

KWAME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY, KUMASI

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**The mediating role of eco-innovation on the effect of environmental concern on sustainable
procurement in the context of construction firms**

By

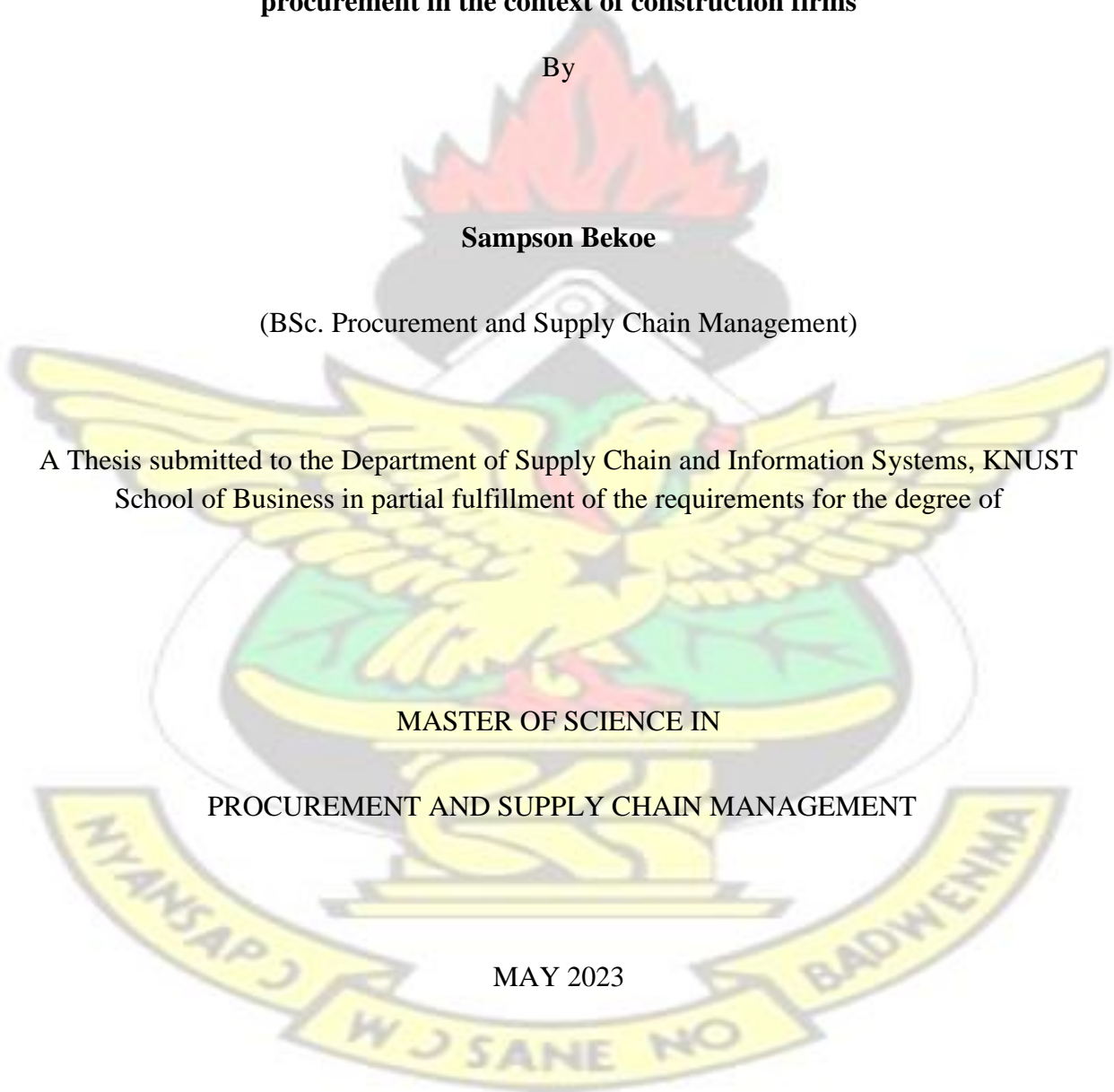
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(BSc. Procurement and Supply Chain Management)

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School of Business in partial fulfillment of the requirements for the degree of

**MASTER OF SCIENCE IN
PROCUREMENT AND SUPPLY CHAIN MANAGEMENT**

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DECLARATION

I hereby declare that this submission is my work towards the Masters of Science in Logistics and Supply Chain Management and that, to the best of my knowledge, 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 acknowledgment has been made in the text.

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DEDICATION

This work is dedicated to God Almighty, My Wife (Beatrice Tenkoramaa) and my kids
(Ewuraa Abenaa Amofoaa Bekoe & Nana Yaa Nyantankywaa Bekoe).

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ABSTRACT

The primary objective of this research was to investigate how eco-innovation might serve as a mediator between environmental concerns and sustainable procurement practices in the context of construction firms. The problem statement elaborates on the shortcomings that inspired the suggestion of three separate objectives. The research was conducted using a cross-sectional survey and quantitative method that included both descriptive and explanatory design. Leaders in the Ghanaian construction industry were the study's target population. 350 completed questionnaires were returned from a study of 400 procurements, logistics, and senior executives or managers at all Ghanaian construction firms. Primary data was gathered using a combination of convenience and purposive sampling techniques. Structural Equation Modeling in the form of SmartPLS 4 was used to verify the study's hypotheses. The data were summarized using descriptive statistics, also called summary statistics. According to the results of the research, sustainable procurement is significantly influenced by environmental concerns in the construction industry. It was also found that the link between environmental concern and sustainable procurement is mediated by eco-innovation, which has a substantial effect on sustainable procurement. Based on the findings, it seems that construction firm managers may improve sustainable procurement by committing to and placing more emphasis on environmental concern and eco-innovation. The study recommended that construction managers adopt more environmentally friendly practices, such as the use of high-quality, recyclable materials and components that are easily removed and returned to manufacturers at the end of the building's life cycle.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The construction industry plays essential support in the development of both developed and developing nations. Apart from its role in developing the infrastructure in any economy, it employs significant workforces particularly, in emerging economies. Despite the contribution of the industry to socio-economic development, attaining sustainable related goals in construction is rapidly becoming a key performance indicator in the industry (Agyekum et al., 2022). The built environment globally is responsible for 33% of energy consumption, 30% of greenhouse gas emissions, 40% of solid waste streams (in developed countries), and 40% of raw material consumption (Hamilton et al., 2020). In Africa, 56% of all energy use is attributed to the built environment, which is responsible for between 25-40% of all waste generation, 5% of all water consumption, and 3,9 tons of CO₂E (greenhouse gas emissions).

This implies that the industry has an immense impact on the environment (Xia et al., 2015; Agbesi et al., 2018). Despite several strategies employed to minimize the environmental consequences of the industry, the growth of the environmental impact of the industry in developing countries remains worrisome. Bratt et al. (2013) stated that public procurement has a significant potential to drive the sustainability agenda of a country because of its volume. Similarly, construction procurement too can be a main driver to promote the national sustainability agenda (Ruparathna and Hewage, 2015). In recent times, sustainable procurement is receiving significant attention as a strategic way of achieving environmental impact reduction (Zaidi et al., 2019; Yu et al., 2020; Gholizadeh et al., 2020; Kannan, 2021).

In the context of construction, sustainable procurement is a process whereby the client and participating organization meet design and development requirements in a way that achieves value for money on a whole-life basis to generate benefits not only for project stakeholders but also for society and the economy while minimizing any environmental damage (Yu et al., 2020; Ogunsanya et al., 2022). Despite the increased trend in sustainable procurement research and practice, most organizations in the public sector are yet to fully adopt sustainable procurement (Islam et al., 2017). Public institutions play a critical role in selecting the other stakeholders along the supply chain including consultants, and contractors, and determining construction products (Wilkinson et al., 2015). If they were to demand sustainability in construction procurement, a considerable amount of progress could be made toward the attainment of sustainable development (Wong et al., 2016). Sustainable procurement provides the vehicle for the industry to address economic advancement and social equity in the construction industry while minimizing the impact on the environment and contributing to the larger effort of achieving sustainable development (Meehan and Bryde, 2015). Sustainable procurement in the construction industry is the process by which a client and a participating organization meet design and development requirements in a way that achieves value for money on a whole-life basis, thus bringing about positive outcomes for all parties involved in the project, as well as for society, the economy, and the environment as a whole (Alkilani and Jupp, 2013).

Despite the increased trend in sustainable procurement research and practice, the implementation of sustainable procurement faces many challenges (Qazi and Apollonia, 2022; Agyekum et al., 2022). Key among these challenges that face the implementation of sustainable procurement is the management or leaders of organizations. According to

Kwatia (2022), top-level managers are responsible for environmental decisions in the organization. Hence, the environmental concern of managers or these top-level managers plays a critical role in the sustainable procurement agenda. Environmental responsibility will drive individuals to pay close attention to environmental issues, motivate them to take the initiative to take responsibility for environmental protection, and promote their positive practice of pro-environmental behavior (Yue et al., 2020). Environmental concern represents the degree of individual care for ecology and the environment (Jacopo et al., 2018). Though prior studies have shown that environmental concern is important in achieving the sustainability drive, it is unclear how environmental concern affects sustainable procurement. This study, therefore, examines how environmental concerns affect sustainable procurement in the construction industry in Ghana.

1.2 Statement of the Problem

The construction industry constitutes the essential backbone of economic progress and is recognized to be the key driver of economic growth and the sustainable development agenda (Muriithi 2017). Despite the role of the industry in growth, it has serious environmental implications when not properly handled. In this regard, circular procurement remains essential if nations desire to continue enjoying the support of the industry and keeping the environment safe. Procurement in the construction industry makes the sector prone to many environmental impacts. Hence, procurement plays a very important role for construction firms because of its role in advancing the sustainability agenda, given its position and ability to influence external organizations in the supply chain (Seuring 2004) through organizational policies and practices (Renukappa et al. 2016). Unfortunately, the implementation of environmentally firm procurement practices such as sustainable procurement faces multiple obstacles. This is due to the lack of understanding

of sustainable procurement due to the unavailability of sustainable procurement guidelines particularly in emerging economies (Wirahadikusumah et al., 2021; Ogunsanya et al., 2019). Environmental orientation remains a strategic way of pursuing the sustainability agenda, prior studies have argued that environmental concern plays an essential role in green purchase decisions and behavior (Cerri et al., 2018; Zhang et al., 2018; Kautish et al., 2019 Yue et al., 2020; Janmaimool, P. and Chudech, 2020; Ibrahim et al., 2021; Li et al., 2021) and neglected its impact on sustainable procurement. Though many governments, organizations, and authorities at all levels across the world have been urged to promote procurement policies and practices that encourage environmentally sound goods and services and sustainable construction (Varnäs et al., 2009; Qazi and Appolloni, 2022; Agyekum et al., 2022), yet till date, there are limited studies on the strategies which effectively promote wider uptake of SP in the construction industry (Ann et al., 2020). Various aspects such as green procurement practices, recycling, and sustainable construction practices have been explored in the literature (Meehan and Bryde, 2015, Eriksen et al., 2017), but the strategies and measures which ensure that SP is prevalent and rapidly adopted within the industry are limited in the literature. Jacopo et al. (2018) further argued that, despite the growth of the two concepts (environmental concern and sustainable procurement), combining the two concepts is rare and hence the slow pace in the uptake of sustainable procurement in the construction industry. To date, it is unknown how the construction industry could leverage environmental concerns to achieve sustainable procurement. This study, therefore, seeks to answer the question “Does environmental concern promote sustainable procurement?”

Adding to the limited knowledge on how construction firms could leverage environmental concerns to achieve sustainable procurement, Extant literature (Liao, Y.C. and Tsai, 2019; Khan et al., 2020; Huang et al., 2020; Tao et al., 2021; Sun et al., 2021; Ch'ng et al., 2021) points to the essential role of eco-innovation in the sustainability drive. Green products and green consumption are becoming more popular as consumers' environmental consciousness grows (Burki and Dahlstrom, 2017; Wang et al., 2018), and top management of businesses is also realizing that there may be a balance between corporate development and environmental protection and that ecological innovation can also create a new market niche. Ecological innovation is a necessary trend for businesses to increase their competitiveness and run sustainably in the "green economy" (He et al., 2019; Liu et al., 2019; Lopes Santos et al., 2019). Thus, apart from the vacuum of literature on the association of EC and sustainable procurement, past studies have certain drawbacks. First, prior research has been limited to a few developed countries. Therefore, this study was undertaken in Ghana with a distinct cultural context to determine whether the analyzed context may yield significantly different findings. Second, in addition to the variables listed above, other mediating variables can be investigated based on a particular theory. Therefore, eco-innovation is introduced in this study as a mediating variable. To date, limited or no study has been conducted to examine how eco-innovation may mediate the association between EC and sustainable procurement. Though the applicability of eco-innovation is missing in sustainable procurement literature, this study expects that EC significantly drives eco-innovation and further indirect role of eco-innovation in EC-SP relationships. In response to the calls to examine the indirect role of ecological innovation, this study represents the first attempt to investigate how eco-innovation may mediate the

association between EC and sustainable procurement. This study, therefore, makes a twofold contribution. While this study happens to be the first of the kind to explore how EC impacts sustainable procurement in the context of developing economies. This study extends existing knowledge. The outcome of this study may also be useful to buyer and supplier entities, especially in public procurement interested in building and maintaining ethical practices among themselves. Secondly, examining how eco-innovation may mediate the association between EC and sustainable procurement provides a contemporary theoretical extension.

1.3 Objective of the Study

The main objective of this study is to investigate the mediating role of eco-innovation on the effect of environmental concern on sustainable procurement in the context of construction firms. Based on gaps identified and discussed in the problem statement three specific objectives were put forward. These objectives include

- i. To examine the effect of environmental concern on sustainable procurement among construction firms in Ghana.
- ii. To evaluate the influence of eco-innovation on sustainable procurement among construction firms in Ghana.
- iii. To analyze the mediating role of eco-innovation on the effect of environmental concern on sustainable procurement.

