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# Perception and Adoption of Local Building Materials in Contemporary Nigerian Construction

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## ABSTRACT

The construction industry is under increasing pressure to adopt sustainable materials that will reduce environmental impacts whilst meeting growing housing demands. Although Nigeria possesses abundant indigenous building materials with proven environmental, economic and climatic advantages, their utilization in contemporary construction remains untapped. This study investigated stakeholders' perceptions of local building materials and the factors influencing their adoption within the Nigerian construction industry. A quantitative, cross-sectional survey design was adopted, and data were collected through a structured online questionnaire administered to construction stakeholders across Nigeria. A total of 106 valid responses were analyzed using descriptive statistics comprising frequencies, percentages and cross-tabulations. The findings indicate that respondents generally recognize the sustainability and economic benefits of indigenous building materials but remain concerned about durability, standardization, aesthetics and social perceptions. Institutional limitations, inadequate awareness, limited technical knowledge and weak policy support were also identified as significant barriers to wider adoption. The study concludes that increasing stakeholder confidence through material standardization, professional education, public awareness and supportive government policies are essential for improving the adoption of local building materials. These findings contribute to sustainable construction discourse and provide practical insights for policymakers, researchers and construction professionals seeking to promote environmentally responsible construction methodologies in Nigeria's building industry.

**Keywords**: Local Building Materials, Material Adoption, Indigenous Materials, Policy, Standards, Sustainable Construction, Building Materials, Nigeria

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## 1. INTRODUCTION

The construction industry is a major driver of socio-economic development but remains one of the world's most resource-intensive sectors.

Its continued dependence on energy-intensive materials such as cement, steel and fired clay contributes significantly to resource depletion, environmental degradation and carbon emissions, accounting for approximately 37% of global energy-related $CO_2$ emissions (UNEP, 2023). Consequently, sustainable construction has emerged as a key strategy for developing resilient and climate-responsive built environments by promoting materials with lower embodied energy and lifecycle impacts (Zhang & Xiao, 2023; Estrada & Lee, 2023; Barbhuiya & Das, 2023; Balali et al., 2020).

Renewed interest in indigenous and locally sourced materials, including earth, laterite, timber and agricultural residues, reflects their potential to support environmentally sustainable and economically viable construction (Abimaje et al., 2017; Okeke et al., 2024). Advances in compressed stabilized earth blocks, engineered timber and bio-based composites further demonstrate that these materials can satisfy contemporary structural requirements while reducing embodied carbon (Danladi et al., 2025; Okeke et al., 2025; Farid et al., 2022; Latapie et al., 2023). However, their adoption is constrained more by stakeholder perceptions and institutional barriers than by technical limitations, making behavioural understanding essential for promoting their wider utilization, particularly in resource-rich countries such as Nigeria (Baiche et al., 2008; Ben-Alon, 2020).

### 1.1 Background of Study

Nigeria's construction industry faces the challenge of meeting growing housing demand while advancing sustainable, climate-responsive development. Despite abundant indigenous materials such as laterite, bamboo, timber and agricultural residues, the industry remains heavily dependent on energy-intensive conventional materials, increasing environmental impacts and vulnerability to supply chain disruptions (Zhang & Xiao, 2023; Salami et al., 2021). Although these local materials have demonstrated climatic suitability and ongoing technological improvements for modern construction, their utilization remains limited (Olotuah, 2002; Oloruntoba & Ayodele, 2013; Okeke et al., 2020; Odu, 2019).

Evidence suggests that this underutilization is driven less by technical limitations than by behavioural, institutional and socio-cultural factors influencing material selection. Professional attitudes, client preferences and market perceptions often discourage the specification of indigenous materials despite their proven benefits (Umar et al., 2021; Obia & Obot, 2016). Addressing this gap requires understanding how stakeholder awareness and perceptions influence adoption decisions, thereby supporting evidence-based strategies for promoting sustainable construction in Nigeria (Eze et al., 2023; Mogaji et al., 2025).

### 1.2 Statement of Problem

Despite Nigeria's abundant indigenous building materials and advances improving their performance, contemporary construction remains dominated by conventional materials with higher environmental impacts (Olotuah, 2002; Danladi et al., 2025; Okeke et al., 2025). Existing research has focused largely on technical performance, with limited attention to how stakeholder awareness, perceptions, preferences and perceived barriers influence adoption decisions (Akadiri, 2018; Umar et al., 2021; Eze et al., 2023). This study addresses this behavioural gap to support wider adoption of sustainable local building materials.

### 1.3 Aim and Objectives of the Study

**Aim:** The aim of this study is to examine the perception of stakeholders towards local building materials and how this perception influences their adoption in contemporary Nigerian construction.

**Objectives:** The specific objectives of the study are to:

1. Assess the level of awareness and familiarity of construction stakeholders with local building materials in Nigeria.
2. Examine stakeholders' perception of the durability, aesthetic value, and overall performance of local building materials relative to conventional materials.
3. Identify the key factors influencing the preference for, or avoidance of, local building materials in contemporary construction practice.
4. Investigate the relationship between the perceived social status associated with building materials and their adoption.
5. Determine the incentives and strategies that could encourage greater adoption of local building materials in the Nigerian construction industry.

### 1.4 Research Questions

Arising from the objectives above, the study seeks to answer the following research questions:

1. What is the level of awareness and familiarity of construction stakeholders in Nigeria with local building materials?
2. How do stakeholders perceive the durability, aesthetic quality, and overall performance of local building materials compared to conventional materials?
3. What factors influence stakeholders' preference for, or avoidance of, local building materials in contemporary construction?
4. To what extent does the perceived social status associated with a material influence its adoption in building construction?
5. What incentives or strategies could encourage greater adoption of local building materials within the Nigerian construction industry?

