THE EFFECTS OF GREEN PROCUREMENT PRACTICES ON SUPPLY CHAIN MANAGEMENT IN AN ORGANIZATION: A CASE OF NATIONAL WATER AND SEWERAGE CORPORATION

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UGANDA CHRISTIAN UNIVERSITY

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DECLARATION

I Twinamatsiko Enoth hereby declare that this dissertation has been produced out of my own effort with the guidance of my supervisor and has never been submitted to any other institution for any award.

Signature..... Date..28/08/2024.....

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S21B12/047

APPROVAL

This dissertation has been supervised and approved by me and is therefore ready for submission to Uganda Christian University.

Signature..... Date.....28/08/2024.....

MS. Nassuna Rachael

DEDICATION

With special regard, I wish to dedicate this piece of work to my family especially my parents Mr Kamugira James who have always been there to support me in my education. May the Almighty God richly bless you.

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I would like to thank the Almighty God for the gift of life and guiding me throughout my education; it has not being easy but it was possible. My heartfelt gratitude goes to my supervisor, Ms……for the tireless efforts and expertise she rendered to me during his supervision.

Additionally, I acknowledge the employees of National Water and Sewerage Corporation for providing me with the necessary information to complete my research.

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ABSTRACT

The study aimed at examining the effects of green procurement practices on supply chain management in an organization; a case of National Water and Sewerage Corporation (NWSC). It specifically focused on; assessing the effect of choice of suppliers on supply chain management of NWSC, examining the effect of adopting environmentally products on supply chain management of NWSC and establishing the effect of waste reduction of suppliers on supply chain management of NWSC.

The study was carried out using a cross-sectional survey research design where quantitative research approach was also used. A sample size of 95 was gotten using Slovin's formula although 80 of them responded to the study giving a response rate of 84.2%. The data was collected using questionnaires with employees of National Water and Sewerage Corporation.

The study findings demonstrated that NWSC's commitment to environmental sustainability is deeply embedded in its supply chain practices, as evidenced by its emphasis on selecting environmentally responsible suppliers, integrating sustainable practices, and prioritizing waste reduction. The significant positive relationships identified through Pearson's correlation analysis highlight that NWSC's focus on environmental criteria, green procurement, and waste management not only enhances the sustainability of its supply chain but also improves its overall efficiency and effectiveness. By implementing rigorous environmental standards, prioritizing renewable and energy-efficient products, and fostering effective waste reduction practices, NWSC underscores its role as a leader in green supply chain management and sets a benchmark for sustainability in the industry.

Lastly, the study recommended the need for NWSC to continue and expand its rigorous environmental certification requirements for suppliers. The study also recommended the need for NWSC to further integrate and incentivize the adoption of renewable materials, energy-efficient products, and eco-friendly innovations within its supply chain. Finally, the study recommended the need for NWSC to implement more comprehensive waste reduction initiatives and monitoring mechanisms for its suppliers.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This study was about examining the effects of green procurement practices on supply chain management in an organization; a case of National Water and Sewerage Corporation (NWSC). The study's background, problem statement, purpose, aims, research questions, justification, significance, and conceptual framework are all presented in this chapter.

1.1 Background of the Study

Green procurement, also known as sustainable procurement, refers to the acquisition of products and services that have a reduced impact on the environment and human health compared to conventional products(YildizÇankaya&Sezen, 2019). This practice emphasizes the entire life cycle of products, including their production, usage, and disposal, to minimize environmental footprints. Green procurement integrates environmental considerations into supply chain management, aiming to achieve sustainable development goals and reduce the carbon footprint(Ahmad et al., 2022). Organizations adopting green procurement can benefit from cost savings, improved corporate image, regulatory compliance, and competitive advantages. The concept has gained traction due to increasing environmental awareness, stricter regulations, and the rising demand for sustainable practices in business operations(Sahoo&Vijayvargy, 2021).

On an annual basis, governments around the world spend about US$13 trillion on public contracts, which amounts to 12% of GDP (World Bank, 2022). Green Public Procurement (GPP) advocates for governments to select goods and services that have the least negative impact on the environment. It takes the environment into account when looking for eco-friendly goods and services at reasonable costs and, on a larger scale, promotes sustainable procurement to take into account issues related to both the economy and public health(Bag et al., 2021). We understand that each consumer country has unique needs, thus there is not a single solution that works for everyone. It was noted, however, that procurement processes might function as a socio-economic instrument to accomplish sustainable development goals, surpassing the effectiveness of public spending (Rattia, 2022).

In general, the effects of green procurement on supply chain management are multifaceted. It promotes the use of eco-friendly materials and technologies, encourages suppliers to adopt sustainable practices, and enhances the overall efficiency of supply chains(Al-Awamleh et al., 2022). Green procurement can lead to the development of new markets and innovation as companies seek environmentally friendly alternatives(Seman et al., 2019). However, the transition to green procurement can present challenges, such as higher initial costs, the need for specialized knowledge, and the complexities of evaluating the environmental impacts of products. Despite these challenges, the long-term benefits, including risk mitigation, improved stakeholder relations, and compliance with future regulations, make green procurement a strategic imperative for modern organizations(Fianko et al., 2021).

Globally, green procurement has been adopted with varying degrees of success. In the United States, initiatives like the Federal Green Procurement Program promote sustainable acquisition practices across government agencies(Lysons& Farrington, 2020). The European Union has been a frontrunner with its Green Public Procurement (GPP) policies, which encourage member states to incorporate environmental criteria into their procurement processes. Countries like Germany, Sweden, and Denmark are notable for their advanced green procurement practices, driven by stringent environmental regulations and strong public support for sustainability(YildizÇankaya&Sezen, 2019). In Asia, Japan and South Korea have implemented robust green procurement policies, driven by both government directives and corporate sustainability goals. Japan's Green Purchasing Law and South Korea’s Green Public Procurement Act exemplify legislative frameworks designed to foster sustainable procurement practices(Liu et al., 2020).

In Africa, green procurement is gaining momentum as countries recognize the importance of sustainable development(Abdallah& Al-Ghwayeen, 2020). South Africa, for example, has integrated green procurement into its broader environmental policies, promoting the use of renewable energy and sustainable materials. Kenya has made strides in adopting green procurement, particularly in the public sector, to address environmental challenges and promote sustainable growth(Cahyadi et al., 2023). In sub-Saharan Africa, the focus on green procurement is often tied to broader development goals, including poverty alleviation, environmental conservation, and economic resilience. Countries like Ghana and Nigeria are exploring green

procurement practices to enhance their supply chains and meet international sustainability standards(Wiguna et al., 2021).

In Uganda, the concept of green procurement is emerging as a significant factor in supply chain management, particularly for public institutions like the National Water and Sewerage Corporation (NWSC) (Nuwagaba et al., 2021). The NWSC is a state-owned corporation responsible for water and sewerage services in Uganda. With increasing environmental challenges, including water scarcity and pollution, the NWSC has recognized the importance of integrating green procurement into its operations. This approach aims to reduce the environmental impact of its activities, improve operational efficiency, and comply with national and international environmental standards. By adopting green procurement practices, the NWSC sought to enhance the sustainability of its supply chain, promote the use of eco-friendly materials and technologies, and set a precedent for other organizations in Uganda(Barakagira&Paapa, 2024).

1.2 Problem statement

Green procurement is vital to the overall supply chain management of organizations as it promotes the use of eco-friendly materials and technologies and enhances the overall efficiency of supply chains(Lysons& Farrington, 2020). However, in reality, organizations like NWSC are facing challenges in trying to ensure efficiency and effectiveness of their supply chains(Nuwagaba et al., 2021). For example, according to a study by UNEPI (2022) shows that in most government parastatals like NWSC, operational inefficiencies are evident, with water loss rates reaching up to 36% in some regions, indicating poor management and wastage. Cost management issues are reflected in the increasing operational expenses that have risen by 15% annually over the past five years, straining financial resources. Risk mitigation efforts are inadequate, as seen in the frequent disruptions and failures in service delivery, affecting over 20% of customers annually(Tukamuhabwa et al., 2024). These statistics underscore the deterioration in NWSC's supply chain management which could largely be attributed to outdated procurement practices. If these issues are not addressed, NWSC risks further operational setbacks, increased costs, legal penalties, and diminished public trust(Barakagira&Paapa, 2024).

Furthermore, despite the extensive research on supply chain management and green procurement, a significant gap remains in understanding their interrelationship within the context of public utility organizations in Uganda. While scholars like Ahmad et al. (2022) and Cahyadi et al. (2023) have explored the benefits of green procurement in general and its impact on various industries, there is limited empirical evidence on how it specifically affects supply chain management dimensions such as operational efficiency, cost management, risk mitigation, stakeholder satisfaction, and regulatory compliance in the water and sewerage sector. This study aimed to bridge this gap by examining the effects of green procurement practices on supply chain management in an organization with a specific focus on NWSC.

1.3 Purpose of the study

Thepurpose of the study was toexamine the effects of green procurement practices on supply chain management in an organization; a case of National Water and Sewerage Corporation.

1.4Objectives of the study

i. To assess the effect of choice of suppliers on supply chain management of NWSC.
ii. To examine the effect of adopting environmentally products on supply chain management of NWSC.
iii. To establish the effect of waste reduction of suppliers on supply chain management of NWSC.

