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Stakeholders' Perceptions of Barriers to Sustainable Construction Practices in South-South Nigeria

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Abstract

As global attention shifts towards sustainable development, sustainable construction has become increasingly important; however, its implementation in Africa, particularly Nigeria, remains constrained. Therefore, the study ascertained stakeholders' perceptions of barriers to the implementation of sustainable construction practices (SCP) in South-South Nigeria, with a view to identifying key barriers and proposing measures. The study was anchored on Institutional Theory, which explains how regulative, normative and cultural-cognitive conditions influence implementation outcomes. A mixed-methods exploratory design was adopted using questionnaires and focus group discussions (FGD). Ten professionals comprising Architects, Builders, Civil/Structural Engineers, Quantity Surveyors and Town Planners participated in the FGD. In addition, the study population comprised 1,254 built-environment professionals, from which a sample size of 304 was determined. A 15% (46) over-sampling buffer was applied to account for potential non-response, and a total of 350 questionnaires were administered. Of the questionnaires administered, 289 were retrieved (82.57%), while 272 valid responses were retained for analysis. Quantitative data were analysed using percentages, mean scores and standard deviation, while qualitative data were thematically analysed and integrated with the quantitative findings. Findings revealed that inadequate government incentives constituted the most significant barrier, followed by financial constraints, weak enforcement, insufficient training and low market demand. Unstable policies, limited stakeholder collaboration and resistance to change further reflected institutional weaknesses. The study concluded that SCP implementation is constrained by interconnected financial, regulatory and institutional barriers. Therefore, it recommended strengthened institutional capacity, improved inter-agency collaboration, public awareness and financial incentives, including tax reliefs, grants and subsidies, to facilitate wider adoption.

Keywords: Sustainable Construction, Stakeholders' Perception, Implementation Barriers, Construction Practices, South-South, Nigeria

1. INTRODUCTION

The transition towards sustainable construction has gained increasing attention because the construction industry contributes significantly to environmental degradation, excessive resource consumption, greenhouse gas emissions, and construction waste (Babalola, 2020; Thomas, Nair, and Enserink, 2023; Pearce, 2005). Sustainable construction addresses these concerns by integrating environmental protection, economic viability, and social responsibility into project planning, design, construction, and facility management (Ebhomenye, 2020; Kibert, 2016; Wang, Li, and Wang, 2019).

Despite its recognised benefits, implementation across developing countries remains challenging (Babalola, 2020; Okoye, Okolie, and Odesola, 2022). In Nigeria, growing sustainability awareness has not translated into routine construction practice because of persistent institutional, technical, economic, and regulatory constraints (Akinshipe *et al*., 2019; Ehimioboh *et al*., 2024; Ezeokoli *et al*., 2023; Omopariola *et al*., 2024).

Several factors impede the effective integration of sustainable construction principles into project delivery. Inadequate government support, insufficient professional knowledge, financial constraints, weak regulatory enforcement, and limited stakeholder commitment constitute major barriers to adoption (Akinshipe *et al*., 2019). Similarly, poor awareness of sustainable technologies, inadequate technical expertise, and limited industry capacity undermine implementation across construction projects (Ifije and Aigbavboa, 2020). Consequently, organisations struggle to incorporate sustainability into routine operations despite increasing recognition of its long-term advantages (Baba, Achoba, and Otaro, 2015; Bejide *et al*., 2021; Ezeokoli *et al*., 2025).

Institutional and policy deficiencies further complicate implementation. The absence of comprehensive national policies, inconsistent environmental regulation enforcement, and weak institutional coordination have slowed the adoption of sustainable construction practices in Nigeria (Babalola, 2020; Mba *et al*., 2025). Additionally, technopolitical barriers, sociocultural influences, and inadequate sustainability education continue to restrict industry-wide progress (Akindele *et al*., 2023; Mogaji, Mewomo, and Bondinuba, 2025).

Financial limitations also influence adoption decisions. High initial investment requirements, inadequate funding mechanisms, and limited client willingness to finance sustainable technologies discourage implementation (Osuizugbo *et al*., 2020). Misconceptions about green building costs further affect investment decisions, notwithstanding the long-term economic and operational benefits of sustainable facilities (Ekung *et al*., 2022). Furthermore, limited digital transformation and insufficient uptake of innovative technologies constrain the industry's ability to optimise sustainable project delivery (Oke *et al*., 2019).