1.4 Research Questions

- i. What is the effect of environmental concern on sustainable procurement among construction firms in Ghana?
- ii. What is the influence of eco-innovation on sustainable procurement among construction firms in Ghana?

- iii. What is the mediating role of eco-innovation on the effect of environmental concern on sustainable procurement?

1.5 Significance of the Study

In response to the calls to examine the indirect role of ecological innovation, this study represents the first attempt to investigate how eco-innovation may mediate the association between EC and sustainable procurement. This study, therefore, makes a twofold contribution. While this study happens to be the first of the kind to explore how EC impacts sustainable procurement in the context of developing economies. This study extends existing knowledge. The outcome of this study may also be useful to buyer and supplier entities, especially in public procurement interested in building and maintaining ethical practices among themselves. Secondly, examining how eco-innovation may mediate the association between EC and sustainable procurement provides a contemporary theoretical extension. The study will benefit these firms by contributing immensely towards how these organizations will come out with policies that will ensure that stakeholders' issues that confront them are addressed for the recommendations that will be made available in the studies. Again, this study will also contribute to firms with institutional frameworks that by far will ensure effective and efficient stakeholder management to drive growth in construction firms.

The findings of this study will also provide owners and managers and policymakers with insights to put the appropriate strategies and measures in place to boost circular procurement through stakeholder orientation. Therefore, this study may provide a better understanding to both practitioners and regulatory institutions regarding accounting adoption and its outcome in the Ghanaian construction firm's context.

1.6 Research Methodology

The proposed study will employ a positivist research approach which will use a quantitative methodology. Again, the study also will combine both descriptive and explanatory research designs. Combining these two designs enabled the researcher to describe the study variables in the Ghanaian context and also explore the relationship among the variables at the aggregate level. The study population comprised senior managers of construction firms in Ghana. A sample of 200 firms is proposed to be sampled in the study. After selecting the manufacturing firms, the researcher will further have used purposive sampling method to select individuals that are directly involved in the subject under investigation. The study will conduct an extensive literature review to help to discover the academic writings supporting the relevance of the topic and the research hypotheses. Again, the study proposes the use of a primary source of data to validate the results produced in literature through field surveys using questionnaires adopted from previously validated instruments. After the data collection, the primary data that has been gathered from the field will be vetted for accuracy and reliability. The questionnaires that have been adequately filled will be coded into excel for analysis. This study will employ two data analysis approach i.e. descriptive and inferential analysis using multivariate data analyses such as Structural Equation Modelling (SEM) and factor analyses to fulfill the set objectives in chapter one. Descriptive analysis will be based on information provided by respondents concerning their organization (demographical data), which includes the profile of the organization and the respondents. The essence of the descriptive analysis is to test for normality and this includes frequencies, percentages, means, skewness, and kurtosis statistics. The motive of this analysis is to ensure that the data gathered are suitable for covariance-based-SEM

analysis. It is done to check for missing data, outliers, and data distribution (Hair et al., 2017). The inferential analysis will be used to test the hypothesis in the study.

1.7 Scope of the Study

The scope sets the context and boundaries of the research. Contextually the study will focus on construction firms across the country. Though many factors may affect construction firms, this study focuses on the effect of environmental concern, eco-innovation, and sustainable procurement of construction firms.

1.8 Limitations of the Study

The study anticipates some limitations. Though prior studies recommend the use of a single respondent in a study of this nature, however, in practice no single person controls or manage the entire firm, this study, therefore, will be limited by using a single respondent. Additionally, including a moderator in the relationship would be more robust and valid in contexts specific to service delivery or the public sector. It would have been useful to employ a longitudinal research design in understanding the mediating role of eco-innovation on the effect of environmental concern on sustainable procurement in the context of construction firms.

1.9 Organization of the Study

There are five chapters in the study. The study's subject and the intriguing problem at hand are introduced in the first chapter. The study's context, problem statement, research aims and questions, and importance are among the many elements that make up this document. By reviewing pertinent material on the research topic and field, the second chapter comes to a close. An analysis of previous theoretical and empirical efforts is provided in this section. The third chapter outlines the research techniques required to fulfill the study's goals. The study design, data, procedures, and analytical tools are all included in the

research methodology. The study's results are outlined in the fourth chapter, which also has pertinent commentary. The last chapter summarizes, concludes, and makes suggestions in light of the research's conclusions. This study focuses on the effect of environmental concern, eco-innovation, and sustainable procurement of construction firms.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Chapter two of this research is organized into five main sub-headings. The first sub-heading talks about the conceptual review which provides definitions, operationalization and how the constructs have been used in the study. The next sub-heading talks about the theoretical review which also provides the theoretical underpinnings of the study. The third sub-heading also talks about the empirical review which present a related article based on the study. Conceptual framework and hypotheses development were discussed in following sub-headings. The chapter ends with a summary which highlight the gap explored in the study.

2.2 Conceptual Review

A conceptual review of the key concepts employed in this work is presented in this section. These concepts include environmental concern, sustainable procurement, and eco-innovation. The key concepts are therefore discussed below.

2.2.1 Environmental Concern

Environmental concern is defined as people's knowledge of environmental problems (Landry et al., 2018), as well as their efforts and propensity to help find solutions (Wang et al., 2022). An expanded definition of environmental concern was developed by researchers (Si et al., 2022), and it encompasses certain environmental attitudes and value orientations. An emotional attitude about the seriousness of environmental problems is referred to as environmental concern (Ruslim et al., 2018). Paul et al. (2016) also proposed that environmental concern is defined as the degree to which people are aware of

environmental issues and express a personal desire to help address these issues. According to studies, those who are concerned about the environment are dedicated to finding solutions and will place pressure on others to follow suit (Si et al., 2022, Zhu et al., 2020). Environmental concern, according to Lee and Lim (2020) refers to the level of emotional participation in environmental concerns. According to this definition, environmental concern is the degree of emotional investment in environmental concerns. The individual concern of environmental issues is referred to as environmental concerns in which a person can help solve environmental issues or they can demonstrate their desire to help improve things (Suki 2016). Based on the definition given above, the study makes use of the definition of Landry et al. (2018) who stated that environmental concern is defined as people's knowledge of environmental problems.

Consumers that care more about the environment typically have more optimistic views, which will probably lead to an increase in behavioral intentions (Hoang et al. 2019). Green product purchases are predicted in large part by environmental concern (Al Mamun et al., 2020). A person who cares deeply about the environment would often purchase things that are safe for the environment. According to prior research, environmental concern has a substantial and positive impact on buying intentions for green items (Maichum et al., 2017), purchase intentions for green products (Paul et al., 2016), and purchase intentions for organic food (Saleki et al., 2019). Thus, having an environmental concern entails both a conative (wanting to preserve the ecosystem) and a cognitive (realizing that the environment is damaged) component.

2.2.2 Sustainable Procurement

The term "sustainable procurement" refers to the incorporation of CSR concepts into a company's procurement procedures and choices. It focuses on collaborating with suppliers

to create goods that are both socially and ecologically sustainable. It makes sure that its suppliers' workers have respectable working circumstances, that the goods or services they acquire are ecologically sound, and that socioeconomic concerns like human rights and ethical business practices are taken care of (Caldera, Mohamed and Feng, 2022; Weiß, Hajduk, and Knopf, 2017).

The first and most crucial step toward a corporate organization's sustainable supply chain is sustainable procurement. To reach the intended environmental performance objective, strategic cooperation between customers and their suppliers is necessary (Rathore et al., 2020). Supplier selection criteria may include a supplier's usage of sustainable business practices. This may encourage healthy competition among suppliers, and it may also have the effect of lowering the carbon emissions those suppliers produce (Hussain and Al-Aomar, 2018). Lamba and Singh (2019) introduced a dynamic supplier selection model that was later expanded to a flexible supplier selection model combining both qualitative and quantitative elements to emphasize the significance of supplier selection in procurement choices. For instance, the United Nations (2022) categorizes sustainable procurement indicators into twelve categories: pollution prevention, resource conservation, climate change mitigation, and adaptation, biodiversity protection, habitat restoration, human rights and labor issues, disability inclusion, gender issues, social health and well-being, total life cycle costs, SMEs in local communities, and sustainability promotion. Companies outline the following potential advantages of sustainable procurement: increased revenues (new products, differentiation), lower costs (greater resource efficiency), risk management (compliance with laws and regulations and customer preferences), and the development of intangible assets (by creating a socially and

environmentally responsible brand or corporate image) (Wisner, Tan & Leong 2017, 110). Additionally, it can benefit organizations by raising standards, creating long-term, collaborative relationships based on trust with suppliers (Vide, 2022), innovating technologies, raw materials, and goods, upholding good community relations, and fulfilling moral and ethical obligations (Lu et al., 2016).

2.2.2.1 Eco-innovation

Fussler and James (1996) as cited by Hojnik and Ruzzier (2016a) introduced the idea of "eco-innovation," which they defined as the reduction of adverse environmental consequences while offering innovative goods and processes as a benefit to the consumer and the business. Eco-innovation helps achieve environmental responsibility and sustainability goals by bringing new concepts, behaviors, goods, and methods to market (Hojnik and Ruzzier, 2016b). In contrast to traditional approaches that do not include environmental implications, Yurdakul and Kazan (2020) define eco-innovation as a new or significantly enhanced product, technique, or business strategy that helps to decrease environmental hazards, pollution, and the detrimental effects of resource consumption. Eco-innovation is the formulation or implementation of new/improved, goods, services, processes, and marketing strategies that bring environmental improvements as opposed to applicable substitutes according to the Organisation for Economic Co-operation and Development (OECD, 2009). Innovation, according to Zhang and Walton (2017), is the development of a new good, service, or technique of manufacturing, as well as a fresh approach to marketing or sourcing goods and services. The environmental perspective distinguishes eco-innovation from traditional innovation methods. Vence and Pereira (2019) define eco-innovations as innovations that can attract green rents on the market,

with a focus on financial gains. The double benefit is underlined once more, highlighting eco-innovation as a means of making money while protecting the environment. Eco-innovation is defined by Salo et al. (2020) as an innovation that enhances environmental performance, while they also note that economic and social repercussions play a major part in its creation and deployment and hence determine its dissemination route and contribution to competitiveness and overall sustainability. The study deployed the definition of Yurdakul and Kazan (2020) which define eco-innovation as a new or significantly enhanced product, technique, or business strategy that helps to decrease environmental hazards, pollution, and the detrimental effects of resource consumption. An eco-innovation indicates improved living conditions, lower unemployment and greater employment rates, job creation, the preservation of biodiversity, a reduction in the use of natural and artificial resources, and lower overall costs. Man's influence on the environment is minimized (Dogaru, 2020). Eco-innovation may therefore help the environment and the economy. This conclusion was reached after analyzing research by several scientists that examined ecological and financial-economic indices (Vasileiou et al., 2022; Ghisetti, 2018; Yurdakul & Kazan, 2020). As sustainability tends to promote consumer satisfaction, it is obvious that businesses will raise their investments in environmentally friendly technology and other environmental demands (Daz-Garca et al., 2015). Eco-innovation has a significant influence on business operations since it may enhance results, save costs, boost profits, and improve a company's environmental performance (Costantini et al., 2017).

2.3 Theoretical Review

This section discusses the theoretical literature that underpins this research. Institutional theory, legitimacy theory and stakeholder theory are three examples of the theoretical literature the study takes into account. A brief overview of these theories is given in the following subsections.

2.3.1 Institutional Theory

According to DiMaggio and Powell (1983), an organization is shaped by its surrounding institutional environment. The concepts that are prevalent in the neighborhood where the organization is based are subsequently institutionalized, acknowledged as true, and used to inform the organization's way of thinking. Organizations are created as a result of external forces that shape them through imitation or mimicry processes and compliance (DiMaggio and Powell, 1983). According to Scott (1987), instrumentality and the constitutional approach go hand in hand. An organizational analysis approach is offered by Scott (1995). There are three institutional pillars, in Scott's opinion: regulatory, normative, and cognitive. The fundamental aspect of obedience, the management system, the logic of human behavior, and the indication of the institution's pillars are where the differences between the three pillars may be noticed. As a result, the institutional theory serves as the company's foundation for utilizing firm resources and eco-innovations (innovations that do not harm life or the environment) efficiently in its operational processes. Resources used in this study come from both internal and external business aspects. Environmental concern is an example of internal elements, whereas sustainable procurement is an example of external factors.

2.3.2 Legitimacy Theory

According to legitimacy theory, a company does not have the right to exist unless its ideals are shared by the larger community in which it works (Dowling and Pfeffer, 1975). According to the theory of legitimacy, a company must be able to demonstrate that it has functioned under established standards and that all of its actions are acceptable to outsiders (O'Donovan, 2002). If the outcomes and the community's expectations of the company are similar, the firm will gain legitimacy (Deegan, 2002). Based on the preceding justification, the legitimacy theory may be utilized by corporations to understand social values in society; in this study, ideas connected to the environment are discussed. The company uses eco-innovation to be able to incorporate environmental and social concerns into its operational activities (Dixon and Clifford, 2007). The company is a corporate entity that anticipates making money from its operations. As a result, it is anticipated that the eco-innovation used by the company as a result of this legitimacy theory will enhance firm performance.

2.3.3 Stakeholder Theory

Stakeholder theory, according to Freeman and Medoff (1984), refers to a group or persons who may impact or be influenced by the attainment of the firm's aims. According to the stakeholder theory, businesses must also consider the interests of their stakeholders in order to operate effectively (Friedman and Miles, 2006). According to this study, the company may benefit stakeholders more by implementing eco-innovations that are backed by its ability to use both internal and external resources. In exchange, stakeholders might assist the business by enhancing sustainable procurement through the use of eco-innovation

2.4 Conceptual Framework

This study sought to examine the relationships between environmental concern and sustainable procurement through the mediating role of eco-innovation. Environmental concern formed the independent variable while sustainable procurement was the dependent variable through the mediating role of eco-innovation. Figure 2.1 illustrates the interrelationship between these variables.