### 1.5 Scope of Study

This study adopts a national perspective, examining the perception and adoption of local building materials among construction stakeholders across Nigeria rather than restricting itself to a single city, state, or geopolitical zone. The study draws on primary data collected from a cross-section of respondents including architects, builders, engineers, students of the built environment, and other professionals and clients involved in or exposed to building design, construction, or use.

The local materials considered include, but are not limited to, laterite, mud/compressed earth blocks, bamboo, and timber, examined in comparison with conventional materials such as cement, concrete, steel, and glass. The study focuses specifically on stakeholder perception encompassing awareness, attitudes, and beliefs about durability, aesthetics, sustainability, and social status and how these perceptions relate to actual or stated material preference and adoption behaviour. Matters of structural engineering testing, material chemistry, or in-depth cost-benefit modelling of specific materials fall outside the scope of this study, except where such data are drawn from existing literature to support the discussion.

### 1.6 Significance of the Study

The significance of this study lies in its contribution to closing the persistent gap between the technical potential of Nigeria's local building materials and their low rate of adoption in contemporary construction (Alade et al., 2018; Oloruntoba & Ayodele, 2013). By focusing specifically on perception as a driver of adoption, rather than only on material performance, the study offers the following contributions:

- **To the built environment industry**: The findings will provide construction professionals, building material manufacturers, and building product developers with evidence based on the specific perceptions that hinder client and professional uptake of local materials, informing more targeted product development, marketing, and standardization efforts.
- **To policy and regulatory bodies**: Given that housing affordability and the national housing deficit remain pressing policy concerns (Ekpo, 2019; Obakin, 2020), the study's findings can inform government agencies and corporate or regulatory bodies on the incentives and regulatory interventions (e.g., certification, awareness campaigns, building code reforms) needed to promote the use of local materials in mainstream construction.
- **To academia**: The study extends the existing body of literature which is largely composed of localized, single-city assessments (Alade et al., 2018; Nzewi et al., cited therein), by providing a national-level perspective on stakeholder perception, contributing a broader evidence base for future research.
- **To sustainable development**: By identifying pathways to greater adoption of local, low-embodied energy materials, the study contributes to Nigeria's broader sustainability and affordable housing agenda (Obakin, 2020; Windapo & Ogunsanmi, 2014).

### 1.7 Definition of Key Terms

- **Local Building Materials**: Materials sourced, processed, and utilized within a given locality, typically requiring relatively low levels of technology to produce, such as laterite, mud/compressed earth blocks, bamboo, timber, and thatch (Omole & Bako, 2013).
- **Conventional/ Modern Building Materials**: Industrially manufactured, often imported, building materials such as cement, reinforced concrete, steel, and glass, which currently dominates contemporary Nigeria’s construction practice.
- **Perception**: The way in which construction stakeholders interpret, evaluate, and form beliefs and attitudes about the durability, aesthetic value, social inclusion, and suitability of a given building material.
- **Adoption**: The extent to which a building material is selected, specified, and actually used in building design, construction, or ownership decisions.
- **Stakeholders**: Individuals and groups involved in or affected by building construction decisions, including architects, engineers, builders, students of the built environment, and building owners/occupants.
- **Sustainability (in construction)**: The use of materials, methods, and practices that minimize environmental impact, conserve resources, and support long-term social and economic wellbeing (Windapo & Ogunsanmi, 2014).
- **Contemporary Nigerian Construction**: Present-day building practices in Nigeria, characterized by the widespread use of conventional/imported materials alongside a comparatively limited application of local materials.

## 2. LITERATURE REVIEW

This chapter reviews literature on the availability, use, perception, and adoption of local building materials in Nigeria. It traces the material landscape and contemporary construction culture, unpacks the perceptual and structural drivers of material choice, and situates the study within diffusion of innovation and planned behaviour theory before presenting the empirical and conceptual frameworks guiding the research.

### 2.1 Local Building Materials in Nigeria

Nigeria possesses an abundant and long-documented stock of local building materials. Olotuah (2002) was among the earliest to make a sustained case for building with earth as a low-cost housing material in Nigeria, arguing that its abundance and favourable thermal properties make it particularly suited to tropical construction, and noting that walls built with compressed stabilised soil blocks (CSSBs) can be around a third cheaper than conventional alternatives. This cost advantage has since been reaffirmed in more recent work by Abimaje et al. (2017), they reviewed compressed stabilised earth brick (CSEB) as a sustainable building material in Nigeria and concluded that it meets structural performance requirements while remaining significantly cheaper to produce than sandcrete, and Danladi et al. (2025) similarly found that cement-stabilized compressed earth bricks can be engineered to be both cost-effective and structurally adequate for low-rise construction.

Despite this, the local materials market itself remains underdeveloped. Nwaki and Eze (2022), in a survey of construction professionals across Nigeria, found that earth-based construction materials continue to suffer from a weak commercial market compared to conventional materials, even though the underlying materials are technically sound and locally abundant; they recommend deliberate market rejuvenation strategies, including standardization and targeted commercial promotion, to correct this imbalance.

This is emphasized by Oloruntoba and Ayodele (2013) and Ugochukwu et al. (2014), both of whom described local materials as a comparatively underexploited resource relative to the volume of imported materials patronized by Nigerian builders and clients. Beyond earth-based systems, emerging research has also explored novel local/agro-waste materials such as corncob-based building products, which Okeke et al. (2024, 2025) present as viable low-carbon alternatives to conventional cement-based materials, suggesting that Nigeria's local materials base extends beyond traditional earth and timber into a wider range of underexploited agricultural by-products.



Figure 2.1: Compressed Stabilized Earth Blocks (CSEBs) used for sustainable housing construction.