The construction industry in South-South Nigeria operates within a complex environmental and socio-economic setting characterised by rapid urbanisation, oil and gas exploration, coastal development, and expanding infrastructure projects (Efe, 2018; Ehimioboh, *et al*., 2024). These conditions require construction methods that minimise ecological damage while ensuring efficient utilisation of resources. However, implementing sustainable construction practices remains difficult because many projects continue to rely on conventional approaches that prioritise short-term cost considerations over environmental performance. Consequently, opportunities to improve energy efficiency, minimise material waste, conserve water resources, and reduce carbon emissions are often overlooked (Abisuga and Okuntade, 2020; Lawal *et al*., 2024). The region possesses unique environmental characteristics, economic activities, and construction demands that may influence the nature and severity of implementation challenges. Therefore, the study ascertained stakeholders' perception of the barriers to the implementation of sustainable construction practices in South-South Nigeria, with a view to identifying key barriers of SC and proposing appropriate measures for improved adoption. Understanding these region-specific constraints is therefore essential for developing practical interventions capable of improving sustainable construction performance, strengthening environmental stewardship, and supporting resilient infrastructure development within South-South Nigeria.

2. LITERATURE REVIEW

Institutional Theory

Institutional Theory was first introduced by John R. Commons in 1934, but it gained popularity in the 1970s and 1980s through the work of scholars such as Philip Selznick, Alvin Gouldner, and Lynne Zucker (Scott, 2014). Institutional Theory posits that institutions are the rules, norms, and values that govern the behavior of individuals and organizations (Scott, 2014) Institutional Theory is a theoretical framework that explains how institutions shape the behavior and actions of individuals and organizations (Scott, 2014). In the context of construction practice, Institutional Theory can be applied to understand how institutional factors influence the adoption and implementation of sustainable construction practices.

Components of Institutional Theory

Institutional Theory provides a useful lens for understanding how formal rules, professional expectations and shared beliefs influence organisational behaviour. Scott (2014) conceptualises institutions through three mutually reinforcing pillars: regulative, normative and cultural-cognitive elements. The regulative pillar comprises laws, regulations, sanctions, monitoring and enforcement mechanisms. Within sustainable construction, these include environmental legislation, building regulations, planning requirements, procurement policies and sustainability standards. Where such requirements are weak, inconsistent or poorly enforced, stakeholders may have limited motivation to adopt sustainable construction practices (SCP).

The normative pillar concerns professional values, standards, responsibilities and expectations regarding appropriate conduct. Professional bodies, universities, consultants, contractors and industry associations can therefore influence how sustainability is understood and incorporated into construction activities. The cultural-cognitive pillar reflects shared beliefs, assumptions and taken-for-granted practices. Consequently, limited awareness, resistance to change and preference for familiar construction methods may discourage the adoption of sustainable alternatives (Scott, 2014).

Application of Institutional Theory to the Study

Institutional Theory has been applied to sustainable construction because implementation is shaped not only by organisational decisions but also by pressures within the wider institutional environment. DiMaggio and Powell (1983) identify coercive, normative and mimetic pressures. Coercive pressures originate from government regulations and institutional dependencies; normative pressures emerge from professional standards and expectations; while mimetic pressures occur when organisations emulate practices perceived as successful. These mechanisms explain both the diffusion of sustainable practices and their limited adoption where institutional pressures are weak or contradictory.

Its relevance is supported by previous research. Van-Bueren and Priemus (2002) found that institutional conditions can constrain sustainable construction despite the availability of appropriate technologies. In Nigeria, Unegbu et al. (2025) identified weak regulatory frameworks, high initial costs, organisational culture, inadequate stakeholder collaboration and limited government support as significant barriers. Institutional legitimacy pressures, organisational capacity and lifecycle-cost considerations as important influences on sustainable construction adoption.

Institutional Theory is particularly appropriate for examining stakeholders' perceptions of challenges to SCP implementation in South-South Nigeria. The regulative dimension provides a basis

for examining weak enforcement, inadequate regulations, bureaucratic procedures, limited monitoring and insufficient incentives. The normative dimension addresses professional competence, training, standards and institutional support, while the cultural-cognitive dimension captures limited awareness, resistance to change and entrenched conventional practices.

The theory also recognises that government agencies, clients, consultants, contractors and professional bodies occupy different institutional positions and may therefore perceive implementation challenges differently. Accordingly, stakeholders perceived challenges can be understood as institutional conditions that either constrain or facilitate SCP implementation. Strong, coherent and supportive institutions should promote adoption, whereas weak enforcement, inadequate professional norms and entrenched conventional beliefs are likely to perpetuate implementation difficulties.

Barriers to the Implementation of Sustainable Construction Practices

The implementation of sustainable construction practices remains constrained by a combination of economic, institutional, technical and behavioural factors. In Nigeria, Baba, Achoba and Otaro (2015) identified poverty, financial bottlenecks, high building-material costs, inadequate financial instruments, obsolete housing policies and limited access to innovative building technologies as major challenges to sustainable housing provision. Uwazie, Igwemma and Okonkwo (2015) similarly associated the slow development of sustainable housing with economic, environmental, energy and institutional difficulties. These studies establish that the transition towards sustainability depends not only on technical solutions but also on the economic and policy environment within which construction activities take place.

