 \geq 0.20$) , with the other four being considered as strong or large relationships (f^2 values greater than 0.08) (Hair et al., 2016).

Predictive relevance (Q^2)

Primarily, evaluating the predictive significance of a predictor construct on predicted constructs in PLS-SEM demands the use of Q^2 statistic. According to Hair et al. (2019), "Q^2 values greater than 0 suggest that the explanatory constructs are predictive of the explained construct". The table below (Table 25) presents the Q^2 predict scores for each of the explanatory variables on the explained variables as Q^2 = 0.555 for the relationship between both internal and external drivers of SSC and SSCM practices, Q^2 = 0.399 for the relationship between SSCM practices and operational performance, Q^2 = 0.546 for the relationship between SSCM practices and financial performance, as well as Q^2 = 0.501 for the relationship between SSCM practices and

environmental performance, which signify strong predictive relevance Henseler et al. (2009).

Table 25: Coefficient of Determination (R^2), Effect Size (f^2) and Predictive Relevance (Q^2)

	Exo	Endo	R^2	Adjusted R^2	f^2	Q^2
H_1	ID_SSC	SSCM	0.787	0.786	0.193	0.555
H_2	ED_SSC	SSCM	0.787	0.786	0.615	0.555
H_3	SSCM	OP	0.683	0.681	2.151	0.399
H_4	SSCM	FP	0.502	0.499	1.007	0.546
H_5	SSCM	EP	0.618	0.616	1.615	0.501

Source: Fieldwork (2022)

Significance and relevance of the structural model path coefficient

The structural model presented by hypotheses H_1 – H_5 from the table below (Table 26) demonstrates that the explanatory variables; effect of internal SSC drivers on SSCM practices, the impact of external drivers on SSCM practices, the effect of SSCM practices on environmental performance, the impact of SSCM practices on financial performance, and effect of SSCM practices on operational performance explained 33.5%, 59.7%, 82.6%, 70.8% and 78.6% respectively, and were deemed to be largely correlated by Cohen (1988). The t-statistic and p-values, as presented in the table below (Table 26), indicated that all factors investigated for this research were statistically relevant.

Again, the study's findings were reported using the t-stat values recommended by Hair et al. (2014). They proposed that t-stat values above

1.96 correspond to p-values < 0.05 and vice versa. The path coefficients, on the other hand, were examined using Cohen (1988)'s criteria. He suggested that correlation coefficients (R) of 0.10 represents weak or small correlation; a correlation coefficient of 0.30 represents a moderate correlation while correlation coefficient of 0.50 represents a large or strong correlation, thus the relationship between internal drivers of SSC and SSCM as moderate, with other four relationships depicting a strong correlation.

Table 26: Results of the Structural Model

	IND	DEP	Beta(R)	Std Dev	T- stats	P-value	Comment
H_1	ID_SSC	SSCM	0.335	0.060	5.543	0.000	Supported
H_2	ED_SSC	SSCM	0.597	0.063	9.549	0.000	Supported
H_3	SSCM	OP	0.826	0.034	24.025	0.000	Supported
H_4	SSCM	FP	0.708	0.049	14.457	0.000	Supported
H_5	SSCM	EP	0.786	0.047	16.665	0.000	Supported

Source: Fieldwork (2022)

Model fit assessment

This study evaluated the structural model fitness proposed by Hair et al. (2016) with absolute caution as directed by literature (Acquah, 2020: Hair et al. 2016). The SRMR is the first important structural model fitness measure in PLS-SEM. The model's SRMR score was 0.055, as presented in Table 27, which is between the acceptable range of 0.08 and 0.10, as suggested by Hair et al. (2016), with an NFI value of 0.726, which is closer to the threshold of 1.00, indicating a substantial near fit model. The summary of the model fit analysis is presented in the table below.

Table 27: Summary of the Model fit analysis

	Saturated Model	Estimated Model
SRMR	0.055	0.055
d_ULS	4.200	4.200
d_G	4.448	4.448
Chi-Square	4965.678	4965.678
NFI	0.726	0.726

Source: Fieldwork (2022)

Main Analysis

This section summarises the results of the connections presented in the table above (Table 26) and is used to analyze the various hypotheses. The findings were based on 5,000 bootstrap samples, which produced a two-tailed 95 per cent confidence interval (CI). A substantial association is defined by a CI that is greater than zero (Bossman & Agyei, 2022).

