



**SUSTAINABLE PROCUREMENT AND PERFORMANCE OF CEMENT  
MANUFACTURING FIRMS IN KENYA**

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**ABSTRACT**

Manufacturing firms are businesses engaged in the transformation of raw materials into finished goods through various processes. In Kenya, manufacturing firms play a pivotal role in the economy by converting raw materials into finished goods, which are essential for both consumer use and industrial applications. The main purpose of this study is to establish the influence of sustainable procurement on performance of cement manufacturing firms in Kenya. Specifically, the study sought to establish the influence of reverse logistics on performance of cement manufacturing firms in Kenya, to assess the influence of green specification on performance of cement manufacturing firms in Kenya, to evaluate the influence of green inventory management on performance of cement manufacturing firms in Kenya and to establish the effect of green tendering on performance of cement manufacturing firms in Kenya. This study was anchored by: Resource-Based View (RBV), Innovation Diffusion Theory, Systems Theory and Stakeholder Theory. The descriptive cross-sectional study design was used. The target population comprised of 126 procurement and logistics officers working in seven cement manufacturing firms namely. Census method was used. The study used 13 respondents in the pilot study to ascertain the data collection instrument validity and reliability. The study used descriptive statistics in the form of measures of central tendencies (mean, standard deviation, and percentages) to describe the data. The study used inferential statistics (correlation and regression analysis) to test the relationship between the dependent and independent variables. The study findings were presented through use of tables and figures. The study concludes that reverse logistics has a positive and significant effect on performance of cement manufacturing firms in Kenya. In addition, the study concludes that green specification has a positive and significant effect on performance of cement manufacturing firms in Kenya. Further, the study concludes that green inventory management has a positive and significant effect on performance of cement manufacturing firms in Kenya. The study also concludes that green tendering has a positive and significant effect on the performance of cement manufacturing firms in Kenya. Based on the findings, the study recommends that the management of cement manufacturing firms in Kenya should implement a comprehensive waste management and recycling program. By establishing a system that encourages the return of unused or excess cement, as well as packaging materials, companies can significantly reduce waste and promote sustainability. In addition, the study recommends that the management of cement manufacturing firms in Kenya should adopt eco-friendly materials and production processes that prioritize sustainability. By integrating recycled materials, such as fly ash or slag, into their cement formulations, companies can reduce their carbon footprint and resource consumption.

**Key Words:** Sustainable Procurement, Green Specification and Green Tendering, Cement Manufacturing Firms

## **Background of the Study**

Manufacturing firms are businesses engaged in the transformation of raw materials into finished goods through various processes. This transformation can involve mechanical, chemical, or assembly methods, depending on the type of product being produced. The primary objective of these firms is to create tangible products that can be sold in the market, ranging from consumer goods like electronics and clothing to industrial products such as machinery and components (Islam, *et al*, 2020). Manufacturing firms play a pivotal role in the economy by converting raw materials into finished goods, which are essential for both consumer use and industrial applications. This transformation process not only adds value to basic materials but also creates a wide array of products that enhance the quality of life. From everyday items like food and clothing to complex machinery and electronics, the output of manufacturing firms meets fundamental needs and drives consumption across various sectors. Manufacturing firms are significant drivers of employment (Jama & Mohamud, 2024). They provide millions of jobs worldwide, ranging from skilled positions in engineering and design to unskilled labor in assembly lines. This employment fosters economic stability and growth, as workers earn wages that circulate within the community, supporting local businesses and services. Moreover, the training and development opportunities offered by these firms contribute to a skilled workforce, essential for the advancement of industries (Tiwari, Wei & Nor, 2020).

Manufacturing firms also play a critical role in technological innovation. They often lead research and development efforts, investing in new processes and products that push the boundaries of what is possible. This innovation not only enhances the efficiency of production but also leads to the creation of entirely new markets and industries. The collaboration between manufacturing and technology sectors has been a driving force behind advancements in automation, artificial intelligence, and sustainable practices, ensuring that manufacturing remains relevant in a rapidly changing economic landscape. Furthermore, manufacturing firms are integral to international trade (Afrah & Sawsan, 2020). Many operate on a global scale, sourcing materials and components from various countries while exporting their products worldwide. This interconnectedness boosts economic relationships between nations and contributes to global supply chains. However, it also means that manufacturing firms must navigate complex regulatory environments, trade policies, and economic conditions, making adaptability a key characteristic for success in the global marketplace (Nangpiire, Gyebi & Nasse, 2024).

Sustainable procurement is a holistic approach that integrates environmental and social considerations into the purchasing process, aiming to minimize negative impacts on the planet while promoting ethical practices. One key component is reverse logistics, which involves the process of returning products from the consumer back to the manufacturer or distributor for reuse, recycling, or proper disposal. This practice not only helps reduce waste and conserve resources but also allows companies to recover value from returned products. By implementing effective reverse logistics systems, firms can enhance their sustainability profile and improve overall operational efficiency (Oyewobi, Ija & Jimoh, 2020). Green specification refers to the process of defining the environmental criteria and standards that products or services must meet, ensuring that suppliers align with sustainability goals. Green inventory management involves optimizing stock levels and managing supplies in a way that minimizes waste and encourages the use of sustainable materials. Green tendering focuses on incorporating sustainability criteria into the bidding process, allowing organizations to evaluate suppliers not only on cost but also on their environmental performance (Mukumba & Shakantu, 2024). This study sought to establish the influence of sustainable procurement on performance of cement manufacturing firms in Kenya.

Nyaga and Achuora (2020) found that procurement performance is most affected by green specification followed by reverse logistics, green inventory management and green tendering

respectively. It is further concluded that the combined effect of sustainable procurement practices is higher than those of individual practices. Njooora and Noor (2020) found that the existence of laws, policies and regulations have resulted to effective and efficient procurement performance in the manufacturing sector. On the other hand compliance to the laws have resulted to cost saving procurement performance in the manufacturing sector. Teamwork in the organization has led to effective and efficient procurement performance in the organization. This is due to the organization's top management introducing to the new staff to the organization's existing culture. This culture awareness have encouraged teamwork which in turn have resulted to effective and efficient procurement performance.