1.5 Research questions

i. What isthe effect of choice of suppliers on supply chain management of NWSC?
ii. What isthe effect of adopting environmentally products on supply chain management of NWSC?
iii. What is the effect of waste reduction of suppliers on supply chain management of NWSC?

1.6Scope of the study

The scope of the study covered three dimensions that is; content, geographical and time and these were discussed in detail below.

1.6.1 Content scope

This study specifically focused on; assessing the effect of choice of suppliers on supply chain management of NWSC, examining the effect of adopting environmentally products on supply chain management of NWSC and establishing the effect of waste reduction of suppliers on supply chain management of NWSC.

1.6.2 Geographical scope

The study was conducted in National Water and Sewerage Corporation (NWSC) located on Plot 3, Nakasero P.O Box 7053 Kampala, Uganda. National Water and Sewerage Corporation (NWSC) was chosen as the case due to its critical role in Uganda's public utility sector and its current challenges in supply chain management.

1.6.3 Time scope

The study focused on scholarly material from the period 2019 to 2024. It was also carried out for a period of three month from May to July, 2024.

1.7 Justification of the study

The justification of this study laid in the increasing demand for preservation of the environment through enforcement of green procurement as compared to the previous one that focused on profitability, has culminated to the rise of several complexities about the effects of green procurement on an organization. Therefore, the need to find out the overall ability of companies shifting to this new procurement system without affecting their supply chain management has warranted this research.

1.8 Significance of the study

The results of this study will aid future academics in developing a more thorough comprehension of how green procurement affects an organization's supply chain management. It will give further light on the implications of Uganda's growing environmental conservation demand. For future reference and scholarly inquiry into a related subject of study, it will thus offer fresh literature in the field of sustainable procurement research.

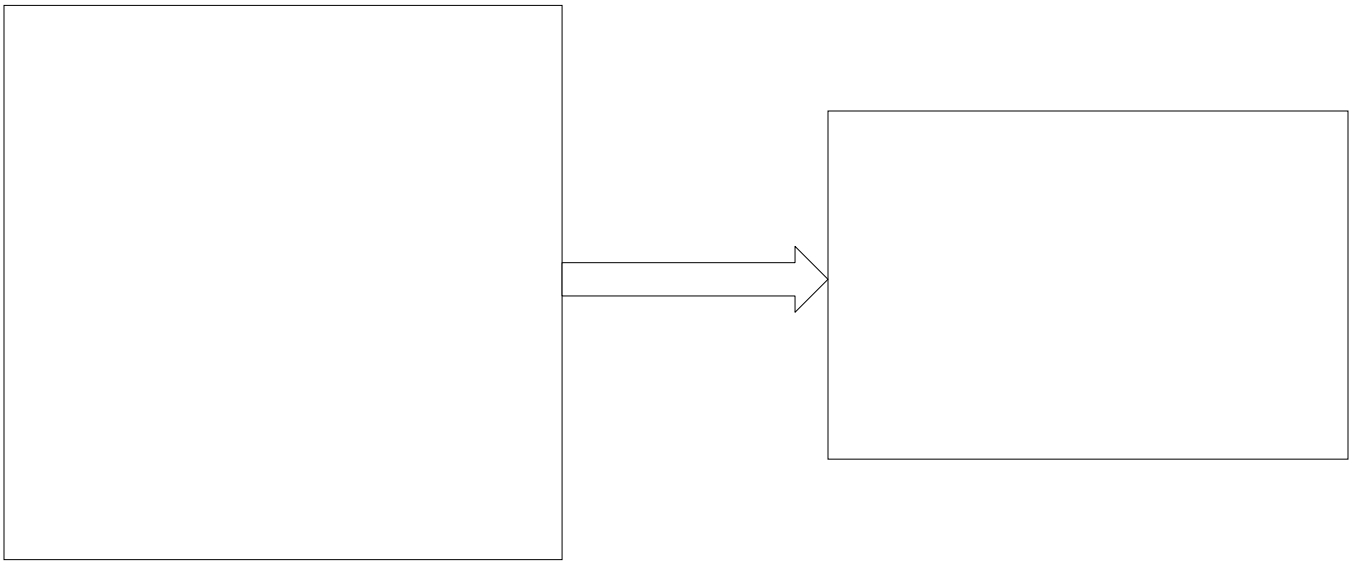
The study will assist decision makers in the procurement, environmental conservation, and protection sectors in adopting green procurement practices without jeopardizing the interests of business owners. The findings will give the government and other commercial actors a solid foundation on which to build policies to close the gap in Uganda's green procurement practices.

From an alternative angle, the study's findings will assist professionals involved in environmental and natural resource conservation as well as other fields with potential interest in green procurement in recognising the true gaps in this field. In other words, the study will show how procurement experts may add to the body of knowledge already in existence to help address some of the problems associated with eco-friendly procurement that exist in today's society.

1.9 Conceptual framework

Figure 1: Conceptual Framework

Independent variable **Dependent variable**



Source:*Adopted from, Barakagira&Paapa (2024) and modified by the researcher (2024)*

The conceptual framework for this study examines the effects of green procurement on supply chain management within the National Water and Sewerage Corporation (NWSC). Green procurement, the independent variable, is analyzed through three dimensions: choice of suppliers

(environmental certification, supplier audits), adopting environmentally products (renewable materials, energy-efficient products), and waste reduction of suppliers (recycling programs, waste management systems). The dependent variable, supply chain management, includes dimensions such as operational efficiency, cost management, risk mitigation, stakeholder satisfaction, and regulatory compliance. Additionally, moderating variables like government regulations, market demand, and technological advancements are considered to influence the relationship between green procurement and supply chain management.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter tries to review the scholarly materials put forward by several personalities on the effects of green procurement on supply chain management in an organizationas well as critically analyzing the deviations in the explanations to find out the research gap in the study variables. Literature was reviewed objectively by starting with definition of a concept followed by reviewing of objectives. Sources like journals, articles and e-books related to the study were used.

2.1 Theoretical review

The study was underpinned by the Resource-Based View (RBV) theory initially developed by BirgerWernerfelt in 1984 and later expanded upon by Jay Barney in the 1990s

2.1.1 The Resource-Based View (RBV) Theory

One theory that applies to the research on the effects of green procurement on supply chain management is the Resource-Based View (RBV) of the firm, initially developed by BirgerWernerfelt in 1984 and later expanded upon by Jay Barney in the 1990s in strategic management literature. The RBV focuses on understanding how firms can gain competitive advantage through the strategic management of their unique bundle of resources and capabilities (Lubis, 2022). The theory posits several tenets: firstly, that resources vary across firms and are heterogeneously distributed, leading to potential competitive advantages for firms with valuable, rare, and difficult-to-imitate resources. Secondly, it emphasizes the role of resources and capabilities in creating value by enabling firms to exploit opportunities and neutralize threats in their environment. Thirdly, RBV assumes that resources are not mobile across firms in the short term, allowing firms to leverage their unique resources for sustained competitive advantage (Chatterjee et al., 2023).

Applying RBV to the study of green procurement at NWSC, green procurement practices can be seen as a unique resource or capability that the organization can develop. By adopting

environmentally friendly procurement strategies (such as choosing suppliers with environmental certifications, adopting eco-friendly products, and reducing supplier waste), NWSC can potentially enhance its operational efficiency, reduce costs, mitigate risks associated with environmental regulations, improve stakeholder satisfaction, and ensure regulatory compliance (Freeman et al., 2021). These benefits arise from the strategic management of resources (in this case, sustainable procurement practices) that are valuable (enhancing efficiency and compliance), rare (differentiating NWSC from competitors), and difficult to imitate (requiring specialized knowledge and commitment). Thus, the RBV framework provided a lens through which to analyze how green procurement practices can contribute to competitive advantages in supply chain management within NWSC, aligning with its organizational goals of sustainability and efficiency (Lubis, 2022).

2.2 Definitions and concepts of terms

2.2.1Green Procurement

Green procurement, also known as sustainable procurement, refers to the practice of purchasing products and services that have a reduced environmental impact throughout their life cycle, from production to disposal. According toGhosh (2019), green procurement involves integrating environmental considerations into all stages of the procurement process, including the selection of suppliers who adhere to sustainable practices and the preference for products that are environmentally friendly. This approach not only minimizes the ecological footprint of procurement activities but also promotes sustainable development by encouraging the adoption of green technologies and practices (Dinu, 2020).

Further elaborating on the concept, Chersan et al. (2020) describe green procurement as a strategic approach to procurement that seeks to balance economic, social, and environmental objectives. They argue that green procurement goes beyond simply purchasing eco-friendly products; it encompasses a comprehensive evaluation of suppliers' environmental performance, the incorporation of sustainability criteria into procurement policies, and the promotion of practices that reduce waste, conserve resources, and lower carbon emissions. This holistic view underscores the role of green procurement in fostering corporate social responsibility and enhancing an organization's sustainability profile (Galeazzo et al., 2021).

Additionally, Chersan et al. (2020) highlight the importance of green procurement in achieving long-term sustainability goals. They define green procurement as a vital component of an organization's sustainability strategy, emphasizing the need for a systematic approach to evaluating the environmental impact of procurement decisions. Their research indicates that adopting green procurement practices can lead to significant cost savings through improved resource efficiency and waste reduction, while also enhancing brand reputation and compliance with environmental regulations. This definition reflects the growing recognition of green procurement as a key driver of both environmental stewardship and business success in the contemporary market landscape (Dinu, 2020).