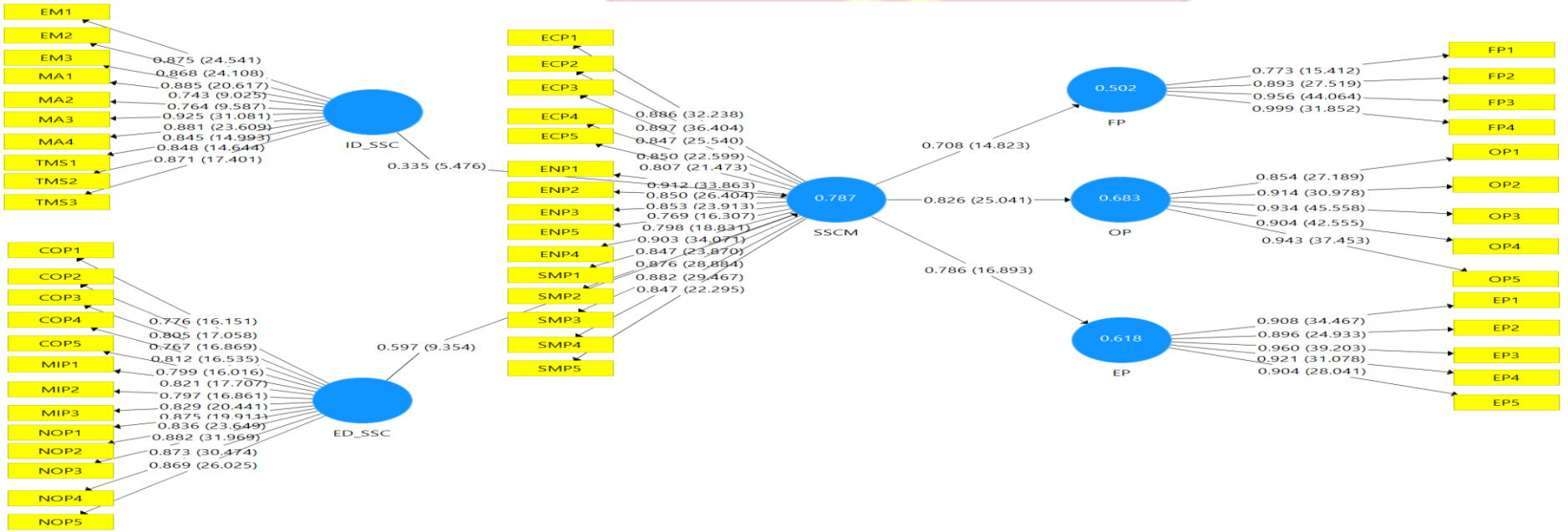


Figure 5: Results of the Structural Relationship

Source: Fieldwork (2022)

Effect of internal drivers of SSC on SSCM practices

The initial or first goal of this study was to ascertain the impact of internal SSC drivers (ID_SSC) as a component of SSC drivers on SSCM practices (SSCM) and test for the corresponding hypothesis (**H_1**): *Internal drivers of SSC have a favourable impact on adopting sustainable supply chain management practices*, as depicted in the figure above, was supported by a statistically significant positive correlation among the two constructs based on the PLS-SEM results displayed in the table (Table 13) above ($\beta = 0.335$; $t = 5.543$; $p = 0.000 < 0.05$). The t-stats score ($t= 5.543$) is higher than the permissible minimum criterion of 1.96 accounts for the acceptance of the null hypothesis. The Beta (β) result suggests that a component increment in the internal drivers of SSC will result in a 33.5% rise in SSCM practices. Again, as depicted in the figure above, the R squared value ($R^2 = 0787$) illustrates the extent to which internal drivers account for the variations in the SSCM practices. That is, 78.7% of the changes in SSCM practices are accounted for by internal drivers of SSC, with the remaining percentage accounted for by other factors not included in this study.

Effect of external drivers of SSC on SSCM practices

The second objective of the study sought to assess the effect of external drivers of SSC (ED_SSC), as the second component of the drivers of SSC on SSCM practices, with a hypothesized objective (**H_2**) to generate a *statistically favourable connection between external drivers of SSC and SSCM practices*, was confirmed by the result of the PLS-SEM analysis as displayed in the table (Table 13) above ($\beta = 0.597$; $t = 9.354$; $p = 0.000 < 0.05$). This is attributed to the model's t-statistic was $t = 9.354$, which was far more than the

1.96 minimum standard, and demonstrated a substantial influence of external SSC drivers on SSCM practices. It implies that an increase in the unit measurement of external drivers of SSC will lead to 59. 7% increment in the unit measurement of SSCM practices. The R squared value of $R^2 = 0.787$, on the other hand, means that external SSC drivers account for 78.7% of the variations in SSCM practices.

