



## **ADVANCING SUSTAINABLE PROCUREMENT IN THE CONSTRUCTION INDUSTRY: INSIGHTS, AWARENESS, AND COLLABORATIVE STRATEGIES**

Elizabeth Ojelabi<sup>1</sup> & Donatus Ebere Okonta<sup>2</sup>

<sup>1</sup>*School of Environmental Studies, Federal Polytechnic Ilaro, Ogun State, Nigeria*

<sup>2</sup>*School of Computing, Engineering and Digital Technologies, Teesside University, Middlesbrough, United Kingdom*

### **Abstract**

*The construction industry uses a lot of resources and contributes significantly to environmental damage. It is essential to use procurement methods to reduce the impact of construction operations. This study seeks to evaluate and promote the use of procurement in the construction sector, highlighting the value of increasing stakeholder knowledge, offering education, and encouraging teamwork. The research combined both survey and literature review to tackle the research objectives. Based on a survey of 414 respondents in the construction industry, reveals key insights into sustainable procurement practices were revealed, 92.8% had prior knowledge of sustainability, only 47.8% were familiar with sustainable procurement, Architects emerged as pivotal players (46.4%) responsible for sustainable procurement, emphasizing their role in material and supplier selection, and 97.1% opined they were interested in learning more about sustainable procurement. The study identified various benefits, including environmental conservation, economic efficiency, social responsibility, improved project management, and strategic advantages. It is crucial to integrate sustainable procurement into architectural educational curricula and implement policies to promote its practices. By incorporating sustainability considerations into procurement decisions, organizations can enhance their reputation, lower risks, and support the transition toward a more sustainable economy.*

**Keywords:** Sustainable Procurement, Environmental Impact, Construction Industry, Sustainability, Economic efficiency

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### **Introduction**

In today's environment, sustainable procurement has evolved as a critical discipline in the building sector. It is more than just collecting materials and services for building projects; it is also about strategically managing these aspects to reduce negative environmental repercussions. As Kumar (2022) points out, sustainable procurement is both an ethical and a strategic decision. It not only helps to decrease environmental harm by reducing waste and preserving natural resources, but it also provides a compelling way for construction enterprises to increase their market competitiveness (Erasmus & Iyer-Raniga, 2022). This introduction emphasizes the rising relevance of sustainable procurement, notably in the construction industry.

Sustainable building has gained traction in recent years, owing mostly to worldwide initiatives aimed at changing traditional construction practices (Serpell, 2013). As a result, there has been an influx of in-depth case studies and comprehensive research concentrating on many elements of sustainable building, with sustainable procurement being a key issue (Foo et al., 2019). This rising amount of research has not only increased our understanding, but has also enhanced public and industry stakeholder awareness.

This improved understanding has resulted in the creation of a number of attractive prospects in the construction sector, which have been realized via joint efforts (Cherel-Bonnemaison et al., 2021; UNDP, 2023). Cost savings, enhanced worker productivity, better quality control, more strict environmental testing, and lower emissions of volatile organic compounds are among the advantages. Despite these advancements, the building sector faces a fundamental challenge: the development of large construction waste (USEPA 2023). This trash is a result of dismantling existing facilities and erecting new ones, and it contains a wide range of items, from building supplies to excavation debris, posing environmental and public health problems. Given the magnitude and diversity of waste created by the construction industry, it is critical for construction companies to prioritize sustainable procurement practises in order to prevent negative environmental effects. The study will be conducted with the following goals in mind:



- Assessing the level of awareness and understanding of sustainability and sustainable procurement in the construction sector.
- To boost the awareness of sustainable procurement in the construction industry and offer insights on how to implement sustainable procurement strategies.
- To identify the unique roles and responsibilities of major stakeholders in promoting the effective adoption of sustainable procurement practices.
- To highlight the numerous advantages of sustainable procurement, including environmental, economic, social, and strategic advantages.
- To motivate construction professionals to actively learn more about sustainable procurement and its practical application.

Despite vast studies regarding green building practices, there is a significant vacuum in the full examination of sustainable procurement in the construction sector. Previous research has frequently concentrated on discrete aspects of sustainability, leaving a holistic approach that integrates environmental, social, and economic factors missing. This study seeks to bridge that gap by conducting an in-depth examination of sustainable procurement practices and their influence on all three pillars of sustainability. The construction sector has a considerable environmental impact, as indicated by high carbon emissions and resource consumption (Finance and Economist, 2022; Venditti, 2023; Royal Academy of Engineering, 2021). These aspects highlight the critical necessity for sustainable buying practices. Construction businesses have the opportunity to reduce environmental impact, develop social responsibility, and enhance economic results, by aligning procurement practices with objectives for sustainability. The study's findings are intended to give useful information to construction stakeholders, advise policymakers, and drive future research. Finally, this research seeks to make it simpler for the construction sector to adopt sustainable procurement techniques, thereby contributing to a more sustainable future.