Wechuli and Odari (2021) found a significant positive relationship between the components of sustainable procurement practices namely corporate social responsibility, environmental purchasing, responsible procurement, and use of technology in procurement with corporate governance. Muhumed and Paul (2021) found that reverse logistics significantly and positively influenced performance of cement manufacturing companies in Machakos County. Further, the study concluded that green purchasing has a significant and a positive effect on Performance of cement manufacturing companies in Machakos County. The study also concluded that legal and regulatory framework had significant and a positive effect on performance of cement manufacturing companies in Machakos County. Finally, the study concluded that employee competency had a significant and positive effect on the performance of cement manufacturing companies in Machakos County.

Machira, Ajwang and Kabubo (2024) found that the sustainable procurement practices had positive and significant relationship with cost performance of road construction projects in Kenya. A standard multiple linear analysis was performed with performance of road construction projects as the dependent variable and green purchasing and sustainable supplier management as the predictor variables. The regression results showed that the sustainable procurement practices had positive and significant influence on the cost performance of road construction projects in Kenya. Therefore, the conclusion was that sustainable procurement practices have significant influence on cost performance of road construction projects in Kenya.

### **Statement of the Problem**

Cement manufacturing firms in Kenya face several challenges that impact their operations and profitability. One of the primary issues is the fluctuation in raw material prices. The cost of key inputs like clinker, gypsum, and limestone has been volatile due to both local and international market dynamics. For instance, according to the Kenya National Bureau of Statistics, the price of clinker increased by approximately 10% between 2020 and 2022, directly affecting production costs for cement manufacturers. Another significant challenge is the increasing competition in the industry (Machira, Ajwang & Kabubo, 2024). The entry of new players and the expansion of existing firms have intensified rivalry. As of 2023, Kenya's cement industry had over ten major players, including Dangote Cement and Bamburi Cement, leading to price wars and reduced profit margins. The competition is further exacerbated by the rise of alternative construction materials, such as interlocking bricks and prefabricated panels, which are gaining traction due to their cost-effectiveness and sustainability (Machira, Ajwang & Kabubo, 2024).

Infrastructure deficits also pose a critical challenge. Inadequate transport and logistics networks hinder the efficient distribution of cement products across the country. The World Bank reported that about 40% of Kenya's road network is unpaved, leading to increased transportation costs and delivery delays. This situation is compounded by a lack of reliable energy supply, with power outages leading to production downtimes and increased operational costs (Nyaga & Achuora, 2020). Additionally, regulatory hurdles and compliance issues can be burdensome for cement manufacturers. The government has implemented various environmental regulations to minimize

the industry's carbon footprint, which, while important for sustainability, require significant investment in technology and processes. Compliance with the National Environmental Management Authority (NEMA) regulations has forced many firms to allocate substantial resources to meet environmental standards (Wechuli & Odari, 2021).

Sustainable procurement significantly influences firm performance by enhancing operational efficiency and reducing costs over the long term. By integrating environmental and social considerations into the purchasing process, firms can identify suppliers who prioritize sustainability, which often leads to more efficient resource utilization. Additionally, sustainable procurement practices often involve optimizing supply chains, which can minimize waste and reduce logistical costs. This efficiency not only boosts profitability but also strengthens the firm's competitive advantage in a market increasingly driven by sustainability concerns (Muhumed & Paul, 2021). Various studies have been conducted on sustainable procurement and organization performance. For instance, Wechuli and Odari (2021) assessed on the role of sustainable procurement practices on corporate governance. Machira, Ajwang and Kabubo (2024) conducted a study on the sustainable procurement practices and cost performance of road construction projects and King'oo and Muli conducted a study on the influence of procurement practices on organizational performance. However, none of these studies focused on reverse logistics, green specification, green inventory management and green tendering on performance of cement manufacturing firms in Kenya. To fill the highlighted gaps, the current study sought to determine the influence of sustainable procurement (reverse logistics, green specification, green inventory management and green tendering) on performance of cement manufacturing firms in Kenya.

### **Objective of the Study**

The main objective of this study is to establish the influence of sustainable procurement on performance of cement manufacturing firms in Kenya.

### **Specific Objectives of Study**

The study was guided by the following specific objectives.

- i). To assess the influence of green specification on performance of cement manufacturing firms in Kenya.
- ii). To establish the effect of green tendering on performance of cement manufacturing firms in Kenya.

### **Theoretical Framework**

#### **Innovation Diffusion Theory**

Innovation Diffusion Theory (IDT) is a framework that seeks to explain how new ideas, technologies, or practices spread within a social system over time. Developed by Everett Rogers (1962) in his seminal work, "Diffusion of Innovations," the theory outlines several key elements that influence the adoption process. At its core, IDT emphasizes the role of communication channels, social systems, and the perceived attributes of the innovation itself in determining how quickly and widely an innovation is adopted. One of the central components of IDT is the classification of adopters into distinct categories based on their willingness to embrace new innovations. These categories include innovators, early adopters, early majority, late majority, and laggards. Innovators are those who are the first to adopt, often driven by a desire for novelty or a tolerance for risk. Early adopters follow closely and are typically more socially connected and influential, playing a crucial role in persuading others to adopt. The early and late majority represent the bulk of adopters who require more reassurance before making a commitment, while laggards are resistant to change and may adopt only when it becomes absolutely necessary.

The theory also identifies several attributes of innovations that impact their diffusion: relative advantage, compatibility, complexity, trialability, and observability. Innovations perceived as having a clear advantage over existing alternatives tend to diffuse more rapidly. Compatibility with existing values and practices, ease of understanding and use, the ability to be tested on a limited basis, and visibility to others also significantly influence adoption rates. These attributes help potential adopters assess the innovation's potential benefits and align them with their own needs and experiences. Another critical aspect of IDT is the role of social systems and communication channels in facilitating or hindering the diffusion process. Social networks, peer influence, and opinion leaders can significantly impact how quickly an innovation spreads. Mass media, personal networks, and community organizations play important roles in disseminating information about the innovation, shaping perceptions, and creating a supportive environment for adoption. Understanding these dynamics allows innovators and change agents to develop strategies that enhance the likelihood of successful diffusion.

Innovation Diffusion Theory (IDT) operates on several key assumptions that shape its framework and applications. One primary assumption is that the adoption process is a linear progression, moving from awareness to decision, implementation, and confirmation. This perspective implies that individuals systematically evaluate an innovation based on its attributes and their own circumstances before deciding to adopt it. Additionally, IDT assumes that social networks and communication channels function optimally to disseminate information, allowing innovations to spread efficiently. This view highlights the importance of early adopters and opinion leaders in influencing the broader population. However, these assumptions may not account for the complexities of real-world decision-making, where adoption can be more chaotic and influenced by numerous external factors.