Effect of SSCM practices on operational performance

The third goal of the study was to examine the influence of SSCM practices on Operational performance, as a dimension of performance outcomes, after analyzing the effects of the two components of the drivers of SSC on SSCM practices with a hypothesized objective (**H_3**) to establish "*a positive relationship between SSCM practices and operational performance outcomes".* This hypothesis was accepted by the results of the PLS-SEM analysis presented in table (Table 13) above ($\beta = 0.826$; $t = 25.041$; $p = 0.000 < 0.05$). The reason for accepting this assertion is that the model's t-statistic value ($t = 25.041$) is greater than the minimum threshold for rejecting the null hypothesis as prescribed by Hair et al. (2014). It can be deduced from the Beta (β) value that a unit increase in SSCM practices will cause a whopping 82.6% rise in operational performance. The value of the R squared ($R^2 = 0.683$) means that 68.3% of the changes in the operational performance are explained by SSCM practices, with the remaining percentage not accounted for in this study.

Effect of SSCM practices on financial performance

Similar to the third objective, the fourth goal of this study was to assess the impact of SSCM practices on financial performance. As a result,

hypothesis (**H_4**) attempted to establish *a statistically favourable association between SSCM practices and financial performance*. However, the PLS-SEM results reported in table (Table 13) above validated this hypothesis (β = 0.708; t = 14.369; p = 0.000 < 0.05). This is attributed to the fact that the model's t-statistic was t = 14.369, which was far more than the 1.96 minimum standard, and demonstrated a substantial influence of SSCM practices on financial performance. The Beta score (β = 0.708) suggests that a unit increment in SSCM practices will account for a 70.8% increment in financial performance. The value of the R squared (R^2 = 0.502) means that 50.2% of the changes in the explained variable (financial performance) is accounted for by the explanatory variable (SSCM practices), with the remaining percentage not accounted for by this study.

Effect of SSCM practices on environmental performance

Like the third and fourth objectives of the study, the final target of the study aimed to evaluate the effect of SSCM practices on Environmental performance, with the hypothesized objective (**H_5**) to "*posits a positive relationship between SSCM practices and environmental performance"*. This hypothesis was accepted by the results of the PLS-SEM analysis presented in table (Table 13) above (β = 0.786; t = 16.893; p = 0.000 < 0.05). The reason for accepting this assertion is that the model's t-statistic value (t = 16.893), as shown, is greater than the minimum threshold for rejecting the null hypothesis as prescribed by Hair et al. (2014). It can be deduced from the Beta (β) value that a unit increase in SSCM practices will cause a massive 78.6% rise in environmental performance. The value of the R squared (R^2 = 0.618) means that 61.8% of the changes in the environmental performance is explained by

SSCM practices, with the remaining percentage not accounted for in this study.

Table 28: Decisions of the Hypotheses

Hypothesis	Paths	Results	Decision
H_1	Internal Drivers of SSC ➔ SSCM practices	Validated	Accept
H_2	External Drivers of SSC ➔ SSCM practices	Validated	Accept
H_3	SSCM practices ➔ Operational Performance	Validated	Accept
H_4	SSCM practices ➔ Financial Performance	Validated	Accept
H_5	SSCM practices ➔ Environmental Performance	Validated	Accept

Source: Fieldwork (2022)

Discussion of the Results

The results of the PLS-SEM analysis indicated that all five hypotheses are supported and are thoroughly discussed in the following paragraphs.

Effect of internal drivers of SSC on SSCM practices

The table (Table 27) shows that hypothesis (**H_1**), which shows the association between internal drivers of SSC (ID_SSC) and SSCM practices (SSCM), is substantially supported. Deducing on the above hypothesis, management of the upstream oil and gas firms must pay keen attention to the activities of the internal drivers of the sustainable supply chain like employee motivation, top management commitment and managerial attitude since it directly impacts the adoption of sustainable supply chain management practices. This outcome is consistent with the findings of Yadav et al. (2018),

Broccardo et al. (2019), and Emamisaleh and Rahmani (2017), with RBV as the theoretical backing linking explaining how the internal resources of an organization help in undertaking a strategic management practice (SSCM practices) to gain competitive advantage. However, the observations of Green et al. (2012) and Zailani et al. (2012) partially corroborate the premise that environmental and green buying positively relates to financial success, contrary to the findings of De Steur (2020) and Neri et al. (2018).