#### Sustainable Procurement in the Construction Industry

Simply said, procurement is the process of procuring various items and services for a construction project in compliance with pre-determined requirements (Ruparathna, & Hewage, 2015). According to Rajeev and Kasun (2013), procurement is an essential phase in any construction process which seeks out, purchases, and provides the labour, materials, and administrative support required to carry out the project's predetermined objectives. The procurement strategy of an organisation may be one of its most impactful and successful sustainability initiatives. It can support healthier communities and more sustainable economies, encourage resource conservation, and benefit people, communities, societies, and the environment in a number of other ways (Achim et al., 2013). Sustainable procurement refers to the application of the concepts within the sustainable development goals to procurement practises in order to create a safer, much more habitable planet that enhances a higher quality of life while taking into account an organization's production and consumption practises (Welford, 1997; Greener, 2008; Meehan & Bryde, 2011; Sudersan, 2021).

Sustainable procurement, additionally referred to as green procurement or eco-procurement, is the process of acquiring products and services in a way that optimises value for an organisation while minimising negative environmental, social, and economic effects (Overvest, 2023). Every stage of the procurement process must take sustainability into account, from selecting a supplier and negotiating a contract to delivery and disposal (Samani, 2023). Although there is a connection between sustainable procurement and sustainability, there still seems to be some separation between the two. As a result, sustainability in the building sector is heavily focused on supply, as opposed to sustainable procurement, which lays a heavy emphasis on purchase.. Therefore, before the procurement chain is built, numerous organizations with the goal of being sustainable must first establish various environmental and social requirements with the suppliers inside this chain (Sharma & Henriques, 2005; Simpson et al., 2007). In the construction industry, sustainable procurement is seen as a relationship process between a client and an engaging organization that results in the adaptation of particular design and development standards in such a way that value for money and product is consistently delivered over time, creating benefits for project participants, the economy, and the local society with little to no harm to the environment (Alkilani, 2012). Sustainable purchasing is viewed as a "solution to integrate environmental and social considerations in all steps of the procurement process, in order to reduce impacts on human health, the environment, and human rights" within the mining industry (Mello, Eckhardt & Leiras, 2017). In an effort to research and assess the factors to be taken into account for the implementation of



sustainable procurement using the sustainability portfolio model, they offered their opinions. It was found that contracts within the mining industry's internal movement segment fit well as a strategic commodity, indicating that the products integrated in this category offer a risk in the strategic supply chain because the required investment between the buyer and supplier.

#### The benefits of Sustainable Procurement

There are a range of secondary and tertiary benefits to sustainable procurement such as health, safety, quality and environmental issues. It is often the case that these secondary benefits are missed by clients, suppliers and consultancies alike. It is a common misconception that ecological considerations are limited to building projects. All industries have an impact, directly or indirectly, on the environment (Rosenblum et al., 2000). The construction industry is no exception. In fact, due to its large-scale operations, it has a significant impact on the environment, both positive and negative. Through sustainable procurement practices, the construction industry can contribute to improving our quality of life through sustainable development. The construction industry is a significant economic, social and environmental force in society. With more than 8 million employees annually, it contributes about 20 per cent to GDP and occupies about 7 percent of the workforce (Abdul Hamid, et al., 2021). Another major benefit based on Ruparathna and Hewage (2015) is the reduction in cost of production over a long-term period. Moreover, there stands to also be a reduction in the usage of harmful materials for construction on human health, improved waste management via proper needs assessment, quantity surveying efficiency, architectural precision, effective time management and reduction in financial wastage (Ogunsanya et al., 2019)

Sustainable public procurement could also be applied in various sectors within the construction industry as in the case of the European union public procurement which has been implemented across the European countries. This has in turn supported public procurement strategies and public-private partnerships as well as interventions within the industry (Elena, Diego & Jean, 2022). Also, the recent trend of the Green public procurement approach (GPP) that focuses on growing sensitivity to the issues of climate change as a result of production and use of goods or services influenced during the procurement process in every phase. It can also be applied in aspects of life cycle costing and tender

#### The Role of Stakeholders in the construction Industry

Since public procurement accounts for roughly 14% of the total GDP in Europe (EC, 2013) and has a significant potential to lead to environmental improvements within the public sector, the issue of sustainable procurement has trickled down into government ministries and public-private partnerships (Nicholas, Elena, and Migue, 2016). However, in order to realize the benefits of sustainable procurement, it is crucial to involve stakeholders in the creation of product and service standards as well as a unified public purchasing power that is geared toward achieving the highest possible environmental performance (DMoI, 2011). In order to raise awareness, a criteria document that outlines how sustainability should be applied when asking papers like tenders over the course of the full construction life cycle should be created. Additionally, this could be requested for integrated and traditional performance contracts, design service bids, etc. (DMoI, 2011). Furthermore, stakeholders are starting to pressure companies to incorporate sustainability into their procurement practices, revamping various conventional supply chain practices for a more sustainable procurement practice, particularly in their supply chain front, as a result of the ongoing deterioration and intensification of social bias (Erik, Stefan, & Lara, 2022).