Critiques of IDT often center around its perceived oversimplification of the adoption process. Critics argue that the linear model does not capture the non-linear and iterative nature of how individuals and organizations engage with innovations. For instance, users may cycle back to earlier stages, reconsidering their decisions based on new information or changing contexts. Furthermore, the categorization of adopters can be limiting, as it overlooks the diverse motivations and behaviors of individuals within these groups. Not all innovators or early adopters share the same characteristics or influences, which can lead to an incomplete understanding of the adoption process. Another significant critique of IDT is its focus on individual decision-making rather than considering broader systemic and cultural factors that influence adoption. For example, the theory may underemphasize the role of institutional barriers, economic conditions, or cultural values that can either facilitate or hinder the diffusion of innovations. Critics argue that by concentrating primarily on individual choices and perceived attributes of innovations, IDT risks neglecting the social, political, and economic contexts that shape adoption dynamics.

Moreover, the theory has been criticized for its tendency to idealize the role of communication channels. While effective communication is crucial for diffusion, the assumption that information flows smoothly and reaches all potential adopters is often unrealistic. Barriers such as misinformation, mistrust, or lack of access to communication networks can impede the diffusion process. This critique highlights the need for a more nuanced understanding of how communication dynamics operate in different environments, particularly in marginalized communities where information may not be as readily accessible. This theory was relevant in assessing the influence of green specification on performance of cement manufacturing firms in Kenya.

### **Stakeholder Theory**

Stakeholder Theory is a framework in management and ethics that emphasizes the importance of considering all parties affected by a company's actions, not just its shareholders. Developed by

Edward Freeman (1984), the theory posits that businesses operate within a network of relationships that includes various stakeholders—such as employees, customers, suppliers, communities, and investors. By acknowledging these stakeholders and their interests, organizations can create more sustainable and ethically sound business practices. The central idea is that businesses should strive to create value for all stakeholders rather than focusing solely on maximizing shareholder profit. A key aspect of Stakeholder Theory is the identification and prioritization of stakeholders based on their influence and the significance of their interests. Stakeholders can be categorized into primary and secondary groups. Primary stakeholders are those whose direct involvement is essential for the company's survival, such as employees and customers. Secondary stakeholders may include groups like the media, advocacy organizations, and government entities, which can influence or be affected by the organization's activities. Understanding the dynamics among these different stakeholders helps organizations make informed decisions that consider a wider array of perspectives and potential impacts. Stakeholder Theory also highlights the ethical responsibility of businesses to engage with their stakeholders transparently and fairly. This engagement fosters trust and collaboration, which can lead to better outcomes for all parties involved. The theory suggests that businesses should actively seek feedback from stakeholders and incorporate their views into decision-making processes. By doing so, companies not only enhance their social license to operate but also strengthen their long-term viability and reputation.

Stakeholder Theory operates on several foundational assumptions that guide its principles and practices. One primary assumption is that businesses exist within a network of relationships with multiple stakeholders, each of whom has distinct interests and influences. This perspective challenges the traditional view that a company's sole responsibility is to maximize shareholder value. Instead, Stakeholder Theory posits that long-term success is best achieved by addressing the needs and concerns of all stakeholders, including employees, customers, suppliers, and the broader community. Another key assumption is that ethical considerations should guide business decisions, advocating for transparency, fairness, and accountability in stakeholder engagement.

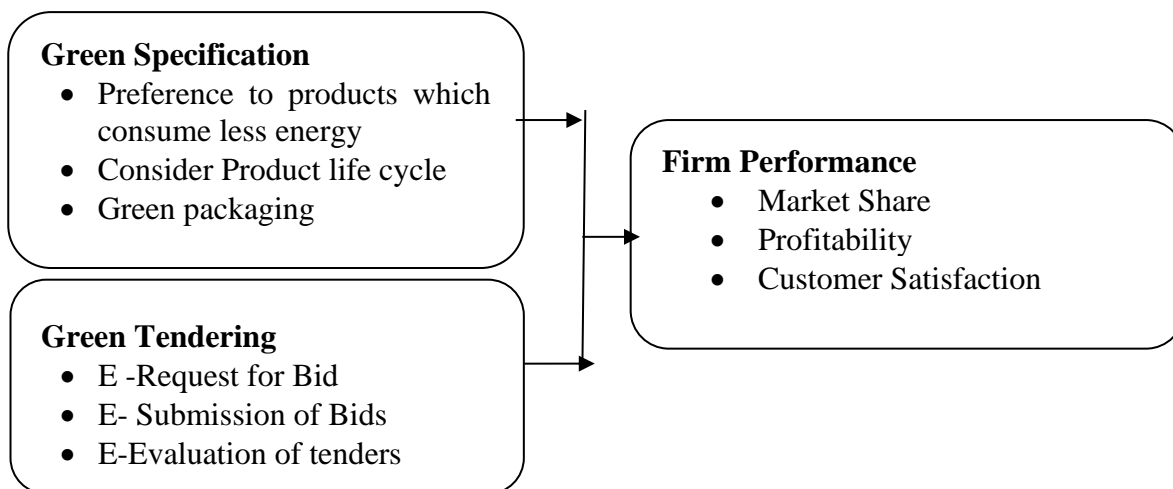
Despite its strengths, Stakeholder Theory faces several critiques. One prominent critique is its potential for ambiguity regarding which stakeholders should be prioritized and how their interests should be balanced. With a wide array of stakeholders, companies may struggle to define whose interests matter most, leading to conflicting priorities. This lack of clarity can complicate decision-making processes and may result in organizations becoming mired in negotiations and compromises that dilute their effectiveness. Critics argue that this complexity can hinder an organization's ability to respond decisively to challenges, as the focus on multiple stakeholders may slow down critical decisions. Another significant critique relates to the challenge of measuring stakeholder interests and outcomes. While the theory advocates for engagement and consideration of diverse perspectives, quantifying the impact of these interactions can be difficult. Businesses may find it challenging to gather meaningful data on stakeholder preferences or to evaluate the effectiveness of their engagement strategies. This ambiguity can undermine accountability, as organizations may struggle to demonstrate how they are fulfilling their responsibilities to stakeholders.