Subsequent Nigerian studies have expanded this understanding by identifying professional, regulatory and market-related constraints. Daniel, Oshineye and Oshodi (2018), based on stakeholders in Abuja, found lack of expertise, inadequate strategies for promoting sustainable construction and insufficient demand to be among the most significant barriers. Osuizugbo et al. (2020), in Lagos State, similarly identified poor government support, inadequate legislation and regulation, limited client demand, low awareness and concerns about adoption costs among the leading barriers. Toriola-Coker et al. (2021) further demonstrated that poor sustainability education, inadequate incentives, limited understanding of life-cycle costs, low prioritisation of sustainable construction and resistance to cultural change restrict implementation. Collectively, these studies indicate that implementation barriers extend beyond finance and technology to include knowledge, institutional support, market demand and professional behaviour.

More recent evidence reinforces the multidimensional nature of the problem. Okoye, Okolie and Odesola (2022) found that the implementation of sustainable construction in Nigeria is exposed to risks associated with the unavailability and cost of sustainable materials and equipment, unfamiliar construction techniques and ineffective communication among project participants. Idris et al. (2024), focusing on Nigerian SMEs, identified financial constraints, inadequate expertise, regulatory challenges and technological complexity as major barriers. Unegbu et al. (2025) further examined the Nigerian construction industry and demonstrated that organisational culture, sustainable-technology availability, stakeholder engagement, financial constraints and government regulations are interconnected dimensions of the implementation problem. Mogaji, Mewomo and Bondinuba (2024) similarly showed that the adoption of innovative building materials is affected by a combination of economic, knowledge, institutional and market-related barriers. These studies suggest that barriers should not be examined as isolated variables because constraints at one level may reinforce constraints at another.

Evidence from outside Nigeria supports this position but also demonstrates the importance of context. Ametepey, Aigbavboa and Ansah (2015) found that sustainable construction in Ghana is constrained by cultural resistance, lack of government commitment, additional investment costs, inadequate professional knowledge and legislation. Hwang and Ng (2013) showed that green construction projects in Singapore also encounter knowledge, skills and project-management challenges, indicating that sustainability barriers are not restricted to developing countries. At a broader level, Darko and Chan (2017); Darko, *et al*, (2018); Chan, *et al* (2018) identified cost, inadequate information, insufficient incentives, weak demand and inadequate green-building regulations as recurring barriers internationally. Karji, Namian and Tafazzoli (2020) likewise grouped barriers in the United States into pre-construction, managerial, legislative, and financial/planning constraints. These international studies confirm the generality of the problem while simultaneously demonstrating that the relative importance of individual barriers is context dependent.

Despite this substantial body of evidence, an important empirical and contextual gap remains. Existing Nigerian studies have largely examined sustainable construction barriers from national or geographically limited perspectives, with notable attention to Abuja, Lagos, SMEs, housing, innovative materials and rural regulatory implementation. Daniel *et al*. (2018), for instance, investigated stakeholders in Abuja, while Osuizugbo *et al*. (2020) examined the Nigerian construction industry through a Lagos-based study. Recent research has also concentrated on specific organisational or thematic settings, such as SMEs, innovative building materials and rural building regulations.

More importantly, the literature has not sufficiently established how stakeholders across the construction value chain in South-South Nigeria perceive, prioritise and differentiate these barriers, nor how economic, institutional, technological, organisational and behavioural constraints interact within the region's distinctive construction environment. This is the specific knowledge gap addressed by the present study, Stakeholders' Perceptions of Barriers to the Implementation of Sustainable Construction Practices in South-South Nigeria. The study therefore moves beyond merely identifying a list of barriers. It provides region-specific empirical evidence on the perceptions and relative significance of barriers among relevant construction stakeholders and establishes whether the constraints reported in national and international literature adequately explain the South-South Nigerian context. In doing so, the study provides an empirical basis for developing more context-sensitive interventions, policies and institutional strategies for improving SCP implementation across the region.

Table 2.1 Summary of Key Literature

Authors	Year	Location / Area of study	Methodology	Major findings
Baba, Achoba and Otaro	2015	Nigeria (national housing sector)	Assessment of sustainable housing provision using the Holistic Sustainability Approach (HSA), organised around social, economic and environmental dimensions.	Major constraints included poverty, redundant/obsolete housing policies, financial bottlenecks, high building-material costs, inadequate financial instruments, lack of innovative building technologies, uncontrolled development, poor maintenance culture and inadequate social infrastructure.

