EVALUATING THE EFFECT OF SUSTAINABLE PROCUREMENT ON SUPPLY CHAIN SURPLUS – THE MEDIATING ROLE OF GREEN SUPPLY CHAIN LEARNING

By

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APRIL, 2022
EVALUATING SUSTAINABLE PROCUREMENT ON SUPPLY CHAIN SURPLUS –
THE MEDIATING ROLE OF GREEN SUPPLY CHAIN LEARNING.

A CASE STUDY OF PHARMACEUTICAL FIRMS IN KUMASI

By

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A thesis submitted to the Department of Supply Chain And Information Systems,
School of Business, College of Humanities and Social Sciences, KNUST

in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

APRIL, 2022
DECLARATION

‘I hereby declare that this submission is my own work towards the “Master of Science in Logistics and Supply Chain Management” Degree and that, to the best of my knowledge and belief, it contains no material previously published by another person nor material which has been accepted for the award of any other degree of the University, except where due acknowledgement has been made in the text’.

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| Head of Department | Signature | Date |
ABSTRACT

Procurement is concerned with the identification and acquisition of materials, goods and services needed by an organization to support its operational activities towards the achievement of its corporate objectives. Procurement affects a firm’s financial performance to some extent since a greater portion of firms budget is spent on procurement of goods and service. Sustainable procurement is one of the key indicators for measuring organization’s economic, social, and environmental performance. Sustainable procurement is concerned with procurement of goods and services that are environmentally friendly. Sustainable procurement and green supply chain learning has impacts on supply chain performance in diverse ways. However, there was no literature on the effect of sustainable procurement on supply chain surplus or profitability on pharmaceutical companies in the Ashanti region of Ghana. This study seeks to evaluate sustainable procurement on supply chain surplus, and mediated by green supply chain learning. The findings revealed that both sustainable procurement and green supply chain learning have a positive and significant effect on supply chain surplus. Also green supply chain learning was found to play a positive and significant mediating role between sustainable procurement and supply chain surplus. Managers should understand that the pursuit of sustainable procurement is potentially beneficial to the organisation. Thus, incorporating sustainability strategies into the procurement system should not be seen as a burden, but rather an opportunity that has potential benefits for the organisation and the entire supply chain. The model is proposed and tested only on pharmaceutical companies. Future studies should test the model in other industries to examine how it compares. Cross industrial analysis may also be beneficial to knowledge development.
DEDICATION

I dedicate this thesis to the glory of God Almighty, whose grace and protection made it possible for me to complete this academic course. I also dedicate it to my wife, family and colleagues for their unwavering support throughout my entire period of education.
ACKNOWLEDGEMENTS

My foremost sincere gratitude is to God for His grace and favour throughout the period of my academic work. Special thanks also goes to my able supervisor, Dr. Seth Nkrumah for his excellent supervision, guidance and motivations which helped me to successfully complete this thesis; may the Lord continue to bless and keep him. I wish to express my appreciation to all my lecturers and other supporting staff for their tremendous contribution towards my education. I thank my wife, family and friends for their diverse contributions towards the fulfillment of this thesis. God richly bless you all.
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<tr>
<td>GSCL</td>
<td>Green Supply Chain Learning</td>
</tr>
<tr>
<td>LLCI</td>
<td>Lower Limit Confidence Interval</td>
</tr>
<tr>
<td>SC</td>
<td>Supply Chain</td>
</tr>
<tr>
<td>SCS</td>
<td>Supply Chain Surplus</td>
</tr>
<tr>
<td>SP</td>
<td>Sustainable Procurement</td>
</tr>
<tr>
<td>SSC</td>
<td>Sustainable Supply Chain</td>
</tr>
<tr>
<td>ULCI</td>
<td>Upper Limit Confidence Interval</td>
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<td>WCED</td>
<td>World Commission on Environment and Development</td>
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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In response to the sustainable development goal, the concept of sustainability has in recent times become paramount in all facet of organisational activities. According to World Commission on Environment and Development (WCED, 1987), sustainable development is about ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. With reference to the commercial environment, sustainability goals might be realized not only by the efforts of an organisation but also by the active involvement of the members of the whole Supply Chain (Kannan, 2021). Sustainable Procurement (SP) is therefore seen as very relevant to achieving sustainable development. Sustainable procurement is one of the sustainable supply chain (SSC) activities that encourages not only the focus business but also its supply chain (SC) units to work toward a common objective of a sustainability roadmap. According to Meehan and Bryde (2015), Sustainable Procurement has a significant influence on both product and labour demand in the economy.

A phrase used to characterize the value added by an organization's supply chain function is supply chain surplus, also known as supply chain profitability. Supply chain planning's ultimate purpose is to maximize supply chain excess. The quantity of supply chain surplus can be used to determine the success of a supply chain system and its future prospects (Bansal et. al., 2013). In order to maximize supply chain excess, every facility that has an impact on costs must be investigated (Shah, 2009).
Green Supply Chain Learning is key in procurement and supply chain. The procurement process is hinged on a very strong relationship between the seller and the purchaser. However, Green Supply Chain Learning appears to be a very key element in achieving sustainable procurement. Researchers have defined the concept in several ways. For instance, Muduli and Barve, (2011) cited by Padmalalitha, Rajeswari, & Vijaya, (2020) green supply chain learning includes acquiring eco-friendly inputs to disposal/reuse/recycle of used products. Green supply chain learning is about actions taken by firms to learn and share information relating to green practices across its supply chain. In the manufacturing industry protection of the environment and economic gains are connected to a firm’s ability to green the supply chain (Padmalalitha, Rajeswari, & Vijaya, 2020). Which means that firms must integrate green practices in their supply chain system towards the achievement of both economic and environmental sustainability.

1.2 Problem Statement

In the year 2002, it was recommended in the World Summit of Sustainable Development that governments and appropriate authorities at the local, national and international level should establish eco-friendly procurement policies and regulations (Islam et. al., 2016). This has for almost two decades awakened and heightened both academics and industries interest in the need to factor sustainable practice in procurement processes of businesses. According to the European International Contractors, (2004), SP plays a crucial role in achieving Sustainable Development. This is because Sustainable procurement practice incorporates social, economical, environmental and community factors in the purchase and sale of products (Islam et. al., 2016). Therefore, to be regarded as sustainable, the purchasing practices typically evaluate the supply chain and effects in regard to five aspects: environment, diversity, human rights, philanthropy and safety (Brammer and
Walker 2011, 422). In other words, sustainable procurement deals with managing all aspects of the upstream components of the supply chain to maximise triple bottom line performance (Sayed et. al., 2021).

According to Yu (2014), Supply Chain surplus serves as a criterion for assessing the progress of supply chain systems. It represents the value addition by supply chain function associated with an organisation. Supply chain surplus may be the value addition by supply chain function associated with an organisation. This could be presented mathematically as;

\[ \text{Supply chain surplus} = \text{Revenue generated from the customer} - \text{Complete cost incurred to provide and deliver the product or service.} \]

Sustainable Procurement has from the past decade receive much attention by researchers in the context of in-house and outsourcing implementation modes (Sayed, Hendry and Bell, 2020), buyer-supplier dyad relationships (Ghadimi, 2016), Sustainable procurement in Australia and UK Universities (Young, Nagpal and Adams, 2016), and sustainable procurement in the Canadian construction industry (Ruparathna and Hewage, 2015). However, the effects of sustainable procurement on supply chain surplus have been less researched. The extant work of Kim, Jeong and Jung (2012) revealed that sustainable supply chain has the potential to increase supply chain surplus of companies.

A careful observation from the procurement literature reveals the research on the concept of sustainable procurement have been relatively focused on advanced economies than in developing economies such as Ghana. Thus, this study would be amongst the first researches on the Sustainable Procurement and Supply Chain surplus nexus in sub-Saharan Africa and Ghana to be precise. The present will therefore examine the effect of Sustainable Procurement on Supply Chain surplus and also the mediation role of green supply chain learning on the Sustainable Procurement - Supply Chain surplus nexus.
1.3 Research Objectives

The main purpose of the study is to assess the effect of sustainable procurement on supply chain surplus. Specifically, the purpose of the study is guided by the following objectives;

1. Examine the effect of sustainable procurement on supply chain surplus.
2. To evaluate the effect of sustainable procurement on green supply chain learning.
3. To ascertain the relationship between green supply chain learning and supply chain surplus.
4. To determine the mediating role of green supply chain learning on the relationship between sustainable procurement and supply chain surplus.

1.4 Research Questions

1. What is the effect of sustainable procurement on supply chain surplus?
2. What is the effect of sustainable procurement on green supply chain learning?
3. What is the relationship between green supply chain learning and supply chain surplus?
4. What is the mediating role of green supply chain learning on the relationship between sustainable procurement and supply chain surplus?

1.5 Significance of the Study

The study will contribute to both literature and practice. The finding of the study will advance understanding of how sustainable procurement enhances supply chain profitability considering the mediating role of green supply chain learning.
Also, the finding of the study will draw managers attention to the need to focus on sustainable procurement practices as a means to enhancing green supply chain learning which will in turn improve supply chain profitability of organizations.

1.6 Scope of the Study

The scope of research defines the coverage area of the study. The present study is confined to examining the effect of Sustainable Procurement on Supply Chain surplus. The study will be conducted on Pharmaceutical Companies in the Ashanti region.

1.7 Overview of the Methodology

Quantitative research design will be employed to analyse and answer the various research questions of the study. Data will be drawn from 121 respondents from ten Pharmaceutical companies within the Ashanti region. Questionnaire will be the main data collection instrument. Data will be analysed using Statistical Package for Social Sciences.

1.8 Limitations of the Study

The study was limited to Ghanaian Pharmaceutical manufacturing firms with at least five years of experience in the industry, which are within the Ashanti region, and within Kumasi to be precise. Hence, the applicability of this research finding to organisations from different industry or sector should be careful done.
1.9 Organisation of the Study

The research will be divided into five chapters. The study's first chapter introduced the study by looking at the study's background, problem, research aims, research questions, significance, and scope. The study's second chapter will go through important literature and theories. The study's third chapter discussed the numerous methods and procedures that will be used in the research. The study's design, demographic, sample size and sampling methodology, data collection instruments, data processing method, and validity and reliability were all covered in this chapter. The presentation and discussion of the research findings will be the emphasis of the study's fourth chapter. The study's fifth chapter will summarize the findings, conclude, and offer suggestions.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter two of this work gives the related reviews of the conceptual, theoretical and the empirical literature to the topic under study. It gives the definitions of the variables under research, related theories and the empirical evidence propelled by other researchers with regards to the research topic. Three variables, namely, sustainable procurement, green supply chain learning and supply chain surplus coupled with the dimensions of the variables were defined in this chapter.

2.2 Conceptual Review

This section gives the definitions and the concepts of the variables under study. It defines the concepts of sustainable procurement, green supply chain and supply chain surplus. The section also defines procurement and sustainability.

2.2.1 Defining the concept of Procurement

The concept of procurement, according to Ezeanyim et al (2020) involves origination and acquisition of goods, works and services at the right time and price with the right quality and quantity through the process of identification of firm or individual needs, determination of sources, identification, evaluation and selection of the right supplier. In other words, procurement encompasses all the processes and activities that an organization go through, guided by the firm’s policy and compliance regulations, in order to purchase the inputs they need for operations.
According to Van Weele (2018) cited in Moshtari et al (2021), procurement involves communication and collaboration with internal buyers regarding specifications of products and services, sourcing, supplier and product evaluation, and contract and relationship management among other things. Procurement activities can be grouped into primary and secondary tasks. It concerns with the processes through which firms identify external sources of suppliers of goods, services and works and enter into contractual agreement with the supplier often through the process of tendering or competitive bidding. In other words, the procuring entity must match its needs with and external supply source, engage in negotiation and enter into contract with the successful supplier for supply of goods, services and works.