Additionally, some critics question the practicality of Stakeholder Theory in competitive markets. They argue that in situations where profit margins are tight, businesses may feel pressured to prioritize short-term financial performance over long-term stakeholder interests. This tension can create a perception that Stakeholder Theory is idealistic or impractical, especially for companies operating in highly competitive industries where immediate financial results are critical. Critics contend that without a clear framework for prioritizing stakeholder interests, organizations may inadvertently revert to a focus on shareholder value, particularly in times of financial strain. Moreover, Stakeholder Theory can sometimes be seen as a reactive approach rather than a proactive one. Critics argue that merely responding to stakeholder interests does not necessarily

lead to innovative or forward-thinking strategies. Instead, organizations might benefit from a more proactive stance that anticipates stakeholder needs and proactively seeks to create value for all parties involved. This forward-looking approach could help businesses not only to address current stakeholder concerns but also to foster long-term relationships and drive sustainable growth. This theory is relevant in establishing the effect of green tendering on performance of cement manufacturing firms in Kenya.

### Conceptual Framework

A conceptual framework is a structure which the researcher believes can best explain the natural progression of the phenomenon to be studied (Camp, 2019). It is linked with the concepts, empirical research and important theories used in promoting and systemizing the knowledge espoused by the researcher (Peshkin, 2018).



**Figure 2. 1: Conceptual Framework**

#### Green Specification

Green specification refers to the practice of integrating environmental considerations into the specifications and criteria used for products, materials, and processes during procurement and design. This approach emphasizes the selection of goods and services that minimize negative environmental impacts throughout their lifecycle, from production and use to disposal (Ravindra *et al*, 2020). By focusing on sustainability, green specifications often prioritize products that are made from recycled or renewable materials, are energy-efficient, and have lower emissions during manufacturing and use. Choosing products that consume less energy is a fundamental aspect of sustainable procurement and environmental responsibility. Energy-efficient products not only reduce greenhouse gas emissions but also lead to significant cost savings over time. For example, appliances that meet energy efficiency standards typically use less electricity, resulting in lower utility bills for consumers and businesses alike (Anzagira *et al*, 2021). By prioritizing energy-efficient options, organizations can minimize their carbon footprint and contribute to global efforts to combat climate change. Furthermore, promoting energy-efficient products encourages manufacturers to innovate and invest in cleaner technologies, fostering a market that values sustainability (Nyaga & Achuora, 2020).

Considering the entire product life cycle is crucial for making informed and sustainable choices. The life cycle of a product encompasses all stages, from raw material extraction and manufacturing to distribution, use, and eventual disposal or recycling. By evaluating each phase, businesses can identify areas for improvement and select products that minimize environmental impact

throughout their life span (Omusesebe, 2021). For instance, opting for materials that are sustainably sourced, designed for durability, and easily recyclable can significantly reduce resource depletion and waste. This holistic approach not only supports sustainable practices but also enhances product quality and consumer satisfaction, ultimately leading to more responsible consumption patterns (Mutua, Odock & Litondo, 2020).

Green packaging refers to the use of environmentally friendly materials and processes in the packaging of products. This approach aims to reduce the ecological footprint of packaging through the use of biodegradable, recyclable, or reusable materials. By adopting green packaging solutions, companies can significantly minimize waste and resource consumption, aligning with sustainable practices and consumer preferences (Omari & Deusdedita, 2022). For example, using compostable materials instead of traditional plastics can help reduce landfill waste and pollution. Additionally, optimizing packaging design to use less material while still protecting the product can further enhance sustainability efforts. Implementing green packaging not only reflects a company's commitment to environmental stewardship but can also attract eco-conscious consumers, ultimately benefiting both the planet and the bottom line (Othman, 2020).

### **Green tendering**

Green tendering refers to the process of incorporating environmental considerations into the procurement and tendering practices of goods and services (Othman, 2020). This approach emphasizes the selection of suppliers and products based on their sustainability credentials, such as energy efficiency, reduced waste, and environmentally friendly materials. E-Request for Bid (e-RFB) refers to the digital process by which organizations solicit bids from suppliers or contractors for goods and services through an online platform (Omari & Deusdedita, 2022). This approach streamlines the traditional bidding process by allowing buyers to create and distribute requests for bids electronically, significantly reducing paperwork and administrative overhead. By leveraging technology, e-RFB enables wider outreach, allowing organizations to connect with a broader pool of potential suppliers, including those from diverse geographical locations (Cherotich & Ngugi, 2020). Furthermore, e-RFB systems often include features such as automated notifications, tracking capabilities, and standardized templates, enhancing transparency and ensuring that all interested parties receive the same information. This digital method not only improves efficiency but also promotes a more competitive bidding environment, ultimately leading to better value for organizations (Chrisostom & Monari, 2020).

E-Submission of Bids is the process by which suppliers submit their proposals electronically in response to an e-RFB (Offei & Nataliia, 2022). This method simplifies and expedites the bidding process, allowing vendors to easily upload documents, proposals, and supporting materials through an online portal. E-submission systems often include security features to protect sensitive information, ensuring that bids remain confidential until the official opening (Zafikha et al, 2020). Additionally, digital submissions can help eliminate common issues associated with paper-based bidding, such as lost documents or late deliveries. By facilitating a more streamlined and efficient submission process, e-submission of bids encourages participation from a wider range of suppliers and fosters competition, ultimately leading to better quality proposals and enhanced value for the procuring organization (Bumali & Mulyungi, 2020).

E-Evaluation of Tenders involves the use of digital tools and platforms to assess and compare submitted bids in an efficient and transparent manner (Nasiche & Ngugi, 2021). This process typically includes automated scoring systems, which can help evaluators quickly analyze proposals based on predefined criteria, such as price, quality, and sustainability measures. By leveraging technology, organizations can ensure a more objective evaluation, reducing the potential for



human error or bias (Namusonge & Momanyi, 2022). E-evaluation also enhances collaboration among evaluation teams, allowing members to access bid information and collaborate in real time, regardless of their location. Additionally, digital records of the evaluation process promote accountability and transparency, making it easier to justify decisions and maintain compliance with procurement regulations. Overall, e-evaluation streamlines the tender assessment process, improving efficiency and contributing to more informed and equitable procurement outcomes (Nyaga & Achuora, 2021).