## 2.2 Contemporary Construction Practices

Nigeria's contemporary construction sector remains structured around imported, industrially produced materials, a pattern with roots in outdated planning and regulatory frameworks. Oladapo and Olotuah (2007) argue that Nigeria's real estate laws and policies have not kept pace with the need for sustainable development, leaving construction practice to default to familiar, conventional systems rather than adapting to more resource-efficient alternatives. This is compounded by weak sustainability integration in current building practice: Salami et al. (2021), assessing mixed-use buildings in Lagos, found that sustainability indicators are inconsistently applied across contemporary developments, while Okeke et al. (2020) describe Nigerian cities more broadly as "fragile," with construction practices that do not adequately respond to environmental or resource constraints. The economic implications of this reliance on conventional materials are considerable. Odu (2019) notes that green and resource-efficient housing investment remains a difficult business case to make in the Nigerian and broader African context, given entrenched construction norms and financing structures that favour conventional materials. Comparative international evidence reinforces the scale of what is at stake. Zhang and Xiao (2023) found that building materials account for a substantial share of the life cycle environmental impact of buildings in developing countries, meaning that Nigeria's continued dependence on cement- and steel-based construction carries environmental costs beyond the immediate cost implications discussed in section 2.1.

## 2.3 Perception of Local Building Materials

Perception continues to emerge as the central explanatory variable in the local-materials literature. Umar et al. (2021), assessing architects' awareness of sustainable building materials in Minna, Nigeria, found that awareness levels remain moderate at best, with many practising architects lacking detailed technical knowledge of local and sustainable material options. Similarly, Obia and Obot (2016), surveying architectural practice in South-South Nigeria, found that awareness of sustainability principles exists in the profession but is not consistently translated into design decisions or material specification. Mba et al. (2025), examining green architecture in Enugu State, likewise found that positive perceptions of environmentally responsive design do not necessarily translate into widespread professional practice.

International comparative evidence suggests this perception gap is not unique to Nigeria. Baiche et al. (2008), studying attitudes toward earth construction in Zambia, found that earth remains widely associated with poverty and underdevelopment despite its performance advantages, a finding that closely parallels Aghimien et al.'s (2016) Nigerian finding that public opinion regarding compressed stabilized interlocking earth blocks (CSIEB) is dominated by the belief that earth-based materials are "for the poor," even though the same materials meet structural requirements for general construction. Ben-Alon (2020) frames this as a broader challenge of integrating earthen materials into mainstream, rather than niche or alternative, construction practice internationally. Okanya and Alabdullatief (2026), in the most directly comparable recent Nigerian study, further demonstrate that professional awareness of a novel sustainable material can remain significantly below even a moderate benchmark, and that favourable perception of a material's environmental or performance merits does not reliably predict readiness to specify or adopt it as a distinction central to the study's own preliminary findings.

### 2.4 Factors Influencing Material Preference

A range of factors beyond raw material performance shape building material selection in Nigeria and comparable contexts. Akadiri (2018) identifies cost, availability, durability, and aesthetic appeal as the dominant factors influencing material selection among Nigerian construction professionals, while Ogunkah and Yang (2012) similarly find that green vernacular materials are evaluated by designers against criteria of cost, familiarity, and perceived risk, often to the disadvantage of vernacular options relative to conventional ones. Ekhaese and Ndimako (2023) extend this discussion by highlighting the health and wellbeing benefits of eco-friendly construction materials, suggesting that health considerations represent an underused argument in favour of local and natural materials that has not been fully leveraged in professional or client decision-making.

Client and stakeholder perspectives also shape material choice significantly. Ansah et al. (2015), upon examining housing projects in Ghana, found out that stakeholders weigh a combination of cost, durability, and market availability when selecting materials, with local materials frequently disadvantaged by inconsistent supply. Fei et al. (2021) and Balali et al. (2020) both note that innovative and green materials must compete with conventional materials across multiple criteria simultaneously, including sustainability, cost, and performance. This multi-criteria evaluation framework tends to favour materials with an established track record, which structurally disadvantages local materials that lack extensive documented performance histories. Okanya and Alabdullatief (2026) add a further dimension specific to Nigeria: professional category itself is a significant factor, with architects showing significantly greater willingness than engineers to recommend novel sustainable material to clients, a pattern attributed to disciplinary differences in professional training and risk tolerance.

### 2.5 Barriers to Adoption

Structural and institutional barriers to local material adoption are well documented across the Nigerian construction literature. Ogbu and Osazuwa (2024) identify weak institutional support and limited access to capital as key barriers constraining indigenous construction firms more broadly in Nigeria, conditions that extend naturally to the local materials sector, given that many local material producers operate at a similarly small, under-capitalized scale.

Eze et al. (2023) and Mogaji et al. (2025), in separate but complementary assessments, both identify high initial cost, weak regulatory frameworks, and limited professional awareness as recurring barriers to sustainable and innovative material adoption in Nigeria's construction industry; findings consistent with Unegbu et al.'s (2025) and Ebekozien et al.'s (2024) work discussed earlier in this review.

Koko and Bello (2020) add that inadequate government policy support and weak enforcement of green building standards constitute a further hindrance specific to the Nigerian regulatory environment. International comparative literature situates these barriers within a broader pattern: Khalfan et al. (2015), studying contractor perceptions in Australia, and Choi (2009), examining market barriers to green development in the United States, both find that even in more developed construction markets, cost perception, market inertia, and limited awareness constrain the adoption of alternative or sustainable materials, thus suggesting that Nigeria's barriers, while more acute, are not categorically different from patterns observed internationally. Barbhuiya and Das (2023) note that a lack of accessible, standardized life cycle assessment data further compounds these barriers globally, since decision-makers frequently lack the comparative performance data needed to confidently select alternative materials over familiar, conventional ones.