Uwazie, Igwemma, and Okonkwo	2015	Nigeria (housing sector)	Conceptual/literature-based discussion of sustainable development and greening of the Nigerian housing sector.	The paper identifies economic, environmental, energy, policy and institutional difficulties as important challenges to greening the housing sector and argues for greater encouragement of green building as a standard.
Daniel, Oshineye and Oshodi.	2018	Abuja, Nigeria	Mixed methods: 150 questionnaires distributed to construction-industry stakeholders in Abuja and 8 interviews.	The most critical barriers were lack of expertise, lack of strategy to promote sustainable construction and lack of demand. The study also highlighted short-term-benefit culture and resistance to including sustainable practices in contracts, and recommended sustainability training/education for professionals.
Osuizugbo, *et al.*	2020	Lagos State, Nigeria	Questionnaire survey; snowball sampling; 117 questionnaires distributed, 72 valid responses; 5-point Likert scale; frequency, percentage, mean, Relative Importance Index (RII) and ranking.	The five highest-ranked barriers were poor government support (RII 0.81), lack of relevant laws/regulations (0.79), lack of client demand (0.76), low awareness (0.75), and fear of higher investment/adoption cost (0.74).
Toriola-Coker, *et al.*	2021	Nigeria	Quantitative approach using a questionnaire survey of professionals and other stakeholders; descriptive analysis.	Highly ranked barriers included poor sustainability education in academic institutions, lack of incentives for designers, ignorance of life-cycle-cost benefits, low prioritisation of sustainable construction, resistance to cultural change, lack of government policies/support, client preference for traditional materials, weak industry integration and limited professional awareness/knowledge.
Bejide, *et al.*	2021	Edo State, Nigeria	Quantitative survey; 158 questionnaires distributed through random sampling; 122 usable responses; 5-point Likert scale; frequency/percentage and Mean Item Score using SPSS.	Lack of sustainability by consultants was identified as a major implementation challenge. Introduction of sustainable construction into educational institutions was the most significant mitigating measure.

Okoye, Okolie and Odesola,	2022	Nigeria (building industry)	Questionnaire survey of 256 building professionals; 47 risk factors assessed; quantitative risk analysis using mean values and risk prioritisation number.	Highest-likelihood risks included unavailability of sustainable materials/equipment, unfamiliar construction techniques/processes and high initial costs. Highest-impact risks included high initial costs, poor/inefficient communication and high cost of sustainable materials/equipment.
Idris, *et al*.	2024	Abuja, Nigeria; SMEs	Quantitative research design; structured questionnaires to 116 SME owners, managers and key decision-makers; analysis included comparison between small and medium enterprises.	Financial constraints, lack of expertise, regulatory challenges and technological complexity were the most significant barriers. No statistically significant differences were found between small and medium enterprises in their perceptions of the barriers.
Unegbu, *et al.*	2025	Nigeria	Mixed methods: literature review plus cross-sectional survey of 237 construction professionals (project managers, engineers and policymakers); quantitative analysis with SPSS and LISREL.	Weak regulatory frameworks and high initial costs were significant barriers. Organisational culture, sustainable-technology availability, stakeholder engagement, financial constraints and government regulations were important interconnected dimensions.
Mogaji, *et al.*	2024	Nigeria (construction industry; innovative building materials)	Empirical investigation of barriers to adoption of innovative building materials for sustainable construction; the article reports quantitative mapping/analysis of the identified barriers.	The study identifies interconnected institutional and adoption barriers affecting innovative building materials in Nigeria and provides a basis for practical interventions by policymakers and industry stakeholders.
Mba, *et al.*	2025	Rural communities in Enugu State, Nigeria	Mixed methods using a structured survey involving architects, town planners and community leaders; in-person paper questionnaires.	Key barriers included limited regulatory awareness, inadequate enforcement, socio-economic constraints, cultural resistance, lack of technical/financial resources, weak institutional frameworks, poor infrastructure, traditional construction practices and weak collaboration between authorities and community leaders.
Ametepey, *et al.*	2015	Ghana	Multiple methods: semi-structured interviews with	The five strongest barriers were resistance to cultural change, lack

			18 contractors and 16 consultants, plus a questionnaire survey of 100 practitioners; barriers ranked by mean scores and grouped using factor analysis.	of government commitment, fear of higher investment costs, lack of professional knowledge and lack of legislation. Six broader components were financial, political, management/leadership, technical, socio-cultural, and knowledge/awareness barriers.
Chan, *et al.*	2018	Ghana		
Hwang and Ng	2013	Singapore	Literature review, surveys and interviews with project managers involved in green construction.	Challenges included longer pre-construction processes, uncertainties associated with green materials/equipment, communication and interest problems among project-team members, and the need for stronger project-management knowledge and skills.
Darko, and Chan	2017	Global literature / international studies	Systematic literature review of academic journal studies on barriers to green-building adoption.	The most frequently reported barriers were lack of information, cost, lack of incentives, lack of interest/demand, and lack of green-building codes and regulations.
Karji, *et al.*	2020	United States	Comprehensive literature review and expert validation to identify 12 barriers; questionnaire survey of 135 industry professionals; Principal Component Analysis (PCA).	Four major barrier groups were identified: pre-construction constraints, managerial constraints, legislative constraints, and financial/planning constraints.
Al-Otaibi, *et al.*	2022	Developed and developing countries; construction and demolition waste management	Literature review to identify 11 barriers, expert review, questionnaire survey, Relative Importance Index (RI) ranking and SPSS statistical analysis.	The four major barriers to sustainable construction and demolition waste management were insufficient attention to C&D waste management, lack of law enforcement, lack of regulation, and financial constraints.