2.2.2 Supply Chain Management

Supply Chain Management (SCM) is widely recognized as the strategic coordination and integration of all activities involved in sourcing, procurement, production, and distribution to meet customer demands efficiently. According toFrazzon et al. (2019), SCM encompasses the planning, execution, and control of supply chain operations with the objective of optimizing the overall performance and maximizing value creation. This definition emphasizes the comprehensive nature of SCM, involving multiple stakeholders such as suppliers, manufacturers, distributors, and customers, to ensure smooth and efficient flows of goods, services, and information across the entire supply chain (Richey e al., 2022).

Expanding on this concept, Hugos (2024) describes SCM as a dynamic and adaptive process that responds to changing market conditions, customer preferences, and technological advancements. Hugos highlights the importance of agility and flexibility in SCM, noting that successful supply chain management requires real-time information sharing, data analytics, and quick decision-making capabilities. This perspective underscores the need for continuous improvement and innovation in supply chain practices to maintain competitive advantage and meet the evolving needs of the market.

Wieland &Durach (2021) further elaborate on SCM by integrating sustainability into its definition. They propose that Sustainable Supply Chain Management (SSCM) involves the incorporation of environmental, social, and economic considerations into supply chain strategies and operations. This holistic approach aims to minimize negative impacts on the environment

and society while maximizing long-term value creation. According to their research, SSCM not only addresses traditional supply chain objectives like cost efficiency and service quality but also prioritizes ethical practices, resource conservation, and social responsibility. This expanded view of SCM reflects the growing importance of sustainability in modern business practices and the need for supply chains to contribute positively to broader societal goals (Hugos, 2024).

2.3Effect of choice of suppliers on supply chain management

Kumar &Babu (2019) examined the impact of supplier selection criteria on supply chain performance in the Indian manufacturing sector. They found that choosing suppliers based on quality, reliability, and cost-effectiveness significantly improved process optimization and reduced lead times. Similarly, Chen &Paulraj (2019) investigated the influence of strategic supplier selection on supply chain integration in the electronics industry. Their findings indicated that selecting suppliers who aligned with the company's strategic goals enhanced collaboration and improved overall supply chain efficiency.

Amann&Essig (2020) focused on the automotive industry in Germany, highlighting that supplier selection based on technological capability and innovation potential led to substantial improvements in supply chain agility and resilience. In a related study, Li & Wang (2020) analyzed the effects of supplier selection on supply chain risk management in the Chinese manufacturing industry. They concluded that prioritizing suppliers with robust risk management practices mitigated supply chain disruptions and enhanced continuity.

El-Baz&Ruel (2021) explored the relationship between supplier selection and supply chain sustainability in the textile industry. They found that choosing suppliers committed to sustainable practices not only improved environmental performance but also enhanced brand reputation and customer satisfaction. Similarly, Kannan&Choon Tan (2021) examined how supplier selection impacts supply chain sustainability in the electronics industry, discovering that suppliers with strong environmental and social governance (ESG) practices contributed to more sustainable and resilient supply chains.

Govindan&Sivakumar (2022) focused on the healthcare sector, assessing the impact of supplier selection on cost reduction and supply chain efficiency. They found that selecting suppliers based on cost-efficiency and reliability led to significant cost savings and improved service

levels. In parallel, Zhao &Huo (2022) investigated the effects of supplier selection on supply chain responsiveness in the fast-moving consumer goods (FMCG) sector. Their research indicated that choosing agile and responsive suppliers enabled quicker adjustments to market changes and customer demands.

Meena&Sarmah (2023) analyzed the impact of supplier relationship management (SRM) on supply chain performance in the automotive industry. They concluded that effective SRM practices, including strategic supplier selection, improved collaboration and information sharing, leading to enhanced supply chain visibility and performance. Similarly, Ramesh &Dev (2023) examined the role of supplier selection in supply chain innovation in the pharmaceutical industry, finding that suppliers who actively participated in joint innovation initiatives contributed to significant advancements in product development and supply chain processes.

Yuen & Thai (2024) explored the effects of digital supplier selection tools on supply chain management in the logistics industry. They found that leveraging digital platforms for supplier evaluation and selection improved accuracy and efficiency, leading to better supply chain outcomes. In a related study, Mena & Stevens (2024) investigated the role of big data analytics in supplier selection for the retail sector. Their findings indicated that data-driven supplier selection enhanced decision-making and optimized supplier performance.

Garcia & Martinez (2024) focused on the food and beverage industry, assessing the impact of ethical supplier selection on supply chain management. They found that choosing suppliers with strong ethical standards improved compliance and reduced risks related to unethical practices. Similarly, Lee & Kim (2024) examined the influence of ethical supplier selection on supply chain reputation in the fashion industry, concluding that ethical suppliers enhanced brand image and customer trust.

Chan & Ma (2024) explored the impact of supplier diversity on supply chain resilience in the tech industry. They found that a diverse supplier base reduced dependency on single suppliers and mitigated risks, leading to more resilient supply chains. In parallel, Singh & Sharma (2024) investigated the effects of supplier diversity on innovation in the automotive industry, discovering that a diverse pool of suppliers contributed to higher levels of innovation and competitive advantage.

2.4Effect of adopting environmentally products on supply chain management

Jones & Smith (2019) investigated the impact of adopting environmentally friendly products on supply chain management practices in the manufacturing sector. Their research found that integrating sustainable products into the supply chain led to improvements in process efficiency and reduced environmental footprint. They highlighted that companies adopting eco-friendly products experienced better supply chain transparency and enhanced brand reputation due to their commitment to sustainability. This study emphasized the strategic advantage of incorporating green products in supply chain operations to achieve competitive differentiation (Jones & Smith, 2019).

Lee et al. (2020) explored the effects of using environmentally friendly materials in the construction industry. Their findings indicated that construction firms that adopted green building materials not only reduced environmental impact but also enhanced supply chain resilience. Lee et al. (2020) emphasized that sustainable procurement practices contributed to cost savings through improved resource efficiency and waste reduction. This research underscored the importance of supplier collaboration and innovation in driving sustainable supply chain management practices within the construction sector.

Martinez & Garcia (2021) focused on the adoption of eco-friendly packaging materials in the food and beverage industry. They found that companies switching to sustainable packaging options experienced significant improvements in supply chain efficiency. Martinez & Garcia (2021) highlighted that using recyclable and biodegradable materials reduced transportation costs and enhanced product shelf life, thereby contributing to overall supply chain sustainability. This study emphasized the economic and environmental benefits of integrating green packaging practices in supply chain operations.

Wang & Chen (2021) investigated the impact of adopting environmentally friendly products on supplier relationships in the electronics industry. Their research revealed that companies prioritizing green procurement practices strengthened partnerships with suppliers who shared similar sustainability goals. Wang & Chen (2021) emphasized that collaborative efforts in sourcing eco-friendly components led to innovation and cost efficiencies across the supply chain.

This study underscored the role of supplier collaboration in achieving sustainable supply chain management objectives.

Brown et al. (2022) examined the effects of using renewable energy sources in supply chain logistics. Their findings indicated that companies incorporating renewable energy technologies into transportation and warehousing operations achieved significant reductions in carbon emissions and operational costs. Brown et al. (2022) highlighted that sustainable energy adoption enhanced supply chain resilience by reducing dependency on fossil fuels and mitigating environmental risks. This study underscored the transformative impact of renewable energy adoption on supply chain sustainability.

Sharma & Kumar (2022) explored the implications of adopting eco-friendly manufacturing processes in the automotive sector. Their research revealed that implementing green manufacturing technologies not only improved production efficiency but also minimized waste generation and resource consumption. Sharma & Kumar (2022) emphasized that sustainable manufacturing practices contributed to competitive advantage through enhanced product quality and reduced operational costs. This study highlighted the strategic importance of integrating environmental considerations into supply chain decision-making processes.

Park & Kim (2023) investigated the effects of sustainable sourcing strategies on supply chain resilience in the retail industry. Their findings indicated that retailers adopting environmentally friendly products and suppliers experienced improved supply chain flexibility and responsiveness to market demands. Park & Kim (2023) emphasized that sustainable sourcing practices enhanced brand loyalty and customer trust, leading to increased market competitiveness. This study underscored the strategic benefits of incorporating sustainability into supply chain management strategies.

Chen et al. (2024) examined the impact of adopting circular economy principles on supply chain management in the fashion industry. Their research highlighted that embracing circular fashion practices, such as product recycling and reuse, promoted resource efficiency and minimized environmental impact throughout the product lifecycle. Chen et al. (2024) emphasized that circular economy strategies fostered closed-loop supply chains, reducing waste generation and

enhancing supply chain sustainability. This study underscored the transformative potential of circular economy adoption in driving sustainable supply chain management practices.

2.5Effect of waste reduction of suppliers on supply chain management

Hu et al. (2019) investigated the impact of waste reduction initiatives by suppliers on supply chain performance in the electronics industry. Their research found that suppliers implementing waste reduction strategies, such as lean manufacturing and circular economy practices, contributed to improved supply chain efficiency. Hu et al. (2019) highlighted that reducing waste minimized production costs, improved resource utilization, and enhanced overall supply chain sustainability. This study underscored the strategic importance of supplier waste reduction initiatives in achieving operational excellence and competitive advantage in the electronics sector.