Effect of external drivers on SSCM practices

This study validated the second hypothesis (**H_2**), describing the association between External Drivers of SSC (ED_SSC) and SSCM practices (SSCM) as positively correlated. It, therefore, follows that management of the upstream oil and gas firms must pay keen attention to the activities of the external drivers of the sustainable supply chain like pressures from competitors (mimetic pressures), natives of where major upstream oil and gas operations take place (normative pressures) and government decrees (coercive pressures) as it has a significant positive effect on the adoption of sustainable supply chain management practices, as established by the institutional theory. This outcome is consistent with the findings of Ivic et al. (2021), Foerstl et al. (2015), and Emamisaleh and Rahmani (2017).

Effect of SSCM practices on operational performance

Hypothesis (**H_3**), which proposes a considerable positive link between SSCM practices (SSCM) and operational performance (OP), was adequately supported, as revealed in this study. This suggests to various managements that embracing SSCM practices (economic management practices, social management practices and environmental management practices) as a strategic

management practice, has a significant potential to enhance the internal and external operations of the respective firms, which affect the overall performance, as confirmed by the RBV theory. This conclusion is consistent with Magon et al. (2018), Saeed and Kersten (2019), and Naidoo & Gasparatos (2018) results, which confirmed a positive and significant correlation SSCM practices and Operational performance.

Effect of SSCM practices on financial performance

This study supports the fourth hypothesis (**H_4**), which postulates a positive link between SSCM practices (SSCM) and financial performance (FP). By implication, adopting SSCM practices (economic management practices, social management practices and environmental management practices) as a strategic management practice by managers of upstream oil and gas firms, has a significant potential of strengthening the financial position, which affects the overall performance, as established by the RBV theory. This inference is directly in line with the conclusions from Cantele and Zardini (2018) and Miras-Rodríguez et al. (2015) and is now in contention with the findings from Nizam et al. (2019) and Ameer and Othman (2012).

Effect of SSCM practices on environmental performance

As shown in Table 27, the final Hypothesis (**H_5**) describing the relationship between SSCM practices and Environmental Performance is validated. Based on the findings of the study, it can be concluded that when upstream oil and gas firms' management wants to improve its environmental performance, it should prioritize SSCM methods (economic management practices, social management practices and environmental management practices). Similarly, Yadav et al. (2018) and Naidoo and Gasparatos (2018)

found that SSCM techniques enhance environmental performance, using RBV theory as their philosophical justification.

Chapter Summary

Using the findings of the PLS-SEM analysis, this chapter assessed the study's aims and related them to more extensive literature. After completing multiple validity and reliability assessments to establish the robustness of the structural model, the results revealed a positive significant influence of the predictor factors on the predicted variables employed in the study. The next chapter contains the study's summary, suggestions, and conclusion.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Introduction

This chapter is essentially regarded as the research's conclusion. It, therefore, outlines the study's significance, research approaches used, findings of the analysis of the responses and practical recommendations for industry-level policymakers, as well as proposals for future relevant studies.

Summary of the study

The study's primary motivation was first to examine the influence of the drivers of sustainable supply chain on sustainable supply management practices on the one hand and determine the value of the adoption of the practice (SSCM practices) in the upstream oil and gas industry on the other, after a thorough analysis of existing knowledge of conceptual and theoretical philosophies surrounding the concept of sustainable supply chain. Precisely, the study sought to; ascertain the effect of internal drivers of SSC on SSCM practices and assess the effect of external drivers of SSC on SSCM practices on the one hand, and determine the effect of SSCM practices on operational performance, evaluate the effect of SSCM practices on financial performance and investigate the effect of SSCM practices on environmental performance on the other hand.