3. METHODOLOGY

The study adopted a mixed-methods approach with an exploratory design that integrate both qualitative and quantitative techniques to achieve a comprehensive understanding of the level of implementation of sustainable construction practices in South-South, Nigeria. Guided by the pragmatic research paradigm, it combined questionnaires, and interviews to collect both quantitative and

qualitative data. Participants comprised government agencies, construction professionals, contractors, and industry experts from Delta, Edo, and Rivers States.

Table 3.1 Professionals in the Built Environment

S/N	Registered Professionals	Delta	Edo	Rivers	Total
1	Architects	115	102	130	347
2	Builders	56	63	69	188
3	Civil & Structural Engineers	132	110	145	387
4	Quantity Surveyors	55	60	65	180
5	Town Planners	40	57	55	152
	Total	**398**	**392**	**464**	**1254**

The sample size for constructions professionals in the study was determined using Taro Yameni's formula

Using the Yamane sample calculation where:

$n = N/1 + N (e)^2$

N = the population size

n = the population size

e^2 = the acceptable sampling error (take "e" to be 0.05)

Using the formula;

N = 1254, e = 0.05, n =?

From the formula;

n = 303.26

An additional 15% (46) over-sampling buffer was applied to compensate for non-response, producing a target of approximately 350 administered questionnaires Therefore, a sample size of **350** was adopted for professionals in the built environment

A purposive sampling technique was also adopted to ensure that only respondents with relevant knowledge and experience in construction and sustainability issues were included in the focus group discussions. Therefore, A total of 10 participants were involved in Focus group discussion, two participants (this includes Architects, Builders, Civil/Structural and Engineers, Quantity Surveyors and Town Planners) from each profession were selected. The purpose of the interview was to supplement the questionnaire and to retrieve information that could not be included in the questionnaire.

The validity of the instrument was established by the researcher's supervisor and other experts who carried out both the fact and content validation of questionnaire, and focus group questions. The content validity of the instruments was established through expert review by five academics in construction management, cost management, Architecture, Urban and Regional Planning, and Structures. And two senior professionals each from the Nigerian Institute of Quantity Surveying (NIQS), The Nigeria Institute of Building, (NIOB), The Nigeria Institute of Architects (NIA), and Nigeria Society of Engineers (NSE), Nigerian Institute of Town Planners (NITPL) Delta State Chapters. Their feedback was used to refine ambiguous questions and ensure relevance and clarity. Construct validity was ensured by aligning each question with the study objectives and variables derived from existing

literature. This is to confirm that the instrument has the ability to measure what it was expected to measure and enable the researcher obtain information relevant to the purpose of the study.

To determine the reliability of the instrument, the researcher distributed 30 copies of the instrument to thirty (30) respondents of construction professionals in Anambra, Imo and Enugu state that are not part of the main study for trial testing after approval of the instrument by the supervisor. Cronbach alpha method was used to determine internal consistency of the questionnaire items. The instrument yielded the following reliability indexes based on cluster 0.82 for cluster A, O.80 for cluster B and 0.84 for cluster C. While an overall reliability coefficient of 0.82 was obtained for the entire instrument. With the reliability coefficient yielded, it was deemed fit for the research to be conducted using questionnaire, and focus group designed for data collection.

Ethical considerations were observed throughout the data collection process. Respondents were informed about the purpose of the study, the nature of their participation, and the intended use of the information provided. Informed consent was obtained from participants before administering the questionnaires and conducting the focus group discussions. Participation was voluntary, and respondents were informed of their right to decline participation or withdraw, where applicable, without any penalty. Confidentiality and anonymity were maintained by avoiding the unnecessary collection of personally identifying information and ensuring that participants' identities were not disclosed in the presentation of the findings. The data collected were used solely for academic research purposes and handled securely to prevent unauthorized access, disclosure, or misuse. Electronic data were stored in password-protected files, while physical research materials were kept securely. The findings were reported in aggregate form, and qualitative contributions were presented without identifying individual participants.