Procurement includes all the activities of a firm, which ensures the effective utilization of the limited or scarce resources available to the firm for the benefit of the company and its stakeholders (Mutangili, 2021). In other words, procurement activity involves the purchase of materials for reuse or service by an individual, private or government organisations for the benefit of the user(s) (Aigheysi & Edore, 2015).

For me, procurement is the function of an organisation, that ensures the purchasing and availability of needed resources at the right time and price, of the right quality and quantity and from the right source through the guidance of the organisation’s purchasing policy.

2.2.2 Definition of Concept of Sustainability

The concept of sustainability has in recent times become paramount in all facet of organisational activities. According to WCED (1987), sustainable development is about ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. With reference to the commercial environment, sustainability goals might be realized not only by the efforts of an organisation but also by the active involvement of the members of the whole Supply Chain
The Rio Summit in 1992 and World Summit for Sustainable Development in 2002 have encouraged the promotion of the concept of sustainable development as the combination social, environmental and economic considerations to make balanced judgement over the long-term (Kim, Jeong and Jung, 2012). According to Mc Williams et al. (2006), cited by (Kim, Jeong and Jung, 2012) sustainability has now become an important differentiator among competing firms in the market, and therefore corporate sustainability is now an in-interest area of study in the field of Strategic Management.

2.2.3 Definition and Concept of Sustainable Procurement

Sustainable Procurement is very crucial if sustainability development goals and objectives are to be achieved. According to Birkin et al. (2009) cited by (Meehan & Bryde, 2010) Business entities are now operationalising and integrating environmental aspect of performance that are in support of the triple bottom line (TBL) concept. Sustainable Procurement can be defined as program of activities which seeks to achieve sustainability development objectives through responsible buying and supply process (Journal of purchasing and supply management, 2012). According to Rajeev et al. (2015) Sustainable procurement includes all activities carried out by an organisation to satisfy its needs for goods, services, works and utility in a way, such that value for money is achieved on whole life basis with regards to the achievement of benefits not only to the organisation but also to the society and the economy, whilst minimizing damage to the environment. According to the European International Contractors, (2004), Sustainable Procurement plays a crucial role in achieving Sustainable Development. This is because Sustainable procurement practice incorporates social, economic, and environmental and community factors in the purchase and sale of products (Islam et. al., 2016). Therefore, to be regarded as sustainable, the purchasing practices typically evaluate the supply chain and its effects in regard to five

Sustainable procurement deals with managing all aspects of the upstream components of the supply chain to maximise triple bottom line performance (Sayed et. al., 2021). In other words, supplier’s activities must be sustainable. Sustainable Procurement is an act or an effort by a firm in an attempt to achieve sustainability development objectives through the means of purchasing and supply (Helen Walker, Stephen Brammer, 2012). This means that, firms, in their attempt to achieving economic and organisation goals must show positive attitude towards society and the environment through the acquisition of their inputs through responsible purchasing from suppliers who integrate sustainability in their activities. According to Walker and Bramme (2009) cited by (Journal of purchasing and supply management (2012) Sustainable procurement is in line with, and supports the principle of sustainable development objectives to maintain a strong, healthy and just society, living within environmental limits and promoting good governance. In other words, sustainable procurement seeks to create a polluted free environment and society for the betterment of mankind. To achieve sustainable development designing and implementing strategies organisations must do well to consider to include all members of its supply chain (Green et al., 1996, Nathan, 2005) cited by (Joanne Meehan & David Bryde, 2010). Which means that for a firm to formulate and implement a successful sustainable development objective, firms must collaborate and engage in learning process with its upstream and downstream member accurate data to formulate strategies. An effective collaboration with a company’s suppliers is very crucial towards the achievement of a better environmental performance by a firm by (Joanne Meehan & David Bryde, 2010). In other words, firms must work with its suppliers to reduce toxic waste. According to (Robinson, 2004, Sebastian, 2011 & McMichael et tal, 2003) cited by (Rajeev & Kasun, 2015) Efforts of combination from different disciplines is needed, in an attempt to achieve
sustainable development. Sustainable procurement is a potential multi-dimensional tool to help firms achieve that.

Based on the above definitions, the study defines Sustainable Procurement as the set of operational policies of a firm, which seeks to achieve economic benefits, and towards the creation of a better social and environmental conditions for mankind and nature.

2.2.3.1 Environmental Purchasing

Regulations and escalating awareness of consumers on the impact of manufacturing companies on the environment and society has informed and led most companies to respond by way of consideration of transforming their supply chain process (Louis Lu, Wu, & Ku, 2007). According to Koplin et al., (2007), Maignan et al., (2002) cited by (Stefan Winter & Rainer Lasch, 2016) responsibilities and accountabilities of companies stretches beyond just their internal practices to include their suppliers’ behaviours. Environmental Purchasing is about buying with social and ethical responsibility (Md. Mazharul Islam, 2017). It is concerns with how firms source their supplies from suppliers whose operations are consistence with sustainable development objectives in an attempt to improve upon society and the environment. It is concern with how a firm learn about the operations of its suppliers to ensure that, their operation is sustainable before purchasing from them. Sustainability has been embraced and considered by most companies and has resulted in these firms introducing supplier selection schemes, which includes environmental and social criteria in their engagement with suppliers (Seuring and Muller, 2008) cited (Md. Mazharul Islam, 2017). Many companies have come to understand the value and benefits of sustainable actions or purchasing by (Md. Mazharul Islam, 2017), and the competitive advantage they enjoy as a result of behaving responsibly (Seuring and Muller, 2008) by
producing products differentiation and market position improvement (Polonsky and Jevons, 2006). According to Wu and Dunn (1995) and (Porter 1985) cited by (Louis Lu, Wu, & Ku, 2007) all the members of the supply chain should be involved in reducing the focal firm’s total environmental from start to finish and throughout the product life cycle.

Environmental purchasing therefore means that companies exhibit responsible behaviour in sourcing or dealing with suppliers.

2.2.3.2 Diversity

The intense competition within the business environment makes it difficult for SMEs, Minority business enterprises and the women own business enterprises to compete for procurement contracts, but this unfavourable situation has a negative effect with respect to the achievement of sustainable development goals. Diversity is one of the ways to resolve the situation.

Procurement Diversity is in consistence with sustainable development goals, and it is one of the many means through which organisations can act sustainably towards the society, and involves companies procuring from local suppliers, SMEs, Minority and Women own business enterprises. According to Mayoux, (2001) cited by (Barbara Orser and Allan Riding, 2017) one of the sure mechanisms through which we can deal with and to redress the perceived market failures such as discrimination and economic exclusion is procurement. In other words companies engaged diversity procurement supports the sustainability of the society or the social economy. Most companies are now considering procurement diversity as a procurement policy knowing the benefits of dealing with minority enterprises, and according to (Carter, Auskalns, and Ketchum, 1999) cited by Augustine, Matthew, ‘Minority Business Enterprises (MBE) and Organizational Diversity Procurement Programs, a company’s reputation is enhanced as an ethical entity when it
procures diversely and this can have a positive impact on the entity’s market position. Organisations should therefore design preferential procurement programs supports and encourages diversity.

2.2.3.3 Safety

Unfavourable working condition affects productivity and has a negative impact on sustainability development. Employees need a safe working environment and working condition to be productive, and work towards the achievement of sustainable development goals. Organisation should be responsible towards the well-being of their suppliers and must engage in a constant inspection of the premises of their suppliers to ensure that safety protocols are duly observed and followed.

According to Hughes et al, (2008) cited by (Kwesi Amponssah-Tawiah, 2013) safety is concerned with employees’ security from physical injury at the work place. As cited by Kwesi Amponssah-Tawiah, (2013) The International Occupational Hygiene Association (IOHA) defines occupational health and safety as the science of anticipating, recognizing, evaluating, and controlling hazards that may arise in or from the workplace and endanger workers' health and well-being, while also considering the potential impact on surrounding communities and the general environment. (ILO, 2009). Safety should be a procurement criterion of entities pursuing sustainability development. According to Adei & Kunfaa, (2004) cited by (Kwesi Amponssah-Tawiah, 2013) Occupational related accidents, diseases and hazards are estimated to cost Ghana about her 7% GDP. In other words, the cost associated with unsafe working environment has a negative impact on productivity and finances of an organisation. Companies must therefore work to maintain and achieve environmental safety and towards sustainability development, they must employ an innovative technology to create a safe working environment.
2.2.4 Definition of Concept of supply Chain

The value of a green supply chain Bowen et al., (2001; Hall), 2003, Rao,(2002) quoted by Saridogan, (2012). Supply chain management varies from cost reduction to integrating suppliers in participatory decision-making that fosters environmental innovation (Bowen et al., 2001; Hall, 2003, Rao, 2002). The administration of the complete flow of goods and services is referred to as supply chain management, and it encompasses all procedures that transform raw materials into finished commodities. According to Beamon, (1999) cited by (Wang, 2012) supply chain management contains four levels, supplier, manufacturer, distributor, and consumer. Tan et al., (1998) cited by Wang, 2012 defines supply chain management as management activities which encompasses material/supply management from raw materials to finish product. Supply chain is defined as a ‘network of connected and interdependent organisations mutually and co-operatively working together’ (Christopher, 2016, p. 3) cited by (Andreas Wieland, 2021). Thus, supply chain consists of individual organisation joining their efforts together to pursue a common goal of satisfying customer’s needs. According to Chopra, (2019, p. 15) cited by (Andreas Wieland, 2021) supply chain consist of all parties involved directly or indirectly, in fulfilling a customer request. Supply chain involves collaboration of firms with common interest to satisfy identified needs of customers profitably. Many companies have gained competitive advantage through supply chain. Supply chain involves the whole process of making and selling commercial products, from the supply of materials through to the sale of the finished products (Grimshaw, 2020). Meaning that, the supply chain is made up of processes that converts raw material received from suppliers into commercial goods and services to meet the demands of the market. According to Kenton, (2021) supply chain is a network of existing relationship between a firm and its suppliers to produce and distribute a specific good or service to the final consumer. Thus, the supply chain involves a firm
partnering with the upstream and downstream members of the chain to serve consumers’ needs.

2.2.5 Definition of the concept of Supply Chain Learning

Manufacturing is no longer just conversion of inputs into finished products. Businesses are now required to engage in sustainable operations. And therefore, for a business organisation to survive today’s stiff competition and to achieve sustainability in today’s business environment business organisations must engage in learning. Firms must learn about new regulations, innovation and the new technologies available in order to compete effectively and also to gain competitive advantage over competitors. Since firms forms part of a supply chain, the learning process should cover all the members of the supply chain for a better development of policies and strategies (John Bessant & Raphael Kaplinsky, 2003). Learning involves the accumulation and development of a core knowledge base – the ‘core competences and a long-term development of a capability for learning and continuous improvement across the whole organisation (John Bessant & Raphael Kaplinsky, 2003). According to Nielsen (2005) cited by Siew-Phaik Loke, Alan G. Downe, Murali Sambasivan & Khalizani Khalid (2012) these capabilities can be in a form of tacit or fairly dynamic in nature. Members across the supply chain gain massive benefits from the learning process through transfer of knowledge and skills by (Siew-Phaik Loke, Alan G. Downe, Murali Sambasivan & Khalizani Khalid (2012). Learning involves a focus firm collaborating with the upstream and downstream members of the chain to share information, exchange knowledge and skills towards the achievement of a common objective. Supply chain learning encompasses a focus firm monitoring the activities of members across the supply chain in order to manage both the internal and external learning processes (Flint, Larsson, & Gammelgaard, 2008; Hernandez-Espallardo, Rodriguez-Orejuela, & Sanchez-Perez, 2010) cited by (Wei Lisi, Rui Zhu, & Chunlin
Yuan, 2019). In other words, firms can take advantage of innovation and technological opportunities by managing both the internal and external learning processes of its network. The significance of supply chain learning in achieving sustainability is recognize by both firms and researchers (Gong et al., 2018; Willis, Genchev, & Chen, 2016) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019). I would like to define supply chain learning as a systematic process through which firms acquire knowledge about its partners and business environment for a better decision and policy making that achieves sustainability. Operating sustainably and behaving right toward the environment is much involving, as such firms must learn from its upstream and downstream members to acquire information, knowledge, resources and skills (Chen & Hung, 2014; De Marchi, 2012; Noci & Verganti, 1999; Zhu, Sarkis, & Lai, 2013) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019).