Accordingly, five hypotheses were developed and examined, using Smart PLS-SEM. The study adopted the positivist research paradigm and conducted an explanatory study, allowing the researcher to collect and analyse responses quantitatively. In all, a minimum of 261 firms were chosen as the respondents out of the total population of 849 upstream oil and gas firms on

PC's register using a simple random technique of sampling. 265 hard copies of the structured questionnaire were then distributed to these respondents. They were filled and completed by procurement officers, managers, owners or CEOs, or any other portfolio in the organization charged with the mandate to procure goods and services, out of which 261 were correctly completed and returned, further used for the analysis. These responses were analyzed using SPSS (for the descriptive statistics) and Smart PLS-SEM (for the inferential statistics). The summary of the specific objectives is presented in the subsequent sub-sections.

Conclusion

The objectives of this study were essentially divided into two parts: assessing the actions of SSC drivers on SSCM practices on the one hand and SSCM practices on performance results on the other. The summary of the findings is discussed in the subsequent paragraphs.

Internal drivers of SSC and SSCM practices

The findings of the study's first objective demonstrated a positive but moderate association between internal SSC drivers and SSCM practices, meaning that the greater the degree of internal SSC drivers' activities, the higher the adoption rate of SSCM practices. In other words, the more motivated employees (EM) are towards sustainability, total support of top management (TMS) for sustainable initiatives and effective managerial attitude (MA) towards SSC, the more likely organizations will implement SSCM practices across its entire supply chain. This shows that one of the impetuses for SSCM activities is internal SSC drivers like supporting or supplying the necessary SSC equipment to the frontline workers to help to

reduce environmental impacts and enhance operations of the entire supply chain. As a result, the substantial relationship between the two constructs supported the notion that internal SSC drivers favourably affect SSCM practices in the upstream oil and gas industry.

External drivers of SSC and SSCM practices

The second specific aim of this study's first set of objectives was to ascertain the impact of the external drivers of SSC on SSCM practices and its corresponding hypothesis of establishing a positive relationship between the two constructs. The findings indicated a positive and strong association between external drivers of SSC and SSCM practices, implying that the greater the degree of pressure from the local communities in which these firms operate (normative pressure), the complete application of sustainability laws by the mandated statutory organizations (coercive pressure) and high intensity of competitions among competing firms within the upstream oil and gas industry (mimetic pressure) for SSC standards, the higher the rate at which firms adopt SSCM practices. This clearly shows that external drivers of SSC are a major driver of SSCM practices. Consequently, this statistically significant association between these constructs validated the hypothesised relationship, which is in line with previous studies.

SSCM practices and operational performance

The third but primary goal of the second set of objectives was to establish the impact of SSCM practices on operational performance. The findings suggest that SSCM practices have a significant positive relationship with operational performance. This evinces that ensuring or adopting SSCM practices such as environmentally sustainable supply chain management

practices (ENP), socially sustainable supply chain management practices (SMP), as well as economically sustainable supply chain management practices (EMP) will lead to an increase or enhancement in the level of energy consumptions, decrease in fees for waste discharges and decrease in the cost of productions, which forms part of the day-to-day activities of the firm (OP). This outcome, therefore, validated the proposed hypothesis that SSCM practices positively influence operational performance and supports earlier findings of various SSCM authors, as indicated in the empirical review section of this study.

SSCM practices and financial performance

Similar to the third objective, the fourth objective of the study aimed to assess the effect of SSCM practices on the financial performance of upstream oil and gas firms. The results of the analysis supported the notion that SSCM practices positively affect financial performance, indicating that an improvement in the level of SSCM practices from the triple bottom aspect of sustainability (i.e., social, economic and environmentally sustainable supply chain management practices) of a firm will lead to a significant improvement in the revenue accrued, the interest gained on sustainable investment and growth in gross and net profits, as strong indicators of financial standings of a firm as argued for by the resource-based view and other relevant related literature. Though many findings on this objective are contrary to this finding, it is of the belief that SSCM practices significantly positively affect revenue, investment and profits in the long run.

SSCM practices and environmental performance

Likewise, the third and fourth goals, the fifth and final aim of the study, targeted to investigate the effect of SSCM practices on environmental performance, with its corresponding hypothesis that SSCM practices have a significant positive relationship with environmental performance. The findings of this study proved this assertion, showing a much appreciable positive impact on environmental performance, that is, a reduction in toxic discharge, reduction in the pollution of air, land and the sea, as well as the reduction of the frequent occurrence of environmental accidents by embarking on environmentally sustainable supply chain management (ENP), socially sustainable supply chain management practice (SMP) and lastly, economically sustainable supply chain management practices (EMP). This implies that an increase in the level of SSCM initiatives by a firm leads to an enhancement of its immediate surrounding in which it operates, as indicated by earlier sustainability scholars, with theoretical support from the resource-based view (RBV), which posits that an organization can gain improvement of its overall performance by assembling resources to undertake specific strategic management initiative such as the SSCM.