A total of 350 questionnaires were distributed to respondents in the study area. Out of this number, 289 were successfully retrieved, representing a response rate of 82.57 percent. After careful screening and data cleaning, 272 questionnaires were found to be properly completed and suitable for analysis. This accounts for 77.70 percent of the total distributed and 94.12 percent of those collected. Respondent were asked to rate their perception of the barriers to the implementation of sustainable construction practices (SCP) in the study area using a frequency distribution table and a five (5) point's Likert scale of 1-5. Where **1** = Strongly Disagree **2** = Disagree **3** = Neutral **4** = Agree **5** = Strongly Agree. Quantitative data were analysed using descriptive statistics, including percentages, mean scores, and **RII**= Relative Importance Index. Qualitative data were analysed thematically and integrated with the quantitative findings to strengthen the credibility, validity, and overall depth of the study's conclusion.

4. RESULTS AND DISCUSSION

This shows the presentation and analysis of data obtained from field survey, interview and discussion of findings from the results of the analyses of the data. The data contained in the study have been collected and systematically explained in conformity with the method. Based on this, this section is structured into four sub sections.

1. Presentation and Analysis of Focus group discussions (FGD)
2. Presentation and analysis of questionnaire
3. Discussion of Results

Summary of Focus Group Discussions

This section presents the summary of information retrieved from the interviewees by the researcher in the cause of the study.

Barriers to the Implementation of Sustainable Construction Practices

The FGD findings revealed that the implementation of sustainable construction practices (SCP) in South-South Nigeria is constrained by a combination of financial, regulatory, technological, knowledge-related and behavioural challenges. The participants' responses were organised into five major themes: high upfront costs, weak regulatory and institutional support, limited availability of sustainable materials and technologies, inadequate awareness and capacity, and resistance to change.

High upfront costs and financial constraints emerged as a major challenge. Participants explained that sustainable materials, technologies and construction methods often require higher initial investments, which can discourage clients and contractors whose decisions are strongly influenced by immediate project costs. Most participants noted that the implementation of sustainable construction practices is constrained by high initial investment requirements, which encourage clients and contractors to prioritise conventional construction options perceived as more affordable in the short term. These responses suggest that although sustainable construction may generate long-term economic and environmental benefits, stakeholders may prioritise short-term affordability during project decision-making.

A second major theme was weak regulatory frameworks, enforcement and government incentives. Participants indicated that the absence of consistent sustainability requirements and inadequate enforcement reduces the institutional pressure to adopt SCP. All participants agreed that weak and inconsistently enforced regulatory frameworks reduce the institutional pressure required to translate sustainable construction policies into actual project practices Participants further suggested that tax reliefs, grants and subsidies could reduce the financial burden associated with sustainable construction. This finding reinforces the importance of institutional support in translating sustainability policies into practical construction outcomes.

Limited access to sustainable materials and technologies was also identified. Participants reported difficulties obtaining suitable materials and technologies within the region, alongside concerns about their affordability and availability. As most participants explained, limited availability, accessibility and affordability of sustainable construction materials and technologies constitute practical supply-side barriers to SCP implementation in the region. This indicates that implementation barriers extend beyond stakeholder willingness and include supply-side and market constraints.

The participants also identified limited awareness, inadequate training and insufficient technical capacity as important barriers. Some stakeholders were perceived to have limited knowledge of sustainable construction principles and their practical application. Also, participants remarked that inadequate awareness, professional training and technical capacity limit stakeholders' ability to understand, evaluate and effectively implement sustainable construction practices. This suggests that professional development and continuous training are necessary for converting sustainability knowledge into project-level practice.

Finally, resistance to change and entrenched conventional practices emerged as a behavioural barrier. Participants noted that some clients and practitioners continue to favour familiar construction methods because they perceive them as less risky, cheaper and easier to implement. All participants agreed that entrenched conventional practices and resistance to change constrain the transition towards

sustainable construction, particularly where stakeholders perceive conventional methods as less risky and more predictable. This finding demonstrates the influence of cultural-cognitive factors on SCP implementation. In addition, FGD Participant 6 stated that entrenched conventional practices and resistance to change constrain the transition towards sustainable construction, particularly where stakeholders perceive conventional methods as less risky and more predictable

The FGD findings indicate that implementation challenges are interrelated rather than isolated. Financial constraints may be reinforced by weak incentives, while inadequate knowledge, limited material availability and resistance to change can further weaken stakeholders' willingness to adopt sustainable alternatives.

Drivers of Sustainable Construction Practices

The FGD also identified several factors capable of driving SCP adoption. These included environmental and health benefits, government policies and incentives, stakeholder awareness and capacity development, and demonstration of successful sustainable projects.

Participants expressed a strong recognition of the environmental and social benefits associated with SCP. They identified reduced energy consumption, improved indoor environmental quality, reduced waste generation and lower environmental impacts as important motivations. All participants agreed that recognition of the environmental benefits of sustainable construction, particularly reduced energy consumption and waste generation, can motivate stakeholders to adopt SCP. Similarly, FGD Participant 4 noted that, perceived improvements in public health and indoor environmental quality constitute important non-financial motivations for sustainable construction adoption. This indicates that stakeholders' recognition of the broader benefits of sustainability can provide an important motivational basis for adoption.