#### Methodology

The study was carried out utilizing a mixed methods technique to allow for several lines of inquiry that allow for the resolution of the research questions. The use of both quantitative and qualitative data in the same study is known as "mixed methods" research (Bowers et al., 2013; Creswell and Plano Clark, 2011). According to Ivankova (2006), Tashakkori and Creswell (2007), and Tashakkori and Teddlie (2003), mixed methods designs are appropriate for addressing research questions that neither quantitative nor qualitative methods could resolve on their own. These designs can also facilitate various lines of inquiry that strengthen the available data and allow questions to be addressed in greater detail. Ashakori and Teddlie (2003).



The conducted literature review was crucial to providing answers to the research questions and deep insight into sustainable procurement, including how to differentiate between sustainability and sustainable procurement, what ideas they have in common, what advantages sustainable procurement has in the construction industry, and what the roles of relevant stakeholders are.

The administration of a 450-question questionnaire survey of professionals in the building sector is one of the quantitative methodologies adopted in this study. Out of the 450-questionnaire distributed using the Google Forms, only 414 survey responses were received. The survey evaluated the adoption of sustainable procurement methods, implementation challenges, and perceived advantages of sustainable procurement. It included both closed- and open-ended questions. Using descriptive statistics like means, frequencies, and percentages, the quantitative data obtained from the survey were examined. The study was carried out in compliance with ethical research standards, which included collecting participants' informed consent, respecting participant confidentiality, and preventing participant injury. In addition, significant terms related to environmental, economic, social, project management, material, and strategic ideas were identified through analysis of the advantages of sustainable procurement from the respondents which were extracted and mapped to the categories.

To assure the validity of our research findings, we strategically combined a variety of sampling strategies in this study. The objective was to thoroughly examine sustainable procurement methods in the construction sector. To get a representative sample of professionals working in the construction business, stratified sampling was utilized. Our population, which was made up of engineers, contractors, and architects, was segmented into strata based on their respective occupations. We further divided the respondents into three groups depending on their years in the workforce: those under 25 years old, those between 26 and 35 years old, and those between 36 and 50 years old. Additionally, several states in Nigeria as well as Ogun State, the UK, Ethiopia, and other geographical areas were taken into consideration as independent strata. By making sure each sub-group was properly represented, we were able to gain a better insight of how sustainable procurement is seen across the many aspects of the industry. Additionally, convenience sampling was employed to speed up data collecting. This technique was especially helpful for gathering information from individuals who were easily reachable through our network and online discussion forums. Convenience sampling, although being less organized, offers a more comprehensive perspective of sustainable sourcing practices and delivers useful insights from interested participants. We used various sample techniques in an effort to strike a balance between convenience and representativeness that would eventually deepen and broaden the scope of our study findings. By taking into account various job roles, experience levels and geographical contexts, this method allowed us to develop a sophisticated picture of sustainable procurement in the construction sector.

#### Results discussions

The study's main conclusions are presented in this section's results and findings, which gives readers a thorough grasp of sustainable procurement in the construction sector. For industry stakeholders and politicians aiming to advance sustainable procurement practices, the findings have major ramifications.

#### *Demographic Information*

From the 414 responses, received, all respondents provided their gender, 85.5% (354) of them were men and 14.5% (60) of them were women. This could be another sign of the persistent disparity between the participation of men and women in the construction business. Most respondents, 60.9% of whom were between the ages of 26 and 35, were determined to be in their middle years, according to the survey. 21.7% of respondents were under 25 years old, and 17.4% of respondents were between the ages of 36 and 50. This might mean that younger construction industry experts are more engaged in and knowledgeable about sustainable procurement, whereas older professionals might not be.