2.2.6 Definition of the concept of Green Supply Chain Learning

Green supply chain learning is one of the many solutions for firms who want to stay competitive, innovative and achieve sustainability amidst the current stiff competition and the intense pressures from stakeholders to achieve sustainable development. According to Chen, Lai, & wen, (2006); De Marchi, 2012; Zhao, Feng, & Shi, (2018) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019) the rising nature of environmental pollution has a great impact on business operations of firms. According to Muduli and Barve, (2011) cited by (Padmalalitha, Rajeswari, & Vijaya, 2020) green supply chain includes acquiring eco-friendly inputs to disposal/reuse/recycle of used products. Green supply chain learning is about actions taken by firms to learn and share information relating to green practices across its supply chain.

Firms must embrace the concept of corporate environmentalism towards the achievement of a better economic and environmental performance. Corporate environmentalism explains how efficient an organisation’s practices are, and also to demonstrate dual benefits
of economic prosperity and environmental protection (Sheu et al., 2005; Shah, 2011a, 2011b; Busch and Lewandowski, 2018) cited by (Padmalalitha, Rajeswari, & Vijaya, 2020). In the manufacturing industry protection of the environment and economic gains are connected to a firm’s ability to green the supply chain (Laari et al., 2018) cited by (Padmalalitha, Rajeswari, & Vijaya, 2020). Which means that firms must integrate green practices in their supply chain system towards the achievement of both economic and environmental sustainability. According to Muduli and Barve, (2011) cited by (Padmalalitha, Rajeswari, & Vijaya, 2020) green supply chain includes acquiring eco-friendly inputs to disposal/reuse/recycle of used products. Green supply chain learning is about actions taken by firms to learn and share information relating to green practices across its supply chain.

### 2.2.6.1 Green Supplier Learning

Companies rely on raw material resource to meet their operational needs. Therefore, getting accurate and timely data from the supply market on inputs is very crucial to strategic decision making. Green supplier learning ranges from acquiring environmental protection information, learning environmental management abilities, collaborating to tackle environmental issues developing capabilities is green knowledge and skills from suppliers (Flint et al., 2008; Hernandez-Espallardo et al., 2010) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019). Which means that focal organisations can enter into partnerships or collaborations with suppliers, and to learn from each other and to work together to achieve a common goal. Learning from suppliers helps firms to be productive, effective and innovative since information acquired will be process to aid in major decision and policy making.
Learning from suppliers helps management to avoid potential errors problems in design of strategies since the supplier was considered in the product design phase of the business strategy (Chen, 2001; Mishra & Shah, 2009) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019). Green supplier learning can lead firms to design new products and can also lead to green innovation. And according to Lee & Kim, (2011); Zhao et al., (2018) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019) green supplier learning foster partnership between a firm and its supplier which can lead to new product development or operational processes because information on input resources is known. With the growing nature of global supply chain, joint learning is crucial for a firm’s sustainability objectives according to (Fang and Zou, 2010; Lubatkin et al., 2001) cited by (Choi, Jean, & Kim, 2019). In other words, information sharing between firms helps in taking decisions that support organisational objectives. I define green supplier learning as an organisation’s efforts to understand the green and sustainability practices objectives of its supplier through collaboration.

2.2.6.2 Green Customer Learning

The sharing of green expectation by buyers with collaborative partners enhances green product innovation (Wong, 2012) cited by (Nguyen, Onofrei, Truong & Lockrey, 2020). Business entities exist to satisfy customer’s needs profitably. So therefore, customer satisfaction is very crucial to the continuity of any business enterprise. Researchers have defined the concept customer satisfaction in several ways. For instance, Liang and Zhang (2012) define customer satisfaction as the consumer good feel, which results from his/her view of proper product or service performance in line with his/her expectations. Precisely, A favorable feeling experienced by a person after consuming a product is known as satisfaction (Aburayya et. al. 2020). The degree to which a customer expresses pleasant feelings about a service interaction is referred to as satisfaction (Lin & Hsieh, 2006).
Consumer satisfaction refers to a situation in which a customer is successfully compensated in a purchasing situation in exchange for a specific cost (Al-Alak, 2009; Jeong, Cha, & Jang, 2016). When a comparison is made between prior buying and consuming habits and the projected benefit from a product or service brand in terms of its predicted ability to meet the consumer's goals, satisfaction is deemed satisfactory (Bergman & Klefsjo, 2010). Firms must learn about the expectations of customers before they can produce products that meets the needs of the customer and green customer learning is one of the mechanisms through which customer satisfaction can be achieved. Customers are becoming concern about environmental issues and therefore demand green products from their suppliers and expect them to practice in an environmentally friendly manner. Wong, (2013) cited by (Nguyen, Onofrei, Truong & Lockrey, 2020) talks about green customer cooperation with emphasis on information visibility and collaboration between customers and suppliers for environment performance. Focal companies must collaborate in learning process with customer to get information necessary product development that meet the needs of the customer.

Green customer learning involves information gathering, capacity enhancement, and jointly problem solving according to (Fang &Zou; Flint et al., 2008; Hernandez-Espallardo et al., 2010) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019). Through this process firms become aware of the needs of the customer, build mutual understanding and design eco-friendly products to reduce waste disposal ( Feng, Wang, Lawton, & Luo; Kim, Chiou, & Calantone, 2018) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019). To establish customer loyalty, firms must maintain an environmental collaborative relationship that will result in green technology in their manufacturing processes. The research and development department must learn from customers in order to come up with products that meets or satisfies the customer.
2.2.6.3 Green Innovation

Innovation according to Merriam-Wester, (2017) cited by (Kahn, 2018) can be defined as Introduction of something new or a new idea, method, or service. Innovation makes it possible for firms to switch from traditional way or processes of doing business onto new model that sustains the business operations. Innovation is very crucial to the sustainability of firms if they are to survive the increasing customer demands of green products and the increasing pressures from stakeholders demanding firms to be responsible towards the environment. Innovation leads to product and process improvements which results from the attempt to respond to customers’ demand. Firms must therefore concern themselves in building innovation networks processes that encourages innovation. Innovation networks leads to innovations through a process of integrating customers and suppliers (Roy, Sivakumar, and Wilkinson 2004; Wagner 2012) cited by Gerd J. Hahn (2020). Technology and digitalisation offer avenues for innovation improvement of which firms should take advantage of. Digitalisation is defined as the usage of digital technology to effect changes in products, business processes or the entire business models (Nambisan et al. 2017) cited by Gerd J. Hahn (2020).

Green innovation is defined as innovation in technologies that saves energy and material usage, mitigation of environmental pollution, recycling and reuse of used products, improvement and development of product, corporate environmental management (Chen et al., 2006) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019). The benefits of green innovation to firms goes beyond just mitigating the negative effect of their activities on the environment to increase in productivity, corporate reputation, and improve corporate performance and competitiveness (Chen et al., 2006; Chiou et al., 2011) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019). Though technological in nature, green innovation is divided into green product innovation and green process innovation (Chen et al., 2006;
Zailani, Govindan, Iranmanesh, Shaharudin, & Chong, 2015) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019). In pursuit of attainment of organisational objectives of economic, social, and environmental sustainability, firms should embrace and integrate green innovation into their business operational processes in order to achieve success.

2.2.7 Definition of the concept of Supply Chain

Supply chain management is defined as the management of the entire flow of goods and services, and includes all processes that transforms raw materials into final product. According to Beamon, (1999) cited by Wang, 2012 supply chain management contains four levels, supplier, manufacturer, distributor, and consumer. Tan et al., (1998) cited by Wang, (2012) defines supply chain management as management activities which encompasses material/supply management from raw materials to finish product. Supply chain is defined as a ‘network of connected and interdependent organisations mutually and co-operatively working together’ (Christopher, 2016, p. 3) cited by (Andreas Wieland, 2021). Thus, supply chain consists of individual organisation joining their efforts together to pursue a common goal of satisfying customer’s needs. According to Chopra, (2019, p. 15) cited by (Andreas Wieland, 2021) supply chain consist of all parties involved directly or indirectly, in fulfilling a customer request. Supply chain involves collaboration of firms with common interest to satisfy identified needs of customers profitably. Many companies have gained competitive advantage through supply chain. Supply chain involves the whole process of making and selling commercial products, from the supply of materials through to the sale of the finished products (Grimshaw, 2020). Meaning that, the supply chain is made up of processes that converts raw material received from suppliers into commercial goods and services to meet the demands of the market. According to Kenton, (2021) supply chain is a network of existing relationship between a firm and its suppliers to produce and distribute a specific good or service to the final consumer. Thus, the supply
chain involves a firm partnering with the upstream and downstream members of the chain to serve consumers’ needs.

2.2.8 Supply Chain Surplus

Companies engage in various business activities in order to make profit from their business operations. An effective way to assess or measure the performance of a supply chain network is to consider the profitability of the whole supply chain, but not the profitability of the individual chain members. Supply chain impacts firms’ profitability (Ellram & Liu, 2002; Fawcett et al., 2007) cited in (Tripathi, Talukder, & Rangarajan, 2021).

A phrase used to characterize the value added by an organization's supply chain function is supply chain surplus, also known as supply chain profitability. Supply chain planning's ultimate purpose is to maximize supply chain excess. The quantity of supply chain surplus can be used to determine the success of a supply chain system and its future prospects (Bansal et. al., 2013). Every facility that has an influence on costs must be examined in order to maximize supply chain surplus (Shah, 2009). According to Juhui et al., (2015) cited in (Tripathi, Talukder, & Rangarajan, 2021) supply chain profitability can be defined as a function of firm’s business level and non-business level performance.

According to Yu (2014), Supply Chain surplus serves as a criterion for assessing the progress of supply chain systems. It represents the value addition by supply chain function associated with an organisation. Supply chain surplus may be the value addition by supply chain function associated with an organisation. This could be presented mathematically as;

\[ \text{Supply chain surplus} = \text{Revenue generated from the customer} - \text{Complete cost incurred to provide and deliver the product or service.} \]

2.2.8.1 Cost Reduction
Firms in the manufacturing or pharmaceutical industry has to cope with rising cost of doing business. So therefore, most companies are putting in strategies to reduce or manage these costs associated with doing business to maximize profit. Supply chains face sundry cost pressures today and fifty percent survey respondents admitted that manufacturing cost have been paramount in driving up supply chain cost according to research conducted by Aberdeen University in 2007. Cost reduction in supply chain refers to actions taken by management, which focuses on finding most effective and affordable means to produce and store products, transport them from point A to point B, and ensure customer satisfaction (Cathy Habas, 2020) – Chron. In other words in an attempt to satisfy customers’ needs, cost of serving those needs must be controlled to ensure profits for the supply chain. Cost has a bearing on supply chain surplus, so to achieve a favourable corporate profitability, supply chain cost should be checked. According to inquest supply chain cost includes; investment costs, transportation costs, procurement costs, production costs, and inventory costs. Among the many techniques firms can employ to reduce supply chain costs includes; streamline ordering process, manage inventory, monitor customer demands, make use of space, track performance and consider automation in their operations. Cost reduction can be used as a strategy to mitigate supply chain risk, and also help firms to stay competitive.

2.2.8.2 Gross Revenue

Firms exist to serve the demands of customers for money or profit. The supply chain supplies goods and services to customers for money. Gross Revenue reports or records all monies earned from sales. According to Hayek, 2018 sales revenue or gross revenue flows from an organisation’s operating activities which represent the total monies or income it receives as flow of cash or an increase in assets from its primary activities, whether from the sale of its commodity products or services.
According to Schultz, 2022 Gross revenue is the total sum of all money generated by a business from its core operational activities or core business without taking into account any part of that total has been used for expenses. Gross revenue is considered without cost or expenditure. Gross revenue helps in assessing the supply chain performance.