Government policies, regulations and financial incentives were repeatedly identified as critical drivers. Participants suggested that effective regulation could establish minimum sustainability requirements, while tax incentives, grants and subsidies could reduce the financial burden associated with sustainable construction. Most participant agreed that clear, consistent and effectively enforced government policies can provide the institutional direction and certainty necessary to promote SCP implementation. In addition, 80% of FGD Participants noted financial incentives can reduce the cost disadvantage associated with sustainable construction and thereby improve stakeholders' willingness to adopt sustainable materials and technologies. This finding is particularly significant because it indicates that stakeholders perceive government intervention not merely as regulatory control but also as an enabling mechanism for adoption.

Another important driver was education, professional training and stakeholder engagement. Participants emphasised the need to improve awareness among clients, contractors, consultants and other construction stakeholders. They indicated that greater knowledge would help stakeholders understand the long-term economic, environmental and social benefits of SCP.

Finally, participants highlighted the importance of successful examples and demonstration projects. They argued that documenting and replicating projects that have achieved measurable benefits could increase stakeholder confidence and demonstrate that sustainable construction is both feasible and beneficial in the Nigerian context. As one participant 9 explained, "successful sustainable construction projects can function as demonstration models that increase stakeholder confidence and encourage replication".

The qualitative findings demonstrate that SCP implementation in South-South Nigeria is influenced by interconnected economic, regulatory, technological, professional and behavioural factors. The findings also correspond with the three dimensions of Institutional Theory. Weak regulations and limited incentives reflect the regulative dimension; inadequate training, professional capacity and stakeholder support reflect the normative dimension; while resistance to change and preference for conventional practices reflect the cultural-cognitive dimension. Thus, the FGD evidence provides qualitative support for understanding SCP implementation challenges as institutional as well as economic and technical issues.

Table 4.1 Barriers hindering the implementation of Sustainable Construction Practices (SCP) in the study area

Barriers	1	2	3	4	5	Mean	RII	Rank
Lack of government incentives	0	0	0	150	122	4.449	0.890	1
Limited financial support mechanisms	0	10	09	133	120	4.335	0.867	2
Weak enforcement of regulations	0	10	10	140	112	4.301	0.860	3
Insufficient training opportunities	0	10	0	160	102	4.301	0.860	4
Low market demand for green buildings	02	20	07	122	122	4.268	0.854	5
Absence of clear implementation guidelines	02	20	07	121	122	4.254	0.851	6
High initial investment cost	0	10	30	132	100	4.184	0.837	7
Limited access to sustainable materials	10	10	10	162	80	4.074	0.815	8
Inadequate sustainability data	20	40	20	92	100	3.779	0.756	9
Unstable policy environment	10	50	05	137	70	3.761	0.752	10
Perceived risk of adopting new technologies	10	57	20	110	75	3.673	0.735	11
Poor stakeholder collaboration	20	30	20	155	47	3.658	0.732	12
Resistance to change from traditional methods	10	50	35	107	70	3.651	0.730	13
Inadequate technical expertise	20	80	20	120	32	3.235	0.647	14
Limited awareness among clients	10	100	20	100	27	2.96	0.592	15

***Note*: 1** = Strongly Disagree **2** = Disagree **3** = Neutral **4** = Agree **5** = Strongly Agree. **RII**= Relative Importance Index

The result in **Table 4.1** presents the challenges hindering the implementation of sustainable construction practices in the study area using the Relative Importance Index (RII). The findings revealed that lack of government incentives ranked first with an RII of 0.890, indicating it is the most significant barrier. This was followed by limited financial support mechanisms (RII = 0.867), weak enforcement of regulations (RII = 0.860), and insufficient training opportunities (RII = 0.860), reflecting the critical influence of institutional and capacity-related constraints. Low market demand for green buildings (RII = 0.854), absence of clear implementation guidelines (RII = 0.851), and high initial investment cost (RII = 0.837) also emerged as major obstacles. Limited access to sustainable materials recorded an RII of 0.815, while inadequate sustainability data (RII = 0.756), unstable policy environment (RII = 0.752),

perceived risk of adopting new technologies (RII = 0.735), poor stakeholder collaboration (RII = 0.732), and resistance to change from traditional methods (RII = 0.730) were moderately significant. Inadequate technical expertise (RII = 0.647) and limited awareness among clients (RII = 0.592) ranked fourteenth and fifteenth, respectively, indicating comparatively lower influence on sustainable construction implementation in the study area.