### 2.6 Sustainability and Local Materials

The sustainability case for local materials rests on strong comparative environmental evidence. Estrada and Lee (2023) demonstrate that concrete carries substantially higher embodied energy and carbon footprint than many alternative construction materials, while Latapie et al. (2023), in a bibliometric analysis of bio- and earth-based building materials, confirm growing global research interest in these materials as a sustainability solution, though they note that this research interest has not yet translated into proportional market uptake. Farid et al. (2022) and Abed et al. (2022) similarly demonstrate the sustainability credentials of engineered wood and mass timber systems as viable structural alternatives to concrete and steel, reinforcing that the environmental case for material diversification extends beyond earth-based materials alone.

Nigerian-specific and comparable African evidence supports this position further. Assoumou et al. (2023), examining compressed earth block use in Ouagadougou, Burkina Faso, propose a conceptual framework for achieving sustainable building outcomes through greater use of compressed earth block, while Lakys et al. (2022) similarly find strong drivers for compressed earth block adoption in Kuwait once acceptance barriers are addressed. Komolafe and Oyewole (2018), examining green building awareness among Lagos office property users, found generally positive awareness but limited translation of that awareness into demand for sustainable buildings or materials; a pattern consistent with the attitude–behaviour gap raised throughout this chapter. Ebohon et al. (2026) further note that circular construction material adoption faces comparable structural barriers even in more developed supply chains such as the UK and China, reinforcing that Nigeria's sustainability-adoption gap reflects a global structural challenge rather than a uniquely local shortcoming, even as its severity is compounded by weaker local regulation (Unegbu et al., 2025).

## 2.7 Theoretical Framework

This study is anchored on **Rogers' (2003) Diffusion of Innovation (DOI) Theory** and **Ajzen's (1991) Theory of Planned Behaviour (TPB)**, introduced in the previous version of this chapter. Additional recent literature strengthens the case for this pairing. Nguyen and Khanh (2025) apply the Theory of Planned Behaviour directly to barriers in sustainable building material adoption, finding that attitude, subjective norms, and perceived behavioural control each independently shape adoption intention directly supporting this study's use of TPB to explain the gap between positive attitudes toward local materials and actual adoption behaviour. Kumar and Tawalare (2021) and Mahat et al. (2019), examining green building technology adoption in India and Malaysia respectively, both identify relative advantage and compatibility (core diffusion of innovation constructs) as critical determinants of adoption success, lending cross-national support to Rogers' framework in construction-materials contexts specifically.

The international timber-adoption literature offers a particularly close theoretical parallel. Laguarda Mallo and Espinoza (2015) found that awareness was strongly associated with willingness to adopt cross-laminated timber among American architects, while Markström et al. (2018) found that Swedish architects valued the environmental and aesthetic advantages of engineered wood but remained constrained by cost and technical uncertainty; a pattern of "relative advantage without full trialability or observability" that mirrors Rogers' theoretical predictions. Rajendra and Mohanasundaram (2025) similarly identify civil engineers and architects as key gatekeepers whose adoption decisions determine broader market uptake of smart and green building materials, reinforcing the relevance of professional category as a moderating variable in this study's conceptual framework.

Okanya and Alabdullatief (2026) apply this same theoretical lineage directly within Nigeria, showing that low awareness prevents Rogers' diffusion process from progressing beyond the "knowledge" stage, while limited local availability and the absence of demonstration projects independently reduce trialability and observability.

## 2.8 Empirical Framework

Empirical precedent for this study's approach comes from both Nigerian and comparative African evidence. Agyekum et al. (2020), surveying built-environment professionals in Ghana, found that vernacular building materials such as timber, bamboo, and laterite are viewed favourably in principle for green building delivery, yet remain underused in practice due to structural and market barriers similar to those identified in Nigeria. Mba et al. (2024), reviewing evolving trends in sustainable architectural design practice, found a persistent gap between design aspiration and built outcome across African contexts, reinforcing the "attitude-behaviour gap" that runs throughout this review. Within Nigeria specifically, Alade et al. (2018) empirically demonstrated a gap between the availability and actual usage of local materials in Ado-Ekiti, while Windapo and Ogunsanmi (2014) found no statistically significant difference in the environmental impact of local versus conventional materials, undermining assumptions of conventional-material superiority.

Ebekozien et al. (2024) and Unegbu et al. (2025) both provide quantitative and qualitative confirmation that cost, regulation, and client demand, rather than material performance, are the dominant empirical predictors of adoption outcomes in Nigeria's construction sector.

Most recently, Okanya and Alabdullatief (2026) provide the closest empirical precedent to this study, explicitly distinguishing "favourable perception" from "adoption readiness" among 254 Nigerian construction professionals and finding that professional category significantly predicts adoption willingness; a distinction and a variable this study incorporates directly into its own conceptual framework (Section 2.9). Taken together, this body of empirical work establishes strong precedent for a perception-driven, professionally-differentiated adoption gap, but remains fragmented across single-city studies, single-material studies, or single-profession samples. This study's national, mixed-stakeholder approach is designed to address that fragmentation directly.

### 2.9 Conceptual Framework

The conceptual framework presented in the previous message, where perception-related factors and structural/enabling factors interact, moderated by stakeholder characteristics, to determine adoption remains the guiding model for this study. The additional literature reviewed in this chapter reinforces each element of that framework: perception-related factors are supported by sections 2.3 and 2.7 (Umar et al., 2021; Baiche et al., 2008; Okanya & Alabdullatief, 2026); structural/enabling factors are supported by sections 2.5 and 2.6 (Eze et al., 2023; Mogaji et al., 2025; Koko & Bello, 2020); and the moderating role of stakeholder type is directly supported by Okanya and Alabdullatief's (2026) finding that professional category significantly predicts adoption willingness independent of experience or location. The framework therefore proposes, consistent with the wider literature reviewed in this chapter, that adoption of local building materials in Nigeria will remain limited unless positive perception and structural enablement are addressed jointly, rather than in isolation.