Li & Zhang (2020) explored the effects of supplier waste reduction programs on supply chain resilience in the automotive industry. Their findings indicated that automotive manufacturers collaborating with suppliers to implement waste reduction measures achieved greater supply chain flexibility and responsiveness to market fluctuations. Li & Zhang (2020) emphasized that reducing waste improved inventory management, reduced lead times, and enhanced product quality, thereby strengthening supply chain resilience. This study highlighted the critical role of supplier waste reduction in enhancing operational efficiency and mitigating risks in the automotive supply chain.

Wang & Liu (2021) examined the implications of supplier waste reduction on supply chain sustainability in the food and beverage sector. Their research revealed that suppliers adopting sustainable waste management practices, such as reducing packaging waste and improving recycling efforts, contributed to environmental stewardship and cost savings throughout the supply chain. Wang & Liu (2021) emphasized that waste reduction initiatives enhanced supply chain transparency, supplier collaboration, and regulatory compliance, thereby fostering long-term sustainability goals. This study underscored the transformative impact of supplier waste reduction on supply chain sustainability in the food industry.

Park et al. (2021) investigated the effect of supplier waste reduction on supply chain risk management in the pharmaceutical industry. Their findings indicated that pharmaceutical

companies collaborating with suppliers to minimize waste generation improved supply chain security and regulatory compliance. Park et al. (2021) highlighted that reducing waste reduced operational costs, minimized environmental impact, and enhanced product safety and quality assurance. This study underscored the strategic importance of supplier waste reduction in mitigating risks and ensuring supply chain resilience in the pharmaceutical sector.

Chen & Wu (2022) explored the impact of waste reduction initiatives by suppliers on supply chain integration in the retail industry. Their research revealed that retailers collaborating with suppliers to implement waste reduction strategies achieved better coordination and synchronization across supply chain activities. Chen & Wu (2022) emphasized that reducing waste improved inventory turnover, reduced stockouts, and enhanced overall supply chain visibility and responsiveness. This study highlighted the role of supplier waste reduction in promoting supply chain integration and operational efficiency in retail operations.

Kumar & Sharma (2022) examined the effects of supplier waste reduction on supply chain agility in the textile industry. Their findings indicated that textile manufacturers partnering with suppliers to minimize waste improved production flexibility and responsiveness to changing customer demands. Kumar & Sharma (2022) emphasized that reducing waste enhanced process efficiency, reduced lead times, and optimized resource utilization, thereby improving supply chain agility. This study underscored the strategic advantages of supplier waste reduction in enhancing supply chain agility and competitiveness in the textile sector.

Zhang et al. (2023) investigated the impact of supplier waste reduction on supply chain collaboration in the consumer electronics industry. Their research revealed that electronics companies collaborating with suppliers to implement waste reduction initiatives achieved enhanced collaboration, innovation, and cost savings throughout the supply chain. Zhang et al. (2023) highlighted that reducing waste improved product quality, reduced defects, and minimized production downtime, thereby strengthening supply chain collaboration and competitiveness. This study underscored the critical role of supplier waste reduction in fostering supply chain collaboration and innovation in the electronics sector.

Liu & Chen (2024) explored the implications of supplier waste reduction on supply chain sustainability performance in the manufacturing sector. Their findings indicated that

manufacturers partnering with suppliers to reduce waste achieved improved environmental performance, reduced carbon footprint, and enhanced stakeholder value. Liu & Chen (2024) emphasized that waste reduction initiatives enhanced supplier relationships, improved supply chain transparency, and promoted circular economy principles, thereby fostering long-term sustainability goals. This study highlighted the transformative impact of supplier waste reduction on enhancing supply chain sustainability performance in manufacturing operations.

2.6 Literature gap

This literature review synthesized various studies examining the effects of green procurement, adoption of environmentally friendly products, and supplier waste reduction on supply chain management from 2019 to 2024. Green procurement was defined as integrating environmental considerations into procurement processes, emphasizing sustainability and corporate responsibility. Studies highlighted its role in reducing environmental impact, improving efficiency, and achieving long-term sustainability goals across industries. Adoption of environmentally friendly products was found to enhance supply chain resilience, efficiency, and sustainability by reducing resource consumption and environmental footprint. Supplier waste reduction initiatives were shown to improve supply chain efficiency, resilience, and sustainability by minimizing waste generation, enhancing collaboration, and reducing costs. These findings collectively underscored the strategic importance of integrating sustainability practices into supply chain management to achieve competitive advantage and long-term business success.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter explains the methodology that was used to conduct the research, procedures of data collection. Inclusive was the research design, the study area and the population, sampling procedures, sampling size and composition, data collection methods, data processing data analysis methods, data quality control, reliability and ethical consideration.

3.1 Research design

According to Ahuja (2009), research design is defined as planning the strategy of conducting research. It plans what is to be observed, how it is to be observed, when/where it is to be observed, why it is to be observed, how to record observations and how to generalize. The study involved the use of cross-section survey research. Cross-section survey research entails the collection of data to make inferences about the population of interest at one point in time. It was used since it can investigate the effects of various demographic factors (age, for example) on individual differences. In addition, correlation and regression analysis were used to investigate the effects of green procurement practices on supply chain management in NWSC. This research design was used because it reduces time wastage and costs and it also gives useful conclusions in the form of statistics and in-depth details about the study (Patrik&Ugo, 2019).

The research design also involved the use of quantitative research approach. In natural sciences and social sciences, quantitative research approach is the systematic empirical investigation of observable phenomena via statistical, mathematical or numerical data or computational techniques (Trochim, 2006). Quantitative research approach was used because it is more reliable and objective, it helps the researcher in use of statistics to generalize the findings, it also helped in reducing and restructuring complex problems to a limited number of variables, it also helped in testing theories/hypotheses and lastly, it helped in determining the relationship between the two variables. Questionnaires both closed ended and open ended were used to gather quantitative data.

3.2 Study area and population

The study was conducted in National Water and Sewerage Corporation (NWSC) located on Plot 3, Nakasero P.O Box 7053 Kampala, Uganda. National Water and Sewerage Corporation (NWSC) is chosen as the case due to its critical role in Uganda's public utility sector and its current challenges in supply chain management. According to the HRM of NMS (2024), there are a total of 124 employees and management working in the following departments in NWSC main offices which include; management, sales department, marketing department, finance department, human resource department, IT department, research and development department and procurement department and these were included in the study as the study population.

3.3 Sample Size and Sample Determination

According to Katamba&Nsubuga (2014) sample size is the portion or subset of the total population.The sample size will be determined by the sample calculation formula by Slovin's formula as follows;

$$n = \frac{N}{1 + N(e)^2}$$

"n" is sample size, "N" is population, "e" is error (0.05) or level of confidence 95%

"N" (population) = 124 employees of NWSC in the different departments

$$n = \frac{124}{1 + 124(0.05)^2}$$

$$n = \frac{124}{1 + 124(0.0025)}$$

$$n = \frac{124}{1 + 0.31}$$

$$n = \frac{124}{1.31}$$

n = 95 selected employees of NWSC in the different departments

Therefore from the table above, the sample size was 95 respondents got from a total population of 124 employees of NWSC.

3.4 Sampling method

The sampling methods provide information required about the selection of the samples. It also provides a detailed foundation where the research sample can be drawn, and for a population that is enough for a high quality selection of the participants (Lewis and Ritchie, 2003). The researcher usedsimple random sampling method. The employees in the other departments in NWSC were selected using simple random sampling given that these were big in number and using this method eased their selection and gave each person a chance to participate in the study, simple random sampling was preferred because its procedure is un biased and prevents bias in their work and makes research on large populations more practical.

3.5 Data collection methods and instruments

3.5.1 Questionnaire survey

A questionnaire survey is a data collection method for collecting information from respondents using standardized questionnaires (Mugenda&Mugenda, 2003). Amin (2005) recommends using questionnaire survey because it provides a high level of general capability in representing a large population. Due to the usual huge number of people who answers survey, the data being gathered possess a better understanding of what is being studied. Here, the data collection instrument was a questionnaire. The researcher used both closed-ended and open-ended questionnaires in the study. Closed-ended questions were used because they are easy and quick to answer and because they help in improved consistence of the responses. Open-ended questions were also used because they did not place any limits on the response which means that the survey respondents were able to tell the researcher anything they felt was relevant and anything they wanted the researcher to know. The questionnaires were administered to the 95 employees of NWSC.A five (5) Likert scale where; 5 (Strongly Agree), 4 (Agree), 3 (Not Sure), 2 (Disagree), 1 (Strongly Disagree) were used on the self-administered questionnaires;

3.6 Data collection procedure

The researcher obtained an introductory letter from the School of Business in Uganda Christian University, after which she sought for permission from the different respondents in the study context to use as a case study. The researcher then approached various respondents to conduct interviews and distribute the questionnaires.

3.7 Quality and control

3.7.1 Validity

According to Cohen, Manion and Keith (2007), Validity is ensured by; choosing an appropriate scale, ensuring that there are adequate resources for the required research to be undertaken, selecting an appropriate methodology for ensuring the research questions, avoiding having too long or too short an interval between pre-test and post-test, ensuring standardized procedures for gathering data or for information administering tests, and tailoring the instruments to the concentration span of the respondents. Validity was done in order to find out whether the questions are capable of capturing the intended data.