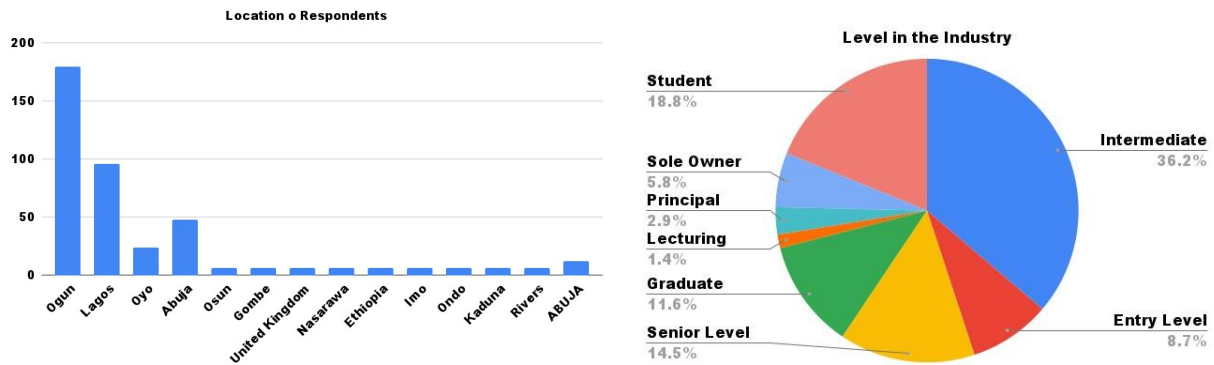


Figure 1: Demographic Information about survey respondents

Respondents were from a variety of countries, including the UK, Ethiopia, and states in Nigeria like Rivers, Kaduna, Ondo, Imo, Nassarawa, Gombe, Osun, Oyo, Lagos, and The Federal Capital Territory, Abuja. With 180 respondents (43.5%), Ogun State had the highest percentage of responders because more of the questionnaire was widely distributed in Ogun state.

*Knowledge of the Concept of Sustainability*

The survey results indicate that a significant portion of the respondents (92.8%) had prior knowledge of the concept of sustainability. A minor proportion of respondents (1.4%) reported being unsure about their knowledge of sustainability, while only a negligible portion (5.8%) reported having no prior knowledge of the concept. The comprehension of sustainability constitutes the basis for a comprehensive understanding and practical application of Sustainable Procurement. Hence, it can be deduced that this research will potentially contribute to the amplification of awareness surrounding sustainability and Sustainable Procurement.

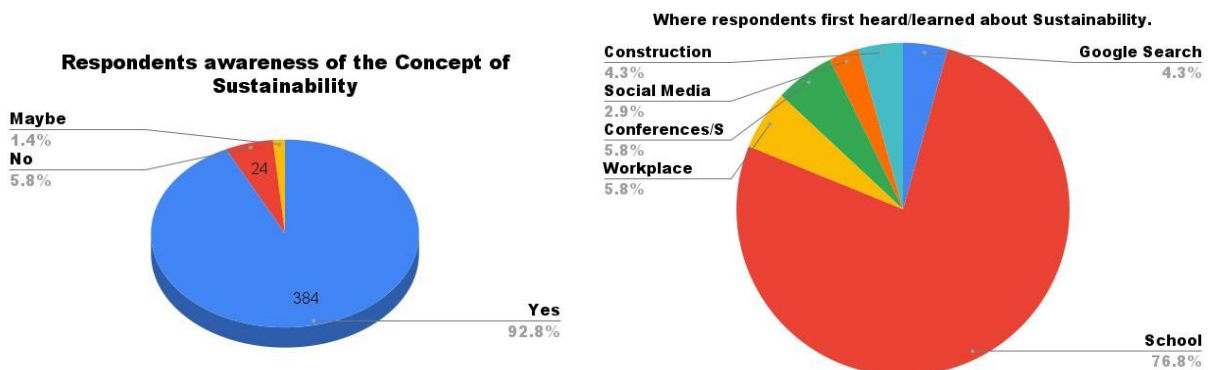


Figure 2: Survey responses of participants knowledge on the concept of sustainability

The results of the study showed that 76% of the respondents were first introduced to sustainability through their academic studies. This highlights the importance of including academic professionals among the respondents. Other sources of knowledge on sustainability included construction sites, social media, conferences and seminars, websites and online searches, and the workplace. In sustainable construction, procurement decisions should align with environmental, economic, and social sustainability goals. A well-informed workforce is better equipped to make responsible procurement choices that consider factors such as the life cycle of materials, environmental impact, and resource conservation. This research's goal of amplifying awareness surrounding sustainability and sustainable procurement is directly relevant to the construction industry's efforts to integrate these principles into its operations.

*Knowledge of the concept of sustainable Procurement*

Only 47.8% of those polled claimed to have any special understanding of sustainable procurement. 14.4% were unsure, and 37.7% claimed they were unfamiliar with the idea. These findings show that the construction industry has to increase its understanding of sustainable procurement. A startling discovery is how little the building sector knows about sustainable procurement. It reveals a sizable gap in the comprehension and use of sustainable procurement practices, which are becoming increasingly important for the industry's sustainable development. The deliberate selection of materials, suppliers, and methods in the construction industry that minimize environmental effect, encourage social responsibility, and improve long-term economic sustainability is known as sustainable procurement. The fact that over half of the respondents were unaware of this idea points to the urgent need for programs to raise knowledge of sustainable procurement in the construction industry.

The majority of respondents (31.9%) said that they first learned about sustainable procurement in school or class. Other sources mentioned by respondents included advertisements, the workplace, websites/Google, construction sites, conferences/seminars, social media, and other venues.