## 3. METHODOLOGY

This study adopted a quantitative research methodology to investigate stakeholders' perceptions and adoption of local building materials within the Nigerian construction industry. The quantitative approach was considered appropriate because the study sought to obtain objective and measurable data regarding respondents' awareness, perceptions, material preferences, perceived barriers, sustainability considerations and willingness to utilise local building materials in contemporary construction. Quantitative research facilitates the systematic collection and analysis of numerical data, enabling researchers to identify patterns and trends across a relatively large group of respondents while reducing subjective bias in the interpretation of findings.

### 3.1 Research Philosophy

This study is anchored on the **positivist research philosophy**, which maintains that social phenomena can be investigated objectively through empirical observation and systematic analysis. Positivism assumes that knowledge is derived from observable evidence and that relationships among variables can be examined using structured methods capable of producing reliable and replicable findings. The philosophy is particularly suited to quantitative research where numerical data are collected and analyzed to explain existing patterns of behaviour.

### 3.2 Research Design

The study adopted a cross-sectional survey research design. A cross-sectional survey involves collecting data from a defined population at a single point in time in order to examine existing opinions, behaviours and conditions without manipulating the study environment. This design was considered appropriate because the research sought to assess the current perceptions of construction stakeholders regarding local building materials rather than monitor changes over an extended period. Furthermore, the findings were interpreted using the propositions of the Diffusion of Innovation Theory and the Theory of Planned Behaviour, thereby connecting the descriptive survey results with established theoretical explanations of innovation adoption within the construction industry.

### 3.3 Study Area

The study was conducted within the Nigerian construction industry through a nationwide online survey administered using Google Forms. Nigeria provides a suitable context for investigating the adoption of local building materials due to its abundant natural resources, diverse climatic conditions, rich architectural heritage and rapidly expanding construction sector. The country possesses extensive deposits of indigenous building materials, including laterite, clay, timber, bamboo, natural stone, raffia, and agricultural residues, many of which have historically been utilized in vernacular architecture across its various ecological zones. These materials have demonstrated considerable potential for promoting environmentally sustainable and climate-responsive construction while reducing dependence on imported or highly processed conventional materials.

### 3.4 Target Population

The population of the study comprised stakeholders actively engaged in Nigeria's built environment and construction industry whose professional activities involve the specification, selection, production, regulation or utilization of building materials. These stakeholders play significant roles in construction decision-making and therefore possess valuable insights into the factors influencing the adoption of local building materials.

### 3.5 Sampling Technique

A non-probability sampling approach was adopted for this study, combining purposive sampling and snowball sampling techniques. The choice of this approach was informed by the specialized nature of the target population, which comprised construction professionals and individuals with relevant knowledge of building materials and sustainable construction practices. The questionnaire was administered electronically through Google Forms over the study period. At the conclusion of data collection, 106 valid responses were obtained and retained for analysis after screening for completeness and consistency. Responses containing substantial missing information or duplicate entries were excluded from the final dataset to improve data quality and ensure the reliability of the findings.

### 3.6 Research Instruments

Primary data for the study were collected using a structured questionnaire developed after an extensive review of literature relating to sustainable construction, indigenous building materials, material selection and behavioural adoption. The questionnaire served as the principal data collection instrument because it enabled information to be obtained directly from respondents in a standardized manner while facilitating quantitative analysis of the collected data.

The questionnaire was developed to align with the objectives of the study and were informed by concepts identified within the literature review and theoretical framework.

### 3.7 Data Collection

Primary data for this study were collected through a structured online questionnaire administered using Google Forms. The online mode of data collection was selected because it provided an efficient and cost-effective means of reaching construction professionals and other stakeholders distributed across different regions of Nigeria. The increasing adoption of digital communication platforms among built environment professionals further enhanced the suitability of this approach, allowing respondents to complete the questionnaire at their convenience irrespective of geographical location.

### 3.8 Method of Data Analysis

The study employed descriptive statistical techniques because the primary objective was to examine and describe stakeholders' perceptions regarding the adoption of local building materials in contemporary Nigerian construction. Descriptive statistics provide an effective means of summarising quantitative data, identifying patterns within responses and presenting findings in a clear and interpretable manner. Respondents' demographic characteristics were analyzed using frequency distributions and percentages, providing an overview of the professional composition of the study sample and other relevant background characteristics. Similar descriptive measures were employed to examine respondents' awareness of local building materials, perceptions regarding their suitability for modern construction, material preferences, perceived barriers to adoption and views concerning sustainability. The use of frequencies and percentages enabled straightforward comparison of response patterns across questionnaire items while highlighting the prevailing opinions of participants.

Beyond the statistical summaries, the findings were interpreted through the theoretical perspectives of the Diffusion of Innovation Theory and the Theory of Planned Behaviour, which served as the principal interpretive frameworks for the study. The Diffusion of Innovation Theory provided insight into respondents' acceptance of indigenous building materials as innovations within the construction industry, while the Theory of Planned Behaviour offered a behavioural perspective for understanding how awareness, perceptions and attitudes may influence stakeholders' willingness to utilise local building materials in contemporary construction practice. Rather than treating these theories solely as conceptual foundations, they were applied in the interpretation of the empirical findings presented in chapter four, thereby strengthening the relationship between the literature, methodology and discussion.

## 4. RESULTS AND DISCUSSION

This chapter presents the results of the questionnaire survey administered to construction stakeholders across Nigeria and discusses them through the theoretical lens established in chapter two which are; Rogers' (2003) Diffusion of Innovation (DOI) Theory and Ajzen's (1991) Theory of Planned Behaviour (TPB). Rather than treating theory as a closing remark, each results section below is read against the specific construct it addresses: awareness results are read as evidence of where respondents sit on Rogers' innovation-decision process.