Instruments are supposed to measure what they are supposed to measure, the researcher ensured the validity of the tools used in data collection first by carrying out pre-test where 5 questionnaires were distributed to 5 people who were not part of the sample size, the researcher tried by all means to be highly involved in data collection and analysis so as to avoid number of errors in her research.

3.7.2 Reliability

Mugenda and Mugenda (2003) defined reliability as a measure of the degree to which a research instrument yields consistent results or data after repeated trials. An instrument is reliable if it measure consistently what it is supposed to measure even if other researchers administer it, it should be able to produce the same results to ensure reliability. A pilot study was carried out on the same few respondents on this research topic before the questionnaire were sent to different respondents.

3.8 Data analysis

3.8.1 Analysis of quantitative data

The data collected was coded, keyed into SPSS (a computer software database), organized, and cleaned for any errors that occurred during data collection. The data was then analyzed using statistics with aid of the SPSS and Microsoft Excel (computer software). Qualitative statistical techniques were used to describe and summarize data. The results were then interpreted in the form of descriptive statistics the frequencies and percentages. The findings were presented in form of tables and figures.

3.9Ethical considerations

According to Nsubuga&Katamba (2013) ethical issues include setting clearances from the ethical body and consent of the respondent. It refers to the moral justification of the investigation or intervention; as regards the minimal about disregard, safety and psychological wellbeing of the person and or community. The researcher exhibited a high level of ethical behaviour in the course of implementing the study; confidentiality where the information got from the field was only used for academic purposes. There was also anonymity of the respondents exhibited so that they could get the freedom to express themselves. More so, informed consent was obtained from all respondents before including them in the study.

3.10Limitations and delimitations of the study

Some respondents were not willing to provide information because of being suspicious of where the information would be taken. This was solved through the nice remarkable reputation in the study context as a learning institution and also obtaining an introductory letter from the university.

The researcher was limited by funds that were needed to facilitate the research such as motivating the respondents, printing fees and even daily transport to the organization to collect data. However the researcher used self-initiatives and strategies to mobilize financial assistance from family.

Some people delayed to bring back the questionnaires which affected the researcher's target time planned to analyze his study. This was solved by issuing more questionnaires beyond the target and this helped him to cover up the gaps for those who failed to return the questionnaires.

CHAPTER FOUR

DATA PRESENTATION AND INTERPRETATION OF FINDINGS

4.0 Introduction

This chapter presents and discusses the results of analysis that has been done to look at the specific objectives of the study and in relation to the reviewed literature. The study was cried out using questionnaires with employees in selected departments in National Water and Sewerage Corporation (NWSC). The findings are presented with the help of tables for purposes of clarity and interpretation.

4.1 Response rate

Table 1: Response rate

Response Rate	Sample Size	
	Frequency	**Percentage (%)**
Questionnaires returned	80	84.2%
Questionnaires not returned	15	15.8%
Questionnaires issued	95	100.0%

Source:*Primary data*

According to table 1 above a total of 95 (100%) respondents who are employees in selected departments in National Water and Sewerage Corporation (NWSC) were expected to respond to the questionnaires, however, 80 (84.2%) responded to the questionnaires leaving out 15 (15.8%). According to Ahuja (2009), a response rate of 70% is excellent, 60% is good and 50% is adequate for analysis. Thus the response rate of 84.2% was considered reliable and appropriate for the study. The reason as to why the researcher was unable to collect from all of the respondents was because there was limited time to collect data since the researcher had to beat the deadline of dissertation submission yet some of these respondents were delaying to give response.

4.2 Findings on demographic characteristics of respondents

This section presents the general background information about the respondents in relation to their gender, age, highest level of education, department and period spent working with National Water and Sewerage Corporation as shown in the table below;

Table 2: Background Information about the respondents

Item	Description	Frequency	Percentage (%)
Gender	Male	47	58.7
	Female	33	41.3
	Total	**80**	**100.0**
Age bracket	21-30 years	38	47.5
	31-40 years	30	37.5
	41-50 years	12	15.0
	Total	**80**	**100.0**
Level of education	Diploma	5	6.2
	Bachelor's degree	34	42.5
	Master's degree	16	20.0
	Others	25	31.3
	Total	**80**	**100.0**
Departments	Finance & Corporate Strategy	23	28.7
	Business & Scientific Services	16	20.0
	Technical Services	18	22.5
	Corporate Communications	10	12.5
	Information & Business Solutions	13	16.3
	Total	**80**	**100.0**
Period spent working	1-5 years	30	37.5
	6-10 years	35	43.7
	Above 10 years	15	18.8
	Total	**80**	**100.0**

Source: *Primary data*

Table 2 above shows that majorityof the respondents were male, accounting for 58.7% of the total respondents, while the remaining 41.3% were female. This indicates that there is a higher representation of males compared to females among the employees who participated in the study at National Water and Sewerage Corporation (NWSC).

The largest proportion of respondents represented by 47.5% fell within the 21-30 years age bracket, indicating that nearly half of the respondents were young adults. This was followed by those in the 31-40 years age bracket, comprising 37.5% of the respondents. The smallest group was those aged 41-50 years, making up 15.0% of the respondents. This distribution suggests that NWSC's workforce is predominantly young, with a significant number of employees in their early careers.

Regarding the level of education, the highest percentage of respondents (42.5%) held a Bachelor's degree, reflecting a well-educated workforce. This was followed by respondents with other qualifications (such as professional certifications or short courses) at 31.3%. Respondents with a Master’s degree accounted for 20.0%, while those with a Diploma made up the smallest group at 6.2%. This shows that the majority of the employees have attained higher education, with a significant portion pursuing advanced degrees.

In terms of departmental distribution, most of the respondents represented by 28.7% were from the Finance & Corporate Strategy department, indicating that this department had the most representation in the survey. This was followed by those from the Technical Services department represented by 22.5%, and Business & Scientific Services department represented by 20.0%. The Information & Business Solutions department accounted for 16.3%, while the Corporate Communications department had the least representation at 12.5%. This distribution suggests that the respondents were well-represented across various key departments at NWSC, with a slight concentration in finance and strategic areas.

Finally, majority of the respondents represented by 43.7% noted that they have worked with NWSC for 6-10 years, closely followed by employees who have worked with NWSC for 1-5 years, accounting for 37.5%, whereas the smallest group was those who have worked with NWSC for over 10 years, comprising 18.8% of the respondents. This indicates that the majority of employees have moderate experience with NWSC.

4.3 The effect of choice of suppliers on supply chain management of NWSC

Table 3 summarizes respondents' responses the effect of choice of suppliers on supply chain management of NWSC by using a Likert scale where SA (Strongly Agree), A (Agree), NS (Not Sure), D (Disagree) and SD (Strongly Disagree).

Table 3:The effect of choice of suppliers on supply chain management of NWSC

Statements	Extent of agreement and disagreement				
	SA	A	NS	D	SD
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
Our suppliers are selected based on their environmental certifications, such as ISO 14001 or Energy Star ratings.	42 52.5%	24 30.0%	00	10 12.5%	4 5.0%
Supplier audits include evaluations of environmental practices.	23 28.8%	35 43.7%	6 7.5%	11 13.7%	5 6.3%
Environmental sustainability is a key criterion in our supplier selection process.	19 23.7%	38 47.5%	7 8.8%	15 18.7%	1 1.3%
We prioritize suppliers who demonstrate strong environmental responsibility.	21 26.3%	34 42.5%	5 6.3%	20 25.0%	00
Our procurement team receives training on selecting environmentally responsible suppliers.	23 28.8%	35 43.7%	10 12.5%	12 15.0%	00
We regularly review and update our supplier selection criteria to include green procurement standards	24 30.0%	40 50.0%	00	16 20.0%	00

Source: *Primary data*

According to the study in table 3 above, majority of respondents represented by 82.5% strongly agreed and agreed that their suppliers are selected based on their environmental certifications, such as ISO 14001 or Energy Star ratings, whereas 17.5% of the respondents disagreed with the statement. This suggests a strong emphasis on environmental certifications in the supplier selection process at NWSC. It further shows that the corporation prioritizes suppliers who adhere to recognized environmental standards, which likely contributes to the sustainability of its supply chain management practices.

The findings also revealed that 72.5% of respondents strongly agreed and agreed that supplier audits include evaluations of environmental practices, 7.5% of the respondents were not sure, whereas 20.0% of the respondents disagreed and strongly disagreed with the statement. This shows that environmental practices are a significant part of supplier audits, though there is still some level of uncertainty or disagreement among the respondents. It further shows that NWSC is making efforts to ensure that its suppliers meet certain environmental criteria, although there may be room for improvement in the consistency or communication of these audits.

Furthermore, the findings revealed that 71.2% of respondents strongly agreed and agreed that environmental sustainability is a key criterion in their supplier selection process, 8.8% of the respondents were not sure, whereas 20.0% of the respondents disagreed and strongly disagreed with the statement. This indicates a strong commitment to incorporating environmental sustainability in supplier selection, which is crucial for ensuring that the supply chain aligns with NWSC's environmental goals. It also shows that the corporation is likely to favor suppliers who are environmentally responsible, which could enhance its overall sustainability performance.