Therefore, it can be concluded that the activities of the drivers of SSC (internal and external) have a positive influence on the adoption of SSCM practices (social, economic and environmental) of firms on the one hand, and also deduced that a firm's performance (operational, financial and environmental) is hugely impacted positively by the adoption of SSCM practices. It should be noted that SSCM practices in the oil and gas sector is mostly long-term.

Implications of the study

Primarily, this explanatory study contributes significantly to the literature and provides realistic managerial insights into sustainable supply chain management.

Contribution to literature

This study examined the drivers (internal and external) of applying sustainable practices in the field of SCM, as well as the subsequent influence on business performance. There is literature on the subject of the SSCM, however, the field is still in its early stages, especially in developing economies and is addressed chiefly from a micro perspective, so this study explored the drivers and benefits (from the standpoint of firms) of SSCM practices from a more comprehensive perspective (i.e., the application of the TBL concepts of sustainability) with many prospects for professionals and supply chain scholars. This explanatory research also gives a comprehensive knowledge of the intricacies of upstream Oil and Gas operations necessary to promote the achievement of sustainable oil exploration in a supply chain management framework.

Managerial implications

This study has important management implications for Ghanaian enterprises and other emerging oil and gas countries. First and foremost, firms must recognize the possible significant consequence of SSC drivers (internal and external) on SSCM practices on the one hand and the consequences of such strategies on different measures of firm performance (operational, financial, and environmental) on the other, and be much more assertive in their implementation of such managerial practices. To improve the implementation

of SSCM practices, managers should boost their support for sustainable projects, urge staff to embrace sustainable standards, and carefully adhere to all local and international sustainability standards. Firms may increase the quality of their SSCM activities and overall performance by using these techniques and many more mentioned in this report.

Finally, managers of these organizations must recognize that they cannot pursue economically sustainable supply chain management practices while ignoring the social and environmental aspects and expect to improve performance; thus, sustainable initiatives such as SSCM must be tackled from a macro perspective in a balanced form over time before they can yield impactful results on overall performance.

Recommendations

In light of the conclusions, the researcher makes the following suggestions to business management and owners, as well as the authorities designated by law to regulate the actions of enterprises in Ghana's upstream petroleum industry. It is thus strongly advised that the managers of Ghana's upstream oil and gas resources pay close attention to the actions of the sustainability drivers (both inside and outside the organization) in guaranteeing the attainment of the SDGs as outlined by the UN. When the activities of the drivers are controlled and supported, the firm can meet all of its performance targets as stated in the research.

As previously said, a sustainable supply chain aids in regulatory compliance and long-term operations. Thus, if all three dimensions of sustainability (economic, social, and environmental) are properly balanced, unlimited crude extraction will not harm future generations. To minimize

interruptions, it is strongly advised that all players in Ghana's upstream oil and gas supply chain work together to achieve sustainable standards along the whole supply chain.

Suggestions for Future Studies

Even though the study provides valuable insights on supply chain sustainability in the upstream oil and gas sector from a comprehensive and broader perspective (TBL), it does not cover all aspects of the drivers of SSC, SSCM practices, and performance dimensions; thus, future research can focus on exploring more factors that facilitate the implementation of SSCM practices and their impact on other performance indicators such as CSR performance, etc. Future research should look at the role of SSCM practices in mediating the relationship between the drivers of SSC and performance outcomes.

Secondly, during the data collection period, it was discovered that the size of the oil and gas firms influences the degree of strategic initiatives undertaken by the firms; thus, future research should investigate the moderating effect of firm size in the relationship between SSCM practices and expected performance outcomes in Ghana. Finally, though the use of the quantitative method has a preferable advantage over the qualitative approach in terms of objectivity and predictive relevance, the findings would have been more accurate if it combined both quantitative and qualitative methods; thus, future research can conduct similar studies using mixed method approach to research.

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APPENDIX

Questionnaire

Dear respondent,

The objective of this study is to assess **how the activities of the drivers Sustainable Supply Chain affect Sustainable Supply Chain Management practices and how these SSCM practices affect Performance outcomes**. I, therefore, appeal to you to answer the following questions as cordially as possible. No form of identity will be disclosed and the information will be used for purely academic purposes.