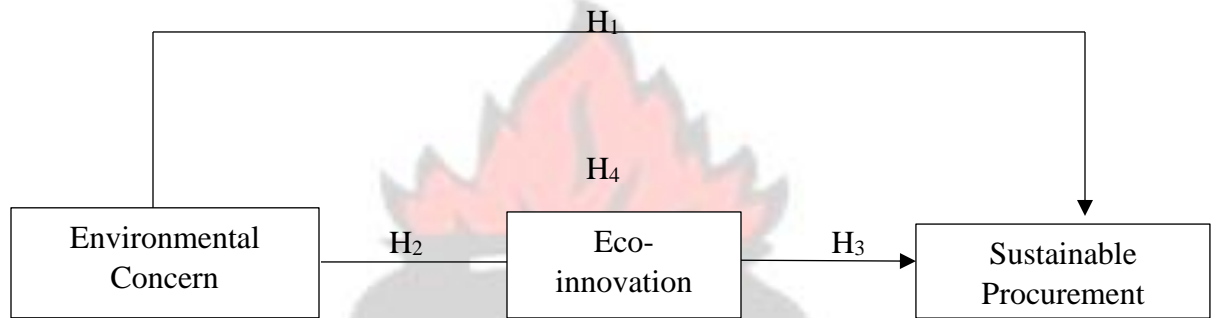


Figure 2.1: Conceptual framework of the study

2.5 Hypothesis Development

Based on the conceptual framework from the above section, the following hypotheses were formulated.

2.5.1 Effect of Environmental Concern on Sustainable Procurement

The manufacturing of things that harm the environment will be decreased as environmental concerns spread, and it will be simple to find customers who wish to utilize the products of eco-friendly businesses (Thieme, Royne, Jha, Levy, & McEntee, 2015). According to Firmansyah and Hartini (2022), customer environmental concerns are now a significant element in determining whether or not they will buy green products. Yarimoglu and Binboga (2019) also discovered that customers who are more concerned about the environment are more likely to engage in eco-friendly activities and buy eco-friendlier goods. They explored the contradictory relationships between environmental pollution and

economic growth, engagement in environmental protection, and other factors while arguing that environmental concern is a significant factor influencing consumer behavior. Lee and Lim (2020) discovered that when customers' and suppliers' environmental concerns grow, social actions like lowering waste emissions or energy use will take place, lowering businesses' operating costs, fostering better stakeholder relations, and having other beneficial consequences. This demonstrates how environmental issues will impact businesses as well as consumers. As a result, environmental concern is changing customer perception, consumer behavior, and corporate operations in addition to concerns about environmental issues. Additionally, future environmental problems and difficulties may offer chances for sustainable management and competitive advantage. Consequently, the research suggests the following:

H1: Environmental concern is positively related to sustainable procurement

2.5.2 Effect of Environmental Concern on Eco-innovation

For innovative applications to be effective, organizational support is a crucial factor. This argument is also acknowledged for introducing green innovation. Additionally, Wang et al. (2021) research showed that businesses are more likely to adopt green innovation if there is more management supports for innovation. According to Weng et al. (2015), one of the major factors influencing the adoption of green practices is the management of environmental concerns. It may catalyze green innovation, which will improve performance and competitiveness for businesses. The results of the Soewarno et al. (2019) survey show that organizational support has a substantial impact on people's readiness to embrace green practices. The findings of the study by Geng et al. (2021) demonstrated that norms, values, and values influence whether people are willing to accept eco-innovations. The results of the Weng et al. (2015) study showed that although Turkish managers are

becoming more environmentally conscious, this is not translating into environmental innovation practices. In the Taiwanese manufacturing sector, Sumrin et al. (2021) investigated the mediation impact of corporate environmental ethics between green relationship learning and green innovation performance. Furthermore, Wang et al. (2021) discovered that the most important driver behind the implementation of green practices is management concern. Consequently, the research suggests the following:

H2: Environmental concern is positively related to eco-innovation

2.5.3 Effect of Eco-innovation on Sustainable Procurement

Green product and process innovation may enhance a company's competitive advantage in addition to reducing negative environmental effects (Kesidou and Wu, 2020). Singh et al. (2019) and Chen (2018) examined the relationship between green product and process innovation and a company's competitive advantage and green image. To assess how green product and process innovations influence competitive advantage, Singh et al. (2019) launched a survey in the information and electronics sector. Numerous studies on eco-innovation demonstrate the beneficial effect cost-savings play as a driving force for cleaner industrial methods in particular (Sellitto et al., 2020; Cai and Li, 2018). Thus, additional economic justifications for eco-innovations, including gaining market share or cutting costs, may also apply. As evidenced by the preceding justifications, eco-impact innovations in gaining competitive advantage have also been acknowledged (Mishra and Yadav, 2021; Wang, 2019). Return on investment, market share, profitability, and sales all show positive correlations between eco-innovation and business performance (Cai and Li, 2018). Lee et al. (2015) recommended that businesses adopt green management and green innovation to enhance environmental performance, meet customer needs, and improve company reputation with regulators and the general public. Despite growing interest in innovation

processes for sustainable development over the past two decades, there has not been much empirical research on the topic. The acquisition and retention and economic impact of the new environmentally friendly goods are highlighted by prior research. But the effects of eco-innovation on the sustainable procurement are overlooked. Consequently, the research suggests the following:

H3: Eco-innovation is positively related to sustainable procurement

2.5.4 Mediating Role of Eco-innovation

Extensive evidence supporting the benefits of environmental concern for sustainable procurement has been provided by prior research, however, it is not universal (Karabulut and Ergun, 2020; Horbach, 2019; Karna et al., 2016). In the link between environmental concern, competitive advantage, and green performance, firms might perceive environmental investments as either an unavoidable expense of doing business or as a source of competitive advantage. For instance, Dogaru (2020) contends that caring for the environment boosts productivity and competitive advantage. However, Hojnik et al. (2018) find little proof that environmental assistance has a major effect on competitive advantage. The competitive advantage and green performance may thus derive from the mediating function of green innovation in the association between OGC and competitive advantage and green performance, respectively, which would account for the results' lack of clarity. According to studies, implementing a green innovation strategy strengthens a company's competitive advantage (Juniati et al., 2019; Kushwaha and Sharma, 2016). Employee development and information sharing in environmental protection are thought to be prerequisites for green innovation. Thus, transforming existing knowledge is a component of green innovation. As demonstrated by Nurjanah and Ardyan, (2022), innovation

happens when staff members share their knowledge of manufacturing processes, and it enhances the firm's competitive advantage. The study argues that for SP to be viewed as a competitive resource, the personnel must be trained in green innovation in addition to having a dedication to environmental concerns. Therefore, SP, which is promoted by green innovation and is distributed throughout the organization, results in a competitive advantage. Consequently, it is assumed that:

H4: Eco-innovation significantly mediates the link between environmental concern and sustainable procurement.

2.5 Empirical Review

Ruslim et al. (2022) investigate the impact of environmental concern, attitude, arbitrary norms, perceived behavioral control, and accessibility on the purchase of green skincare products in Jakarta while using intention to purchase as a mediating variable. Partial Least Squares-Structural Equation Modelling was employed for data analysis (PLSSEM). 180 participants in this study were given online questionnaires through Google Form as part of a purposive sampling technique. The findings of this study showed that environmental concern had a positive and significant effect on intention to purchase. It is advised that other factors not included in this study be added and used in future research in order for it to expand and provide more advantages.

Nurjanah and Ardyan (2022) intends to experimentally demonstrate how open innovation tactics improve eco-innovation and SMEs' performance and sustained competitive advantage. The mediating function of eco-innovation on sustainable competitive advantage and performance was proposed and experimentally evaluated in this study. In order to test the empirical research model, a quantitative technique was used. In all, 223 SMEs in

Yogyakarta's batik industry were investigated. To choose the research sample, the study employed a purposive sampling strategy. The sample standard is SMEs businesses that have been in business for at least three years. Eco-innovation has a big impact on SMEs' performance and competitive advantage. In assessing data normality and outliers, the model testing findings revealed inaccurate data, highlighting the necessity for accuracy in further research.

Mačiulytė-Šniukienė and Sekhniashvili (2021) to demonstrate how EU Member States perform in terms of economic growth, environmental protection, and the creation of eco-innovations, as well as to assess the effects of eco-innovations on economic and environmental performance. The link between eco-innovation, economic development, and environmental performance was investigated using random effect regression. Eco-innovation development influences the environmental performance as well as the economic growth of EU Member States. In the future, the development of eco-innovations and economic growth must be interdependent, although this research only looks at one-way dependence. The Granger causality test may be applied in the future to evaluate relationships.

Widiyati and Murwaningsari (2021) aims to examine how eco-innovation (EI) has changed organizational green culture (OGC), business analytics (BA), and collaborative competence (CC), in order to increase the competitive advantage of the green industry (GCA). By undertaking a survey of 169 Indonesian state-owned firm managers, a structural equation model was created to highlight the relationship between organizational green culture, business analytics, collaborative competency, eco-innovation, and GCA. Eco-innovation is not a mediating factor between business analytics and GCA, EI is a complete

mediator between collaborative competence and GCA, and EI is a partial mediator between organizational green culture and GCA. There is an opportunity to investigate additional, economic value that results from GCA in the future.

Puspitaa (2021) ascertain the impact of internal and external influences on business performance through eco-innovation. This study is a quantitative descriptive study that also uses explanatory research and associative research approaches. information gathered through a questionnaire survey. The study employed institutional theory, legitimacy theory, and stakeholder theory. As a sample, the PT. Surabaya Industrial Estate Rungkut area has 113 businesses. The WarpPLS programmer is used for the structural equation modelling (SEM) and partial least squares methods of data analysis in this study. The findings demonstrate that the impact of a business's competence and market pressure on firm performance is mediated through eco-innovation. Top management is urged by market pressure to be more innovative when developing new eco-friendly items that are challenging for rivals to copy so that businesses may quickly assess the price ranges of relevant products and join market segmentation.

Yurdakul and Kazan (2020) studies the impact of eco-innovation on financial and environmental performance in an effort to close this gap. Data were gathered for this purpose by compiling questionnaires from 219 Turkish industrial businesses. The study employed resource-based view (RBV). The study employed quantitative approach and structural equation modelling to analyzed the data. The finding revealed that cost reduction and thus economic performance are positively impacted by eco innovation. Future studies should compare businesses that are eco-innovative and those that are not to determine the extent to which eco-innovation affects financial and environmental performance.

Li et al. (2019) examines if environmental concern and knowledge in addition to the traditional predictors of the theory of planned behavior (TPB) model, might provide a deeper explanation for a person's willingness to purchase energy-efficient equipment. According to the research, residents' willingness to buy energy-efficient appliances is significantly positively connected with their level of environmental concern. In order to increase residents' willingness to buy energy-efficient appliances, this study offers appropriate policy recommendations for the government, sellers, and residents from the viewpoints of education and counselling, sales and marketing, and independent improvement.

Santos et al. (2019) assesses, at the corporate level, how eco-innovation was structured in businesses operating in developed and developing nations, as well as how it affected those businesses' financial results between 2012 and 2014. A sample of 231 businesses was gathered, with 58 coming from developing nations and 173 from emerging ones. The study employed the theory of innovation. The approach was based on panel data regression and structural equation modelling. Nearly all environmental and social eco-innovation factors were shown to be significant in their respective dimensions in industrialized nations, but not in developing ones, according to the study. The study suggested it is crucial for businesses to improve the quality of the information society receives about their eco-innovative practices and to enlarge the range of indicators that are now quite constrained, including waste production and greenhouse gas emissions.

Juniati et al. (2019) analyses how internationalization has affected Malaysian multinational firms' performance and competitive advantage. 307 managers answered to the 420 questionnaires that were provided to them. In this work, the researchers explored the

used of exploratory factor analysis (EFA) to identify four factors represented by a total of twenty-four items, all of which had factor loadings that are more than or equal to 0.70. The findings further support the idea that eco-innovation significantly influences the link between firm performance and internationalization. The study concluded that it is understandable that the existence of internationalization and integrated eco-innovation allow businesses to perform better and be more competitive.

Cai and Li (2018) examine the link between the drivers, eco-innovation behavior, and firm performance using data gathered from 442 Chinese companies. This study also clarifies how eco-innovation functions and how it affects firm performance. The study also concentrates on eco-innovation, which adds value for customers and businesses, promotes sustainable development, and lessens negative effects on the environment. The study was quantitative research and found out that eco-innovation practices may greatly improve a firm's environmental performance, which in turn has a beneficial indirect effect on economic performance. The study recommend that future studies should use hierarchical linear model (HLM) to assess the accuracy of the first level of company differences and the second level of industry differences.

Hojnik et al. (2018) investigates the mediating role of eco-innovation using a cross-sectional approach to examine the link between internationalization and company economic performance. The study finds that internationalization is strongly and positively linked with firm-level economic performance and that eco-innovation partially mediates this impact using data from 151 internationalized Slovenian enterprises using structural equation modelling. Therefore, future study might examine the impact of internal elements, such as organizational strategy and structure, as well as external ones, such as market and

regulatory changes, on the mechanisms via which eco-innovation translates the impact of internationalization on firm performance.

Alhyasat et al. (2018) assess how motivation affects organizational performance at Jordan Industrial Estate Company (JIEC) in Jordan, with eco-innovation serving as a mediator. The Resource Based View (RBV) paradigm emphasized the importance of motivation in obtaining good organizational performance. Data were collected by questionnaire from 381 JIEC personnel at various levels using a quantitative technique and simple random selection; the response rate was 74.8%. Eco-innovation somewhat influences the link between motivation and organizational performance. This study made recommendations for more research on eco-innovation in developing nations, notably in Jordan, as well as for repeating the same study to guarantee that the study model was validated.

Cao and Chen (2018) performed a study to investigate how external environmental constraints and internal environmental driving forces cause firms to adopt green innovation strategies, with top management's environmental awareness acting as a moderator. A quantitative technique with a sample size of 216 businesses was to collect data. The findings revealed that the association between green innovation strategy and innovative capability is weaker when top management is more environmentally conscious.