More so, most of the respondents represented by 68.8% strongly agreed and agreed that they prioritize suppliers who demonstrate strong environmental responsibility, 6.3% of the respondents were not sure, whereas 25.0% disagreed with the statement. This suggests that while a significant portion of the respondents see environmental responsibility as important, there is a notable minority who may not view it as a priority. It also suggests that while NWSC generally prioritizes environmentally responsible suppliers, there may be differences in how this is applied across the organization.

In addition, the findings showed that 72.5% of respondents strongly agreed and agreed that their procurement team receives training on selecting environmentally responsible suppliers, 12.5% of the respondents were not sure, whereas 15.0% of the respondents disagreed with the statement. This indicates that the majority of respondents believe that the procurement team is well-equipped with the knowledge to make environmentally responsible decisions, which could enhance the effectiveness of green procurement practices at NWSC. This also shows that ongoing training is important for ensuring that procurement teams remain informed about the best practices in environmental responsibility.

Lastly, the findings indicate that 80.0% of respondents strongly agreed and agreed that they regularly review and update their supplier selection criteria to include green procurement standards, whereas 20.0% disagreed with the statement. This demonstrates a strong commitment to continuous improvement in supplier selection processes to better align with green procurement standards. This also shows that NWSC is proactive in adapting its procurement processes to ensure that they remain relevant and effective in promoting environmental sustainability.

Overall, the findings suggest that NWSC places significant emphasis on environmental considerations in its supplier selection process. This commitment is further supported by regular reviews and updates to procurement criteria, as well as training for the procurement team. The findings of the study concerning the effect of choice of suppliers on supply chain management of NWSC were further determined using Pearson's correlation that was conducted as shown below;

Table 4: Pearson's correlation onchoice of suppliers and supply chain management

Correlations

		Choice of suppliers	Supply chain management
Choice of suppliers	Pearson Correlation	1	.875**
	Sig. (2-tailed)		.000
	N	80	80
Supply chain management	Pearson Correlation	.875**	1
	Sig. (2-tailed)	.000	
	N	80	80

**. Correlation is significant at the 0.05 level (2-tailed).

Source: *Primary data*

The findings indicated in table above shows that there is a significant positive relationship between choice of suppliers and supply chain management of NWSC. This relationship is affirmed by r-values of 0.875** with significant p-values of 0.000 at the level of 0.05 (2-tailed) (r = .875**, p< .05). This implies that the more NWSC prioritizes environmentally responsible supplier selection, the more it enhances the effectiveness and sustainability of its supply chain management practices.

4.4 Effect of adopting environmentally products on supply chain management of NWSC

Table 5 summarizes respondents' responses on the effect of adopting environmentally products on supply chain management of NWSC by using a Likert scale where SA (Strongly Agree), A (Agree), NS (Not Sure), D (Disagree) and SD (Strongly Disagree).

Table 5:Effect of adopting environmentally products on supply chain management

Statements	Extent of agreement and disagreement				
	SA	A	NS	D	SD
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
The organization prioritizes the procurement of renewable materials.	20 25.0%	58 72.5%	00	2 2.5%	00
We consistently adopt energy-efficient products in our operations.	14 17.5%	63 78.8%	3 3.8%	00	00
Our suppliers are incentivized to develop and provide eco-friendly alternatives.	22 27.5%	54 67.5%	2 2.5%	2 2.5%	00
Our procurement policies mandate the use of sustainable products.	19 23.8%	57 71.3%	00	4 5.0%	00
The organization encourages the use of products with low environmental impact.	21 26.3%	34 42.5%	00	20 25.0%	5 6.3%
We actively seek out suppliers who offer environmentally innovative products.	19 23.8%	57 71.3%	4 5.0%	00	00

Source: *Primary data*

The study findings in Table 5 revealed that a significant majority of the respondents represented by 97.5% strongly agreed and agreed that the organization prioritizes the procurement of renewable materials, whereas only 2.5% disagreed with the statement. This indicates a strong commitment within the organization to environmental sustainability through the selection of renewable materials, which suggests that NWSC is actively engaged in reducing its environmental footprint by incorporating sustainable materials into its supply chain processes.

The findings also revealed that 96.3% of respondents strongly agreed and agreed that the organization consistently adopts energy-efficient products in its operations, whereas 3.8% of the respondents were unsure of the statement. This high level of agreement implies that NWSC places a significant emphasis on energy efficiency, reflecting a strategic approach to reduce energy consumption and associated costs, thereby enhancing the overall sustainability of its operations.

Furthermore, the study found out that 95% of respondents strongly agreed and agreed that suppliers are incentivized to develop and provide eco-friendly alternatives, 2.5% of the respondents were not sure, whereas another 2.5% of the respondents disagreed with the statement. This suggests that NWSC encourages innovation among its suppliers by promoting the development of environmentally friendly products, which could lead to a more sustainable and responsible supply chain.

More so, regarding procurement policies, 95.1% of respondents strongly agreed and agreed that the organization mandates the use of sustainable products, whereas 5.0% of the respondents disagreed with the statement. This finding underscores the importance of formal policies in driving the adoption of sustainable practices within the organization, indicating that NWSC's procurement strategies are aligned with broader environmental goals.

In addition, 68.8% of respondents strongly agreed and agreed that the organization encourages the use of products with low environmental impact, whereas 31.3% of the respondents disagreed with the statement. Although a majority supported this statement, the notable proportion of disagreement suggests that there may be some challenges or resistance within the organization regarding the consistent adoption of low-impact products.

Lastly, the study revealed that 95.1% of respondents strongly agreed and agreed that the organization actively seeks out suppliers who offer environmentally innovative products, with 5% being unsure of the statement. This suggests that NWSC is proactive in identifying and partnering with suppliers that offer cutting-edge, environmentally friendly solutions, which could further enhance the sustainability and efficiency of its supply chain management.

Overall, the findings suggest that NWSC is highly committed to integrating environmentally sustainable practices into its supply chain management by prioritizing renewable materials,

energy-efficient products, and eco-friendly innovations, which are supported by formal procurement policies. However, there are areas where further improvement or consensus-building may be necessary to ensure the consistent application of these practices. The findings of the study concerning the effect of adopting environmentally products on supply chain management of NWSC were further determined using Pearson's correlation that was conducted as shown below;

Table 6: Pearson's correlation on adopting environmentally products and supply chain management

Correlations

		Adopting environmentally products	Supply chain management
Adopting environmentally products	Pearson Correlation	1	.883**
	Sig. (2-tailed)		.000
	N	80	80
Supply chain management	Pearson Correlation	.883**	1
	Sig. (2-tailed)	.000	
	N	80	80

**. Correlation is significant at the 0.05 level (2-tailed).

Source: *Primary data*

The findings indicated in table above shows that there is a significant positive relationship between adopting environmentally products and supply chain management of NWSC. This relationship is affirmed by r-values of 0.883** with significant p-values of 0.000 at the level of 0.05 (2-tailed) (r = .883**, p< .05). This implies that the more NWSC integrates environmentally friendly products into its operations, the more effective and sustainable its supply chain management becomes. This suggests that adopting eco-friendly practices is crucial for enhancing the overall efficiency and sustainability of NWSC's supply chain.

4.5Effect of waste reduction of suppliers on supply chain management of NWSC

Table 7 summarizes respondents' responses on the effect of waste reduction of suppliers on supply chain management of NWSC by using a Likert scale where SA (Strongly Agree), A (Agree), NS (Not Sure), D (Disagree) and SD (Strongly Disagree).

Table 7:Effect of waste reduction of suppliers on supply chain management of NWSC

Statements	Extent of agreement and disagreement				
	SA	A	NS	D	SD
	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)
Our suppliers are required to implement recycling programs.	23 28.8%	51 63.8%	4 5.0%	1 1.3%	1 1.3%
We collaborate with suppliers to improve their waste management systems.	19 23.8%	53 66.3%	7 8.8%	00	1 1.3%
Waste reduction targets are included in supplier contracts.	21 26.3%	54 67.5%	4 5.0%	1 1.3%	00
Suppliers are regularly monitored for their waste reduction performance.	23 28.8%	51 63.8%	4 5.0%	2 2.6%	00
The organization supports suppliers in adopting zero-waste initiatives.	20 25.0%	58 72.5%	2 2.5%	00	00
Waste reduction achievements are a factor in our supplier evaluation process.	19 23.8%	57 71.3%	4 5.0%	00	00

Source: *Primary data*

According to the findings in Table 7, the majority of respondents, represented by 92.6%, strongly agreed and agreed that suppliers are required to implement recycling programs, 5.0% of the respondents were not sure, whereas 2.6% of the respondents disagreed and strongly disagreed with the statement. This indicates a strong commitment by NWSC to promote recycling among its suppliers, emphasizing the importance of environmental responsibility in their supply chain. This also suggest that NWSC's supply chain management is likely enhanced by such practices, leading to reduced environmental impact and potentially improved sustainability performance.

The findings also revealed that 90.1% of respondents strongly agreed and agreed that NWSC collaborates with suppliers to improve their waste management systems, 8.8% of the respondents were not sure, whereas 1.3% of the respondents disagreed with the statement. This suggests a high level of engagement between NWSC and its suppliers to ensure effective waste management. This also shows that collaborative efforts between NWSC and suppliers can lead to more efficient waste reduction, positively influencing supply chain sustainability and reducing operational risks associated with poor waste management.