According to Treece, 2021 Gross revenue is the total amount of sales a business realises from its activities in a given period of time. Gross revenue recording or reporting is very key to calculating a firm’s profitability or supply chain surplus for a given period. The gross revenue assist in determining whether a firm is growing or declining. It is a crucial element of measurement of a supply chain’s performance.

2.2.8.3 Return on Investment

Firms use resources in order to produce or manufacture a good or service to serve the market needs. The resources put use are expected to earn or generate income or returns or profits for the company.

Return on investment (ROI) is a financial metrics for measuring the profitability of gaining a return from an investment (Andrew Beattie, 2022). In other words, return on investment is a financial tool with which organisations measure their financial performance. In calculating return on investment, the return on the investment is divided by the cost of the investment and the results is expressed in percentage or a ratio.

Also Birkin & Curry, (2021) refers to ROI as a metric used to understand the profitability of an investment. It is a simple ratio that divides its net profit from an investment by its cost. It is mathematically calculated as:

\[
\text{ROI} = \frac{\text{Net Profit}}{\text{Cost of Investment}}
\]
ROI = (Net profit / cost of investment) * 100. Return on investment is very significant in measuring supply chain profitability or financial period over a period of time.

2.3 Theoretical Review

This section reviews the theories related to the topic under study. Specifically, stakeholder theory and resource base view theories were reviewed to enhance the conceptual reviews of the study.

2.3.1 Stakeholder Theory

According to Lin (2018), stakeholder theory refers to the principle that guides the interrelation and interaction between the various interest holders, i.e., employees, owners, regulators, suppliers and customers among others of an organisation. Thus, it guides the operating principles and ethics that are observed in the performance of an organisation. It is opined that stakeholder theory is the philosophy that facilitate identification of various interest groups of an organisation and how those interest groups can be satisfied. (Phillips, 2003; Parmar et al., 2010). Explaining further, Freeman (2010) cited in Ezeanyim et al. (2020) posited that stakeholder theory defines the relationship between an organisation and its external factors as well as its internal players. Accordingly, the theory is concerned with actions of management in relation to the interest of stakeholders and how those actions are influenced by stakeholders in addressing their needs (Ezeanyim et al., 2020). Similarly, de Gooyert et al. (2017) identified the contribution of the stakeholder theory in resolving major challenges associated with the operations of an organisation and its management and other stakeholders. Further studies also revealed that stakeholder theory response to the interest of people affected by the decisions of the organisation by identifying and aligning their interest with that of the organisation (Wagner et al., 2012), and in the opining of Omanji and Moronge (2018), managers carried out this alignment by understanding the
real needs of the stakeholders and provide solutions to them. By implication, the stakeholder theory is relevant in the procurement process since the objective of the procurement is to satisfy the needs of the users of the goods and services. In their argument to critic the relevance of the stakeholder theory and the opinion of others, Barney and Harrison (2020) acknowledged that the theory addressed key challenges that confront management in meeting the needs of stakeholders by shaping business and public policies. This implies that the theory provides guidelines on critical business decisions such procurement decisions that have implication for a company and its interest groups.

From the perspective of value creation, the stakeholder theory is viewed as the fulcrum in value creation for both the entity and its stakeholders (Freudenreich et al., 2020). In this regard, the focus of the theory is vertical such that organizational decisions and functions influence or are influenced by stakeholders (Freeman, 2010). This is seen as aggregated efforts by all stakeholders, in meeting the priorities and interests of every player along the value chain (Haslam et al., 2015). Thus, the theory seeks to promote the interest of everyone that matters in the business cycle. In other words, the theory has multidimensional approach to dealing with organizational issues. By aligning the interest of stakeholders to that of the organisation, the stakeholder theory guides procurement planning which will ensure that the desired outcome is achieved in the best interest of every stakeholder.

2.4 Empirical Review

A study conducted by Islam, Turki, Murad & Karim, (2017) on do sustainable procurement practices improve organizational performance concluded that sustainable procurement contributes to organizational financial performance. The study also addresses sustainable procurement implementation in both public and private sector context. The study also
recommends that, stakeholders’ involvement and engagement in the entire sustainable procurement process is needed to move sustainable procurement agenda forward (Islam, Turki, Murad & Karim, 2017). The study adopts a quantitative research design, and used simple statistical analysis tools such as, correlation and regression as well as regression-based path analysis. The findings of the study were based on a population size of 400 procurement directors and managers from both private and public sector across various fields and locations in Saudi Arabia.

Also, a study conducts by Kim, Jeong and Jung, (2012) on supply chain surplus: comparing conventional and sustainable supply chains showed that sustainable supply chain has potential to increase the supply chain surplus in comparison with the conventional supply chain. They also defined sustainable supply chain in terms of profit, environmental consciousness, and social benefits. The study proposed a framework of sustainable supply chain with emphasis on the need for continuous innovation in strategy and operations of supply chain with regards to consumer consumption and the procurement of materials. The analysis in the study was based on strong assumptions.

Furthermore, conclusions drawn by Wang et al, (2020) on social and environmental sustainability: An empirical analysis of supply chain profitability and the recession showed that retailer’s positive environment and social activities consistently have positive impacts on financial performance. In other words, sustainable procurement practices of retailers on the supply chain have the potential to increase supply chain profitability. The study adopted descriptive survey research design and used simple statistical tools, such as regression, frequency table and chart in analyzing the data. The findings of the study were based on sample panel data observed over the period 2000-2014. The MSCI-ESG index was used to measure performance in the study.
2.5 Conceptual Framework

The conceptual review gives description of the variables used in the model and provide the hypothesis about the relationships between the variables in the study, that is, sustainable procurement, green supply chain learning and supply chain surplus.

Sustainable procurement deals with managing all aspects of the upstream components of the supply chain to maximize triple bottom line performance (Sayed et al., 2021). In other words, supplier’s activities must be sustainable. Whereas green supply chain learning ranges from acquiring environmental protection information, learning environmental management abilities, collaborating to tackle environmental issues developing capabilities is green knowledge and skills from suppliers and customers (Fang & Zou, 2010; Flint et al., 2008; Hernandez-Espallardo et al., 2010) cited by (Wei Lisi, Rui Zhu, & Chunlin Yuan, 2019). According to Yu (2014), Supply Chain surplus serves as a criterion for assessing the progress of supply chain systems. It represents the value addition by supply chain function associated with an organisation. Supply chain surplus may be the value addition by supply chain function associated with an organization.

Figure 2.1 gives a pictorial view of the conceptual framework which shows the existing relationships between the variables of this study. Thus, the relationships between sustainable procurement, green supply chain learning and supply chain surplus. The variables are put in boxes with arrows showing the path of the relationships between the variables. The figure 2.1 also gives the hypothesis (H1, H2, H3, H4) of each relationship. Thus, H1 shows the relationship and effect of sustainable procurement on supply chain surplus, H2 shows the relationship and the effect of sustainable procurement on green supply chain learning, H3 shows the relationship between green supply chain learning and supply chain surplus and H4 however shows the relationship and the effect of supply chain
learning on the relationship between sustainable supply chain learning and supply chain surplus. The variables displayed in this figure will be tested to enable the researcher draw his findings and conclusions.

**Figure 2.1: Conceptual Framework**

<table>
<thead>
<tr>
<th>Sustainable Procurement</th>
<th>Green Supply Chain Learning</th>
<th>Supply Chain Surplus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Purchasing</td>
<td>Green Supplier Learning</td>
<td>Cost reduction</td>
</tr>
<tr>
<td>Diversity</td>
<td>Green Customer Learning</td>
<td>Gross Revenue</td>
</tr>
<tr>
<td>Safety</td>
<td>Innovation</td>
<td>Return on Investment</td>
</tr>
</tbody>
</table>

**Source: Adapted from Mazharul Islam (2017)**

2.5.1 Sustainable Procurement and Supply Chain Surplus

It was opined that the output of an organisation is to some extent a function of procurement performance. Thus, procurement performance is an input to the overall performance of the organisation. In their findings, Kakwezi and Nyeko (2010) stated that without measuring the procurement performance, it will be problematic in ascertaining the overall operational performance. In order to achieve the objectives of procurement, and mitigate poor performance by organisations, reform of the procurement system was proposed (Agaba & Shipman, 2006) cited in Addo and Ackah (2019). The reform is also to ensure that cost is managed efficiently by adoption of best procurement practices including procurement planning.
Sustainable Procurement has from the past decade receive much attention by researchers in the context of in-house and outsourcing implementation modes (sayed, Hendry and Bell, 2020), buyer-supplier dyad relationships (Ghadimi, 2016), Sustainable procurement in Australia and UK Universities (Young, Nagpal and Adams, 2016), sustainable procurement in the Canadian construction industry (Ruparathna and Hewage, 2015), however, its effects on supply chain surplus have been less researched. The extant work of Kim, Jeong and Jung (2012) on supply chain surplus: comparing conventional and sustainable supply chains revealed that sustainable supply chain has the potential to increase supply chain surplus of companies. They explained, that, the concept of sustainable supply chain was derived from social surplus and externality welfare economics, a field of micro-economics. Social surplus represents Consumer surplus and producer surplus; consumer surplus measures the economic well-being of consumers whiles producer surplus measures the economic well-being of producers which is critical to the welfare of the social system (Mankiw 2007) cited by Kim, Jeong and Jung (2012).

Kim, Jeong and Jung concluded, that, sustainable practices yield positive social surplus compared to the conventional practices. Sustainable procurement help reduce cost, risk and optimize eco-friendly practices (Caprar and Neville, 2012; Shah and Arjoon, 2015a) cited by Rajeswari (2020).

Sustainable procurement does not only positively affect the environment but also contribute to cost benefits to a firm (Zhu and Sarkis, 2004; Bowen et al., 2001; Mathiyazhagan et al., 2013) cited by (Padmalalitha, Rajeswari & Vijaya, 2020). Sustainable procurement leads to collaboration among the members of a supply chain, and help build trust, lessened risk, motivated innovation and enhanced profitability according to Testa and Iraldo (2010) cited by Rajeswari (2020). Environmental performance drives legitimate margin on economic performance of the organization (Shah, 2015b; Feng et al.,
2018b) cited in (Padmalalitha, Rajeswari & Vijaya, 2020). With regards to the above discussions, the following hypothesis is proposed:

**H1: There is a significant and positive relationship between sustainable procurement and supply chain surplus.**

### 2.5.2 Sustainable procurement and green supply chain learning.

According to the Sustainable Procurement Task Force, (2006) cited by (Rajeev et al, 2015) Sustainable procurement includes all activities carried out by an organization to satisfy its needs for goods, services, works and utility in a way, such that value for money is achieved on whole life basis with regards to the achievement of benefits not only to the organization but also to the society and the economy.

According to Walker and Brammer,(2009) cited by (Journal of purchasing and supply management,2012) Sustainable procurement is in line with, and supports the principle of sustainable development objectives to maintain a strong, healthy and just society, living within environmental limits and promoting good governance whilst minimizing damage to the environment. Sustainable procurement seeks to address economic, social and environmental related issues facing the globe through procurement of goods and services that are sustainable.

In responds to pressure from stakeholders about concern over environmental and sustainability issues many organisations are making the effort to foster green practices in an attempt to comply with global environmental concerns (Chang, 2011) cited by (Gema, Antonio, & De Marchi, 2017). Companies are coming up with innovations in their operation aimed at reducing pollution and the negative impact their operations have on the environment (Kemp and Pontoglio, 2007)
It is not easy to practice sustainable because of the many requirements and specifications associated with sustainability (Horbach, 2008; De Marchi, 2019) cited by (Gema, Antonio, & De Marchi, 2017). More studies have recognized the importance of firm’s collaboration with stakeholders in order to come up with innovations (De Marchi, 2012) cited by (Gema, Antonio, & De Marchi, 2017).