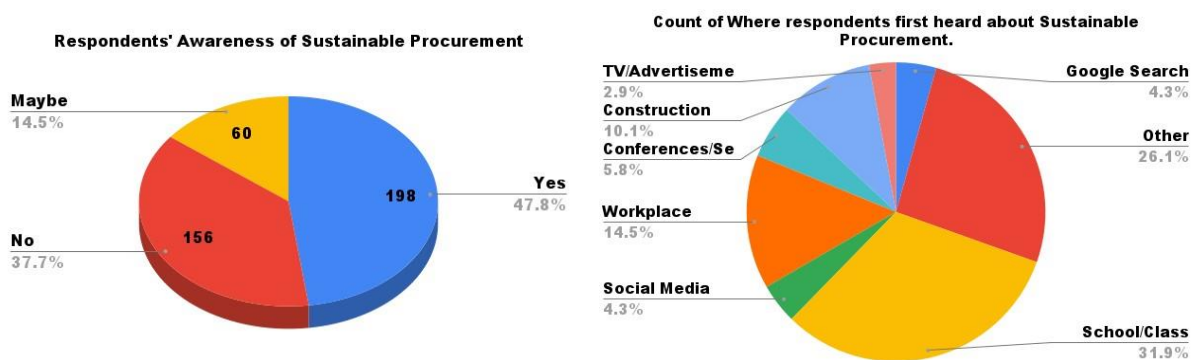


Figure 3: Survey responses of participants knowledge on the concept of sustainable procurement

The survey results showed that 97.1% of the respondents expressed interest in learning more about sustainable procurement, while only 2.9% expressed skepticism. This presents a valuable opportunity. It indicates a receptive audience within the construction industry eager to embrace sustainable procurement practices. By contributing to knowledge dissemination and awareness-raising, can help bridge this gap and facilitate the adoption of sustainable procurement principles across the industry.

The survey also revealed that none of the respondents is averse to an extensive knowledge of sustainable procurement. Additionally, 92.8% of the respondents expressed interest in future learning opportunities about sustainable procurement through conferences, seminars, books, journals, and other academic platforms. Conversely, 7.2% of the respondents expressed skepticism. No respondents indicated disinterest in the subject. The authors believe that this survey served as a form of awareness-raising and may have encouraged respondents and their professional and academic networks to explore and learn more about sustainable procurement and its implementation in the construction industry.

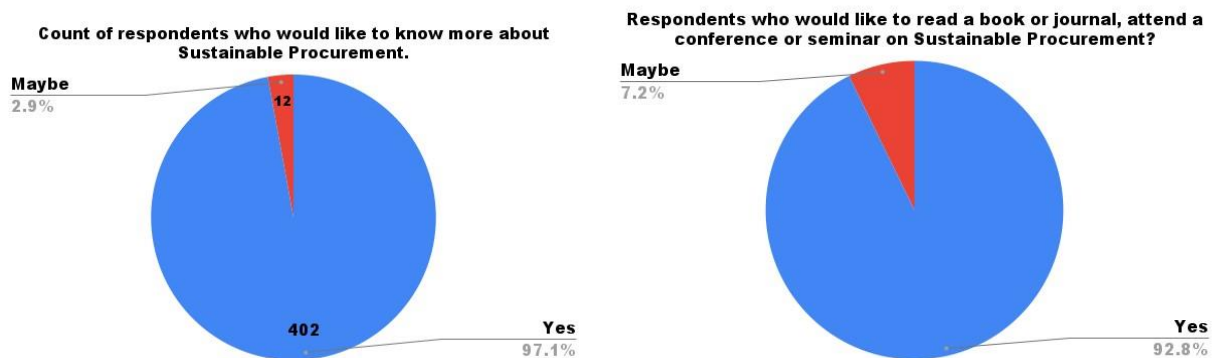


Figure 4: Further inquiry on participants enthusiasm on the concept of sustainable procurement

#### Stakeholders responsible for sustainable procurement

In this study, 13% of the respondents held the belief that builders and engineers are accountable for ensuring a sustainable procurement process in the construction industry. 7.2% believed that this was the responsibility of the government, while 1.4% believed it was the competence of the procurement team. 5.8% held the view that the general public had a duty in this regard, and 1.4% felt that every professional in the industry should be involved in the sustainable procurement process. 14.5% believed that it was the responsibility of suppliers and contractors, while 4.3% felt that the client was in charge of the sustainability of the procurement process. A substantial 46.4% of the respondents believed that architects were responsible for ensuring a sustainable procurement process in construction. This result highlights the critical role of architects in being knowledgeable about sustainable procurement and its application in construction and underscores the importance of incorporating sustainable procurement education into architectural curricula to equip them to face the challenges that may arise in the field.