Weng, et al. (2015) undertook research to evaluate the importance of personal leadership in building an ecologically responsible organization, both internally and internationally. An exploratory research approach was utilized to investigate a corporation in the Norwegian offshore oil and gas industry. The study is based on data from qualitative interviews. The findings suggest that the founder has a beneficial influence on how external

constituents perceive the company's image, particularly in terms of innovation and environmental consciousness.

The table below summarizes the results of earlier studies that have been conducted on the topic area. The results in the table show that although studies have been conducted on the subject area, very little research has been done on the direct link between the constructs in the study. Again, the majority of the study used a qualitative research design.



Table 2.1: Summary of Literature Review

Author/Year	Country	Purpose	Theory	Method	Findings	Future Studies
Hayek (2015)	United States	To assess the impact of audit committee compensation on non-audit service procurement	Agency Theory	Quantitative	Audit committee compensation has a considerable impact on non-audit service procurement.	Future studies be conducted in other industries to generalize the findings.
Okotie and Tafamel (2021)	Nigeria	To look at how the level of transparency affects the Nigerian Civil Service's public procurement processes.	Stewardship theory and stakeholder theory	Quantitative	Strong and favorable relationship between public procurement methods and transparency.	
Vandapuye (2018)	Ghana	To look at the effects of supply chain and stakeholder orientation on the performance of oil marketing firms in Accra.	Stakeholder Theory and Shared Value Theory	Quantitative	Stakeholder Orientation significantly improved the efficiency of the oil marketing firms in Accra Metropolis.	Future research should take into account the mediating or moderating role of business size, the number of branches, and other factors.

Mohammed, (2020)	Ghana	To investigate how market orientation affects business performance in the Ghanaian airline sector	Stakeholder theory	Quantitative	There is a connection between market orientation and company performance.	Future studies may take into account the usage of other aviation-related environmental elements as moderators or mediators
Ngetich (2015)	Kenya	To investigated the impact of strategic orientation on the performance of big retail outlets in Nairobi.	Contingency Theory and Open Systems Theory	Quantitative	Strategic orientation greatly improves the performance of Nairobi retail establishments	Future research look at the impact of interaction orientation on innovation success.
Sönnichsen and Clement (2020)	UK	To provide an overview of the state of the art in green and sustainable public procurement.	Institutional theory and contingency theory.	Qualitative	Circular public procurement qualities, based on the execution of circular policy and strategy, are critical for conducting circular public procurement	Future research should gather additional empirical evidence from public procurement procedures.
Schwarz et al. (2016)	China	To study the impact of servant leadership, on	Social learning theory and	Quantitative	Public service motivation mediates	Future research on servant

		work performance and how public service motivation mediates the relation.	Contingency theory.		servant leadership's impact on followers' work performance.	leadership in government should be done in other nations.
Schwarz et al. (2020)	China	To investigate the relationship between networks governance approaches to leadership and workers' public service motivation PSM and individual job performance.	Social learning theory	Quantitative	Network governance leadership has beneficial link with both public service motivation and job performance	Future research should incorporate panel data with experimental variation of public leadership techniques, such as random assignment.
Bao and Zhao (2018)	China	To investigated two mediating mechanisms of servant leadership's influence on followers' job engagement.	Social exchange theory	Quantitative	Servant leadership is favorably associated to follower work engagement, and this relationship is mediated only by leader-	Further research is needed to validate the findings in different cultural situations.

					member exchange.	
Wang et al., (2018)	China	To investigate the role of servant leadership as a motivator of employee service performance.	social learning theory	Quantitative	Servant leadership by high-level managers could indeed promote employees' service performance.	Future research use a more rigorous strategy to divide the mediating effects of supervisors' servant leadership and service climate mediators.
Rana Mostaghe et al., (2021)	Sweden	To investigate role of consumers in supporting circular business models.		Qualitative	There is a large amount of ethical buying intentions for the circular business model.	Future studies explore diverse demographic samples with varying personal characteristics and cross-compare the model's outputs
Chiara Cantù et al. (2015)	Europe, Middle East, and Africa	To explore purchasing's position as a mediator between		Qualitative	As the company's business strategy grows	Further empirical research is needed to

		the company's customers and suppliers.			more focused on client value, the creation of a customer-driven procurement becomes increasingly important.	understand the range of change processes impacting the purchasing function.
Haensel and Hofmann (2018)	Switzerland	To examine several purchasing and assessment phases throughout the purchase of business services.	Agency theory	Qualitative	Three degrees of integration inside a company's evaluation process: a preparation phase, an acquisition phase, and an operating phase.	Future research on service assessment should always discriminate between the various stages of an evaluation.

CHAPTER THREE

RESEARCH METHODOLOGY AND ORGANIZATIONAL PROFILE

3.1 Introduction

This study examines the mediating role of eco-innovation on the effect of environmental concern on sustainable procurement in the context of construction firms. This chapter objectively presents the methodology of the research. The methods projected in this chapter, purpose to accomplish the study objectives and answer the research questions. The methodology chapter commenced by clearly explaining the research design, secondly, the research sampling procedures, and then the research instrument. The final stage in this section addresses the explanation of the proposed data analysis.

3.2 Research Design

The study adopted a quantitative/deductive research approach as it was relevant in enabling the researcher to test theories deductively by searching for evidence to either support or refute the hypothesis (Creswell & Plano Clark, 2007). The research design is the actual structure that indicates the time frame(s) in which data is collected, the type of study to be conducted, and how many groups are involved in the research study (Edmonds & Kennedy, 2012). The research design, therefore, serves as the roadmap that guides the researcher to achieve the research objectives and provide answers to the study's research questions.

Though there are different forms of research designs, this study employs both descriptive and explanatory research designs. While the descriptive study only observes, explanatory research makes the fan fort to explain the phenomenon. The forces behind the occurrence of the phenomenon are represented by theories or hypotheses. Explanatory research is concerned with

cause and effect (Saunders et al., 2007). The main purpose is to explain the mediating role of eco-innovation on the effect of environmental concern on sustainable procurement in the context of construction firms. Explanatory research holds the assumption that the change in the dependent variable is caused by an external factor. It is usually grounded in theory which helps to answer the how and why questions. In the opinion of Engel and Schutt (2014), explanatory research is the eventual destination of science and on the knowledge continuum, they place it at the apex. Usually, explanatory research is experimental and it allows for the testing of hypotheses (Strydom, 2013). The focus of explanatory research is on how or why things occur. Collis and Hussey (2003) believe that explanatory research extends a descriptive study. In this context, the phenomenon observed by descriptive research is explained and analyzed by the researcher to find reasons beyond the description of the characteristics (Blumberg et al., 2005, Collis and Hussey, 2003). In this study, an explanatory approach will be utilized in chapter 4 to test the stated hypothesis. The explanatory approach will be used to test the mediating role of eco-innovation on the effect of environmental concern on sustainable procurement in the context of construction firms. Because this study is predominantly quantitative it employed both descriptive and explanatory approaches. The beginning of the findings presented a description of individual responses. In a nutshell, the basic features of the data gathered will be described to bring out the summaries of the selected sample and measures adopted. The research domain is clarified and the relationships between the variables are established in Chapter four. This approach was found suitable to help test the generated hypotheses for the study. The approach helped to discover the reality and explain what the reality was. It helped to set the conceptual and theoretical framework as well as an explanation of sustainable procurement among construction firms in Ghana. Asking for the opinion of the respondents in a structured way and analysing the data using mathematical

methods in explaining the phenomena is known as the quantitative approach (Muijs, 2010). This approach provides a detailed explanation for studies that concentrate on examining the relationship between variables (Muijs, 2010).

Considering the positivist approach used, the research design for the current study was explanatory as opposed to descriptive and exploratory. This is because the explanatory research design is characterized by hypotheses that predict the nature and direction of the relationship among the variables of the study. In addition, borrowing from Okesina (2020) the study is a cross-sectional one as opposed to a longitudinal design since data was collected in a short space of time spanning one month.

3.3 Population of the Study

Population is the set of individual persons or objects in which an investigator is primarily interested during a research inquiry (Igwenagu, 2016). It describes the total number of people or items that one wishes to understand. The relevance of a research population has a great reflection on the quality of the study. Thus, the outcome of the study will be hugely negated if wrong, unqualified, and unsuitable respondents are targeted. Hence, it is all time important to clarify the population and the target population before data is collected. To understand the research population, it is important to differentiate between the target population and the accessible population. While the target population represents the broad group that is of interest to the researcher, the accessible population represents the actual participants that the researcher can include in the study. This is also determined by the unit of analysis, thus if the researcher intends to conduct the study at the organizational level, then it is advisable to use a single response, however, if the study is an individual level. Then the focus could be on multiple respondents from a case study. This study is conducted at the organizational level; hence the target

populations include all construction firms in Ghana. Hence the target population of this study is made up of senior managers of construction companies in Ghana. Data is gathered from procurement, logistics, and top executives or managers of all the construction companies in Ghana.

3.4 Sample Size and Sampling Technique

In this study, the population describes all the permanent staff or employees of the selected construction companies in Ghana. A preliminary field survey revealed that the number of employees for the targeted construction companies was 8, 000 workers. The sample size is a representation of the population utilized by the researcher and from whom inferences are made (Babbie, 2013). The study employed the stratified sampling procedure in selecting the sample size for the study. The stratified sample procedure is used when the population is divided into different heterogeneous units and there is the need to fairly represent each sub-unit in the study. The different forms of construction activities constituted the sub-units of the population. Thus, the study selected a proportionate number from each stratum. In doing so, the sample size formula proposed by Yamane (1967) was adopted. In the formula, as specified in equation (1), 'N' is the population size, 'n' is the sample size, and 'e' is the margin of error which was kept at 5%. From equation (1), the study obtained a minimum sample size of 381.

$$n = N / [1 + (N \times e^2)] = 8000 / [1 + (8000 \times 0.05^2)] = 381$$

The study selected a proportionate number from each of the forms of construction firms. The procedure followed in choosing the exact sample size was that the population for the study the sample size of 381. It must be noted that 381 is the minimum sample size needed. To meet this number and be cognizant of the possibility of non-responses and missing values, the study

administered more questionnaires than the requirement for the minimum size. This resulted in a total questionnaire administration of 400. The notion was to ensure that the total number of answered questionnaires will more than adequately meet the minimum sample size requirement. Convenience and purposive sampling techniques were used to select respondents for the study. The sampling technique is an objective and cost-effective technique of gathering information that involves choosing respondents who are ready and understand the issues under inquiry. The method was used to choose 400 participants for this research. Purposive sampling is the process of selecting participants based on the researcher's judgment of who has the relevant information. This study used the purposive sampling technique to draw managers of construction firms in Ghana. The study employed purposive sampling to collect relevant information from employees who are well knowledgeable about the phenomena under inquiry.

3.5 Data Collection

The main instrument used in the data collection was a close-ended structured research questionnaire. According to Cohen, Manion, and Morrison (2017), a questionnaire is an efficient data collection instrument if only the researcher knows exactly what is required and how to measure the variables of interest. The language used in the questionnaire was English as it is the formal language used in Ghana. The items in the questionnaires measured the independent variable which was an environmental concern and the dependent variable which was made up of sustainable procurement. The mediating variable was eco-innovation.

the mediating role of eco-innovation on the effect of environmental concern on sustainable procurement in the context of construction firms

The questionnaire, comprised of four sections, captured the candid opinions of employees on the above variables. The first part of the questionnaire referred to as section A captured the

biographical data of the respondents. Section B of the questionnaire collected data on environmental concerns. While Section C required information on sustainable procurement, Section D captured data on eco-innovation respectively. All the variables were measured on a 1–5-point scale (1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4= agree and 5= strongly agree).

EC was measured using 5- items adopted from Hamzaoui and Linton (2010); Bulut et al.(2021). eco innovation was measured on a 6-item scale adapted from Cheng et al. (2014). Finally, sustainable procurement was measured using a 10-item adopted by Agbesi et al.(2018).

A pilot study is the first step of the entire research protocol and is often a smaller-sized study assisting in the planning and modification of the main study (Thabane et al 2010). In this regard, a pilot study was carried out using a sample size of 22 respondents from the sample frame. Some of the items including the wording of questions were modified based on the feedback from the pilot study.

3.6 Data Processing and Analysis

Data analysis is the process of using a systematic procedure to draw inferences from data gathered from the field as well as considering the various procedures that can be used to analyze the data (Churchill and Iacobucci, 2009). The researchers further suggest that the research design, the kind of data and assumptions made in the research, and concerns associated with the study will influence the suitability of a given technique. Data analysis may follow quantitative or qualitative procedures in scrutinizing the large volume of information obtained from the field. In the quantitative context, the procedure includes the use of statistical techniques to describe and examine variation in the quantitative measures. The quantitative approach emphasizes the

use of either inferential or descriptive statistics (statistical techniques), to understand and establish relationships between constructs.

In this study Statistical Package for Social Sciences (SPSS) version 23 and SmartPLS 3 software will be utilized to conduct descriptive statistics and inferential statistics respectively. The data collected will be coded, cleaned, and prepared for analysis. The data will first be coded in Microsoft excel. In excel the data will be thoroughly checked to avoid possible data entry errors. After cleaning the data will then be exported to SPSS. The data checks in SPSS include missing values, reliability, descriptive statistics, and test of assumptions for multivariate analysis.

Subsequently, SmartPLS version 3 (Ringle et al., 2015) will be employed to conduct inferential statistics through multivariate data analysis.