As reported by Cainelli et al. (2015) cited in (Gema, Antonio, & De Marchi, 2017) firms need to expand beyond the knowledge base of their industry and collaborate with the external environment foe new knowledge base in order to achieve innovation. This means that companies must engage in learning processes in order to be innovative. Base on the above discussions, i propose the following hypothesis.

\[H2: \text{There is significant and positive relationship between sustainable procurement and green supply chain learning.}\]

2.5.3 Green supply chain learning and supply chain surplus

To build innovative capabilities firms must engage in green supply chain learning as the sourcing mechanism for knowledge acquisition (Flint et al, 2008; Huang, Ding, & Kao, 2009; Verghese & Lewis, 2007; Wu, 2013; Zhu et al., 2018) cited in (Lisi, Zhu & Yuan, 2019). Green supply chain learning is crucial if firms can produce products that meet the needs and demands of the customer. The success and survival of every business depends on its customers, therefore in order to satisfy, maintain and attract prospective customers, firms must learn about the expectations of the market through green supply chain learning.

Green supply chain learning influence green products and process innovation (Lisi, Zhu & Yuan, 2019). Green supply chain learning leads to green innovations which eventually enhance firm performance with regards to sustainability (Lisi, Zhu & Yuan, 2019). In other words, green supply chain learning help firms to operate in a manner that enhances
customer satisfaction and loyalty. For instance, Liang and Zhang (2012) define customer satisfaction as the consumer good feel, which results from his/her view of proper product or service performance in line with his/her expectations. Precisely, satisfaction is a positive sensation created in an individual after using a certain product (Aburayya et al. 2020). The degree to which a customer expresses pleasant feelings about a service interaction is referred to as satisfaction (Lin & Hsieh, 2006). Consumer satisfaction refers to a situation in which a customer is successfully compensated in a purchasing situation in exchange for a specific cost (Al-Alak, 2009; Jeong, Cha, & Jang, 2016). When a comparison is made between prior buying and consuming habits and the projected benefit from a product or service brand in terms of its predicted ability to meet the consumer's goals, satisfaction is deemed satisfactory (Bergman & Klefsjo, 2010). In other words, a satisfied customer would want to continue to do business with the firm which has a positive influence on reputation, loyalty, sales and hence profitability and supply chain surplus. I would like to propose the following hypothesis based on the above discussions.

\[ H3: \text{There is a significant and positive relationship between green supply chain learning and supply chain surplus.} \]

2.5.4 Sustainable procurement, green supply chain learning and supply chain surplus.

Based on the discussions above, with respect to hypothesis two (H2) and hypothesis three (H3) I would like to propose the following hypothesis.

\[ H4: \text{Green supply chain learning mediate on the relationship between sustainable procurement and supply chain surplus.} \]
CHAPTER THREE

METHODOLOGY

3.1 Introduction

This section captures the research method used in this study, and the profile of the study area. It gives details on the research strategy, research design, population, sampling procedure, data collection tools, data analysis, quality of the research and the research ethics respectively.

3.2 Research Strategy

Research strategy can be said to refer to the research approach a researcher adopts. Research strategy is referred to as the type of research approach adopted by the researcher. According to Sekaran and Bougie (2016) research strategy consists of experiment, survey research, observations, case studies, grounded theory, action research and mixed methods. In simple term, the research strategy is a research plan which outlines how the objectives of the research will be achieved, and the type of research strategy adopted is dependent on the research objectives. Also, research strategy is described as a suitable research design with a purposeful plan that spelt out and collaborate research methods, techniques, and procedures relevant for gathering relevant data for analysis (Mkansi & Acheampong, 2012). For instance, survey research is referred to as “a system for collecting information from or about people to describe, compare, or explain their knowledge, attitudes, and behavior” (Fink, 2003) cited in (Sekaran and Bougie 2016).
This means that any research that seeks to describe and compare information should use survey research. The survey research is also described as a popular research strategy since it creates an opportunity to collect and analyse qualitative and quantitative data (Sekaran & Bougie, 2016). This study adopted the quantitative and descriptive survey research approach where data was collected on the respondents and analysed based on the research objectives (Mkansi & Acheampong, 2012). This is because the topic is quantitative in nature as it sought to evaluate the effect of sustainable procurement on green supply chain learning and supply chain surplus.

### 3.3 Research design

The study adopted a descriptive research design. According to Cooper and Schindler (2003) cited by (Hafidh, 2022), a descriptive study is concerned with finding out the what, where and how of a phenomenon. Descriptive research design is chosen because it allows one to collect quantitative data which can be analyzed quantitatively using descriptive and inferential statistics. Research design refers to the plans and methods to be implemented to collect data and the techniques to analyze the data in order to achieve the desire objectives of the research (Radhika Kapur, 2018). Research design is very crucial to the success of every research, this is so because it helps in understanding the research operations which leads to an effective and maximum information gathering. According to Kothari, (2014) cited in (Radhika Kapur, 2018) emphasizes that the research design has a bearing on the reliability of the results arrived at in the research. The purpose of research design is to minimize expenditure, facilitates smooth scaling, collect relevant data and techniques, and provide blueprint for plans and to provide a framework to other research experts (Pandey, & Pandey, 2015) cited in (Radhika Kapur, 2018). The research design employed by this study is survey
strategy research which according to Kureshi (2020) is usually linked with inferential research approach.

The survey approach is deemed appropriate because it is the most common research method used in business and management research (Sekaran & Bougie, 2016) such as this study. Structured questionnaires were administered to solicit quantitative data on respondents based on the research objectives which were analysed quantitatively using basic statistical tools like excel and SPSS. The inferential approach was used in making deductive comparison of the findings.

This sample population were drawn from selected pharmaceutical manufacturing firms in the Ashanti region of Ghana.

### 3.4 Study Population

Population specification is a requirement in the documentation of both qualitative and quantitative studies (Asiamah et al, 2017). The research populations is made up of individuals or group of people or object under scientific study (Asiamah et al, 2017). The research population is also defined as the whole group of people, things, or events of interest that the researcher desire to study (Sekaran & Bougie, 2016). The population as used in this study comprises of managers, finance and accounts department, procurement and logistics department staff, and research and development department of the selected pharmaceutical manufacturing companies in the Ashanti region of Ghana.

### 3.5 Sample size and sample technique

Selecting a sample in research is a very crucial activity in research. According to Kothari, (2014) cited in (Radhika Kapur, 2018) in selecting the sample size consideration should be
given to type of universe, sampling unit, source list, size of sample, parameters of interest, budgetary constraints, and sampling procedure. Sampling may be classified into probability sampling methods and non-probability sampling methods (Alvi, 2016) cited by (Radhika Kapur, 2018). Sampling technique on the other hand is the process of selecting the right number and elements of the population (Sekaran & Bougie, 2016). According to Sekaran and Bougie (2016), in the probability sampling, the likelihood or chances of selecting the elements in the population is known or nonzero. In the nonprobability sampling, the probability or chances of selecting elements in the population is unknown or cannot be predetermined (Sekaran & Bougie, 2016).

This study adopts the purposive probability sampling techniques in selecting the sample size. This technique allows element (that is, Management members of the manufacturing companies in Ghana) of the population are selected (Sekaran & Bougie, 2016) in order to achieve the objectives of the study. Simple random sampling technique was used to select 121 respondents from ten (10) pharmaceutical firms in the Ashanti Region. The respondents compose of managers, experience procurement and logistics staff, finance and account staff, and Research and development departments in the respective firms.

3.6 Types and Sources of data

Data forms, and is a crucial aspect of every research work. The analysis, findings, conclusions and recommendations of every research work find their basis from the data used for the analysis. Hence, data is described as the physical representation of information in a manner suitable for communication, interpretation, or processing by human beings or by automatic means (UNECE, 2000). According to Radhika Kapur, (2018) we have two types of data sources, primary and secondary data. Primary data is new, collected by the researcher for the first time for the purpose of the work being pursued, and secondary data
is not new, the data has already been collected by someone. They are numerical in nature, and can be collected through observations, mail questionnaire, schedule, and through direct personal interview. Primary data were used for this research work for the purpose of gathering accurate, and right information. The primary data for this study were gathered through both open-ended and close-ended questionnaires design. The findings of this study is based on the analysis of the primary data collected.

3.7 Data Collection Method

One of the main stages in a research study is data collection that enables the researcher to find answers to research questions. Data collection is the process of collecting data aiming to gain insights regarding the research topic (Hamed, 2021). Data collection refers to the gathering, measuring and analyses of accurate data from variety of sources to answer to research problem. Data collection method is referred to as means through which research data are obtained and used for the research (Sekaran & Bougie, 2016). Observation, questionnaire and interviews are some of the methods for collecting data. However, for this research, questionnaire was used for collecting the primary data. Questionnaires can be administered personally, through mail, and electronic or online. For the purpose of this study, I adopted the personal administered questionnaire method for gathering the primary data.

The questionnaires for this study were put into three categories or sections. That is A, B, C and D in that respect. The section ‘A’ gathers the demographic information of the respondents, whiles the section ‘B’ collect data on Sustainable Procurement. The sections C and D were used to collect data on Green Supply Chain Learning and Supply Chain Surplus respectively.
Table 3.2: Summary of Measurement Items

<table>
<thead>
<tr>
<th>Construct</th>
<th>No. of Measurement Items</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Procurement</td>
<td>8</td>
<td>Islam, and Karim, 2017</td>
</tr>
<tr>
<td>Green Supply Chain Learning</td>
<td>14</td>
<td>Lisi, Zhu and Yuan, 2019</td>
</tr>
<tr>
<td>Supply Chain Surplus</td>
<td>13</td>
<td>Chia, Goh, and Hum, 2009</td>
</tr>
</tbody>
</table>

Source: Researcher’s Construct (2021)

3.8 Data Analysis

Sekaran and Bougie (2016) described data analysis as systematic approach of statistical analysis of data in order to determine if the research hypotheses generated were supported by the data. Data analysis can be defined as the search for answers about relationships among the various classification of data (Radhika Kapur, 2018). SPSS IBM Version 25 and simple MS excel tools were used in the analysis of the data used in this research work. The analysis of the data was organized with respect to the specific objectives of the study, but in the presentation of the data, the demographic information of respondents was first presented. Respondents’ demographics considered in the study included gender, age, education, job position, number of years of work and among others.
3.9 Validity and Reliability test

Validity can be said to be the credibility and believability of a research, whiles reliability refers to the repeatability of the findings (Radhika Kapur, 2018). Validity and reliability in research are very crucial, as it seek to demonstrate the degree to the instruments actually measures what it supposed to measure.

To ensure the validity and reliability of the data used in this study the researcher used certain measures to achieve data and research quality. The primary measure aimed at drawing data from the right source, hence 121 respondents ranging from management, procurement and logistics staff department, finance and account department, and research and development department of the selected pharmaceutical manufacturing companies since the study seeks to evaluate sustainable procurement on supply chain surplus. Furthermore, to ensure, that, the researcher does not influence the responses of respondents, and also for respondents not to answer questions in a hurried manner the respondents’ independence was maintained throughout the data gathering process. The validity and reliability of the data was statistically tested by using IBM SPSS Version 25 to make sure the data corresponds to the research questions and objectives.

3.10 Research Ethics

According to Beauchamp & Childress, 2013 cited by Stolt et al. (2021), research ethics concerns with respect for individuals, beneficence, justice, and respect for communities. It provides guidelines for responsible conduct of research. Research ethics is strengthened by the universally agreed requirements and declarations such as the universal Declaration on Bioethics and Human Rights (UNESCO, 2005) cited by Stolt et al. (2021). Research ethics on the other hand is described as “the application of fundamental ethical principles to
research activities which include the design and implementation of research, respect towards society and others, the use of resources and research outputs, scientific misconduct and the regulation of research” (Stirling, 2021).