### **Empirical Review**

This section presents the empirical review on the factors impacting effectiveness of rightsizing in small and medium enterprises. The section focuses on Green Specification and green tendering on performance of cement manufacturing firms in Kenya.

### **Green Specification**

Ravindra et al (2020) researched on sustainability assessment of cements and concretes in the Indian context: influence of supplementary cementitious material. The work presented here is based on realistic process maps made in cement plants and data collected from them. The concretes assessed are based on two typical strength grades obtained with blended cements, as well as only Portland cement. The results highlight the importance of the SCMs in terms of total energy consumption and carbon dioxide emissions. The study also draws attention to the need to use high grades of concrete to better harness the benefits of the SCMs. Further, the need to generate more relevant data sets for the Indian context is recognized. The life cycle assessment of cement and concrete in the Indian context has been carried out by appropriately adapting existing data bases and conversion factors. Though some aspects may not be relevant to the local conditions, the results seem reasonable. They confirm that the use of supplementary cementitious materials lead to substantial benefits in terms of energy consumption and CO<sub>2</sub> emissions. However, the use of GGBS at a dosage of 15% is not as beneficial as the incorporation of fly ash. This is attributed to energy required to process the slag, which is not treated as a waste product such as fly ash. The newly proposed limestone calcined clay cement (LC3), with a clinker factor  $\alpha$  is seen to be considerably beneficial for impact reduction, even though a conservative calcination energy value has been used. The assessment indicates that LC3 has a promising future in the India. It is also evident that the benefits of using SCMs are significantly more in higher grade concretes. The study concludes that LC3 concretes are very promising in terms of CO<sub>2</sub> emissions, with a tangible reduction compared to OPC concretes of the same compressive strengths.

Anzagira *et al* (2021) studied on stimulation strategies to promote green building uptake in developing countries: the case of Ghana. The quantitative research approach was used to attain the study's goal. Purposive and snowball sampling techniques were found to be suitable for collecting data from 292 relevant stakeholders in Ghana's construction industry. The mean score ranking technique, in conjunction with the relative importance index, was used to establish the relative ranking of, among other things, the stimulus measures for increasing green building uptake in Ghana. An exploratory factor analysis was also used to classify the most significant stimulation strategies for improving green building uptake. The study found that "Educational programmes relevant to GBTs for developers, contractors, and policymakers," "sufficient information on the cost and benefits of GBTs" and "mandated green building codes and regulations" were the top three listed stimulating measures to promote increasing use of green building technologies (GBTs). The enablers were classified as follows: government regulations and policies; commitment and GB research; education and publicity; and incentives and support. The study concluded that the findings have made significant contributions to both theory and practice in the construction

industry. It has added significantly to the body stock of green building knowledge as well as industrial practice particularly in developing countries.

Nyaga and Achuora (2020) researched on sustainable procurement practices and performance of procurement in food and beverages manufacturing firms in Kenya. The study used descriptive cross-sectional survey research design to survey one hundred and eight firms sampled stratifically from two hundred and seventeen food and beverage manufacturing firms registered members of Kenya Association of structured questionnaire was used to collect primary data. The findings were presented on tables and figures. The study revealed that reverse logistics, green specification, green inventory management and green tendering are practiced across the manufacturing firms across Nairobi County. Importantly, the study established that the four sustainable procurement practices (reverse logistics, green specification, green inventory management and green tendering) significantly positively affect procurement performance through reduction of cost, clean environment and increased quality of supplies. Therefore the study concluded that sustainable procurement significantly increases procurement performance with the ultimate positive impact on firm performance. Manufacturers under Nairobi County. Procurement managers were used as the unit of observation.

Omusesebe (2021) investigated the influence of green supply chain practices on performance of energy and petroleum state corporations in Kenya. This study used a descriptive design to describe the phenomena of how green supply chain practices affect performance. The study adapted a survey research design. It targeted all the 10 energy related state corporations in Kenya. Two hundred and fifty five employees manning the procurement departments in the said corporations were sampled from the 761 total. The sampled employees were stratified according to cadres to ensure proper representation. Primary data was collected using self-administered questionnaires filled by the sampled employees. Further, there was one questionnaire to each Finance Manager in each state corporation and 1 questionnaire to a stakeholders and another one to the environment officer to help collaborate the information collected from the procurement officers. Additional secondary data was sourced from material such as annual reports and policy documents publicly available. Results indicated that green supply chain practices; considering the use of green raw material, considering the use of green manufacturing technology, considering green distribution, considering products capacity for green use, and considering green disposal are significantly related to performance of energy and petroleum state corporations in Kenya. The relation is inverse meaning a rise in the practices lowers performance. The study also established that regulations and policy frameworks on environmental conservation moderates the relationship between green supply chain practices and performance of energy and petroleum state corporations in Kenya. The research results concluded that use of green raw materials impacted positively on performance in the energy and petroleum state corporations in Kenya. This can be attributed to the fact that green raw materials, such as recyclable materials can be reused hence lowering production cost.

Mutua, Odock and Litondo (2020) researched on the effect of green logistics practices on performance of logistics firms in Kenya. The study was guided by the philosophy of positivism research and it applied the cross-sectional survey research design. The population of interest consist of 892 logistics firms in Kenya from which a sample of 300 firms is drawn. Primary data were collected using a structured questionnaire. The study established that there is a significant positive relationship between the implementation of green logistics practices and firm performance of logistics firms in Kenya. The questionnaires were sent to a total of 300 logistics firms and 233 questionnaires were received back. A total of 67 firms did not respond or declined to participate with some citing to have a “no-survey” policy. The findings of the study showed that there is a significant positive relationship between the implementation of green logistics practices and firm performance. The findings have shown that green logistics practices significantly influenced firm

performance positively. The study concluded that logistics firms in Kenya have implemented and put into operations practices of green logistics.

### **Green Tendering**

Zafikha *et al* (2020) investigated on the challenges and drivers of green procurement among construction practitioners in Malaysia. This study used both primary and secondary data. The secondary data were from an extensive collection of research, articles, and journals from the internet. The secondary data were used to acquire information and knowledge on Green Procurement. The secondary data were also used to support the primary data. The study found that Carrot and stick techniques, such as rewards, recognition, short course training, supporting and educating suppliers, and budget allocation ensure the successful implementation of green procurement by stakeholders in the Malaysian construction industry. These techniques have been successfully implemented in other fields to ensure compliance. However, the carrot and stick techniques need to be supported with a strong fundamental knowledge among the industry stakeholders. The study concluded that the strengths, weaknesses, opportunities, and threats of green practices need to be clearly highlighted in ensuring that construction practitioners will believe that the implementation will bring benefits in various aspects.