Thank you in advance for your cooperation.

SECTION A: SOCIO DEMOGRAPHIC INFORMATION

These statements are about you. Kindly tick in the box [√] the answer that best describes your response in each of the states.

1. Gender: Male [ ] Female [ ]
2. Position: CEO/MD [ ] Supply Chain Manager [ ] Others [ ]
3. Ownership structure: Sole Proprietorship [ ] Company [ ] Joint Venture [ ] Others [ ]
4. Years of Existence: Below 5 years [ ] 5 – 10 years [ ] 11 – 15 years [ ] Above 15 years [ ]
5. Nature of business operation: Exploration works [ ] Production works [ ] Supporting works and services [ ]

SECTION B: Drivers of Sustainable Supply Chain

The following statements measure the **Drivers of Sustainable Supply Chain**. Please indicate the extent to which you agree to each statement by ticking [√] **only one** of each item.;

Strongly Agree (SA), Agree (A), Somewhat Agree (SWA), Neutral (N), Somewhat Disagree (SWD), Disagree (D) and Strongly Disagree (SD)

S/N	**INTERNAL DRIVERS OF SCC** (Emamisaleh & Rahmani, 2017; Defee et al., 2009; McFadden et al. 2009; Reed, 2002; Aragon-Correa & Sharma, 2003; Chen & Paulraj, 2004; Daily & Huang, 2001; Reed, 2002)							
MA	**Managerial Attitude**	**SA**	**A**	**SWA**	**N**	**SWD**	**D**	**SD**
MA1	Our senior managers believe that our company is likely to derive a benefit by implementing initiatives for productivity enhancements							
MA2	Our senior managers believe that environmental preservation is very important							
MA3	Our senior managers believe that social responsibility for strategic decision-making is of high priority							
MA4	Believe that it is important to improve the quality of life in respective local communities							
TMS	**Top Management Support**							
TMS1	Our senior managers support our efforts to improve the productivity of operations							
TMS2	Our senior managers allocate adequate resources to environmental programs							
TMS3	Our senior managers take part in local community outreach programs actively							
EM	**Employee Motivation**							
EM1	Our senior managers award shop-floor employees for their improvement in productivity							
EM2	Our senior managers support the efforts of shop-floor employees in order to reduce harmful environmental wastes							

EM3	Our senior managers motivate frontline employees to put forward suggestions which help reduce rework							
	EXTERNAL DRIVERS OF SCC (Zsidisin et al., 2005; Ketokivi & Schroeder, 2004; DiMaggio & Powell, 1983; Teo et al., 2003; Perez-Batres et al., 2011; Liu et al., 2010; Emamisaleh & Rahmani, 2017; Acquah et al., 2020)							
MIP	**Mimetic Pressures**	**SA**	**A**	**SWA**	**N**	**SWD**	**D**	**SD**
MIP1	When our major competitors make economic initiatives, customers perceive them to be useful							
MIP2	When our major competitors make environmental initiatives, customers perceive them to be useful							
MIP3	When our major competitors make social initiatives, customers perceive them to be useful							
COP	**Coercive Pressures**							
COP1	Governmental provisions demand us to comply with environmental protection							
COP2	Governmental provisions demand us to observe social justice							
COP3	Our major customers demand us to improve environmental functioning							
COP4	Our major customers demand us to improve social functioning							
COP5	Our parent company demands us to adopt social initiatives							
NOP	**Normative Pressures**							
NOP1	Sustainable initiatives have been greatly affected by labor unions							
NOP2	Sustainable initiatives have been greatly affected by trade associations							
NOP3	Sustainable initiatives have been greatly affected by local communities							
NOP4	Sustainable initiatives have been greatly affected by environmental interest groups							

NOP5	Sustainable initiatives have been greatly affected by employees' suggestions							

SECTION C: Sustainable Supply Chain Management Practices

The following statements measure the **Sustainable Supply Chain Management Practices**. Please indicate the extent to which you agree to each statement by ticking [√] **only one** of each item.;

Strongly Agree (SA), Agree (A), Somewhat Agree (SWA), Neutral (N), Somewhat Disagree (SWD), Disagree (D) and Strongly Disagree (SD)

S/N	**Sustainable supply chain management practices** (Das, 2017)							
ENP	**Environmental Management Practices**	**SA**	**A**	**SWA**	**N**	**SWD**	**D**	**SD**
ENP1	EMSs are in place in our organization in terms of ISO 14001 certification or any comparable EMS							
ENP2	We help suppliers set up environmental management system /get ISO 14001 certification.							
ENP3	We provide design specification to suppliers that include environmental compliance for purchased item.							
ENP4	We address environmental concerns of our customers in terms of eco-friendly design/distribution of products							
ENP5	We have successfully designed our products which consume reduced amount of input materials /energy.							