In that regards the confidentiality of respondents was protected by the researcher. To achieve this respondent were not required to provide their names and place of residence, and the demographics were largely restricted to the respondents’ professional work. Furthermore, it was ensured that respondents acted voluntarily in providing responses to the research questions and not out of compulsion by the researcher. All ethical issues regarding this study were adhered to by the researcher.

### 3.11 Profile of the Study Area

Ghana’s pharmaceutical manufacturing industry is composed of local, international and multinational players. The market supply is a mix of locally produced drugs using imported inputs and finished products, with imports from Asia and Europe dominating supply, Asoko report, 2019. The government and some local manufacturers partner with foreign companies to address health needs of the country. As it is common with developing countries in West Africa, Ghana’s pharmaceutical industry rely on foreign inputs and finished pharmaceutical products. According to (Asoko Market insight and industry report), about 70% of Ghana’s pharmaceutical demand is served mostly through imports from India and China, with local production accounting for the 30%. According to the report, this aligns with the distribution between prescription drugs and over-the-counter (OTC) medications at 74% and 26% of the market respectively. From the report, sales from pharmaceuticals recorded $299 million in 2018, which is up slightly from sales records of $293 million in 2017, according to Fitch Solutions.
Income from the pharmaceutical industry represents 0.5% of Ghana’s GDP and 13% total healthcare expenditure in 2018, Asoko report, 2019. Ghana imported a total of $282 million of pharmaceutical products and raw materials of which about 65% were sourced from France, India and Switzerland respectively according to data from TradeMap as reported by Asoko. Comparatively, the 2018 value was 83% greater than that of 2016, when the import bill recorded $154 million approximately. According to the report, 26% of over-the-counter medications is produced by local pharmaceutical manufacturers, as well as 74% of prescription drugs of the entire market. The worth of Ghana’s pharmaceutical industry in 2018, stood at $3.6 million. From the report, the trade figure is a dramatic reduction in 2012 sales of $78 million. The intervening 5 years have seen a shift in the market structure, manufacturers are expanding to other West African nations rather than producing and exporting from Ghana, Asoko, 2019.
CHAPTER FOUR

PRESENTATION OF FINDINGS, ANALYSIS AND DISCUSSION

4.1 Introduction

This section presents the findings from the primary data collection. The data was collected using a structured questionnaire administered to key informants in the pharmaceutical firms used. The chapter is organised into four sections. The first section presents the demographic profile of the respondent organisations and their key informants. The second section presents the descriptive statistics of the measured variables, along with reliability tests and correlations. The third section presents the results of the inferential statistics used to test the study’s hypothesis. The final section presents the discussion of the findings from the field study.

4.2 Demographic Variables

In this section, the demographic profile of the respondent organisations and their key informants are presented. First, the key individual characteristics are presented in table 4.1.
Table 4.1 Respondents' demographic profile

<table>
<thead>
<tr>
<th>Variables</th>
<th>Category</th>
<th>Count</th>
<th>N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Female</td>
<td>49</td>
<td>40.5%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>72</td>
<td>59.5%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>121</td>
<td>100%</td>
</tr>
<tr>
<td>Education</td>
<td>Up to Diploma/HND</td>
<td>6</td>
<td>5.0%</td>
</tr>
<tr>
<td></td>
<td>Up to first degree</td>
<td>69</td>
<td>57.0%</td>
</tr>
<tr>
<td></td>
<td>Postgraduate degree</td>
<td>46</td>
<td>38.0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>121</td>
<td>100%</td>
</tr>
<tr>
<td>Experience</td>
<td>Less than 3 years</td>
<td>5</td>
<td>4.1%</td>
</tr>
<tr>
<td></td>
<td>Between 3 and 5 years</td>
<td>38</td>
<td>31.4%</td>
</tr>
<tr>
<td></td>
<td>Between 6 and 10 years</td>
<td>64</td>
<td>52.9%</td>
</tr>
<tr>
<td></td>
<td>Between 10 and 15 years</td>
<td>11</td>
<td>9.1%</td>
</tr>
<tr>
<td></td>
<td>Between 15 and 20 years</td>
<td>2</td>
<td>1.7%</td>
</tr>
<tr>
<td></td>
<td>Above 20 years</td>
<td>1</td>
<td>0.8%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>121</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Field study, 2021.

The results from table 4.1 indicates that males make majority of the respondents. The educational level of the respondents is relatively high, as more than 50% are graduates. This lends credence to the study’s results, as we can be sure that the respondents have the ability to read and understand the issues in the questionnaire so as to give a credible response. This is further supported by the fact that about 95% of respondents have had at least 3 years of work experience. This makes it likely that they are knowledgeable in the area, and thus their responses reflect the current happenings in the organisation and the environment.
Table 4.2 Demographic profile of respondent firms

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>Count</th>
<th>N %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Less than 15 employees</td>
<td>4</td>
<td>3.3%</td>
</tr>
<tr>
<td></td>
<td>Between 15 and 50 employees</td>
<td>79</td>
<td>65.3%</td>
</tr>
<tr>
<td></td>
<td>Over 50 employees</td>
<td>38</td>
<td>31.4%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>121</td>
<td>100%</td>
</tr>
<tr>
<td>Age</td>
<td>Below 2 years</td>
<td>3</td>
<td>2.5%</td>
</tr>
<tr>
<td></td>
<td>Between 2 and 5 years</td>
<td>8</td>
<td>6.6%</td>
</tr>
<tr>
<td></td>
<td>Between 5 and 10 years</td>
<td>32</td>
<td>26.4%</td>
</tr>
<tr>
<td></td>
<td>Between 10 and 15 years</td>
<td>37</td>
<td>30.6%</td>
</tr>
<tr>
<td></td>
<td>Above 15 years</td>
<td>41</td>
<td>33.9%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>121</td>
<td>100%</td>
</tr>
</tbody>
</table>


From table 4.2, there are variations in the firm sizes (number of employees) and the age of the firms (the number of years it has been operated). Because these factors can affect investment in sustainable procurement and the nature of customer and supplier relationship, they are used as control variables during the hypothesis testing.

4.3 Descriptive Statistics and Test of Normality

This section presents the descriptive statistics and normality tests for the various items in the questionnaire. From table 4.3, the mean and standard deviation is provided for the descriptive, whereas the skewness and kurtosis is provided for the normality tests. As noted by Tabachnick and Fidel (2007), normality tests are assumed in multivariate statistics such as multiple regression which is used in this study. The results presented in the tables indicate that the distribution of scores on each item is satisfactorily normal as both the skewness and the kurtosis indices obtained are very much within the recommended thresholds of “less than |4|" and “less than |8|” respectively (Kline, 2011).
Table 4. 3 Descriptive statistics and test of normality

<table>
<thead>
<tr>
<th>Sustainable Procurement</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
<th>Skew</th>
<th>Kurt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Environmental Purchasing</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EP1</td>
<td>Uses a life-cycle analysis to evaluate the environmental friendliness of products and packaging</td>
<td>1.00</td>
<td>5.00</td>
<td>3.6446</td>
<td>1.16804</td>
<td>-1.154</td>
</tr>
<tr>
<td>EP2</td>
<td>Participates in the design of products for disassembly</td>
<td>1.00</td>
<td>5.00</td>
<td>3.6694</td>
<td>1.16468</td>
<td>-1.031</td>
</tr>
<tr>
<td>EP3</td>
<td>Asks suppliers to commit to waste reduction goals</td>
<td>1.00</td>
<td>5.00</td>
<td>3.7273</td>
<td>1.10303</td>
<td>-0.878</td>
</tr>
<tr>
<td>EP4</td>
<td>Participates in the design of products</td>
<td>1.00</td>
<td>5.00</td>
<td>2.9091</td>
<td>1.32288</td>
<td>-0.094</td>
</tr>
<tr>
<td>EP5</td>
<td>Reduction of packaging</td>
<td>1.00</td>
<td>5.00</td>
<td>3.7851</td>
<td>1.16338</td>
<td>-1.120</td>
</tr>
<tr>
<td><strong>B. Diversity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DIV1</td>
<td>Purchase from minority and women owned business enterprise (MWBE) suppliers</td>
<td>1.00</td>
<td>5.00</td>
<td>4.1405</td>
<td>.90651</td>
<td>-1.443</td>
</tr>
<tr>
<td>DIV2</td>
<td>Has a formal minority and women owned business enterprise (MWBE) supplier purchase program</td>
<td>1.00</td>
<td>5.00</td>
<td>3.9174</td>
<td>.82246</td>
<td>-1.307</td>
</tr>
<tr>
<td><strong>C. Safety</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAF1</td>
<td>Ensures the safe, incoming movement of product to our facilities</td>
<td>1.00</td>
<td>5.00</td>
<td>3.9917</td>
<td>.82154</td>
<td>-1.452</td>
</tr>
<tr>
<td>SAF2</td>
<td>Ensures that suppliers’ location are operated in a safe manner</td>
<td>1.00</td>
<td>5.00</td>
<td>3.6033</td>
<td>.86100</td>
<td>-.884</td>
</tr>
<tr>
<td><strong>Green Supply Chain Learning</strong></td>
<td>Min</td>
<td>Max</td>
<td>Mean</td>
<td>SD</td>
<td>Skew</td>
<td>Kurt</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>------</td>
<td>--------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td><strong>A. Green customer learning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GCL1 We have acquired important environmental protection information from our major supplier.</td>
<td>1.00</td>
<td>5.00</td>
<td>4.5124</td>
<td>.83781</td>
<td>-2.244</td>
<td>5.569</td>
</tr>
<tr>
<td>GCL2 We have learnt new environmental management abilities from our major supplier.</td>
<td>1.00</td>
<td>5.00</td>
<td>4.2479</td>
<td>.90628</td>
<td>-1.538</td>
<td>2.523</td>
</tr>
<tr>
<td>GCL3 The relationship with major supplier enhances our capacities to maintain sustainable development</td>
<td>1.00</td>
<td>5.00</td>
<td>3.7273</td>
<td>.87560</td>
<td>-.799</td>
<td>1.071</td>
</tr>
<tr>
<td>GCL4 We constantly learn better ways to work with our major supplier jointly in dealing with environmental issues</td>
<td>1.00</td>
<td>5.00</td>
<td>4.2149</td>
<td>.92382</td>
<td>-1.410</td>
<td>1.977</td>
</tr>
<tr>
<td>GCL5 We have established a strong capability in understanding green knowledge and skills of our major supplier</td>
<td>1.00</td>
<td>5.00</td>
<td>3.9091</td>
<td>.99163</td>
<td>-.910</td>
<td>.539</td>
</tr>
<tr>
<td><strong>B. Green Supplier learning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GSL1 We have acquired important environmental protection information from our major customer</td>
<td>2.00</td>
<td>5.00</td>
<td>3.8926</td>
<td>.79374</td>
<td>-.720</td>
<td>.488</td>
</tr>
<tr>
<td>GSL2 We have learnt new environmental management abilities from our major customer.</td>
<td>1.00</td>
<td>5.00</td>
<td>3.8926</td>
<td>.77246</td>
<td>-.915</td>
<td>1.614</td>
</tr>
<tr>
<td>GSL3 The relationship with major customer enhances our capacities to maintain sustainable development</td>
<td>1.00</td>
<td>5.00</td>
<td>3.9008</td>
<td>.77894</td>
<td>-1.223</td>
<td>2.792</td>
</tr>
<tr>
<td>GSL4 We constantly learn better ways to work with our major customer jointly in dealing with environmental issues</td>
<td>1.00</td>
<td>5.00</td>
<td>3.7851</td>
<td>.79798</td>
<td>-.993</td>
<td>1.275</td>
</tr>
<tr>
<td>---</td>
<td>------------------------------------------------------------------------------</td>
<td>-------</td>
<td>------</td>
<td>--------</td>
<td>-------</td>
<td>------</td>
</tr>
<tr>
<td>GSL5</td>
<td>We have established a strong capability in understanding the knowledge and skills of our major customer</td>
<td>1.00</td>
<td>5.00</td>
<td>3.9587</td>
<td>.78948</td>
<td>-.856</td>
</tr>
<tr>
<td><strong>C. Innovation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INO1</td>
<td>We choose the materials of the product that produce the least amount of pollution</td>
<td>2.00</td>
<td>5.00</td>
<td>4.3388</td>
<td>.70183</td>
<td>-1.171</td>
</tr>
<tr>
<td>INO2</td>
<td>We choose the materials of the product that consume the least amount of energy and resources</td>
<td>1.00</td>
<td>5.00</td>
<td>4.2479</td>
<td>.74477</td>
<td>-1.423</td>
</tr>
<tr>
<td>INO3</td>
<td>We use the fewest number of materials to comprise the product for conducting the product development or design</td>
<td>1.00</td>
<td>5.00</td>
<td>4.2479</td>
<td>.73350</td>
<td>-1.457</td>
</tr>
<tr>
<td>INO4</td>
<td>We circumspectly deliberate whether the product is easy to decompose</td>
<td>2.00</td>
<td>5.00</td>
<td>4.3802</td>
<td>.77735</td>
<td>-1.431</td>
</tr>
<tr>
<td>Supply chain surplus</td>
<td>Min</td>
<td>Max</td>
<td>Mean</td>
<td>SD</td>
<td>Skew</td>
<td>Kurt</td>
</tr>
<tr>
<td>----------------------</td>
<td>-----</td>
<td>-----</td>
<td>------</td>
<td>-----</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td><strong>A. Cost reduction</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CR1</td>
<td>1</td>
<td>5</td>
<td>4.29</td>
<td>.69</td>
<td>-1.38</td>
<td>4.54</td>
</tr>
<tr>
<td>CR2</td>
<td>1</td>
<td>5</td>
<td>4.27</td>
<td>.66</td>
<td>-1.43</td>
<td>5.58</td>
</tr>
<tr>
<td>CR3</td>
<td>1</td>
<td>5</td>
<td>4.20</td>
<td>.67</td>
<td>-1.28</td>
<td>4.79</td>
</tr>
<tr>
<td>CR4</td>
<td>1</td>
<td>5</td>
<td>4.16</td>
<td>.79</td>
<td>-1.50</td>
<td>3.82</td>
</tr>
<tr>
<td><strong>B. Gross Revenue</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GR1</td>
<td>1</td>
<td>5</td>
<td>3.27</td>
<td>.77</td>
<td>-.298</td>
<td>.867</td>
</tr>
<tr>
<td>GR2</td>
<td>1</td>
<td>5</td>
<td>3.24</td>
<td>.82</td>
<td>-.470</td>
<td>1.02</td>
</tr>
<tr>
<td>GR3</td>
<td>1</td>
<td>5</td>
<td>4.17</td>
<td>.94</td>
<td>-1.47</td>
<td>2.34</td>
</tr>
<tr>
<td>GR4</td>
<td>1</td>
<td>5</td>
<td>3.83</td>
<td>.84</td>
<td>-1.27</td>
<td>2.31</td>
</tr>
<tr>
<td><strong>C. Return on Investment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROI1</td>
<td>2</td>
<td>5</td>
<td>4.29</td>
<td>.76</td>
<td>-1.12</td>
<td>1.45</td>
</tr>
<tr>
<td>ROI2</td>
<td>1</td>
<td>5</td>
<td>3.92</td>
<td>.82</td>
<td>-1.31</td>
<td>2.48</td>
</tr>
<tr>
<td>ROI3</td>
<td>1</td>
<td>5</td>
<td>4.29</td>
<td>.688</td>
<td>-1.38</td>
<td>4.54</td>
</tr>
<tr>
<td>ROI4</td>
<td>1</td>
<td>5</td>
<td>3.60</td>
<td>.861</td>
<td>-.884</td>
<td>1.31</td>
</tr>
<tr>
<td>ROI5</td>
<td>1</td>
<td>5</td>
<td>2.91</td>
<td>1.32</td>
<td>-.094</td>
<td>-1.29</td>
</tr>
</tbody>
</table>
4.4 Reliability Tests and Correlation Results