**Respondents opinion on the stakeholder responsible for sustainable procurement**

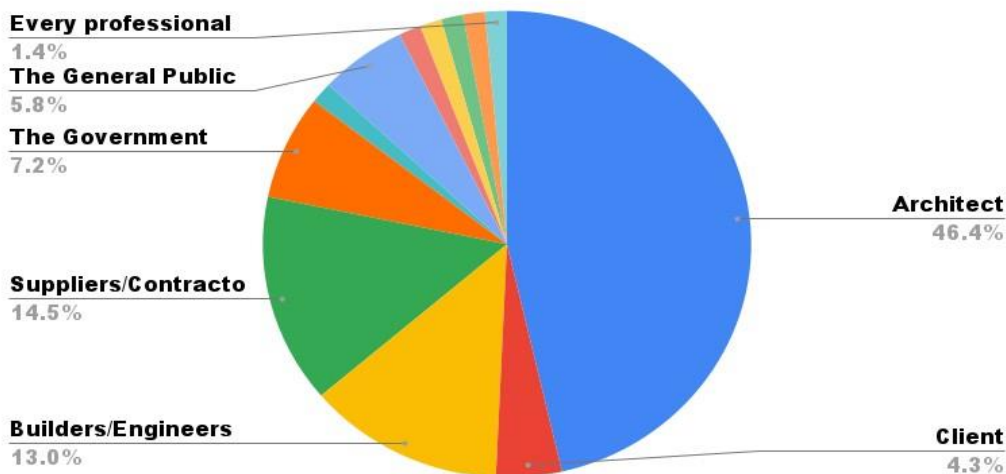


Figure 5: Participants opinion on the drivers of sustainable procurement

Architects, being pivotal in the procurement process, can significantly influence material and supplier selection to align with sustainability goals. The finding underscores the importance of including sustainable procurement education within architectural curricula to empower future architects as champions of sustainability in construction. Collaboration among various industry stakeholders, as indicated by the respondents, is crucial for holistic sustainable procurement practices. These findings suggest that a comprehensive approach involving multiple stakeholders is essential to drive sustainable procurement in the construction sector. This aligns with the idea that sustainable procurement is a collective effort, involving architects, contractors, suppliers, and policymakers, all working together to make informed and sustainable choices in the construction supply chain.

#### The benefits of Sustainable procurement

The study extracted key phrases of the benefits of sustainable procurement from the responses of the respondents. This was essential in shedding light on the tangible benefits of sustainable procurement practices. These phrases reflect the collective wisdom and insights of professionals and organizations actively engaged in shaping the future of construction. In study, we explored and analyzed these key phrases to understand the multifaceted advantages that sustainable procurement brings to the construction industry. These benefits encompass a wide spectrum, from environmental conservation and economic efficiency to social responsibility and long-term sustainability, collectively highlighting the transformative power of sustainable procurement in construction. The key phrases from the respondents on the benefits of sustainable procurement are listed in table 1.



Extracted Key Phrases	
<i>'Increased safety factors'</i>	<i>'Reduced carbon footprint in procurement processes'</i>
<i>'Contribution to global sustainability'</i>	<i>'Transparency and accountability'</i>
<i>'Enhanced competency and qualitative project delivery'</i>	<i>'Regulation of construction costs'</i>
<i>'Conservation of resources'</i>	<i>'Driving substantial sustainability in the industry'</i>
<i>'Use of durable construction materials'</i>	<i>'Adoption of principles that promote sustainable activities.'</i>
<i>'Long-term cost-effectiveness and cost reduction'</i>	<i>'Seamless design and construction decision-making'</i>
<i>'Efficient productivity and ease of work'</i>	<i>'Compliance with environmental laws and targets'</i>
<i>'Minimized exposure to toxins and waste.'</i>	<i>'Environmentally friendly'</i>
<i>'Quality job delivery within budget and on time'</i>	<i>'Reduction of repeat purchases and waste'</i>
<i>'Increased usefulness of materials for future generations'</i>	<i>'Risk reduction and cost reduction'</i>
<i>'Increased revenue growth and improved industry reputation'</i>	<i>'Future-proofed strategy and enhanced supplier diversity'</i>
<i>'New business opportunities and increased industry compliance'</i>	<i>'Support for human rights and the well-being of individuals and communities'</i>
<i>'Long-term sustainability that promotes a better economy and environment'</i>	<i>'Protection of the planet and ensuring continuity and security of supply.'</i>
<i>'Reduction in the cost of materials required for a project.'</i>	<i>'Reduced greenhouse gas emissions.'</i>
<i>'Time and cost savings'</i>	<i>'Improved quality of work'</i>
<i>'Easier and faster work processes'</i>	<i>'Minimized abandoned purchases.'</i>
<i>'Longevity and sustainability'</i>	<i>'Support for individual and community well-being'</i>
<i>'Better economy with less waste and pollution, fewer emissions, and a better distribution of wealth.'</i>	

Table 1: Key Phrases from respondents on the benefits of sustainable procurement

Furthermore, these key phrases from Table 1 into 6 main subjects that relate to the benefits of applying sustainable procurement in construction as illustrated in figure 6. Each phrase was mapped to each representative criteria as illustrated in Figure 7.