Bumali and Mulyungi (2020) researched on factors affecting green procurement implementation on procurement performance in Rwandan state corporations-a case of Rwanda housing authority. The study adopted Descriptive Research Design. The target population is 660; stakeholders, contractors, suppliers and employees of the Rwanda housing Authority while the sample size considered is 66. The findings of the study revealed that majority of the respondents agreed that green procurement implementation affects procurement performance in Rwanda Housing Authority. The coefficients table results show that staff competence, contractor participation, Organization policy and stakeholder participation were all found to be positively and significantly affecting green procurement implementation on procurement performance in Rwanda Housing Authority. It is was therefore concluded that green procurement implementation in state corporations and other public-sector institutions can be adopted to achieve far more benefits than the one previously for the well-being of Rwanda citizens. It provides means for achieving efficiency and control as well as a tool for regulation. Public sector organizations implement green procurement for contracts to achieve benefits such as increased efficiency and effectiveness in public procurement and improved quality services delivery in procurement services.

Nasiche and Ngugi (2021) determinants of adoption of green procurement in the public sector: A case study of Kenya Pipeline Company. The target population of this study was officers in KPC who are directly involved in the procurement function. Random cluster sampling method was employed to select a representative sample which yielded 90 members of staff from a population of 460. Semi-structured questionnaires were administered. The study found out that organization's green capacity, incentives and pressures are the main determinants of green Public Procurement adoption at KPC. The other factors studied; cost of green products and green supply capacity were not found to be significant. These results are an indication that the success of green public procurement relies heavily on enhancing the internal capacity of the organization. The findings confirmed studies by earlier researchers in the subject while at the same time contradicted others. The study concluded that The result obtained for significant determinants (green capacity, incentives and pressures) shows significance and inconsonance when compared to some previous studies in other countries. At the same time, supplier capacity and cost of green items did not show any significant impact on GPP adoption.

Namusonge and Momanyi (2022) researched on the effect of knowledge of green procurement on implementation of green public procurement in secondary schools in Trans-Nzoia county, Kenya.

The study adopted descriptive research design. The target population was 1032 public secondary schools procurement personnel in various procurement committees. Purposive and simple random sampling techniques were used to obtain a sample size of 278 respondents. A closed ended questionnaire was used for data collection. The study found a significant positive correlation between knowledge of green procurement and implementation of green public procurement confidence level. The study also found that organizations need to emphasize and implement an effective awareness-raising action on its human resources, both by means of spreading information on green public procurement. In conclusion, the study endorsed the validity of using knowledge of green procurement, as interventions in the implementation of green public procurement.

Nyaga and Achuora (2021) investigated on the sustainable procurement practices and performance of green tendering in food and beverages manufacturing firms in Kenya. The study was grounded on organization theory, system theory, legitimacy theory and stakeholder theory. The study used descriptive cross-sectional survey research design to survey one hundred and eight firms sampled stratifically from two hundred and seventeen food and beverage manufacturing firms registered members of Kenya Association of Manufacturers under Nairobi County. Procurement managers were used as the unit of observation. A structured questionnaire was used to collect primary data. The questionnaires were self-administered with assistance from the research assistants. The study revealed that reverse logistics, green specification, green inventory management and green tendering are practiced across the manufacturing firms across Nairobi County. Importantly, the study established that the four sustainable procurement practices (reverse logistics, green specification, green inventory management and green tendering) significantly positively affect procurement performance through reduction of cost, clean environment and increased quality of supplies. Therefore the study concluded that sustainable procurement significantly increases procurement performance with the ultimate positive impact on firm performance.

## **RESEARCH METHODOLOGY**

### **Research Design**

A research design is the overall strategy used to integrate the different components of the study in a coherent and logical way, thereby, ensuring that the research problem is effectively and efficiently addressed (Orodho, 2019). It constitutes the blueprint for the collection, measurement, and analysis of data (Creswell, 2019). A descriptive cross sectional survey research design is therefore proposed for this study. A descriptive cross-sectional study is a study in which the condition and potentially related factors are measured at a specific point in time for a defined population (Bland, 2019).

The descriptive cross-sectional study design is selected for this study because of its ability to prove and/or disprove assumptions, cost less to perform and does not require a lot of time, capture a specific point in time, contain multiple variables at the time of the data snapshot and the data obtained through the research design can be used for various types of research (Creswell, 2019).

### **Target Population**

The target population comprised of 126 procurement and logistics officers working in seven cement manufacturing firms namely. Target population refers to a group of individuals with certain characteristics in common, which are of interest to the researcher or relevant to the study (Sekaran & Bougie, 2019). Target population is the population that the researcher may want to generalize the result for the study.

**Table 3. 1: Target Population**

No	Cement Manufacturing Firm	No. of Respondents
1	Bamburi Cement Limited	27
2	East Africa Portland Cement Company	26
3	ARM Africa Limited	20
4	Mombasa Cement	15
5	Savannah Cement	13
6	National Cement	15
7	Lafarge cement	10
	<b>Total</b>	<b>126</b>

**Source: Kenya Association of Manufacturers (KAM) Directory. June, 2023**

### Sampling Frame

A research sample population is a well-defined collection of individuals or objects known to have similar characteristics. All individuals or objects within a certain population usually have a common, binding characteristic or trait (Kothari, 2019). The unit of observation of the research consists of logistic and distribution officers who are signed and responsible for the distribution management activities and the unit of analysis comprises of cement manufacturing firms namely: Bambara Cement Limited, Rhino Cement Foundation, East African Portland Cement Company, Mombasa Cement Company, Savanna Cement, Athi River mining Ltd and National cement company Ltd In Kenya. The sampling frame is a comprehensive list of all sampling units from which a sample can be selected (Creswell, 2019).