3.7 Reliability and Validity

Evaluating the measurement model is very important in quantitative research, it confirms the validation and the result of the research. It is however important for researchers to concentrate on improving the quality of their work (Heale and Twycross, 2015). Again, there are two vital features to deal with in assessing the measurement model, they include the reliability and validity of the study instrument to be used (Saunders, Lewis, & Thornhill, 2016). Khalid et al. (2012), defined reliability measurement as the degree to which the measurement is free from random error by giving a consistent result. Concurrently, it is known as internal consistency of measurement which mirrors the same underlying construct (Cooper and Schindler, 2003). To test for how reliable an instrument is, Hair et al. (2012), came up with two tests of reliability and they are internal consistency and indicator of reliability. For internal consistency reliability, the researcher used Cronbach Alpha. According to Hair, Sarstedt, Ringle, & Mena (2012), the indicator reliability is used to measure the indicator's variance to explain the latent construct

where every indicator's absolute standardized loading should be more than 0.7 (Hair, Ringle, & Sarstedt, 2011). The researchers claim that the indicator loading, between 0.4 to 0.7 should be removed from the scale if deleting the said indicator will increase the composite reliability above the accepted threshold value. However, if the indicator loading is equal to or less than 0.7, it should be removed at all times from the reflective scale. Zikmund (2000), defined validity to be the accuracy of the measurement device and denotes the ability of a scale to measure what is proposed to measure. For quantitative research, the researcher has to certify that the three traditional forms of validity exist in the measurement device and they include face validity, content validity, and construct validity (Heale & Twycross, 2015).

Content Validity: The common method among others is content validity however, it is very needful to be conducted. It tests whether the items would measure all the content which is made to measure in the study (Creswell, 2009; Heale & Twycross, 2015). The content validity is mostly done through reviewing related literature, in this research, the instruments used were validated from past studies. Yet to make sure that it captures all the content of the research, the researcher explored face validity by involving experts to evaluate to ensure that the instruments are suitable in terms of their relevance, appearance, and properly representing the elements (Richard G. Netemeyer, William O. Bearden, 2003).

3.8 Ethical Considerations/Issues

Ethics are the moral principles that a person must follow, irrespective of the place or time (Akaranga & Makau, 2016). Research ethics focus on the moral principles that researchers must follow in their respective fields of research (Fouka & Mantzorou, 2011). A consent form was presented to the authorities of all selected firms to inform them of all benefits and risks involved

in the participation and further sought their consent for their inclusion in the study. Selected firms had the right to decline their participation in the study. The researcher indicated in the consent form that all forms of anonymity and confidentiality would be observed. Privacy of firms in terms of freedom to define the time, extent and the conditions of sharing information were also observed. The researcher avoided any form of actions in their relation with participants that amounts to deception. All forms of plagiarism and falsification of data were also avoided by the researcher.

3.9 Profile of the Construction Industry

Construction includes the creation, repair, maintenance, modification, and demolition of buildings, highways, streets, bridges, roads, sewers, railroads, and communication systems. Key construction subsectors in Ghana include: 1) housing and urban development, including the construction of residential, municipal, and commercial buildings; 2) water and sanitation infrastructure; and 3) transportation infrastructure, including highways, airports, seaports, and harbors. Demand for construction and infrastructure development to satisfy housing needs, modernize highways for freight transport, and create export transportation corridors, among other areas, remains high.

The building industry appears to be thriving in Ghana, contributing significantly to gross domestic product (GDP) and jobs. As an illustration, the demand for cement, a crucial indicator of construction activity, is projected to reach 12.5 million tons by 2021.

In recent years, the nearly \$8 billion Ghanaian construction industry has contributed more than 15% of the country's annual GDP. The industry employs around 420 thousand individuals. Approximately 2,500 active building and construction companies are currently operating in

Ghana. Players range from domestic microbusinesses and independent contractors to multinational international civil engineering and construction behemoths.

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CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION OF RESULT

4.1 Introduction

This chapter presents the findings from the data analysis. Analyses included descriptive statistics, exploratory factor analysis, and confirmatory factor analysis. SmartPLS 4 was used to analyze the hypotheses for this study. In the discussion part, the author analyzes the most important findings in more depth and makes comparisons to other studies with comparable aims.

4.2 Exploratory Factor Analysis

Exploratory factor analysis (EFA) using Promax rotation was performed for further reliability. An item's loading is considered "high" when it's more than 0.6 and "low" when it's less than 0.4. (Hair et al., 1998). The cut-off criteria of 0.5 was employed in this study to make sure the factor loadings weren't too low.

As The study technique consisted of survey questionnaire with key stakeholders. Common procedure bias must be considered carefully in every such survey. Accordingly, the study provides a short explanation of the research's goal and, at relevant locations in the questionnaire, includes paragraphs briefly defining the components (environmental concern, eco innovation and sustainable procurement). Making the survey easier to complete was a primary objective. Since Podsakoff et al. (2003), recommended using Harman's one-factor test to assess the common method bias. The results of the factor analysis are five factors with eigenvalues of one or above account for 70.656% of the variation. Given that the first component accounted for 49% which is less than 50% of the variation, the dataset's common method bias problem was solved.

Table 4.1: Common Method Bias

Component	Initial Eigenvalues		Cumulative %	Extraction Sums of Squared Loadings		
	Total	% of Variance		Total	% of Variance	Cumulative %
1	12.299	38.435	38.435	12.299	38.435	38.435
2	3.33	10.407	48.842	3.33	10.407	48.842
3	2.967	9.272	58.114	2.967	9.272	58.114
4	2.274	7.106	65.22	2.274	7.106	65.22
5	1.74	5.436	70.656	1.74	5.436	70.656
6	0.952	2.975	73.631			
7	0.851	2.66	76.291			
8	0.719	2.246	78.537			
9	0.665	2.077	80.614			
10	0.554	1.732	82.345			
11	0.524	1.638	83.983			
12	0.492	1.537	85.52			
13	0.461	1.442	86.962			
14	0.391	1.222	88.184			
15	0.35	1.095	89.279			
16	0.326	1.019	90.298			
17	0.316	0.988	91.286			
18	0.302	0.942	92.228			
19	0.264	0.825	93.053			
20	0.254	0.794	93.847			
21	0.24	0.75	94.597			
22	0.222	0.693	95.29			
23	0.209	0.654	95.943			
24	0.198	0.619	96.562			
25	0.187	0.584	97.146			
26	0.17	0.531	97.678			
27	0.148	0.461	98.139			
28	0.143	0.447	98.586			
29	0.131	0.409	98.995			
30	0.124	0.388	99.383			
31	0.11	0.344	99.727			
32	0.087	0.273	100			
Extraction Method: Principal Component Analysis.						

4.2.1 Response Rate

Following the steps laid forth in the previous chapter, a total of 400 questionnaires were sent to supply chain managers, procurement managers, and operations managers at construction companies in Ghana. A total of 400 surveys were sent; 350 valid responses were received (for a response rate of 88%). According to Kamel and Lloyd (2015), a response rate of 50% or above is considered adequate for statistical analysis in the area of business management research. Therefore, the predicted 88% response rate may be used to draw valid conclusions.

Table 4.2 Responses Rate

Distributed	Collected	Percentage of Usable
Response	350	88%
Non-Response	50	12%
Total	400	100.0%

4.2.2 Non-response Bias

Non-response bias was analyzed by looking at how early and late respondents behaved. By comparing the averages of all the variables in the model for early responders to those of late responders, non-response bias may be assessed. After comparing two groups of respondents on all variables, the p-value for the F-test (Levene's test of equality of variances) is found to be statistically insignificant. It is assumed that the two groups have the same amount of variability. The t-test p-values also indicate no significant differences between the two groups. A closer look reveals that the first 175 survey takers were not statistically different from the final 175.

Table 4.3 Results of Independent-Samples t-Test for Non-Response Bias

	Group	Mean	Levene's Test for Equality of Variances		
			F	Sig.	T
EC	1.000	27.931	0.152	0.696	2.281
	2.000	26.777			
EI	1.000	57.309	2.272	0.133	1.798

	2.000	55.667			
SP	1.000	40.720	3.853	0.05	2.65
	2.000	38.897			

Elements from the accepted levels all had Item loadings on each component averaging over 0.5, after the cutoff was established. Findings from table 4.3 demonstrated that the sample size is adequate, with a KMO of 0.915 and a Bartlett's test of sphericity value of 0.000. (The typical threshold for significance for this test is 0.70) Kaiser et al. (1970). The result shows that factor loadings for environmental concern ranged from 0.702 to 0.827, eco innovation from 0.708 to 0.903, and sustainable procurement from 0.718 to 0.834, indicating a high level of consistency between the items and the study's major constructs.

Table 4.4: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.915
Bartlett's Test of Sphericity	Approx. Chi-Square	9368.989
	df	496
	Sig.	0.000

4.2.3 Non-response Bias

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Table 4.5: Results of Independent-Samples t-Test for Non-Response Bias

	Group	Mean	Levene's Test for Equality of Variances		
			F	Sig.	T
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	2.000	26.777			
EI	1.000	57.309	2.272	0.133	1.798
	2.000	55.667			
SP	1.000	40.720	3.853	0.05	2.65
	2.000	38.897			

4.3 Demographic Information

The demographic details of the participants are shown below. The results are shown in table 4.6 below. From the result, the female participants represent 49.1% of the sample while the male participants represent 50.9%. The results also show that 27.7% of the participants were around the age of 18 and 30 years, 40.6% were around 31 and 40 years, 24.9% were around 41 and 50 years and 6.9% were also aged above 50 years. The findings also indicated that 22.9% of the participants were bachelor's degree holders, 28.9% were diploma holders, and 8.3% were master's/Ph.D. holders, 0.6% hold HND certificates and 12.9% were junior high school certificate holders 0.3% also hold other certificates 26.3% were senior high school certificate holders. The findings also indicated that 22.6% of the participants were business owners, 49.4% were business owners and managers, 5.7% were proxy employees, 12.6% were managers, 9.4% were production managers and 0.3% of the remaining were sales executives. From the data also, 31.1% of the participants indicated their firms have been in operation for 1-5 years, 25.7% also indicated 11-15 years, 10.9% indicated 16 years and above and 32.3% of the remaining also indicated 6-10 years. From the data also, 7.7% of the participants indicated 30-99 employees in their firms, 50.3% of them also indicated 6-29 employees in their firms, 39.4% also indicated less than 5 employees in their firms and 2.6% of the remaining indicated more than 100

employees in their firms. From the result also, 74.0% of the participants indicated their firm is fully locally owned, 7.4% also indicated fully foreign-owned and 18.6% of the remaining also indicated jointly Ghanaian and foreign-owned.

Table 4.6: Demographic Information

Variable	Dimension	Frequency	Percent
Gender	Female	172	49.1
	Male	178	50.9
Age	18 - 30 Years	97	27.7
	31 - 40 Years	142	40.6
	41 - 50 Years	87	24.9
	Above 50 Years	24	6.9
Level of Education	Bachelor Degree	80	22.9
	Diploma	101	28.9
	Graduate Studies (Master / Ph.D)	29	8.3
	HND	2	0.6
	Junior High School	45	12.9
	Others	1	0.3
Your Position in the Firm	Senior High School	92	26.3
	Business Owner	79	22.6
	Business Owner & Manager	173	49.4
	Employee (proxy)	20	5.7
	Manager	44	12.6
	Production Manager	33	9.4
	Sales executive	1	0.3
How many years have your firm been in operation?	1-5 Years	109	31.1
	11-15 Years	90	25.7
	16 Years and Above	38	10.9
How many employees are in the firm?	6-10 Years	113	32.3
	30-99 employees	27	7.7
	6-29 employees	176	50.3
	Less than 5 employees	138	39.4
	More than 100	9	2.6
Type of ownership	Fully locally owned	259	74.0

Fully foreign owned	26	7.4
Jointly Ghanaian & foreign owned	65	18.6
Total	350	100.0

4.4 Measurement Model Assessment

After the first round of testing is complete, the SmartPLS software examines the metrics used in the final step of testing to ensure accuracy. The outer model might also be called the measuring model in certain contexts. Outer models, also known as measuring models, define the relationships between a latent variable and its indicators (Aburumman et al., 2023). The connections between constructions and their observable parts are specified by the measurement model. Research has to focus on the most revealing factors to make this idea a reality. Indicators (items) are graded on how well they correspond to a theoretical model. Reviewing the measurement model may help improve the survey's instrument's validity, reliability, and accuracy with which variables are measured.

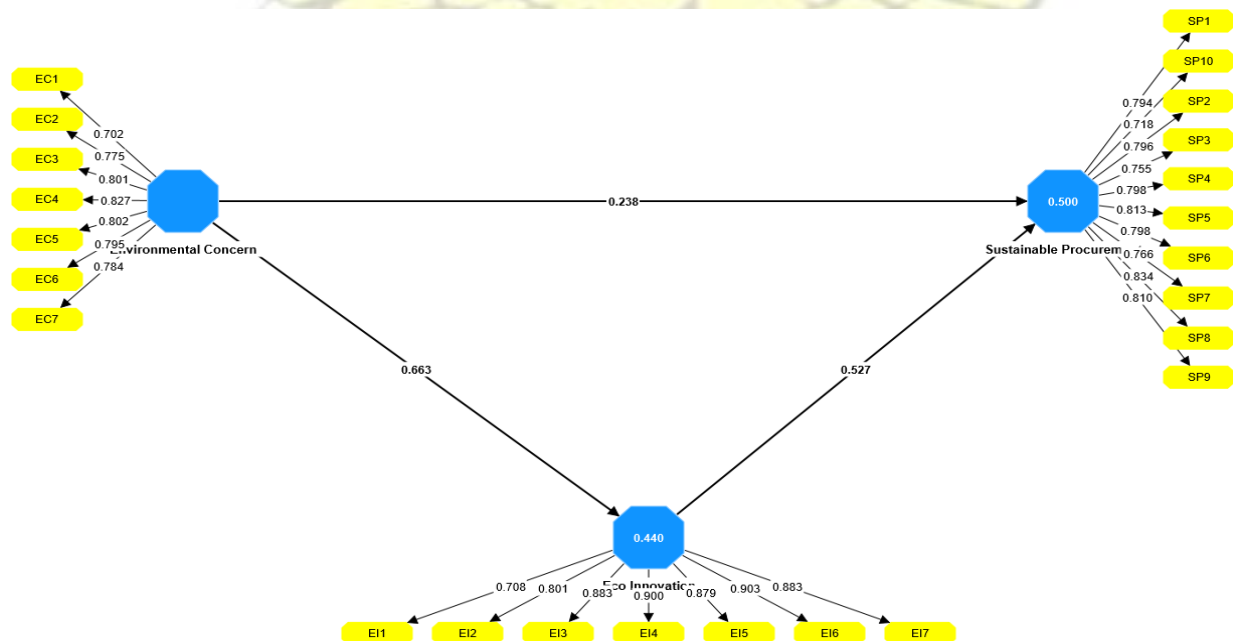


Figure 4.1 Measurement Model Assessment

4.4.1 Reliability Validity and Descriptive Statistics

Internal consistency is tested in two primary ways to ensure its validity. Notable examples of such measures are composite reliability (CR) and Cronbach's alpha (CA). Cronbach's alpha is a reliability estimate based on correlations across apparent indicator constructs, whereas composite reliability (CR) is an assessment of how well one set of items predicts another set's latent variable. A construct's reliability is established when its CA and CR fall between the range of 0.70 and 0.95. The model's consistency values are shown in Table 4.7, where the CR is between 0.918 and 0.949 and the CA is between 0.897 and 0.937 for environmental concern, eco-innovation, and sustainable procurement respectively. This finding indicated that the model is unidimensional hence if repeated will produce the same.