The key phrases from respondents regarding the benefits of sustainable procurement in the construction industry have been effectively categorized into six distinct groups. These categories encompass a wide spectrum of advantages. Firstly, there are clear environmental benefits, including the reduction of the carbon footprint, conservation of resources, and the promotion of eco-friendly practices. Secondly, sustainable procurement offers economic benefits, leading to long-term cost savings, increased revenue, and reduced material costs, thereby enhancing the financial performance of the industry. Moreover, it underscores social responsibility by prioritizing human rights, worker well-being, and community support, aligning construction practices with ethical and social responsibility principles. Additionally, there are project management advantages, including improvements in efficiency, productivity, and project quality. Sustainable procurement also emphasizes material efficiency and durability, resulting in the use of longer lasting and more efficient construction materials. Finally, these practices have strategic benefits, supporting long-term business resilience, fostering innovation, and aligning organizations with global sustainability goals, ultimately creating strategic advantages for construction industry stakeholders.



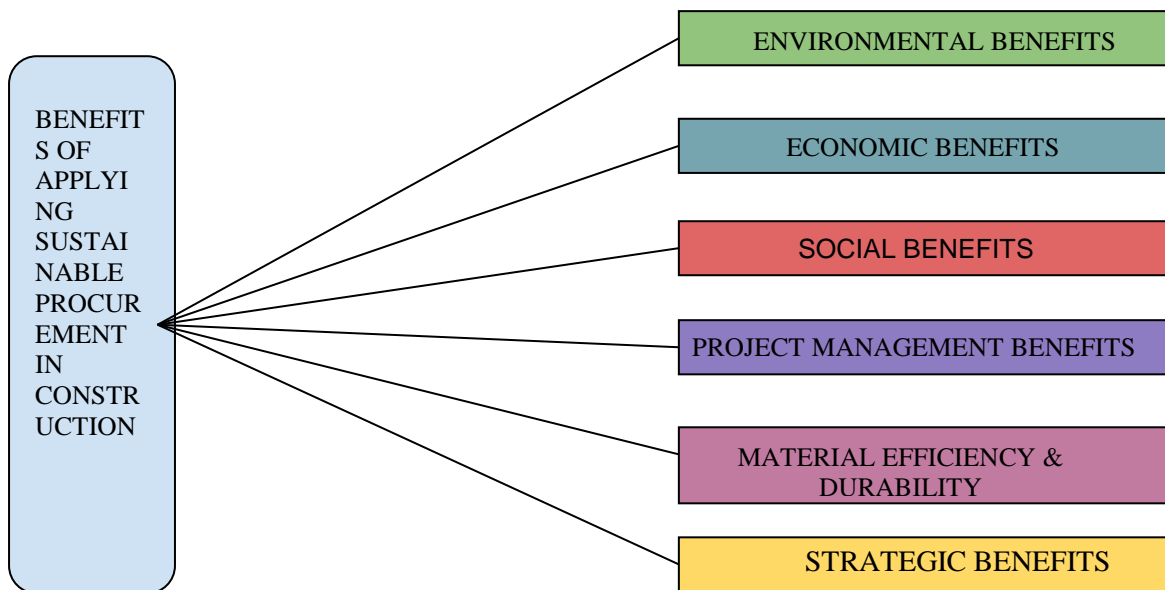


Figure 6: The benefits of Applying sustainable procurement in the construction.