### Sample Size and Sample Technique

The study employed a census approach to collect data from the all the 126 respondents mainly involved in the management of distribution hence no sampling techniques was used. In a census survey, data are collected for all units in the population, if the population is small, a census may be preferable. This is because to produce estimates with small sampling error it may be necessary to sample a large fraction of the population. In such cases, for minimal additional cost, data can be available for the entire population instead of just a portion of it (Statistics Canada, 2019). The approach involved gathering information from every member of the target population. A sampling frame includes every member of the study population from which a sample is to be taken (Cooper & Schindler, 2023). This method is appropriate because it reduces on biases in research since all the respondents were given an equal chance to participate in the study (Mugenda & Mugenda, 2019).

### Data Collection Instruments

In this study, primary data was collected using a semi-structured questionnaire. Questionnaires are deemed suitable for descriptive studies as they enable researchers to identify and describe the variability in different phenomena (Saunders, Lewis, Thornhill, & Bristow, 2019). The choice of using questionnaires is based on their cost-effectiveness, even when dealing with large populations, and their ability to minimize interviewer bias (Mugenda & Mugenda, 2018). According to Kothari (2018), questionnaires provide accurate and valid data as they eliminate researchers' influence and bias.

The structured questionnaire consisted of closed-ended questions, allowing for the collection of quantitative data. This approach facilitates easier data analysis and reduces the time and resources

required for data collection. Each objective of the study was addressed through specific questions in the questionnaire (Mugenda & Mugenda, 2019). According to Kothari (2019), questionnaires are a cost-effective method of gathering information, particularly from a large group of respondents, and they ensure anonymity. Questionnaires comprise a series of concise questions that can be asked verbally by the interviewer or answered independently by the respondents (Bryman, 2018).

By employing a structured questionnaire with closed-ended questions, this study aims to collect quantitative data efficiently, allowing for rigorous analysis and a comprehensive understanding of the research objectives. The use of questionnaires also ensures respondent anonymity and flexibility in completing the survey at their convenience. These methodological choices enhance the accuracy, validity, and practicality of the data collection process, contributing to the overall reliability and robustness of the study findings.

### **Data Collection Procedures**

This study adopted the self-administered questionnaire approach. Self-administered questionnaires offer researchers the potential to reach a large number of potential respondents in a variety of locations (Cooper & Schindler, 2019). Before embarking on data collection, relevant approvals were obtained. An introductory letter from the university introducing the researcher to relevant authorities for field data collection was first obtained. This letter was used to obtain the permit for research from the National Commission for Science, Technology, and Innovation (NACOSTI). In addition, the researcher sought permission from the respective firm in order to be allowed to collect data.

Questionnaires are to be administered to the respondents chosen for the study using the drop and pick method of questionnaire administration. Given the sensitivity of procurement information, the study relied on the university identification letter to make respondents aware that the data so collected is only for academic use. The data collected from the field was done with the aid of research assistants. It is expected that the use of the research assistants improved the return rate of the questionnaires since any clarifications on the questionnaire were made contemporaneously. The research assistants were trained on research ethics and on the research instrument and its administration, interview skills, and data recording. An introductory letter for the research assistant to collect data on the researcher's behalf was given to the research assistants.

### **Pilot Testing**

The study carried out pilot study to pretest and validate the questionnaire and the interview guide. According to Cooper and Schindler (2019), a pilot study is conducted to detect and review weaknesses in the data collection instrument. Pilot testing allows for the detection and correction of a wide range of potential problems with the research instrument. The pilot test should comprise 10% of the sample (Cooper & Schindler, 2019). Thirteen questionnaires were piloted that is 10% of the sample size. The questionnaires were then coded and responses input into SPSS which was used to generate the reliability coefficient. The pilot group was selected randomly from study target population and was excluded in the final study.

### **Data Analysis and Presentation**

The study collected both quantitative and qualitative data. Qualitative data collected was analyzed using content analysis and presented in prose form. On the other hand, quantitative data collected will be analyzed using descriptive statistics techniques such as percentages, frequencies, means, and standard deviation using Statistical Package for Social Sciences (Version 25.0). Pearson R correlation was used to measure the strength and direction of linear relationship between variables. Multiple regression models were fitted to the data in order to determine how the independent

variables influence the dependent variable. Multiple regression Analysis was used in this study because it uses the independent variables in predicting the dependent variable. It is a statistical tool attempting to establish whether some variables can be used together in predicting a particular variable (Mugenda & Mugenda, 2018). Presentation was done in tables and figures.

## ANALYSIS AND INTERPRETATION OF DATA

### Descriptive Statistics

#### Green Specification and Firm Performance

The second specific objective of the study was to assess the influence of green specification on performance of cement manufacturing firms in Kenya. The respondents were requested to indicate their level of agreement on green specification and performance of cement manufacturing firms in Kenya. The results were as shown in Table 4.1

From the results, the respondents agreed that they prefer to purchase products that are energy-efficient ( $M=3.983$ ,  $SD=0.765$ ). In addition, the respondents agreed that energy consumption is a significant factor in their purchasing decisions ( $M=3.806$ ,  $SD=0.845$ ). Further, the respondents agreed that understanding the environmental impact of a product's life cycle is important to them ( $M=3.785$ ,  $SD=0.688$ ). The respondents also agreed that they are more likely to buy products that are designed for durability and longevity ( $M=3.718$ ,  $SD=0.788$ ). In addition, the respondents agreed that they prefer products that use environmentally friendly packaging ( $M=3.698$ ,  $SD=0.686$ ). The respondents agreed that the use of recyclable packaging influences their purchasing decisions ( $M=3.662$ ,  $SD=0.617$ ).

**Table 4. 1: Green Specification and Firm Performance**

	Mean	Std. Deviation
I prefer to purchase products that are energy-efficient.	3.983	0.765
Energy consumption is a significant factor in my purchasing decisions.	3.806	0.845
Understanding the environmental impact of a product's life cycle is important to me.	3.785	0.688
I am more likely to buy products that are designed for durability and longevity.	3.718	0.788
I prefer products that use environmentally friendly packaging.	3.698	0.686
The use of recyclable packaging influences my purchasing decisions.	3.662	0.617
<b>Aggregate</b>	<b>3.731</b>	<b>0.743</b>

#### Green Tendering and Firm Performance

The fourth specific objective of the study was to establish the effect of green tendering on performance of cement manufacturing firms in Kenya. The respondents were requested to indicate their level of agreement on various statements relating to green tendering and performance of cement manufacturing firms in Kenya. The results were as presented in Table 4.2.