When many indicators can reliably evaluate a construct, it is assumed the construct has high convergent validity. A test is said to be convergent valid if it correlates well with other tests that use the same or similar criteria (Jensen, 2003). The extent of convergent validity may be determined using either empirical or theoretical approaches. If several tests are utilized to evaluate the same aspect of an item, then the results may be compared. It is generally accepted that two standardized tests are quantitatively equivalent to one another. Convergence may be shown by a moderate to a high degree of correlation. The factors loading on a scale (FL) and the average variance extracted (AVE) are common measures of convergent validity. The convergent validity data are shown in Table 4.9. (FL and AVE). Loading values of 0.7 or above should be used, while values below this threshold should be disregarded. If CA, CR, or AVE are more than

the threshold, indicators with loadings of 0.4 to 0.7 should be monitored. There is no need to eliminate indicators if doing so would reduce CA, CR, and AVE. AVE ratings greater than 0.5 are generally considered to be satisfactory. All of the indicators had loadings higher than 0.7, as shown by the results. In every instance, the AVE was more than 0.5 which indicates the model's validity.

Discriminant validity was then used to evaluate the extent to which one independent variable differed from the other independent variables in the model of the study environment. Each input variable to a discriminant function has to have a correlation that is lower than the square root of the average variance (AVE) among those variables for the function to be useful (Fornell & Larcker, 1981). Table 4.9 emphasizes the link between the variables using non-diagonal figures, whereas square roots of the AVE are shown in strong diagonal figures. The constructs are highly discriminant because diagonal values are larger than non-diagonal values.

Since it is not possible to reliably assess discriminant validity using the Fornell-Larcker criteria, a new metric, the heterotrait-monotrait (HTMT) ratio of correlations, has been created (Hair et al., 2019; Henseler et al., 2015; Voorhees et al., 2016). The majority of studies have shown that HTMT values beneath 0.90 are ideal. A researcher may do this by calculating the geometric mean of the average correlations for scales measuring the same variable and dividing that number by the average value of the items' correlations across constructs (Henseler et al., 2015). The maximum HTMT is shown to be 0.788 in Table 4.8.

Table 4.7 Reliability Validity and Descriptive Statistics

Confirmatory Factor Analysis	Factor Loading	Descriptive Statistics	VIF
Scale	(t-value)	Mean SD	
<i>Environmental Concern (CA=0.897; CR=0.918; AVE=0.616)</i>			

EC1	0.702(8.359)	3.90	0.899	2.079
EC2	0.775(14.450)	3.93	0.816	2.382
EC3	0.801(17.176)	3.80	0.879	2.225
EC4	0.827(18.593)	3.89	0.854	2.640
EC5	0.802(16.036)	3.96	0.804	2.274
EC6	0.795(15.141)	3.92	0.949	2.651
EC7	0.784(14.732)	3.96	0.864	2.705
Eco Innovation (CA=0.937; CR=0.949; AVE=0.729)				
EI1	0.708(14.799)	4.01	0.889	1.656
EI2	0.801(18.976)	3.85	1.001	2.371
EI3	0.883(26.247)	3.97	0.919	2.794
EI4	0.900(31.703)	4.05	0.929	2.842
EI5	0.879(27.507)	4.02	0.928	2.915
EI6	0.903(33.404)	4.05	0.926	1.045
EI7	0.883(28.873)	4.03	0.962	2.484
Sustainable Procurement (CA=0.932; CR=0.943; AVE=0.622)				
SP1	0.794(17.039)	3.93	0.912	2.904
SP10	0.718(15.072)	3.93	0.84	1.845
SP2	0.800(21.023)	4.04	0.784	3.037
SP3	0.755(13.182)	3.96	0.832	2.147
SP4	0.798(18.065)	3.91	0.862	2.859
SP5	0.813(20.858)	3.94	0.844	3.014
SP6	0.800(16.359)	4.03	0.804	2.924
SP7	0.766(16.927)	4.03	0.797	2.192
SP8	0.834(21.791)	4.04	0.786	3.131
SP9	0.810(19.053)	4.01	0.765	2.918

Table 4.8: HTMT Test results

Constructs	1	2	3
Eco Innovation			
Environmental Concern	0.697		
Sustainable Procurement	0.728	0.630	

Table 4.9: Fornell-Larcker test

Constructs	1	2	3
Eco Innovation	0.854		
Environmental Concern	0.663	0.785	
Sustainable Procurement	0.684	0.587	0.789

4.4.2 Descriptive Statistics

The variables in the research are summarized statistically below. Standard deviation shows how well the mean values reflect the data, whereas the mean values summarize the data (Field, 2009). Summarized results from the descriptive analysis may be seen in Table 4.10. It can be shown that big data analytics capability score ($M=3.95$; $SD=0.840$), creativity score ($M=3.97$; $SD=0.885$), and adaptive capability score ($M=3.96$; $SD=0.811$). The findings show that there was no statistically significant difference between the computed or statistical mean and the observed mean for any of the constructs.

Table 4.10: Descriptive Statistics

Constructs	Mean	Standard Deviation
Big Data Analytics Capability	3.95	0.840
Creativity	3.97	0.885
Adaptive Capability	3.96	0.811

4.5 Fit Summary

Valid values and ranges may be found for the Fitness of Extracted-Index, SRMR, Root Mean Square of Approximation, and Chi-Square (Table 4.11). Both the extracted and unusual indices are under 0.9, the threshold for approval. If a residual has a square root or common root, it is likely not infinitely small. This emphasizes the need of ensuring that all relevant factors and points of view are taken into account in any future research.

Table 4.11: Fit Summary

Indices	Saturated model	Estimated model
SRMR	0.074	0.074
d_ULS	1.663	1.663
d_G	0.786	0.786
Chi-square	1424.146	1424.146
NFI	0.799	0.799

4.6 Coefficient of Determination and Predictive Power of the PLs Model

The performance of the PLS path model in making predictions may also be evaluated using Q2 (Geisser, 1974; Stone, 1974). When Q2 is statistically significant, the prediction power of an endogenous structural model may be calculated (Hair et al., 2019). Table 4.12 displays the model's predictive ability, based on the Q2 score of 0.430 and 0.500 for eco innovation and sustainable procurement.

The researcher made sure the measurement model was correct before evaluating the validity of the structural model and the presumed linkages. The potential for skewed findings was eliminated by checking for collinearity before looking at the structural connections. Here, VIF were calculated for the latent variables involved. VIF values were between 1.045 and 3.131, which is below the minimum acceptable value of 3.3. (Hair et al., 2019). The R2 values of the endogenous variables were analyzed to see how well the model represented the data contained inside the sample. The values of R2 that indicate a high, moderate, and low degree of correlation are 0.75, 0.50, and 0.25, respectively (Hair et al., 2011). Table 4.10 and Figure 4.1 provide an R2 value of 0.440 and 0.500 for econ innovation and sustainable procurement respectively, indicating strong explanatory power.

Q2 values may also be calculated to evaluate the prediction accuracy of the PLS path model (Geisser, 1974; Stone, 1974). Q2 values should be non-zero for a given endogenous construct to reflect the structural model's ability to forecast that construct (Hair et al., 2019). From the table 4.12 Q2 values varied between 0.341 and 0.439, demonstrating the model's usefulness for making predictions.

Table 4.12: Coefficient of Determination and Predictive Power of the PLs Model

Endogenous Constructs	R-square	Q ² predict
Eco Innovation	0.440	0.430
Sustainable Procurement	0.500	0.336

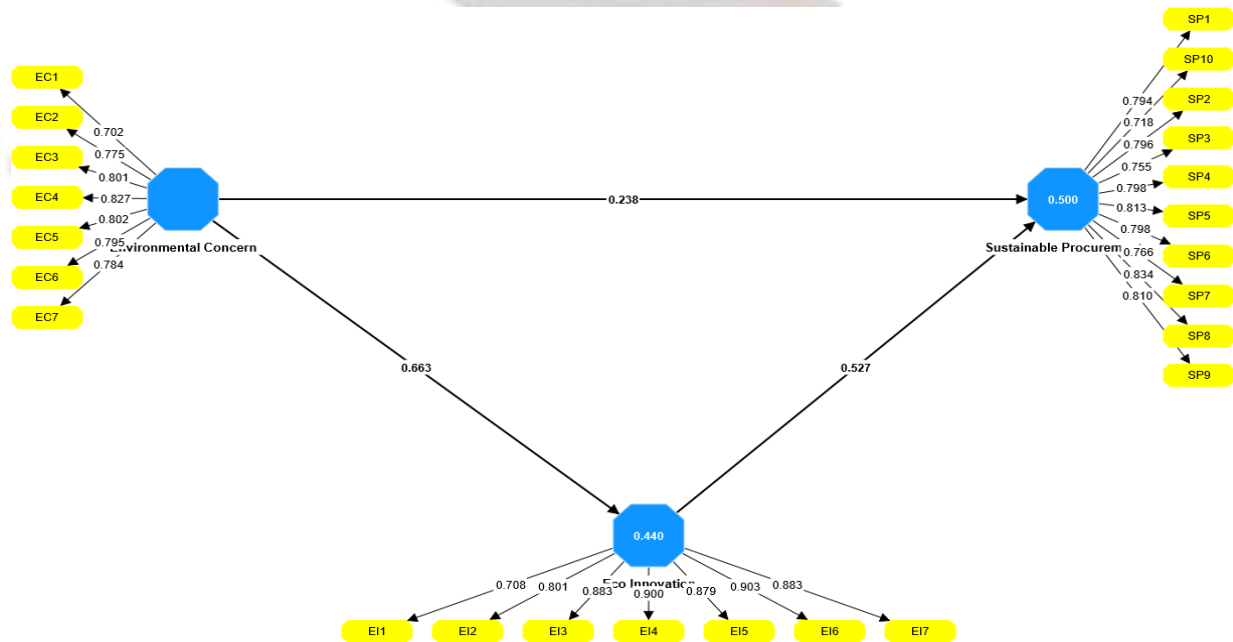


Figure 4.1: Measurement Model Assessment

4.7 Hypotheses for Direct and Indirect Relationship

In this part, smartPLS 4 was used to assess the validity of the study's hypotheses. This study examines the mediating role eco-innovation between environmental concerns and sustainable procurement practices in the context of construction firms. The study first examined the

influence of environmental concern on sustainable procurement. The result in Table 4.13 shows that environmental concern has a positive and significant effect on sustainable procurement ($B=0.164$; $t=2.777$; $p\text{-value}=0.006 < 0.05$).

The study also examined at how eco innovation drives sustainable procurement. According to the results in Table 4.12, eco innovation has a significant and positive influence on sustainable procurement ($B=0.634$; $t=12.968$; $p\text{-value}=0.000 < 0.05$). The study also examine the impact of environmental concern on sustainable procurement. Table 4.12 shows that environmental concern significantly influence sustainable procurement ($B=0.641$; $t=12.220$; $p\text{-value}=0.000 < 0.05$).

The final objective examined the mediating role eco-innovation between environmental concerns and sustainable procurement practices in the context of construction firms. Table 4.12 demonstrates that eco-innovation partially mediate the environmental concerns and sustainable procurement practices link ($B=0.406$; $t=9.079$; $p\text{-value}=0.000 < 0.05$).