Furthermore, the study findings established that 93.8% of respondents strongly agreed and agreed that waste reduction targets are included in supplier contracts, 5.0% of the respondents were not sure, whereas 1.3% of the respondents disagreed with the statement. This finding implies that NWSC integrates waste reduction objectives into its supplier agreements, which likely drives suppliers to prioritize environmental performance. This also shows that by embedding waste reduction targets into contracts, NWSC can better control and manage its environmental impact throughout the supply chain, thus enhancing overall supply chain management.

Mores so, the findings revealed that 92.6% of respondents strongly agreed and agreed that suppliers are regularly monitored for their waste reduction performance, 5.0% of the respondents were not sure, whereas 2.6% of the respondents disagreed with the statement. This high percentage indicates that NWSC places significant emphasis on tracking and evaluating suppliers' waste reduction efforts. It also suggests that regular monitoring fosters accountability and continuous improvement in waste reduction practices among suppliers, contributing to a more sustainable and effective supply chain.

In addition, majority of the respondents represented by 97.5% strongly agreed and agreed that NWSC supports suppliers in adopting zero-waste initiatives, whereas 2.5% of the respondents were not sure about the statement. This overwhelming agreement suggests that NWSC actively encourages its suppliers to minimize waste, reflecting a proactive approach in driving environmental sustainability. This also shows that by supporting zero-waste initiatives, NWSC strengthens its supply chain’s resilience and sustainability, potentially leading to cost savings and reduced environmental liabilities.

Lastly, the findings revealed that 95.1% of respondents strongly agreed and agreed that waste reduction achievements are a factor in NWSC's supplier evaluation process, whereas 5.0% of the respondents were not sure of the statement. This finding indicates that NWSC considers environmental performance as a key criterion in evaluating its suppliers. This also suggests that by including waste reduction in supplier evaluations, NWSC incentivizes its suppliers to continuously improve their environmental practices, which enhances the overall sustainability and effectiveness of its supply chain management. The findings of the study concerning the effect of waste reduction of suppliers on supply chain management of NWSC were further determined using Pearson's correlation that was conducted as shown below;

Table 8: Pearson's correlation on waste reduction of suppliers and supply chain management

Correlations

		Waste reduction of suppliers	Supply chain management
Waste reduction of suppliers	Pearson Correlation	1	.879**
	Sig. (2-tailed)		.000
	N	80	80
Supply chain management	Pearson Correlation	.879**	1
	Sig. (2-tailed)	.000	
	N	80	80

**. Correlation is significant at the 0.05 level (2-tailed).

Source: *Primary data*

The findings indicated in table above shows that there is a significant positive relationship between waste reduction of suppliers and supply chain management of NWSC. This relationship is affirmed by r-values of 0.879** with significant p-values of 0.000 at the level of 0.05 (2-tailed) (r = .879**, p< .05). This implies that efforts to minimize waste by suppliers are closely linked to improvements in NWSC's supply chain operations, potentially leading to enhanced sustainability and operational efficiency.

CHAPTER FIVE

DISCUSSION OF FINDINGS, SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter includes the discussion of findings in relation to the literature. It also summarizes all findings reported in chapter four according to questions of the study, draws conclusions, suggests recommendations and also proposes some areas for further study.

5.1 Discussion of findings

5.1.1 The effect of choice of suppliers on supply chain management of NWSC

The study findings revealed that NWSC places a strong emphasis on environmental criteria in its supplier selection process, supported by high agreement rates on the importance of environmental certifications, supplier audits, and sustainability criteria. Specifically, a significant majority of respondents confirmed that suppliers are selected based on environmental certifications and that the procurement team is trained in choosing environmentally responsible suppliers. These findings align with the literature on green supply chain management (GSCM), which highlights the role of environmental criteria in enhancing supply chain performance. For instance, Abdallah and Al-Ghwayeen (2020) emphasize that integrating environmental and operational performance metrics into supply chain management can mediate improvements in overall business performance, underscoring the value of such practices in NWSC's approach.

The findings also reveal a significant positive relationship between prioritizing environmentally responsible suppliers and effective supply chain management, with Pearson’s correlation indicating a strong association ($r = .875$, $p < .05$). This correlation supports previous research by Ahmad et al. (2022), who found that green supply chain practices significantly impact sustainability performance. Their study demonstrates that companies which implement green procurement practices, including stringent supplier selection based on environmental criteria, often achieve superior sustainability outcomes and operational efficiency, reflecting NWSC’s successful application of these practices.

Furthermore, the study's emphasis on supplier audits and training for green procurement aligns with the research by Liu et al. (2020), which suggests that top management support and green training are crucial for effective green procurement implementation. Their findings indicate that green training enhances the capacity of procurement teams to implement sustainable practices effectively, thereby improving supply chain management. NWSC's training initiatives for its procurement team reflect this strategy, contributing to the observed positive relationship between green procurement practices and supply chain efficiency.

Lastly, the emphasis on environmental certifications and the integration of sustainability criteria in supplier selection resonate with the literature on green procurement's impact on organizational performance. Ghosh (2019) highlights that the implementation of green procurement practices, including stringent environmental criteria, positively affects firm performance by driving sustainable practices and reducing environmental impact. This supports the study's findings, demonstrating that NWSC's focus on green procurement not only enhances its sustainability efforts but also significantly improves supply chain management effectiveness.

5.1.2 Effect of adopting environmentally products on supply chain management

The study findings revealed that NWSC demonstrates a robust commitment to integrating environmentally sustainable practices into its supply chain, with a significant majority of respondents affirming the prioritization of renewable materials, energy-efficient products, and eco-friendly innovations. High agreement levels were observed for policies mandating sustainable products and incentivizing suppliers to offer environmentally innovative options. These findings align with recent literature, such as Ahmad et al. (2022), who argue that adopting green supply chain management practices significantly impacts sustainability performance. Their study highlights how the implementation of sustainable practices, including the prioritization of renewable and energy-efficient products, can drive substantial improvements in a company's environmental and operational outcomes, echoing NWSC's practices.

Furthermore, Pearson's correlation analysis confirmed a significant positive relationship between adopting environmentally friendly products and effective supply chain management ($r = .883$, $p < .05$). This result supports the research by Bag et al. (2021), who emphasize the role of technological dimensions of green supply chain management in enhancing firm performance.

Their findings illustrate that the integration of eco-friendly innovations and products can lead to better supply chain outcomes and operational efficiency. NWSC's commitment to integrating these green practices is consistent with these findings, demonstrating that environmentally friendly products contribute positively to the efficiency and effectiveness of supply chain operations.

Additionally, the emphasis on policies mandating sustainable products and incentivizing suppliers reflects a strategic approach supported by the work of Sahoo and Vijayvargy (2021), who found that green supply chain management practices significantly impact organizational performance. Their research suggests that policies promoting sustainability and encouraging suppliers to innovate can lead to improved environmental performance and overall organizational success. NWSC's policies in this area align well with these insights, further validating the effectiveness of such strategies in enhancing supply chain management.

Lastly, NWSC's focus on integrating eco-friendly innovations and renewable materials resonates with the research by Chersan et al. (2020), who reviewed green public procurement practices and their impact on environmental sustainability. Their study highlights the importance of implementing sustainable procurement policies to achieve better environmental outcomes. NWSC's practices in prioritizing and incentivizing green innovations mirror these recommendations, supporting the idea that such practices can substantially enhance supply chain sustainability and efficiency.

5.1.3 Effect of waste reduction of suppliers on supply chain management of NWSC

The study findings revealed that NWSC strongly emphasizes waste reduction within its supply chain, with 90% to 97% of respondents affirming that suppliers are required to implement recycling programs, collaborate on waste management, set waste reduction targets in contracts, and support zero-waste initiatives. This strong focus on waste reduction aligns with recent literature. For example, Ghosh (2019) highlights that effective waste management practices, such as setting waste reduction targets and implementing recycling programs, are crucial for improving overall supply chain performance. The study's emphasis on waste reduction through supplier engagement and contractual commitments reflects this view, demonstrating NWSC's dedication to minimizing waste and enhancing sustainability.

The high agreement on regular monitoring and incorporating waste reduction achievements into supplier evaluations underscores NWSC's commitment to environmental sustainability. This practice is supported by the work of Fianko et al. (2021), who discuss how incorporating environmental performance metrics into supplier evaluations can drive improvements in green supply chain management. Their research suggests that regular monitoring and performance evaluations are essential for ensuring that suppliers adhere to waste reduction commitments and contribute positively to environmental goals. NWSC's approach to incorporating waste reduction achievements into supplier evaluations aligns with these findings, reinforcing the importance of continuous assessment in achieving sustainability targets.

Pearson’s correlation analysis further confirms a significant positive relationship between suppliers’ waste reduction efforts and NWSC’s supply chain management ($r = .879$, $p < .05$). This result is consistent with the findings of Sahoo and Vijayvargy (2021), who found that green supply chain management practices, including waste reduction efforts, positively impact organizational performance. Their study emphasizes that effective waste management by suppliers is integral to enhancing supply chain efficiency and overall performance. NWSC's focus on waste reduction and its significant correlation with supply chain management performance supports this view, highlighting the role of waste reduction practices in achieving operational excellence.