From the results, the respondents agreed that their organization uses e-request for bids to enhance transparency in the procurement process ( $M=3.955$ ,  $SD=0.895$ ). In addition, the respondents agreed that the e-request for bid process helps reduce paper waste significantly ( $M=3.946$ ,  $SD=0.886$ ). Further, the respondents agreed that their organization ensures that the e-submission process is user-friendly for all bidders ( $M=3.907$ ,  $SD=0.725$ ). The respondents also agreed that electronic submission of bids enhances the speed of the procurement process ( $M=3.902$ ,  $SD=0.881$ ). The respondents agreed that the e-evaluation of tenders improves the accuracy and fairness of the selection process ( $M=3.898$ ,  $SD=0.683$ ). In addition, the respondents agreed that their organization effectively uses digital tools to evaluate submitted tenders ( $M=3.884$ ,  $SD=0.796$ ).

**Table 4. 2: Green Tendering and Firm Performance**

	Mean	Std. Deviation
Our organization uses e-request for bids to enhance transparency in the procurement process.	3.955	0.895
The e-request for bid process helps reduce paper waste significantly.	3.946	0.886
Our organization ensures that the e-submission process is user-friendly for all bidders.	3.907	0.725
Electronic submission of bids enhances the speed of the procurement process.	3.902	0.881
The e-evaluation of tenders improves the accuracy and fairness of the selection process.	3.898	0.683
Our organization effectively uses digital tools to evaluate submitted tenders.	3.884	0.796
<b>Aggregate</b>	<b>3.878</b>	<b>0.757</b>

### Correlation Analysis

The present study used Pearson correlation analysis to determine the strength of association between independent variables (green specification and green tendering) and the dependent variable (performance of cement manufacturing firms in Kenya).

**Table 4. 3: Correlation Coefficients**

		Firm Performance	Green Specification	Green Tendering
Firm Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	109		
Green Specification	Pearson Correlation	.846**	1	
	Sig. (2-tailed)	.001		
	N	109	109	
Green Tendering	Pearson Correlation	.869**	.179	1
	Sig. (2-tailed)	.000	.071	
	N	109	109	109

The results revealed that there is a very strong relationship between green specification and performance of cement manufacturing firms in Kenya ( $r = 0.846$ ,  $p$  value = 0.001). The relationship was significant since the  $p$  value 0.001 was less than 0.05 (significant level). The findings conform to the findings of Ekiyor, Amino, and Altan, (2019) that there is a very strong relationship between green specification and firm performance.

The results also revealed that there was a very strong relationship between green tendering and performance of cement manufacturing firms in Kenya ( $r = 0.869$ ,  $p$  value = 0.000). The relationship was significant since the  $p$  value 0.000 was less than 0.05 (significant level). The findings are in line with the results of Ajoke *et al* (2019) who revealed that there is a very strong relationship between green tendering and firm performance.

Multivariate regression analysis was used to assess the relationship between independent variables (green specification and green tendering) and the dependent variable (performance of cement manufacturing firms in Kenya).



**Table 4. 4: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.872	.760	.761	.10129

a. Predictors: (Constant), green specification and green tendering

The model summary was used to explain the variation in the dependent variable that could be explained by the independent variables. The r-squared for the relationship between the independent variables and the dependent variable was 0.760. This implied that 76% of the variation in the dependent variable (performance of cement manufacturing firms in Kenya) could be explained by independent variables (green specification and green tendering).

**Table 4. 5: Analysis of Variance**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	12.027	2	6.0134	47.90	.000 <sup>b</sup>
1 Residual	6.552	106	.063		
Total	18.579	108			

a. Dependent Variable: performance of cement manufacturing firms in Kenya

b. Predictors: (Constant), green specification and green tendering.

The ANOVA was used to determine whether the model was a good fit for the data. F calculated was 47.90 while the F critical was 2.459. The p value was 0.000. Since the F-calculated was greater than the F-critical and the p value 0.000 was less than 0.05, the model was considered as a good fit for the data. Therefore, the model can be used to predict the influence of green specification and green tendering on performance of cement manufacturing firms in Kenya.

**Table 4. 6: Regression Coefficients**

Model		Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.
		B	Std. Error			
1	(Constant)	0.330	0.084		3.929	0.002
	green specification	0.376	0.095	0.375	3.958	0.002
	green tendering	0.387	0.097	0.386	3.990	0.000

a Dependent Variable: performance of cement manufacturing firms in Kenya

The regression model was as follows:

$$Y = 0.330 + 0.376X_1 + 0.387X_2 + \varepsilon$$

The results also revealed that green specification has significant effect on performance of cement manufacturing firms in Kenya,  $\beta_1=0.376$ , p value= 0.002). The relationship was considered significant since the p value 0.002 was less than the significant level of 0.05. The findings conform to the findings of Ekiyor, Amino, and Altan, (2019) that there is a very strong relationship between green specification and firm performance.

In addition, the results revealed that green tendering has significant effect on performance of cement manufacturing firms in Kenya  $\beta_1=0.387$ , p value= 0.000). The relationship was considered significant since the p value 0.000 was less than the significant level of 0.05. The findings are in line with the results of Ajoke *et al* (2019) who revealed that there is a very strong relationship between green tendering and firm performance.

## Conclusions

The study concludes that green specification has a positive and significant effect on performance of cement manufacturing firms in Kenya. Findings revealed that, preference to products which consume less energy, consider product life cycle and green packaging influences performance of cement manufacturing firms in Kenya.

The study also concludes that green tendering has a positive and significant effect on the performance of cement manufacturing firms in Kenya. Findings revealed that e-request for bid, e-submission of bids and e-evaluation of tenders influences performance of cement manufacturing firms in Kenya.

## Recommendations

The study recommends that the management of cement manufacturing firms in Kenya should adopt eco-friendly materials and production processes that prioritize sustainability. By integrating recycled materials, such as fly ash or slag, into their cement formulations, companies can reduce their carbon footprint and resource consumption.

The study also study recommends that the management of cement manufacturing firms in Kenya should establish criteria that prioritize environmentally sustainable practices in supplier selection. By incorporating requirements for eco-friendly materials, energy-efficient production methods, and waste reduction strategies into their tender processes, firms can encourage suppliers to adopt sustainable practices that align with the company's green objectives.

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