Preference, durability, and status results are read through TPB's attitude, subjective norm, and perceived behavioural control; and sustainability results are read through the "relative advantage" attribute central to both theories. A total of 106 valid responses were received and analyzed using descriptive statistics (frequencies and percentages), consistent with the quantitative, cross-sectional design described in chapter three.

### 4.1 Respondent Characteristics

Table 4.1: Occupational Distribution of Respondents

| Occupation Category | Frequency | Percentage |
|---|---|---|
| Architects | 41 | 38.7% |
| Students (built environment) | 30 | 28.3% |
| Other professionals/clients | 13 | 12.3% |
| Freelancers | 12 | 11.3% |
| Builders | 6 | 5.7% |
| Engineers | 4 | 3.8% |
| Total | 106 | 100% |

Source: Field Survey, 2026

Table 4.2: Gender Distribution

| Gender | Frequency | Percentage |
|---|---|---|
| Male | 75 | 70.8% |
| Female | 31 | 29.2% |

Source: Field Survey, 2026

Table 4.3: Prior Involvement with Local Building Materials

| Response | Frequency | Percentage |
|---|---|---|
| Yes | 55 | 51.9% |
| No | 51 | 48.1% |

Source: Field Survey, 2026

The sample is largely dominated by architects and students of the built environment (67.0% combined), giving the study a strong professional and technical perspective consistent with the professional-focused samples used in comparable Nigerian studies (Okanya & Alabdullatief, 2026; Umar et al., 2021). Respondents are predominantly male (70.8%), reflecting the wider gender composition of Nigeria's construction workforce. Just over half (51.9%) reported prior direct involvement with local materials, indicating that this variable becomes important below, as Rogers (2003) treats direct exposure as a distinct pathway into the innovation-decision process, and separate from awareness gained through training or hearsay.

### 4.2 Awareness (Read as Rogers' 'Knowledge' Stage)

Rogers' (2003) Diffusion of Innovation Theory opens with a "knowledge" stage, in which an individual is first exposed to an innovation's existence and gains some understanding of how it works. The results below are read as a measure of where this sample sits on that stage.

Table 4.4: Self-Reported Familiarity with Local Building Materials

| Familiarity Level | Frequency | Percentage |
|---|---|---|
| Somewhat familiar | 31 | 29.2% |
| Slightly familiar | 30 | 28.3% |
| Very familiar | 30 | 28.3% |
| Not familiar | 15 | 14.2% |

Source: Field Survey, 2026

Table 4.5: Familiarity by Prior Involvement with Local Materials

| Familiarity | Involved = Yes | Involved = No |
|---|---|---|
| Very familiar | 25 | 5 |
| Somewhat familiar | 17 | 14 |
| Slightly familiar | 12 | 18 |
| Not familiar | 1 | 14 |

Source: Field Survey, 2026

Only 28.3% of respondents describe themselves as "very familiar," while a combined 42.5% report only slight or no familiarity; indicating that in Rogers' (2003) terms, a substantial share of this professionally-skewed sample has not yet fully completed the knowledge stage for local materials, despite being built-environment practitioners. This is consistent with Umar et al. 's (2021) finding that Nigerian architects' awareness of sustainable and local materials tends to sit at a moderate rather than advanced level.

Table 4.5 shows that "very familiar" respondents are heavily concentrated among those with prior direct involvement (25 of 55, or 45.5%) versus those without (5 of 51, or 9.8%). This is theoretically significant: it suggests that in the Nigerian context, progression through Rogers' knowledge stage is being driven by direct, hands-on exposure rather than by formal professional training or channels of mass communication, a pathway Rogers (2003) identifies as slower and less scalable than media- or institution-led diffusion. This has direct implications for the recommendations in chapter five: if exposure is the main driver of awareness, then demonstration and pilot projects (which manufacture exposure deliberately) should diffuse awareness faster than campaigns relying on information alone.

### 4.3 Material Preference (Read Through the Theory of Planned Behaviour and DOI Attributes)

Table 4.6: Perceived Durability of Local Materials Compared to Concrete

| Perception | Frequency | Percentage |
|---|---|---|
| Less durable | 45 | 42.5% |
| About the same | 25 | 23.6% |
| More durable | 24 | 22.6% |
| Not sure | 12 | 11.3% |

Source: Field Survey, 2026

Table 4.7: Preferred Building Material Type

| Preference | Frequency | Percentage |
|---|---|---|
| Combination of both | 65 | 61.3% |
| Conventional/modern materials only | 39 | 36.8% |
| Local materials only | 2 | 1.9% |

Source: Field Survey, 2026

Table 4.8: Preferred Material by Perceived Durability

| Durability Perception | Combination | Conventional Only | Local Only |
|---|---|---|---|
| Less durable | 26 | 19 | 0 |
| About the same | 16 | 8 | 1 |
| More durable | 17 | 6 | 1 |
| Not sure | 6 | 6 | 0 |

Source: Field Survey, 2026

Table 4.9: Perceived Effect of Local Materials on Social Status

| Response | Frequency | Percentage |
|---|---|---|
| Yes, positively | 29 | 27.4% |
| Yes, negatively | 27 | 25.5% |
| Not sure | 26 | 24.5% |
| No effect | 24 | 22.6% |

Source: Field Survey, 2026

Table 4.10: Main Reasons People Avoid Local Materials (multiple responses permitted)

| Reason | Frequency | Percentage of Respondents |
|---|---|---|
| Perception of being outdated or low-class | 83 | 78.3% |
| Lack of awareness | 55 | 51.9% |
| Lack of skilled labour | 48 | 45.3% |
| Low durability | 32 | 30.2% |
| Government regulations/lack of standardisation | 28 | 26.4% |
| Poor availability | 19 | 17.9% |