4.4.1 Internal consistency

The internal consistency of the measurement items is examined using the Cronbach’s Alpha (CA) statistic. The generally agree threshold is that CA values 0.7 and above are considered to have acceptable internal consistency. While estimating the CA for the various constructs, some items had to be dropped since they were not internally consistent with the other measures in the same construct.

Table 4.4 Reliability of Constructs

<table>
<thead>
<tr>
<th>Construct</th>
<th>Sub-constructs</th>
<th>Number of items</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable Procurement</td>
<td>Environmental Purchasing</td>
<td>4</td>
<td>0.925</td>
</tr>
<tr>
<td></td>
<td>Diversity</td>
<td>2</td>
<td>0.804</td>
</tr>
<tr>
<td></td>
<td>Safety</td>
<td>2</td>
<td>0.782</td>
</tr>
<tr>
<td>Green SC learning</td>
<td>Green Supplier learning</td>
<td>4</td>
<td>0.923</td>
</tr>
<tr>
<td></td>
<td>Green customer learning</td>
<td>3</td>
<td>0.860</td>
</tr>
<tr>
<td></td>
<td>Innovation</td>
<td>4</td>
<td>0.842</td>
</tr>
<tr>
<td>Supply chain surplus</td>
<td>Cost reduction</td>
<td>3</td>
<td>0.877</td>
</tr>
<tr>
<td></td>
<td>Gross revenue</td>
<td>3</td>
<td>0.734</td>
</tr>
<tr>
<td></td>
<td>Return on Investment</td>
<td>4</td>
<td>0.725</td>
</tr>
</tbody>
</table>

a = Item EP 4 dropped. b = GCL4, GCL5 dropped. c = GSL 4 dropped. d = CR 4 dropped. e = GR 4 dropped. f = ROI 5 dropped.

Source: Field study, 2021.

4.4.2 Correlations and Descriptive.

Table 4.4 below examines the mean, standard deviation and the correlations among the various constructs.
Table 4. 4 Descriptive statistics and correlation

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Size</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Age</td>
<td>-</td>
<td>-</td>
<td>.53**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. EP</td>
<td>3.71</td>
<td>1.04</td>
<td>-.37**</td>
<td>-.08</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. DIV</td>
<td>4.03</td>
<td>.79</td>
<td>-.18*</td>
<td>-.04</td>
<td>.59**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. SAFE</td>
<td>3.80</td>
<td>.76</td>
<td>-.17</td>
<td>-.04</td>
<td>.55**</td>
<td>.78**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. GCL</td>
<td>4.16</td>
<td>.77</td>
<td>-.27**</td>
<td>-.246**</td>
<td>.43**</td>
<td>.63**</td>
<td>.55**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. GSL</td>
<td>3.91</td>
<td>.71</td>
<td>-.09</td>
<td>.07</td>
<td>.32**</td>
<td>.37**</td>
<td>.41**</td>
<td>.23*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. INNOV</td>
<td>4.30</td>
<td>.58</td>
<td>-.11</td>
<td>-.11</td>
<td>.27**</td>
<td>.61**</td>
<td>.47**</td>
<td>.56**</td>
<td>.32**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. CR</td>
<td>4.23</td>
<td>.53</td>
<td>-.35**</td>
<td>-.23*</td>
<td>.21*</td>
<td>.45**</td>
<td>.45**</td>
<td>.45**</td>
<td>.38**</td>
<td>.48**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. GR</td>
<td>3.56</td>
<td>.68</td>
<td>-.22*</td>
<td>-.168</td>
<td>.27**</td>
<td>.47**</td>
<td>.40**</td>
<td>.56**</td>
<td>.39**</td>
<td>.47**</td>
<td>.43**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11. ROI</td>
<td>4.02</td>
<td>.58</td>
<td>-.22*</td>
<td>-.08</td>
<td>.49**</td>
<td>.86**</td>
<td>.84**</td>
<td>.63**</td>
<td>.46**</td>
<td>.71**</td>
<td>.63**</td>
<td>.49**</td>
</tr>
<tr>
<td>-------</td>
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</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
4.5 OLS Path Analysis

The OLS path analysis was carried out using the Hayes PROCESS macro implemented in SPSS. Increasingly, Hayes PROCESS is accepted among researchers as a means of examining moderation, mediation and conditional process analysis. Prior to the estimation of the model, all the sub-constructs for the various 2nd order constructs were added to create a composite construct.

Table 4.5 OLS Path Analysis

<table>
<thead>
<tr>
<th>Direct effects:</th>
<th>Unstandardized coefficients (t-values)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Green Supply Chain Learning</td>
</tr>
<tr>
<td><strong>Control Variables</strong></td>
<td><strong>β</strong></td>
</tr>
<tr>
<td>Firm Size</td>
<td>.0446</td>
</tr>
<tr>
<td>Firm Age</td>
<td>-.0519</td>
</tr>
<tr>
<td><strong>Main Effects:</strong></td>
<td></td>
</tr>
<tr>
<td>Sustainable Procurement</td>
<td>.4714</td>
</tr>
<tr>
<td>Green Supply chain learning</td>
<td></td>
</tr>
<tr>
<td><strong>R²</strong></td>
<td>.4589</td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>33.081</td>
</tr>
<tr>
<td><strong>4</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Intercepts</strong></td>
<td>2.4115</td>
</tr>
</tbody>
</table>

Indirect effects:

<table>
<thead>
<tr>
<th>SP → GSCL → SCS</th>
<th>B</th>
<th>bootstrap LLCI</th>
<th>Bootstrap ULCI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.2837</td>
<td>.1090</td>
<td>.4210</td>
</tr>
</tbody>
</table>

Source: Field study, 2021.
The results of the OLS path analysis is presented in table 4.5 below. Control variables estimated in the model are firm size and firm age. The results indicate that none of the two variables had significant relationship with either of green supply chain learning and supply chain surplus.

The first hypothesis of the study proposed a positive relationship between sustainable procurement and supply chain surplus. The results indicate that the relationship is positive and significant ($\beta = .1353, t = 2.868$). Thus, hypothesis one of the study is supported, as there is a positive relationship between sustainable procurement and supply chain surplus. In other worlds, as sustainable procurement increases, it is reasonable to expect an increment in supply chain surplus too.

The second hypothesis of the study proposed a positive relationship between sustainable procurement and green supply chain learning. The results from the analysis support this proposition ($\beta = .4714, t = 9.4731$). Thus, hypothesis two of the study is supported. When the level of sustainable procurement increases, it is reasonable to expect an increase in green supply chain learning.

Hypothesis three of the study proposed a positive relationship between green supply chain learning and supply chain surplus. Again, this hypothesis is supported as the relationship was found to be positive and significant ($\beta = .6017, t = 9.128$). This provides support for hypothesis three of the study. When the level of green supply chain learning increases, it is reasonable to expect an increase in supply chain surplus.

The fourth hypothesis of the study proposed an indirect relationship between sustainable procurement and supply chain surplus via green supply chain learning. The mediation model was tested using the PROCESS bootstrapping approach with 10000 subsamples. The indirect effect was positive and significant, as the bootstrapping confidence interval
did not include a zero ($\beta = .2837$, LLCI = .1090, ULCI = .4201). Hypothesis four of the study was supported.

A summary of the hypothesis tests is presented in the table below.