Discussion of Results

The findings on the barriers hindering Sustainable Construction Practices (SCP) reveal a strong relationship between structural constraints and implementation outcomes. The questionnaire provides substantial evidence of the barriers confronting sustainable construction in South-South Nigeria. Lack of government incentives ranked highest (RII = 0.890), followed by limited financial support mechanisms (0.867), weak enforcement of regulations and insufficient training opportunities (0.860 each), low market demand for green buildings (0.854), absence of clear implementation guidelines (0.851), high initial investment cost (0.837), and limited access to sustainable materials (0.815). Other constraints included inadequate sustainability data (0.756), unstable policy environment (0.752), perceived risk of new technologies (0.735), poor stakeholder collaboration (0.732), resistance to traditional methods (0.730), inadequate technical expertise (0.647), and limited client awareness (0.592). The ranking therefore indicates that institutional, financial and capacity-related constraints are more pronounced than awareness-related barriers.

This pattern is strongly corroborated by the qualitative evidence. The FGD identified cost as the leading concern, with 70% of participants assigning it a severity rating of 4.5/5, followed by regulatory barriers at 60% and inadequate awareness at 20%. These findings correspond with Hwang and Tan (2012) and Aghimien *et al*. (2018), who identified financial and knowledge constraints as significant barriers to sustainable construction adoption. They also reinforce Ezeokoli *et al*. (2025), Idris *et al*. (2024), Karji *et al*. (2020), Kirebar *et al*. (2022), Kibert (2016), Mba *et al*. (2025), Ofori (2015), Okoye *et al*. (2022), Tarriola-Coker *et al*. (2021), and Unegbu *et al*. (2025), who associated weak governance, institutional limitations and industry resistance with slow sustainability transitions.

Importantly, the South-South context gives these findings a distinctive regional significance. The barriers identified should not be interpreted simply as generic challenges applicable uniformly across Nigeria. The construction sector in the region operates within a distinctive institutional and socio-economic environment characterised by considerable infrastructure demands, dependence on public and private investment, complex stakeholder relationships and uneven institutional capacity across states. Consequently, the combination of weak incentives, regulatory enforcement gaps, limited technical capacity and restricted access to sustainable technologies can have a particularly strong effect on the ability of projects in the region to move from sustainability policy intentions to actual construction practice.

The regional evidence also demonstrates that the availability of sustainable technologies alone does not guarantee their adoption. Where financial incentives are inadequate, regulations are weakly enforced, professional capacity is limited and sustainable materials are difficult to access, stakeholders are likely to continue relying on established construction methods. This is particularly important in the South-South region because implementation decisions are shaped by the interaction between institutional conditions and project-level economic realities. Thus, the study contributes a region-

specific understanding of how national sustainability aspirations are translated or fail to be translated into construction practice at the sub-national level.

The convergence of the questionnaire, and FGD therefore provides compelling evidence that SCP implementation in South-South Nigeria is constrained by interconnected financial, regulatory, technological, professional and institutional barriers rather than by a single deficiency. This suggests that interventions based solely on awareness creation will be insufficient. Improving implementation requires coordinated measures that strengthen government incentives, regulatory enforcement, professional capacity, access to sustainable materials and technologies, stakeholder collaboration and implementation guidance. More importantly, interventions should be adapted to the institutional and market realities of the South-South region rather than relying exclusively on broad national sustainability prescriptions. Such a context-sensitive approach is more likely to translate sustainable construction policy into consistent project-level practice across the region.

5. CONCLUSION

The study revealed that lack of government incentives is the most significant barrier to sustainable construction practices. This is reinforced by financial constraints, weak enforcement, inadequate training, and low market demand, which discourage investment in sustainable practices. In addition, unstable policies, poor stakeholder collaboration, and resistance to change further reflect systemic weaknesses. Based on the findings, the study concluded that sustainable construction implementation is significantly constrained by financial, institutional, and regulatory barriers. To address these issues, it is recommended that government of the various States in the region should increase public awareness and education, enhance institutional capacity and inter-agency collaboration by improving coordination among regulatory bodies, professional institutions, and government agencies. Additionally, it recommended introduction of financial incentives such as tax reliefs, grants, and subsidies to encourage the adoption of sustainable materials, technologies, and building practices, thereby reducing the burden of high initial investment costs.

Limitations of the Study

The study has some limitations that should be considered when interpreting its findings.

- First, its geographic coverage was restricted to three states in South-South Nigeria, which may limit the generalisation of the findings to the entire region.
- Second, the cross-sectional design captured stakeholders' perceptions within a specific period and may not reflect changes in policies, technologies, market conditions or practices over time.
- Third, reliance on self-reported data from questionnaires, interviews and focus group discussions may introduce perception, recall or social-desirability bias. However, triangulation of the quantitative and qualitative evidence helped strengthen the credibility of the findings.

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