Table 4.13: Hypotheses for Direct Relationship

Hypotheses	Path Coefficient	Error	T Statistics	P Values	Decision
Environmental concern -> Sustainable Procurement	0.164	0.059	2.777	0.006	Supported
Eco innovation -> Sustainable Procurement	0.634	0.049	12.968	0.000	Supported
Environmental concern -> Eco innovation	0.641	0.052	12.220	0.000	Supported
Big Data Analytics Capability -> Creativity -> Sustainable Procurement	0.406	0.045	9.079	0.000	Supported

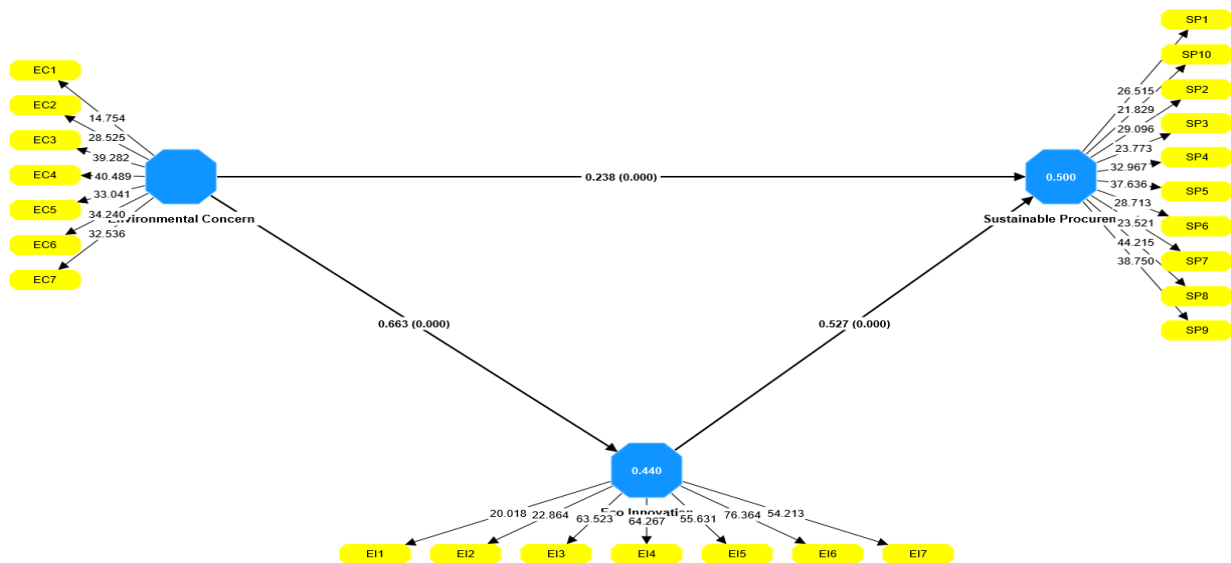


Figure 4.2 Structure Model Evaluation

4.8 Discussion of Findings

This study investigate how eco-innovation might serve as a mediator between environmental concerns and sustainable procurement practices in the context of construction firms. The first objective examined how environmental concern influences sustainable procurement in the construction industry. The result showed a positive and statistically significant association between environmental concern and the sustainable procurement used by construction firms. This study's results provide support to the idea that there is a link between the factors, as hypothesized. It also indicates that the degree to which environmental concerns are addressed accounts for 23.8% of the variations in sustainable procurement practices across construction enterprises (assuming all other variables are equal). The research indicates that if construction companies' management cared more about environmental concerns, more sustainable practices would be used in their procurement. These results provide credence to the legitimacy theory, which posits that an organization's success requires it to take into account environmental and social issues in everything that it does (Dixon and Clifford, 2007). The finding of a positive and

statistically significant association between environmental concern and sustainable procurement in construction firms, analyzed through Institutional Theory, Legitimacy Theory, Stakeholder Theory, and existing literature, provides valuable insights into the alignment of environmental practices with procurement strategies. Institutional Theory suggests that organizations conform to institutional norms and expectations. The positive association between environmental concern and sustainable procurement in construction firms implies a strategic alignment with institutional expectations related to environmental sustainability. Firms may be adapting their procurement practices to mirror industry standards and comply with environmental regulations. The finding suggests that construction firms experience isomorphic pressures to adopt sustainable procurement practices due to external influences such as regulatory bodies, industry associations, and societal expectations. This conformity contributes to isomorphism in the construction industry, where firms align their practices to maintain legitimacy within the institutional environment. Legitimacy Theory suggests that organizations engage in practices to maintain legitimacy in the eyes of their stakeholders. The positive association implies that construction firms perceive sustainable procurement as a means to enhance their legitimacy by demonstrating a commitment to environmental responsibility. This can positively influence stakeholders' perceptions, including customers, investors, and the public. The finding supports the idea that legitimacy considerations act as motivators for construction firms to adopt sustainable procurement. Firms may recognize that integrating environmental concerns into their procurement processes not only aligns with societal expectations but also contributes to building and maintaining legitimacy, essential for long-term organizational success. Stakeholder Theory emphasizes the importance of considering the interests and expectations of various stakeholders. The positive association suggests that construction firms are responsive to the expectations of

stakeholders, including customers, suppliers, and environmental advocacy groups. By aligning procurement practices with stakeholder expectations, firms contribute to building trust and positive relationships. Sustainable procurement reflects a balance of stakeholder interests, considering not only economic considerations but also environmental and social concerns. The positive association implies that construction firms recognize the need to balance the interests of stakeholders, including those with a vested interest in sustainable and environmentally responsible business practices. The study contributes to the existing literature by empirically confirming the positive association between environmental concern and sustainable procurement within the construction industry. It adds to the body of knowledge by providing specific insights into the practices of construction firms in response to environmental concerns. In summary, the finding of a positive and statistically significant association between environmental concern and sustainable procurement in construction firms, as analyzed through Institutional Theory, Legitimacy Theory, Stakeholder Theory, and existing literature, underscores the multifaceted nature of sustainable business practices. It highlights the interconnectedness of organizational behavior, institutional pressures, stakeholder expectations, and the pursuit of legitimacy within the context of environmentally responsible procurement in the construction industry. The results of this study are consistent with those of Ruslim et al. (2022), who investigated the impact of environmental consciousness on the adoption of eco-friendly beauty practices in Jakarta and discovered a positive and statistically significant relationship between environmental consciousness and the intent to buy green skincare products. Consistent with the findings of Li et al. (2019), who found a positive correlation between residents' propensity to purchase energy-efficient appliances and their degree of environmental concern, the findings confirm this relationship.

The second objective examined the effect of eco-innovation on sustainable procurement in the construction industry. The result showed that there is a positive and strong relationship between the capacity to apply eco-innovation and sustainable procurement in the construction sector. The results of this study provide support to the idea that the two variables are related to one another. This further illustrates that shifts in the building industry's promotion of eco-innovation may be tied to shifts in sustainable procurement. This explains 52.7% of the entire change in sustainable procurement practices. The findings indicate that construction managers that actively participate in eco-innovation will benefit from the advantages of higher sustainable procurement. Findings validate the institutional theory that underpins the company's strategy for making effective use of firm resources and eco-innovations (innovations that do not negatively impact life or the environment) in day-to-day business activities (DiMaggio and Powell) (1983). The finding of a positive and strong relationship between the capacity to apply eco-innovation and sustainable procurement in the construction sector, analyzed through Institutional Theory and existing literature, provides valuable insights into the interplay between innovation, institutional pressures, and sustainable procurement practices. Institutional Theory suggests that organizations conform to institutional norms to gain legitimacy. The positive relationship between the capacity for eco-innovation and sustainable procurement implies that construction firms are conforming to the increasing institutional expectations related to environmental sustainability. The strong relationship indicates isomorphic pressures within the construction sector. Firms are likely influenced by external forces such as industry regulations, governmental policies, and societal expectations, compelling them to adopt both eco-innovation and sustainable procurement practices to resemble their peers and meet institutional expectations. The finding suggests that construction firms view the capacity for eco-innovation as a way to

legitimize their commitment to sustainable procurement. By aligning eco-innovation capabilities with sustainable procurement practices, firms enhance their legitimacy in the eyes of stakeholders who increasingly value environmental responsibility. The positive relationship reinforces the idea that eco-innovation is becoming an institutionalized practice within the construction industry. Construction firms may recognize that adopting innovative and environmentally friendly practices is not only a means of conforming to institutional expectations but also a way to position themselves as leaders in a changing institutional environment. The finding aligns with existing literature on innovation and sustainability, which often emphasizes the positive impact of innovation on sustainable practices. It is consistent with the notion that innovation, particularly eco-innovation in this context, contributes to the advancement of sustainable initiatives within organizations. The study contributes to the literature by specifically highlighting the integration of eco-innovation with sustainable procurement in the construction sector. This emphasis on the relationship between the capacity for eco-innovation and sustainable procurement adds granularity to our understanding of how innovative practices influence broader sustainability efforts. The literature review component acknowledges the importance of an institutional perspective in understanding the relationship between eco-innovation and sustainable procurement. By grounding the analysis in Institutional Theory, the study builds on the existing literature that recognizes the impact of institutional pressures on organizational behavior, particularly in the context of sustainability practices. The study contributes by identifying industry-specific patterns within the construction sector. It recognizes that the relationship between eco-innovation and sustainable procurement may vary across industries, and the construction sector, with its unique challenges and opportunities, is demonstrating a strong positive relationship between these two factors. In summary, the finding

of a positive and strong relationship between the capacity for eco-innovation and sustainable procurement in the construction sector, as analyzed through Institutional Theory and existing literature, contributes to our understanding of the complex dynamics shaping sustainability practices in the industry. It emphasizes the role of innovation as a key driver of sustainable procurement, shedding light on how construction firms navigate institutional pressures and legitimacy concerns in the pursuit of environmentally responsible practices. This finding concurs with that of Yurdakul and Kazan (2020), who looked at how eco-innovation affected business and environmental outcomes. The results showed that eco-innovation has a beneficial effect on cost reduction and, by extension, economic performance. This data is similar to that of Cai and Li (2018), who use data from 442 Chinese firms to investigate the connection between drivers, eco-innovation behavior, and business success. Findings suggest that eco-innovation practices may have a significant impact on a company's environmental performance, which has a positive knock-on effect on the company's bottom line.

The last objective examined the mediating role of eco-innovation between environmental concern and sustainable procurement. The findings demonstrated that the connection between eco-innovation and sustainable procurement is strongly mediated by environmental concerns. The study's findings corroborate the hypothesized relationship between the factors. The results also suggest that eco-innovation is responsible for 34.9% of the variation in the influence of environmental concern on sustainable procurement after controlling for other factors. Research results imply that there may be a stronger link between environmental concern and sustainable procurement when top management prioritizes eco-innovation. This finding accords with the stakeholder's theory, which proposes that a business may provide more value to its constituents via the introduction of eco-innovations supported by both internal and external resources

(Friedman and Miles, 2006). For their part, stakeholders may aid the company by increasing eco-friendly purchasing practices (Friedman and Miles, 2006). The findings are consistent with those of Puspitaa (2021), who found that eco-innovation mediates the effect of both internal and external factors on firm performance, namely the impact of a company's competence and market pressure. The findings are also in agreement with those of Hojnik et al. (2018), who used a cross-sectional method to research the connection between internationalization and financial success for businesses. Eco-innovation is shown to partly mediate the relationship between internationalization and firm economic success.



CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This last chapter of the paper provides a concise summary of the study's results, conclusions, and suggestions for further research. Both the study's limits and some ideas for further exploration are provided.

5.2 Summary of findings

This study was conducted to examine how eco-innovation mediate environmental concerns and sustainable procurement nexus in in the context of construction firms. The first objective examined how environmental concern influences sustainable procurement in the construction industry. The result showed a positive and statistically significant association between environmental concern and the sustainable procurement used by construction firms. This study's results provide support to the idea that there is a link between the factors, as hypothesized. It also indicates that the degree to which environmental concerns are addressed accounts for 23.8% of the variations in sustainable procurement practices across construction enterprises (assuming all other variables are equal).

The second objective examined the effect of eco-innovation on sustainable procurement in the construction industry. The result showed that there is a positive and strong relationship between the capacity to apply eco-innovation and sustainable procurement in the construction sector. The results of this study provide support to the idea that the two variables are related to one another. This further illustrates that shifts in the building industry's promotion of eco-innovation may be

tied to shifts in sustainable procurement. This explains 52.7% of the entire change in sustainable procurement practices.

The last objective examined the mediating role of eco-innovation between environmental concern and sustainable procurement. The findings demonstrated that the connection between eco-innovation and sustainable procurement is strongly mediated by environmental concerns. The study's findings corroborate the hypothesized relationship between the factors. The results also suggest that eco-innovation is responsible for 34.9% of the variation in the influence of environmental concern on sustainable procurement after controlling for other factors.

5.3 Conclusion

The primary objective of this research was to investigate how eco-innovation might serve as a mediator between environmental concerns and sustainable procurement practices in the context of construction firms. The problem statement elaborates on the shortcomings that inspired the suggestion of three separate objectives. The research was conducted using a cross-sectional survey and quantitative method that included both descriptive and explanatory design. Leaders in the Ghanaian construction industry were the study's target population. 350 completed questionnaires were returned from a study of 400 procurements, logistics, and senior executives or managers at all Ghanaian construction firms. Primary data was gathered using a combination of convenience and purposive sampling techniques. Structural Equation Modeling in the form of SmartPLS 4 was used to verify the study's hypotheses. The data were summarized using descriptive statistics, also called summary statistics. According to the results of the research, sustainable procurement is significantly influenced by environmental concerns in the construction industry. It was also found that the link between environmental concern and sustainable procurement is mediated by eco-innovation, which has a substantial effect on sustainable procurement. Based on the findings, it seems that construction firm managers may

improve sustainable procurement by committing to and placing more emphasis on environmental concern and eco-innovation

5.4 Recommendations

The primary objective of this research was to investigate how eco-innovation might serve as a mediator between environmental concerns and sustainable procurement practices in the context of construction firms. According to the results of the research, sustainable procurement is significantly influenced by environmental concerns in the construction industry. It was also found that the link between environmental concern and sustainable procurement is mediated by eco-innovation, which has a substantial effect on sustainable procurement. Based on the findings, it seems that construction firm managers may improve sustainable procurement by committing to and placing more emphasis on environmental concern and eco-innovation. Given the significance of the results, the aforementioned is most likely to be the case.

1. The results of this research suggest that a more stringent requirement for sustainable procurement would be consistent with a higher norm for environmental care. That's why it's so important for construction business managers to acquire recycled, repurposed, and used supplies instead of brand-new ones. Further, by transferring their garbage from demolition and construction to be reused, businesses may lessen their environmental impact.
2. Based on the findings of the study, it comes to reason that increasing eco-innovation skills would also increase sustainable procurement. For this reason, construction managers must adopt more environmentally friendly practices, such as the use of high-quality, recyclable materials and components that are easily removed and returned to manufacturers at the end of the building's life cycle. It's conceivable that in the future, the sustainable building will include "renting" these materials.

3. Eco-innovation was shown to bridge the gap between sustainable procurement and environmental concern. In other words, the effect of environmental concern on sustainable procurement is bolstered when construction management places a premium on eco-innovation. To ensure the long-term viability of the company's procurement procedures, construction managers must make significant investments in eco-innovation. To improve the company's capability to overhaul its sustainable procurement, construction management must make substantial expenditures in eco-innovation.