SMP	**Social Management Practices**							
SMP1	Our organization provides healthy and positive working environment for the employees.							
SMP2	The wages and perquisites given out to the employees are sufficient to meet their basic needs in our organization							
SMP3	The safety measures undertaken by our organization are quite advanced and reduce the risk to accident.							
SMP4	We provide employment/business opportunities to the surrounding community. We provide basic social facilities to the local community.							
ECP	**Economic Management Practices**							
ECP1	We attempt to achieve economies of scale in inbound and or outbound transportation							
ECP2	We have implemented lean production and follow it consistently to minimize waste.							
ECP3	We follow Scientific inventory control technique consistently to keep inventory under control							
ECP4	We facilitate our suppliers in carrying out Value Engineering to reduce the cost of components							
ECP5	We facilitate our suppliers implement TQM/Six sigma/TPM/TQC to build quality into the product or service							

SECTION D: Firm Performance Outcomes

The following statements measure the **Performance Outcomes**. Please indicate the extent to which you agree to each statement by ticking [√] **only one** of each item.;

Strongly Agree (SA), Agree (A), Somewhat Agree (SWA), Neutral (N), Somewhat Disagree (SWD), Disagree (D) and Strongly Disagree (SD)

S/N	**Firm Performance** (Inman & Green, 2018; Das, 2018 Acquah et al., 2020)							
OP	**Operational Performance**	**SA**	**A**	**SWA**	**N**	**SWD**	**D**	**SD**
OP1	Decrease in cost of materials purchased							
OP2	Decrease in cost of energy consumption							
OP3	Decrease in fee for waste discharge							
OP4	Decrease in the cost of production							
OP5	Improvement in the efficiency of inbound logistics.							
	Financial Performance (Çankaya & Sezen, 2019; Agyabeng-Mensah et al., 2020a, b, c, d, e; Baah et al., 2020; Acquah et al., 2020)							
FP1	Improvement in revenue							
FP2	Improvement in return on investment							
FP3	Gross profit growth							
FP4	Net profit growth							
	Environmental Performance (Inman & Green, 2018; Das, 2018 Acquah et al., 2020)							
EP1	Reduction in the discharge of toxic materials							
EP2	Reduction in the frequency of environmental accident.							
EP3	Reduction of air emissions							
EP4	Improvement of environmental compliance							
EP5	Reduction in health and safety incidences							

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INSTITUTIONAL REVIEW BOARD SECRETARIAT

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IORG #: IORG0009096

12TH MAY, 2022

Mr. Isaac Mensah
Department of Marketing and Supply Chain Management
University of Cape Coast

Dear Mr. Mensah,

ETHICAL CLEARANCE – ID (UCCIRB/CHLS/2022/13)

The University of Cape Coast Institutional Review Board (UCCIRB) has granted Provisional Approval for the implementation of your research **Sustainable Supply Chain Management Practices in the Upstream Oil and Gas Sector: Drivers and Performance Outcomes.** This approval is valid from 12th May, 2022 to 11th May, 2023. You may apply for a renewal subject to submission of all the required documents that will be prescribed by the UCCIRB.

Please note that any modification to the project must be submitted to the UCCIRB for review and approval before its implementation. You are required to submit periodic review of the protocol to the Board and a final full review to the UCCIRB on completion of the research. The UCCIRB may observe or cause to be observed procedures and records of the research during and after implementation.

You are also required to report all serious adverse events related to this study to the UCCIRB within seven days verbally and fourteen days in writing.

Always quote the protocol identification number in all future correspondence with us in relation to this protocol.

Yours faithfully,

Samuel Asiedu Owusu, PhD
UCCIRB Administrator

ADMINISTRATOR
INSTITUTIONAL REVIEW BOARD
UNIVERSITY OF CAPE COAST