Lastly, NWSC's commitment to supporting zero-waste initiatives and collaborating on waste management with suppliers resonates with the work of Cahyadi et al. (2023), who examine the impact of green communication and collaboration on firm performance. Their research underscores the importance of collaborative efforts and communication in achieving sustainability goals within the supply chain. NWSC's proactive stance on waste reduction and collaboration reflects these principles, demonstrating that effective communication and joint initiatives with suppliers are critical for advancing environmental sustainability and enhancing supply chain performance.

5.2 Summary of findings

The findings revealed that NWSC places a strong emphasis on environmental criteria in its supplier selection process, as evidenced by high agreement rates on environmental certifications, supplier audits, and sustainability criteria. Specifically, a significant majority of respondents confirm that suppliers are chosen based on environmental certifications and that the procurement team is trained in selecting environmentally responsible suppliers. Pearson's correlation analysis further supports this, showing a significant positive relationship between prioritizing environmentally responsible suppliers and effective supply chain management (r = .875**, p< .05). This underscores that NWSC's focus on green procurement significantly enhances the sustainability and efficiency of its supply chain management practices.

Furthermore, the findings revealed that NWSC is strongly committed to integrating environmentally sustainable practices into its supply chain, with a significant majority of respondents affirming the prioritization of renewable materials, energy-efficient products, and eco-friendly innovations. High agreement levels were observed for policies mandating sustainable products and incentivizing suppliers to offer environmentally innovative options. Pearson's correlation analysis further confirms a significant positive relationship between adopting environmentally friendly products and effective supply chain management (r = .883**, p< .05). This underscores that the incorporation of green practices significantly enhances the sustainability and efficiency of NWSC's supply chain operations.

Lastly, the findings revealed that NWSC strongly emphasizes waste reduction within its supply chain, with 90% to 97% of respondents affirming that suppliers are required to implement recycling programs, collaborate on waste management, set waste reduction targets in contracts, and support zero-waste initiatives. The high agreement on regular monitoring and incorporating waste reduction achievements into supplier evaluations underscores NWSC's commitment to environmental sustainability. Pearson's correlation analysis further confirms a significant positive relationship between suppliers' waste reduction efforts and NWSC's supply chain management (r = .879**, p< .05). This indicates that effective waste reduction practices by suppliers are integral to enhancing NWSC's supply chain sustainability and operational efficiency.

5.3 Conclusions

In conclusion, the findings demonstrate that NWSC's commitment to environmental sustainability is deeply embedded in its supply chain practices, as evidenced by its emphasis on selecting environmentally responsible suppliers, integrating sustainable practices, and prioritizing waste reduction. The significant positive relationships identified through Pearson's correlation analysis highlight that NWSC's focus on environmental criteria, green procurement, and waste management not only enhances the sustainability of its supply chain but also improves its overall efficiency and effectiveness. By implementing rigorous environmental standards, prioritizing renewable and energy-efficient products, and fostering effective waste reduction practices, NWSC underscores its role as a leader in green supply chain management and sets a benchmark for sustainability in the industry.

5.4 Recommendations

Based on the findings of the study, the following recommendations have been found necessary concerning the effects of green procurement practices on supply chain management in an organization; a case of National Water and Sewerage Corporation (NWSC).

The study recommends the need for NWSC to continue and expand its rigorous environmental certification requirements for suppliers. By maintaining and enhancing its focus on selecting suppliers based on their environmental credentials, NWSC can further strengthen its supply chain management practices. This approach will ensure that all suppliers align with the organization's sustainability goals and contribute to the overall efficiency and environmental impact of its supply chain.

The study also recommends the need for NWSC to further integrate and incentivize the adoption of renewable materials, energy-efficient products, and eco-friendly innovations within its supply chain. By continuing to prioritize these green procurement practices and providing additional incentives for suppliers to offer innovative environmental solutions, NWSC can enhance the sustainability and effectiveness of its supply chain operations, ensuring that its practices remain at the forefront of environmental responsibility.

Furthermore, the study recommends the need for NWSC to implement more comprehensive waste reduction initiatives and monitoring mechanisms for its suppliers. Given the significant positive impact observed from suppliers' waste reduction efforts, NWSC should reinforce its requirements for recycling programs, waste management collaboration, and zero-waste targets. Regular evaluations and updates of these practices will ensure continued progress towards sustainability goals and improve the overall efficiency of its supply chain management.

In addition, the study recommends the need for NWSC to invest in ongoing training and capacity-building for its procurement team regarding green procurement practices. Enhanced training programs will equip the team with up-to-date knowledge on emerging environmental standards and practices, thus improving their ability to select and manage environmentally responsible suppliers effectively. This investment in human resources will support the overall sustainability objectives of the organization and strengthen supply chain management.

Lastly, the study recommends the need for NWSC to establish and track specific, measurable targets for sustainability and environmental performance across its supply chain. By setting clear goals and regularly assessing progress towards these targets, NWSC can ensure continuous improvement in its green procurement practices. This approach will provide valuable insights into the effectiveness of its strategies and drive further enhancements in supply chain sustainability and efficiency.

5.5 Areas for further research

Since this study aimed at examining the effects of green procurement practices on supply chain management in an organization; a case of National Water and Sewerage Corporation (NWSC), the study recommends that; similar study should be done on other areas concerning this topic and these areas of further research needed include the following:

Further research should focus on exploring the long-term impacts of green procurement practices on the financial performance and competitive advantage of organizations like NWSC. Investigating how the integration of environmental criteria influences cost structures, profitability, and market positioning would provide deeper insights into the economic benefits of sustainability.

Additionally, further studies should focus on examining the challenges and barriers faced by other organizations in implementing green procurement practices and compare these with NWSC's experiences to identify best practices and potential improvements.

Finally, further research should focus on exploring the role of stakeholder engagement and collaboration in enhancing the effectiveness of green procurement initiatives could also offer valuable perspectives for advancing supply chain sustainability.

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APPENDICES

Appendix 1: Questionnaire

For employees in selected departments in National Water and Sewerage Corporation (NWSC)

Dear sir/madam

My name is TwinamatsikoEnoth; I am a student of BPLM at Uganda Christian University. I am conducting a study on "the effects of green procurement practices on supply chain management in an organization; a case of National Water and Sewerage Corporation." You have been specifically selected to participate in this study and the information collected shall be purely for academic purpose and treated with the highest level of confidentiality. The success of this study shall greatly dependent on your response. Your cooperation shall highly be appreciated.

Section A. Bio Data

Please tick the most appropriate answer

1. Gender

a) Male ☐ b) Female ☐

2. Age

a) 21-30 years ☐ b) 31-40 years ☐

c) 41-50 years ☐ d) Above 50 years ☐

3. Education level

a) Certificate ☐ b) Diploma ☐

c) Degree ☐ d) Masters ☐

e) Others specify:……

4. Which department do you belong to in NWSC?

……..

5. How long have you spent working with NWSC?

a) Less than 1 year ☐ b) 1-5 years ☐

c) 6-10 years ☐ d) Above 10 years ☐

Note: In the following sections, rate your degree of agreement on each statement under each objective using a scale of 5(Strongly Agree), 4(Agree), 3(Not sure), 2(Disagree) and 1(Strongly Disagree).

Section B: Green Procurement Practices

	Questions	**Responses**				
No.	**Choice of suppliers on supply chain management**	**5**	**4**	**3**	**2**	**1**
1	Our suppliers are selected based on their environmental certifications, such as ISO 14001 or Energy Star ratings.					
2	Supplier audits include evaluations of environmental practices.					
3	Environmental sustainability is a key criterion in our supplier selection process.					
4	We prioritize suppliers who demonstrate strong environmental responsibility.					
5	Our procurement team receives training on selecting environmentally responsible suppliers.					
6	We regularly review and update our supplier selection criteria to include green procurement standards					
No.	**Adopting environmentally products**	**5**	**4**	**3**	**2**	**1**
1	The organization prioritizes the procurement of renewable materials.					
2	We consistently adopt energy-efficient products in our operations.					
3	Our suppliers are incentivized to develop and provide eco-friendly					

	alternatives.					
4	Our procurement policies mandate the use of sustainable products.					
5	The organization encourages the use of products with low environmental impact.					
6	We actively seek out suppliers who offer environmentally innovative products.					
No.	**Waste reduction of suppliers**	**5**	**4**	**3**	**2**	**1**
1	Our suppliers are required to implement recycling programs.					
2	We collaborate with suppliers to improve their waste management systems.					
3	Waste reduction targets are included in supplier contracts.					
4	Suppliers are regularly monitored for their waste reduction performance.					
5	The organization supports suppliers in adopting zero-waste initiatives.					
6	Waste reduction achievements are a factor in our supplier evaluation process.					

Section C: Supply chain management of NWSC

	Statements	**Responses**				
No.	**Supply chain management of NWSC**	**5**	**4**	**3**	**2**	**1**
1	Our supply chain operations are efficient and streamlined.					
2	We have effective cost management strategies in place.					
3	The organization has strong risk mitigation measures in supply chain management.					
4	Stakeholder satisfaction with our supply chain processes is high.					
5	We consistently comply with regulatory requirements in our supply chain.					
6	The organization effectively manages and reduces supply chain					

	disruptions.					

Thank you very much for your cooperation