5.5 Implications of findings

5.5.1 Managerial Implications

The practical implications of the findings that both environmental concern and eco-innovation significantly influence sustainable procurement, with eco-innovation serving as a significant mediator in the relationship between environmental concern and sustainable procurement, are noteworthy for organizations seeking to enhance their sustainability practices. Organizations should adopt integrated sustainability strategies that encompass environmental concern, eco-innovation, and sustainable procurement. There is the need to develop comprehensive sustainability policies that not only address environmental concerns and eco-innovation but also emphasize sustainable procurement practices. This holistic approach ensures a well-rounded and synergistic sustainability strategy. Innovation, particularly eco-innovation, plays a crucial role in driving sustainable procurement practices. Managers need to invest in research and development to foster eco-innovation within the organization. Actively seek out innovative solutions that align with environmental goals and can be integrated into procurement processes, thereby contributing to overall sustainability. Environmental concern is a significant driver of sustainable procurement, but its impact is enhanced when coupled with eco-innovation. Firms must develop strategic initiatives that emphasize the importance of environmental concern. Align

these initiatives with innovative practices to maximize the impact on sustainable procurement. This may involve employee training, stakeholder engagement, and awareness campaigns. Collaboration with suppliers, particularly in terms of eco-innovation, is essential for advancing sustainable procurement. Firms need to foster strong relationships with suppliers and encourage collaboration on eco-innovation projects. Consider establishing criteria that prioritize suppliers with strong eco-innovation capabilities, ensuring that sustainability is embedded throughout the supply chain. In summary, the practical implications emphasize the need for organizations to adopt a holistic and integrated approach to sustainability, recognizing the interconnectedness of environmental concern, eco-innovation, and sustainable procurement. By aligning these elements, organizations can build resilience, drive innovation, and contribute to a more sustainable and environmentally conscious business model.

5.5.2 Theoretical Implications

Theoretical contributions of the findings to Institutional Theory and Legitimacy Theory are significant, providing insights into the dynamics of how environmental concern, eco-innovation, and sustainable procurement are interrelated. The findings contribute to Institutional Theory by offering a nuanced understanding of how institutional pressures influence the adoption of sustainable procurement practices. The positive influences of environmental concern and eco-innovation highlight the role of external institutional pressures in shaping organizations' behaviors. The study supports the idea of isomorphism in the adoption of sustainable practices within organizations. It suggests that environmental concerns and eco-innovation practices are becoming institutionalized as organizations conform to prevailing norms and expectations related to sustainability. The findings present a dynamic view of institutional influences by highlighting the mediating role of eco-innovation. This suggests that organizations navigate institutional pressures not only by responding to external expectations but also by actively

engaging in innovation processes that contribute to sustainability goals. The study contributes to the understanding of how institutional change is linked to innovation within organizations. The mediation effect of eco-innovation indicates that organizations are not passive recipients of institutional pressures but actively engage in innovative practices to address environmental concerns and align with institutional expectations. Institutional Theory often discusses the phenomenon of decoupling, where organizations may symbolically adopt practices without substantial implementation. The findings, by emphasizing a significant mediation effect, suggest that the relationship between environmental concern and sustainable procurement is not merely symbolic; instead, it involves substantial organizational efforts through eco-innovation. The study contributes to Legitimacy Theory by affirming that environmental concern is a driver for organizations to engage in sustainable procurement. Organizations recognize that addressing environmental concerns is not only essential for environmental responsibility but also for building and maintaining legitimacy in the eyes of stakeholders. The mediation effect of eco-innovation suggests that organizations perceive eco-innovation as a mechanism to enhance their legitimacy concerning sustainable procurement. Eco-innovation serves as a proactive strategy to align with societal expectations and legitimize the organization's commitment to environmentally responsible practices. Legitimacy Theory often discusses symbolic adoption of practices to maintain legitimacy. The findings go beyond symbolism by indicating that the adoption of sustainable procurement practices, driven by environmental concern and mediated by eco-innovation, is substantively linked to legitimacy building rather than being a superficial gesture. The study underscores the connection between stakeholder trust and legitimacy. Sustainable procurement practices, influenced by both environmental concern and eco-innovation, contribute to building trust with stakeholders who increasingly value

environmentally responsible business practices, reinforcing the legitimacy of the organization. Legitimacy Theory often highlights strategic actions taken by organizations to maintain legitimacy. The findings suggest that the strategic use of eco-innovation is not only an operational necessity but also a conscious effort to enhance legitimacy by aligning with societal expectations regarding sustainability. In summary, the theoretical contributions of the findings to Institutional Theory lie in providing insights into the dynamic interplay between external pressures, innovation, and sustainable practices. For Legitimacy Theory, the contributions emphasize the strategic role of environmental concern and eco-innovation in building and maintaining legitimacy within the organizational context of sustainable procurement. The study enriches these theories by highlighting the substantive and strategic nature of the relationships between environmental concern, eco-innovation, and sustainable procurement practices.

5.6 Suggestions for Future Research

The study has two major limitations. To begin, more research is needed to verify the generalizability of our results. In this study, Ghanaian construction companies are used to evaluate the hypothesized internal logic link between environmental concern, eco-innovation, and sustainable procurement. Nonetheless, further research is needed to see whether the findings are generalizable to other eco-friendly items and international locations. To further understand the role that environmental concerns play in shaping sustainable procurement practices, it would be useful to gather data on a broader set of green goods across nations in future studies. People may be cautious to provide information if they think it will be used against them or to make them seem bad. Not everyone you invite to fill out a survey may do so. The problem was addressed by assuring participants in the study through an introduction letter from the University that their participation was entirely voluntary and that any data they gave would be kept confidential and

used solely for research. Second, while investigating the relationship between environmental concern and sustainable procurement, the researcher focused solely on the mediating role of eco-innovation, ignoring other potential mediating and moderating mechanisms like the accessibility of green products, the ease of making purchases, and the involvement of policymakers. These considerations should be included in future studies.



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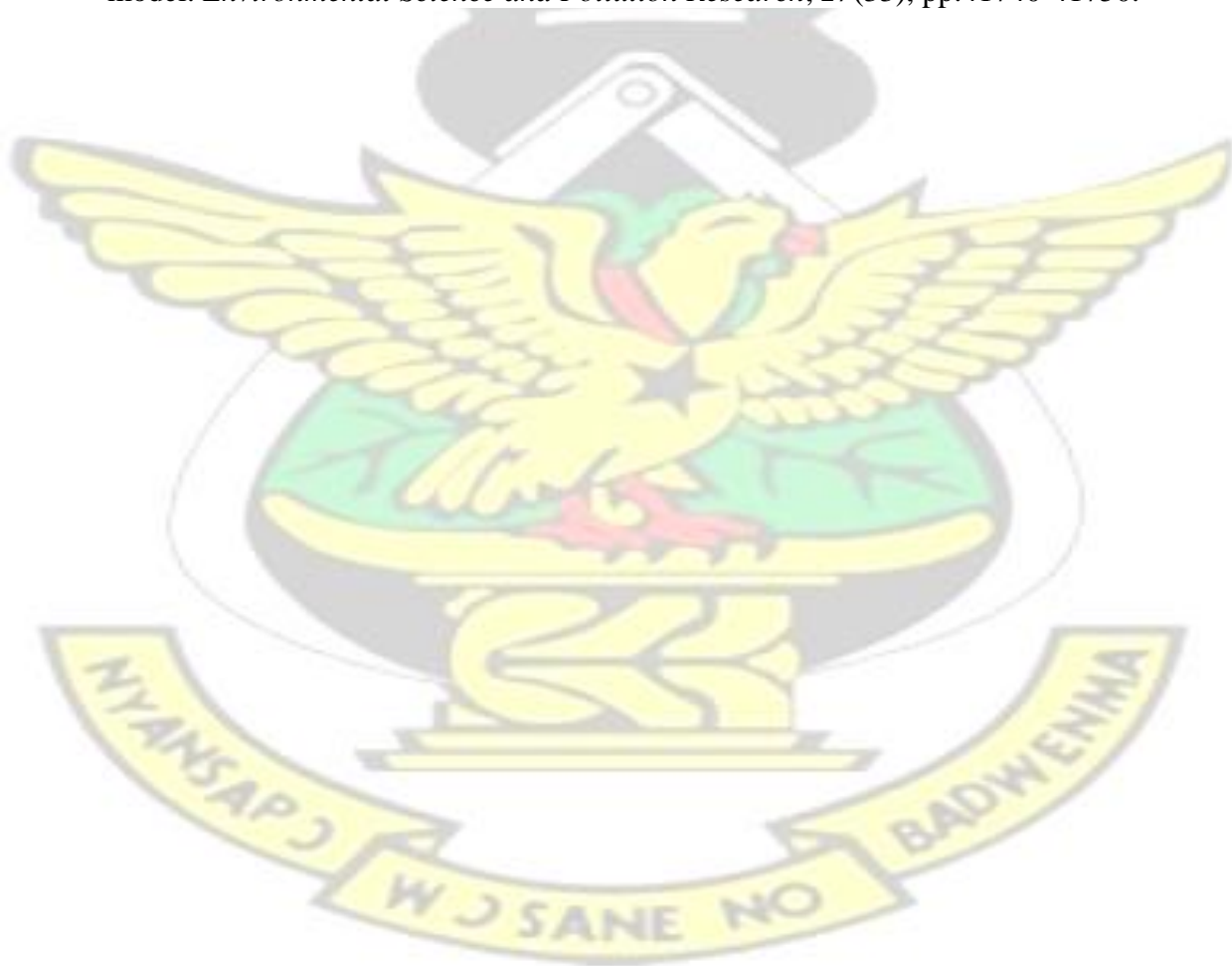
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APPENDIX

SURVEY QUESTIONNAIRE

Dear Sir/ Madam,

My name is, a postgraduate student at the Kwame Nkrumah University of Science and Technology, Kumasi, Department of Supply Chain and Information Systems. This survey instrument has been designed to enable me carry out research on the topic: **“The mediating role of eco innovation on the effect of environmental concern on sustainable procurement in the context of construction firms”**. Any information provided will be used for academic purposes ONLY. There are no risks associated with your participation, and your responses will remain confidential and anonymous.

SECTION A: RESPONDENT’S BIOGRAPHY AND COMPANY PROFILE

When completing this questionnaire, please tick [√] in the applicable box or provide an answer as applicable.

Please answer the following questions:

Gender: Male ☐ Female ☐

Age

18-30 years ☐ 31-40 year’s ☐ 41-50 years ☐ Above 50 years ☐

Level of Education

Junior High School ☐ Senior High School ☐ Diploma ☐ Bachelor Degree

Graduate Studies (Master / Ph.D.) ☐ Others ☐ For Others, please specify.....

Your Position in the Firm

Business Owner ☐ Business Owner & Manager ☐ Manager ☐ Production Manager ☐ Others ☐.....

How many years have your firm been in operation?

1 - 5 years ☐ 6 - 10 years ☐ 11 – 15 years ☐ 16 years and above ☐

How many employees are in the firm?

Less than 5 employees ☐ 5 – 29 employees ☐ 30 – 99 employees ☐ More

than 100 ☐

Type of ownership:

☐ Fully locally owned ☐ Fully foreign owned ☐ Jointly Ghanaian & foreign owned

SECTION B: Environmental Concern (Dunlap et al. 2000)

To what extent do the following statements describe your firm's formation of ethical culture?
using the scale 1 to 5: Not at all – A very great extent

Item	Statement	1	2	3	4	5
EC1	Humans are severely abusing the environment.					
EC2	If things continue on their present course, we will soon experience a major ecological catastrophe.					
EC3	The balance of nature is very delicate and easily upset.					
EC4	Despite our special abilities, humans are still subject to the laws of nature.					
EC5	Humans have the right to modify the natural environment to suit their needs					
EC6	When humans interfere with nature it often produces disastrous consequences					
EC7	Humans will eventually learn enough about how nature works to be able to control it					

SECTION B: Eco Innovation (Hojnik et al., 2018)

To what extent do the following statements describe your firm's formation of ethical culture?
using the scale 1 to 5: Not at all – A very great extent

Item	Statement	1	2	3	4	5
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EI1	The company is improving and designing environmentally friendly packaging (e.g., use fewer paper and plastic materials) for existing and new products.					
EI2	The company chooses materials for the product that consume the least amount of energy and resources for conducting the product development or design.					
EI3	The company uses the smallest possible number of materials to create the product for conducting the product development or design.					
EI4	The company deliberately evaluates whether the product is easy to recycle, reuse and decompose for conducting the product development or design					
EI5	Low energy consumption such as water, electricity, gas and petrol during production/use/disposal					
EI6	Recycling, reuse and remanufacture of material					
EI7	Use of cleaner technology to generate savings and prevent pollution (e.g., energy, water and waste).					
EI8	The manufacturing process of the company effectively reduces the emission of hazardous substances or waste					
EI9	The manufacturing process of the company reduces the use of raw materials.					
EI10	Our firm management often uses novel systems to manage eco innovation					
EI11	Our firm management often collects information on eco innovation trends.					
EI12	Our firm management often actively engages in eco innovation activities.					
EI13	Our firm management often communicates eco-innovation information with employees					
EI14	Our firm management often invests a high ratio of R&D in eco-innovation.					
EI15	Our firm management often communicates experiences among various departments involved in eco-innovation					

SECTION C: Sustainable Procurement (Agbesi et al.,2018)

To what extent do the following statements describe the level of adaptation made by your firm at the start of the relationship with this supplier by checking the appropriate number from 1 to 5 using the following scale: (1=Not at all – 5=A very great extent)

SP1	Our managers ensure compliance with procurement policies/regulations					
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SP2	Our organisations' shows practical expression of commitment to sustainable development					
SP3	We ensure value for money with procurement					
SP4	We have designed procurement policies that take into consideration sustainability					
SP5	My organisation favours contractors/consultants/suppliers that rate highly on sustainability at the tender process					
SP6	We have a documented procurement policy which states our commitment to procuring sustainable works, goods and services					
SP7	My organisation has incorporated sustainability into its procurement process					
SP8	My organisation specifies sustainability criteria in its contract.					
SP9	We currently have ISO14001 certification					
SP10	We have made our contractors/consultants/suppliers aware of our sustainable procurement policy and practices					

Thank you for participating in the survey.