Source: Field Survey, 2026

Ajzen's (1991) TPB proposes that behavioural intention here, that the intention to specify or use local materials is jointly predicted by attitude (personal evaluation of the behaviour), subjective norms (perceived social pressure), and perceived behavioural control (perceived ease or difficulty of performing the behaviour). Each construct is directly observable in this data:

- **Attitude**: Table 4.6 shows attitudes toward local materials' durability are mixed but not hostile, 46.2% rate them as equal or superior to concrete. This is a moderately favourable, not negative attitude base.
- **Subjective norms**: Table 4.9 shows social-status perception almost evenly split between positive (27.4%), negative (25.5%), and neutral or unsure (47.1% combined) indicating unsettled, contested social norms rather than a uniformly discouraging one. Critically, Table 4.10 shows "perception of being outdated or low-class" is cited by 78.3% of respondents as a reason others avoid local materials, which is far higher than the personal ambivalence shown in Table 4.9. This gap between a respondent's own attitude and their perception of social judgement is precisely what TPB predicts subjective norms should capture, that people can hold personally favourable views while still believing the wider social environment penalizes the behaviour.
- **Perceived behavioural control**: Table 4.10 also shows "lack of skilled labour" (45.3%) and "government regulations/lack of standardization" (26.4%) as major cited barriers, these are control-related, not attitudinal, barriers. They describe respondents' confidence in their ability to specify and execute local-material construction well, not their desire to.

Table 4.8, read through Rogers' (2003) DOI attributes, adds a further layer. Even respondents who rate local materials as more durable than concrete overwhelmingly still choose a combination of materials (17 of 24) over local materials alone (1 of 24). This is best explained by trialability; Rogers' concept that an innovation adopted partially, alongside an existing familiar option, is a lower-risk trial behaviour than full replacement. The dominance of "combination" preference across every durability category in Table 4.8 (not just among critics) suggests that respondents are engaging in exactly this kind of low-risk, partial trial adoption, rather than being blocked outright by disbelief in the material's performance.

### 4.4 Sustainability — Read as "Relative Advantage" and the Attitude–Intention Link

Table 4.11: Importance of Environmental Sustainability in Material Choice
Source: Field Survey, 2026

| Rating | Frequency | Percentage |
|---|---|---|
| Very important | 86 | 81.1% |
| Important | 15 | 14.2% |
| Slightly important | 4 | 3.8% |
| Not important | 1 | 0.9% |

Table 4.12: Willingness to Use Local Materials if Improved and Standardized

| Response | Frequency | Percentage |
|---|---|---|
| Yes | 95 | 89.6% |
| Maybe | 9 | 8.5% |
| No | 2 | 1.9% |

Source: Field Survey, 2026

Table 4.13: Incentives Perceived to Encourage Greater Adoption (multiple responses permitted)

| Incentive | Frequency | Percentage of Respondents |
|---|---|---|
| Improved technology and design methods | 87 | 82.1% |
| Awareness campaigns | 68 | 64.2% |
| Training for builders and artisans | 65 | 61.3% |
| Successful model/demonstration projects | 59 | 55.7% |
| Government subsidies or policies | 43 | 40.6% |

Source: Field Survey, 2026

Rogers (2003) identifies relative advantage as the degree to which an innovation is perceived as better than the idea it supersedes, which is the single strongest predictor of adoption rate across his meta-analyzes of diffusion studies. Table 4.11 shows the potential for perceived relative advantage is extremely high: 81.1% rate environmental sustainability as “very important” in material choice, a criterion on which local materials generally outperform cement and steel (Windapo & Ogunsanmi, 2014; Estrada & Lee, 2023). Table 4.12 shows this translates into strong conditional behavioural intention: 89.6% would use local materials if quality were improved and standardized.

Yet this is precisely where TPB’s distinction between intention and behaviour becomes critical: Table 4.7 shows only 1.9% currently act on local-material preference alone, despite this near-unanimous conditional intention. Ajzen (1991) attributes such intention–behaviour gaps to insufficient perceived behavioural control at the point of action, and Table 4.13 confirms this directly, with respondents locating the missing enabling conditions in product quality (improved technology and design methods at 82.1%) and observability (successful model/demonstration projects at 55.7%) rather than in subsidy (40.6%, the lowest-ranked incentive). In Rogers’ (2003) terms, this sample has largely completed the persuasion stage (favourable attitude formed) but remains delayed before the decision and implementation stages, precisely because trialability and observability which are the two DOI attributes most within reach of demonstration projects and standardization remain underdeveloped.

### 4.5 Discussion of Findings

#### 4.5.1 Findings in Relation to Diffusion of Innovation Theory

Read as a whole, the data place this sample at a specific point on Rogers' (2003) innovation-decision process: knowledge is partial (only 28.3% are very familiar as indicated in Table 4.4), persuasion is largely favourable (46.2% rate local materials as equal or superior in durability, 81.1% value sustainability highly), but the process stalls before decision and implementation, because two of Rogers' five innovation attributes which are trialability and observability remain weak. The strong preference for combination use (61.3%, Table 4.7) even among durability-optimists (Table 4.8) is itself an evidence of trialability being exercised in the only low-risk form currently available, while the top-ranked incentive; successful model projects (55.7%, Table 4.13) is a direct, unprompted request from respondents for greater observability. This gives empirical, Nigeria-specific confirmation to Okanya and Alabdullatief's (2026) theoretical argument that low availability and the absence of demonstration projects, not attitude are what prevent Rogers' diffusion process from completion in the Nigerian construction sector.