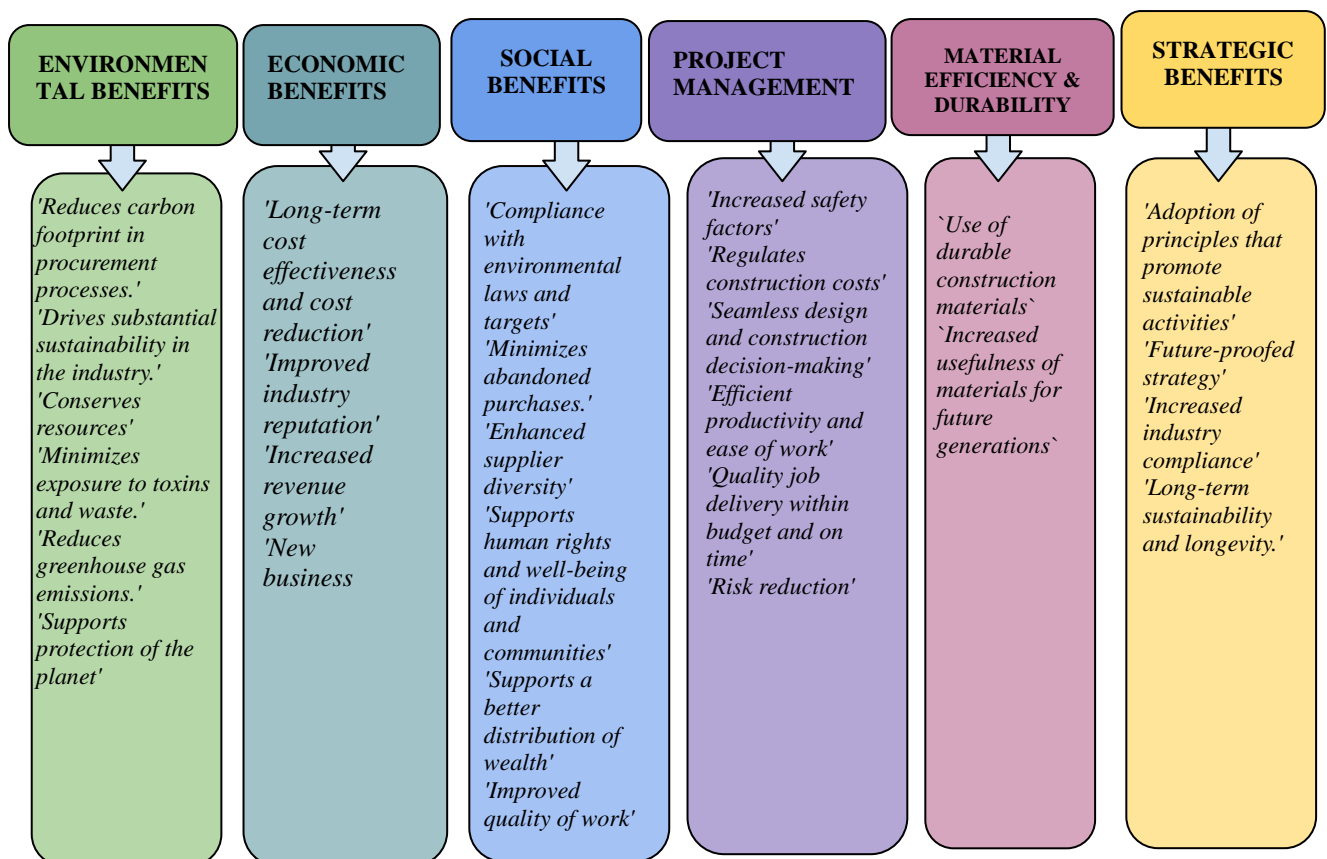


Figure 7: Mapping of the benefits of applying sustainable procurement in construction.



## Conclusion

Sustainable procurement has evolved as an essential practice in today's construction sector, stretching far beyond the simple purchasing of materials and services. It represents a deliberate approach to controlling these factors in order to reduce negative environmental consequences. The importance of sustainable procurement in the construction industry stems not only from its ethical implications, but also from its strategic benefits. It provides construction companies with a one-of-a-kind chance to decrease environmental impact, boost competitiveness, and contribute to global sustainability. Sustainable building, as part of a bigger movement that includes sustainable sourcing, has gained traction in recent years. The construction industry has experienced an upsurge in research and case studies concentrating on sustainable building practices, with sustainable procurement at the forefront. These initiatives have yielded several benefits, including cost savings, greater worker productivity, tighter quality control, stronger environmental evaluations, and decreased hazardous emissions. However, the industry is still dealing with the critical issue of massive construction waste generation.

The goal of this study was to expand our understanding of sustainable procurement in the construction sector by shedding light on its potential benefits and the responsibilities of various stakeholders. The goals of the study were to assess current sustainable procurement practices, identify gaps in the literature, and investigate the advantages of sustainable buying. According to the research findings, while respondents have a high degree of awareness about sustainability (92.8%), particular knowledge regarding sustainable procurement is lower, with just 47.8% having heard about it. This knowledge gap highlights the need for enhanced construction sector awareness and education to encourage sustainable procurement practices. However, it is positive that 97.1% of respondents reported an interest in learning more about sustainable procurement, showing a receptive audience keen to adopt these practices. The roles of stakeholders in sustainable procurement were varied, with architects appearing as major participants (46.4%). The relevance of adding sustainable procurement education in architectural curriculum is highlighted by architects' essential role in material and supplier selection. Collaboration is essential for holistic sustainable procurement practices across diverse stakeholders, including architects, contractors, suppliers, and policymakers. The study also uncovered a wide range of advantages connected with sustainable procurement in construction. Environmental conservation, economic efficiency, social responsibility, project management improvements, material efficiency, and strategic advantages are among the positives. These findings highlight the revolutionary potential of sustainable procurement in reducing the environmental footprint of the construction sector, increasing social responsibility, and improving long-term economic sustainability.

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