**Table 4.6 Summary of hypothesis test results**

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Relationship</th>
<th>$B$</th>
<th>$T$</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SP $\rightarrow$ SCS</td>
<td>.1353</td>
<td>2.868</td>
<td>Supported</td>
</tr>
<tr>
<td>2</td>
<td>SP $\rightarrow$ GSCL</td>
<td>.4714</td>
<td>9.4731</td>
<td>Supported</td>
</tr>
<tr>
<td>3</td>
<td>GSCL $\rightarrow$ SCS</td>
<td>.6017</td>
<td>9.128</td>
<td>Supported</td>
</tr>
<tr>
<td>4</td>
<td>SP $\rightarrow$ GSCL $\rightarrow$ SCS</td>
<td>.2837</td>
<td></td>
<td>LLCI = .1090, ULCI = .4201 Supported</td>
</tr>
</tbody>
</table>

**Note:** SP = sustainable procurement, GSCL = Green supply chain learning, SCS = Supply chain surplus, ULCI = Upper limit confidence interval, LLCI = Lower limit confidence interval

### 4.6 Discussion of Results

The results provide support for all four hypotheses raised in the study, and makes significant contribution towards theory development in the area of sustainable procurement, green supply chain learning and supply chain surplus.

As proposed in hypothesis one, there is evidence that sustainable procurement is positively related to supply chain surplus. This finding in the study supports the findings of Kim, Jeong and Jung (2012) who presented that, sustainable supply chain has the potential to increase supply chain surplus of companies. Similarly, Rajeswari (2020) presented that sustainable practices yield positive social surplus compared to the conventional practices. Sustainable procurement help reduce cost, risk and optimize eco-friendly practices.

Environmentally friendly purchasing practices have been known to improve the image of organisations, help to reduce operational costs through the minimisation of material usage...
in product design and helps to improve profits through the increment in customer base. Again, the pursuit of diversity may improve the social recognition of the organisation, which may increase patronage. According to Padmalalitha, Rajeswari & Vijaya, (2020), environmental performance drives legitimate margin on economic performance of the organization which can be achieved through sustainable procurement. Procurement of safe products will reduce the frequency and/or likelihood of accidents on the company’s own premises and the supplier side, all of which may cause operational disruptions. Overall, the pursuit of sustainable procurement is likely to support the organisation’s question to improve its profits, return on investment and reduce its operational costs.

The findings in hypothesis two suggests that sustainable procurement is positively related to green supply chain learning. This finding conforms with the findings of (Gema, Antonio, & De Marchi, 2017) that, firms need to expand beyond the knowledge base of their industry and collaborate with the external environment for new knowledge base in order to achieve innovation. This means that companies must engage in learning processes in order to be innovative through learning. Again, successful sustainable procurement policies require the development of close relationships with key suppliers. Such relationships facilitate the transfer of key external knowledge that supports the procurement process. Important issues in the relationship includes absorptive capacity and knowledge management, which can determine the performance outcomes (Gema, Antonio, & De Marchi, 2017).

In hypothesis three, there is support for the proposition that green supply chain learning is positively related to supply chain surplus. In the works of Lisi, Zhu & Yuan, (2019), green supply chain learning is crucial if firms can produce products that meet the needs and demands of the customer. Again, Lisi, Zhu & Yuan, (2019), green supply chain learning leads to green innovations which eventually enhance firm performance with regards to
sustainability. Thus, green supply chain learning enables organisations to obtain key market and strategic information from supply chain partners that can be used to improve performance outcomes. Green supply chain learning improves the chances of obtaining positive outcomes from the sustainable procurement process.

Finally, green supply chain learning has been found to mediate the relationship between sustainable procurement and supply chain surplus. As already discussed, sustainable procurement requires the assimilation of information from supply chain partners and this births green supply chain learning. Green supply chain learning then enables the organisations to have access to key strategic information that can be used to improve the performance outcomes of sustainable procurement.
CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This section presents a summary of the study’s findings, the author’s concluding remarks and the recommendations for practice and future studies. First, the summary of findings are presented in line with the objectives and the hypothetical propositions, and then the conclusions are drawn. This is followed by the managerial implications and finally the directions for future studies.

5.2 Summary of Findings

The first objective of the study examined the relationship between sustainable procurement and supply chain surplus. The results from the hypothesis test reveals that sustainable procurement have a significant and positive relationship with supply chain surplus. Thus, a unit increase in sustainable procurement is associated with a .135 increase in supply chain surplus.

The second objective of the study examined the relationship between sustainable procurement and green supply chain learning. The findings show that the relationship is positive and significant, and that a unit increase in sustainable procurement is associated with a .471 increase in green supply chain learning.

Objective three of the study examined the relationship between green supply chain learning and supply chain surplus. The results indicate that green supply chain learning has a significant, positive relationship with supply chain surplus. Based on the regression results,
a unit increase in green supply chain learning is expected to induce a .601 increase in supply chain

The fourth objective proposed and tested the potential mediating role of green supply chain learning in the relationship between sustainable procurement and supply chain surplus. The indirect effect was found to be positive and significant. Thus, green supply chain learning mediates the relationship between sustainable procurement and supply chain surplus. The findings of this research work confirms the findings of a research carried out by Islam et. al, 2017, that sustainable procurement has a significant positive impact on an organization’s financial performance.

5.3 Conclusion

Sustainable procurement has garnered attention as a key aspect of corporate environmentalism. This study has examined the relationship between sustainable procurement, green supply chain learning and supply chain surplus. Using data from 121 pharmaceutical companies, the study developed and tested an empirical model. The results support all of the prior propositions made. The study has shown that the pursuit of sustainable procurement practices induces a positive outcome on organisations, in the form of supply chain surplus. This relationship could also be channelled through green supply chain learning. Again, the findings suggest a positive relationship between sustainable procurement and green supply chain learning, as well as a positive relationship between green supply chain learning and supply chain surplus.
5.4 Recommendations for Practice

Based on the study’s findings, the following recommendations are made to aid managerial decision making.

First, managers should understand that the pursuit of sustainable procurement is potentially beneficial to the organisation. Thus, incorporating sustainability strategies into the procurement system should not be seen as a burden, but rather an opportunity that has potential benefits for the organisation and the entire supply chain.

Second, given the potential of sustainable procurement, business owners and executives should include sustainability issues as a central part of the procurement strategy. It may not be enough to have a few operational environmental considerations in the purchasing process, but rather to strategically outline the long-term goals of the organisation’s procurement system in terms of achieving environmental, social and economic objectives.

Third, stronger collaborations should be developed with supply chain partners to enhance the performance outcomes of sustainable procurement. This will facilitate the development of external knowledge that will be used in designing the procurement process to enhance performance outcomes. Such collaboration is likely to enhance and amplify supply chain learning, which provides access to unique external information and input that will improve the procurement process.

5.5 Recommendation for Future Studies

This study has made significant contribution toward theoretical development in the area of sustainable procurement and supply chain surplus. However, there are some limitations that provide opportunities for future studies.
First, the study uses cross-sectional data, and so cannot reliably be used to make causal inferences. Even though the associations among the constructs have been shown, a causal examination beyond this one would be beneficial for empirical validation and theory building. Future studies should consider using a longitudinal approach to establish causality.

Second, the model is proposed and tested only on pharmaceutical companies. Future studies should test the model in other industries to examine how it compares. Cross industrial analysis may also be beneficial to knowledge development.
REFERENCES


Freeman, R. E., Harrison, J. S., Wicks, A. C., Parmar, B. L., & De Colle, S. (2010). Stakeholder theory: The state of the art.


Padmalalitha Thennal VenkatesaNarayanan, Rajeswari Thirunavukkarasu, Vijaya Sunder M,


Taherdoost, H. Data Collection Methods and Tools for Research.


APPENDIX: QUESTIONNAIRE


For confidentiality reasons, kindly do not indicate your name or provide information about your organization to us. Only reflect on your personal experience as respondent and its environment. I can assure you that your responses for the study will be anonymised and used only for statistical and academic purposes. The questionnaire has specific instructions to follow and scales to use to indicate your responses. Every statement/question included in the questionnaire is relevant and although some appear quite similar, they are also unique in many ways, so kindly do well to respond to each. The questionnaire will take about 20 minutes to complete. I am most grateful that you take the time to participate in this study.

SECTION A

DEMOGRAPHIC DATA

This section collects information about you. Please answer all questions by ticking the appropriate box.

<table>
<thead>
<tr>
<th>1. Gender:</th>
<th>[ ] Male</th>
<th>[ ] Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Age</td>
<td>[ ] 20-29 years</td>
<td>[ ] 30-39 years</td>
</tr>
<tr>
<td>3. Education Level</td>
<td>[ ] HND/Diploma</td>
<td>[ ] Bachelor degree</td>
</tr>
</tbody>
</table>
Position

………………………………………….

Years in Position
[ ] 1-5 years [ ] 6-10 years [ ] above 11 years

5. What category of supplier do you deal with?
[ ] Foreign [ ] Local [ ] Both

7. How the company’s raw materials are been procured?
[ ] Competitive Bidding [ ] Sole-source [ ] Single Source

SECTION B

SUSTAINABLE PROCUREMENT

The following items relate to the sustainable procurement. Kindly use the 5-point scale below to provide the appropriate responses. Thank you.

<table>
<thead>
<tr>
<th>SUSTAINABLE PROCUREMENT</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somehow Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Purchasing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uses a life-cycle analysis to evaluate the environmental friendliness of products and packaging</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participates in the design of products for disassembly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asks suppliers to commit to waste reduction goals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participates in the design of products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduces packaging material</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase from minority and women owned business enterprise (MWBE) suppliers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Has a formal minority and women owned business enterprise (MWBE) supplier purchase program

<table>
<thead>
<tr>
<th>Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensures the safe, incoming movement of product to our facilities</td>
</tr>
<tr>
<td>Ensures that suppliers’ location are operated in a safe manner</td>
</tr>
</tbody>
</table>

**SECTION C**

**GREEN SUPPLY CHAIN LEARNING**

The following items relate to green supply chain learning. Kindly use the 5-point scale below to provide the appropriate responses. Thank you.

<table>
<thead>
<tr>
<th>GREEN SUPPLY CHAIN LEARNING</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somewhat Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green Supplier Learning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have acquired important environmental protection information from our major supplier.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have learnt new environmental management abilities from our major supplier.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The relationship with major supplier enhances our capacities to maintain sustainable development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We constantly learn better ways to work with our major supplier jointly in dealing with environmental issues</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have established a strong capability in understanding green knowledge and skills of our major supplier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Green Customer Learning</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have acquired important environmental protection information from our major customer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>We have learnt new environmental management abilities from our major customer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The relationship with major customer enhances our capacities to maintain sustainable development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
We constantly learn better ways to work with our major customer jointly in dealing with environmental issues.

We have established a strong capability in understanding the knowledge and skills of our major customer.

**Innovation**

We choose the materials of the product that produce the least amount of pollution for conducting the product development or design.

We choose the materials of the product that consume the least amount of energy and resources for conducting the product development or design.

We use the fewest amount of materials to comprise the product for conducting the product development or design.

We would circumspectly deliberate whether the product is easy to decompose for conducting the product development or design.

<table>
<thead>
<tr>
<th>SECTION D</th>
<th>SUPPLY CHAIN SURPLUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>The following items relate to the supply chain surplus. Kindly use the 5-point scale below to provide the appropriate responses. Thank you.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Somehow disagree</td>
<td>Agree</td>
<td>Strongly agree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUPPLY CHAIN SURPLUS</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Somehow Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Reduction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower the direct costs of products and services</td>
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<tr>
<td>-----------------------------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduce indirect costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction of unnecessary costs up</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduction order lead-time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Gross Revenue**

<table>
<thead>
<tr>
<th>Increased sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth in profitability</td>
</tr>
<tr>
<td>Increased Average sales growth rate</td>
</tr>
<tr>
<td>Increased Average net profit</td>
</tr>
</tbody>
</table>

**Return On Investment**

<table>
<thead>
<tr>
<th>Expanding product and service offerings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaching new customers and markets</td>
</tr>
<tr>
<td>Increased in market share</td>
</tr>
<tr>
<td>Changing the product and service mix towards higher-value-added offerings</td>
</tr>
<tr>
<td>Share common resources with other business units</td>
</tr>
</tbody>
</table>

----THANK YOU----