#### 4.5.2 Findings in Relation to the Theory of Planned Behaviour

The data also confirm all three TPB constructs operating simultaneously, but with subjective norms as the construct doing the most damage relative to the other two. Attitude is moderately-to-strongly favourable (Tables 4.6, 4.11), and perceived behavioural control, while constrained (concerns about skilled labour and standardization, Table 4.10), is not reported as severely as the social-perception barrier. The single most-cited reason for avoiding local materials is the perception of being outdated or low-class at 78.3%. Table 4.10 is a subjective-norm variable, not an attitude or control variable; it describes a belief about what others will think, not a personal evaluation of the material or a belief about one's own capability. This directly corroborates Aghimien et al.'s (2016) and Baiche et al.'s (2008) qualitative findings on earth-material stigma, but extends them by showing, quantitatively, that this norm-based barrier outweighs both attitude-based and control-based barriers combined in this sample.

#### 4.5.3 Synthesis and Validation of the Conceptual Framework

Sections 4.5.1 and 4.5.2 jointly validate the conceptual framework proposed in section 2.9: adoption is shown here to be a product of the interaction between perception-related factors (attitude, subjective norms, awareness) and enabling factors (standardization, training, demonstration availability), rather than them either acting alone. Notably, professional category functions as expected in the moderating role assigned to it in the framework: architects and students, who dominate this sample, show high favourable attitude and sustainability valuation but still report low actual local-material-only adoption (1.9%).

This suggests the moderating effect of how stakeholder type operates on degree of favourability rather than removing the underlying perception–enablement gap altogether. This chapter therefore concludes that closing Nigeria's local-materials adoption gap requires interventions that simultaneously; (i) shift subjective norms through visible, high-status demonstration projects, and (ii) increase perceived behavioural control through standardization and skilled-labour training; a two-way conclusion that carries directly into the recommendations in chapter five.

## 5.SUMMARY

This study set out to examine the perception of construction stakeholders toward local building materials in Nigeria and how that perception shapes their adoption in contemporary practice, using a national sample of 106 respondents and the combined theoretical lens of Rogers' (2003) Diffusion of Innovation Theory and Ajzen's (1991) Theory of Planned Behaviour.

### 5.1 Summary of Findings

Three findings stand out as the core empirical contributions of this study:

- Awareness is moderate and exposure-driven, not training-driven. Only 28.3% of a professionally-skewed sample describe themselves as very familiar with local materials, and familiarity is heavily concentrated among those with prior hands-on involvement rather than those with only formal training, indicating that Rogers' (2003) knowledge stage of diffusion is progressing slowly and unevenly across the Nigerian construction workforce.
- Subjective norms, not attitude or technical belief, are the dominant barrier to adoption. While attitudes toward local materials' durability and sustainability are moderately-to-strongly favourable, 78.3% of respondents cite perception of being outdated or low-class as the main reason local materials are avoided making it the single largest gap in the entire dataset between personal belief and perceived social judgement, and the clearest evidence that Ajzen's (1991) subjective-norm construct, rather than attitude, is suppressing adoption in this population.
- Intention to adopt is nearly universal, but conditional on trialability and observability, not subsidy. 89.6% of respondents would use local materials if quality were improved and standardised, and the top-ranked incentives are improved technology and design methods (82.1%) and successful model/demonstration projects (55.7%), both DOI-attribute interventions. Whilst government subsidies or policies ranked lowest (40.6%). This indicates the adoption gap in Nigeria is currently better characterized as a reliability or observability gap than a purely financial or regulatory one.

### 5.2 Conclusion

The study concludes that the underutilization of local building materials in contemporary Nigerian construction is not primarily a function of their technical inadequacy, nor primarily a function of cost or regulatory failure, but is best explained as an unresolved interaction between social perception and structural enablement, exactly as proposed in the conceptual framework of section 2.9. Stakeholders in this national sample are neither uninformed nor hostile toward local materials; they are, in Rogers' (2003) terms, persuaded but not yet enabled to decide and implement, and in Ajzen's (1991) terms, favourably disposed but constrained by a subjective norm they do not necessarily hold personally.

This reframes the policy and professional challenge; efforts to promote local materials in Nigeria should treat visible demonstration and reputation-building as at least as important as cost incentives or technical improvement alone

### 5.3 Contribution to Knowledge

This study contributes to existing literature in three ways. First, it provides a national, mixed-stakeholder (rather than single-city or single-profession) empirical account of the perception–adoption relationship, addressing the fragmentation noted in Section 2.8. Second, it offers quantitative confirmation, via a 106-respondent survey, of a mechanism subjective-norm-driven stigma outweighing attitude and control barriers, that had previously been supported mainly by qualitative or theoretical work (Aghimien et al., 2016; Baiche et al., 2008; Okanya & Alabdullatief, 2026). Third, it demonstrates the practical value of applying Rogers' (2003) DOI and Ajzen's (1991) TPB jointly, rather than singly, to Nigerian construction-materials research, showing that the two frameworks isolate distinct and complementary barriers (trialability and observability under DOI; subjective norms under TPB) that a single-theory analysis would likely have blurred together.

### 5.4 Recommendations

The study recommends:

- Invest in visible demonstration projects. Since observability was both the theoretically-predicted missing DOI attribute and the third-highest-ranked incentive named directly by respondents (55.7%), government agencies, professional bodies, and material producers should prioritise well-publicised flagship or model buildings using local materials, particularly in urban, high-visibility locations, to directly counter the outdated/low-class subjective norm (identified in section 4.5.2).
- Develop and enforce material standardization and certification. Given that standardization-related concerns appear across barriers (26.4%) and near-unanimous conditional willingness (89.6%) hinges on "improved and standardized" quality, national standards bodies (e.g., relevant Nigerian building-materials research and standards institutions) should prioritize certifiable quality benchmarks for common local materials such as compressed stabilized earth blocks.
- Target awareness campaigns at closing the exposure gap, not just the information gap. Since familiarity was shown to be driven by direct involvement rather than general awareness campaigns (Table 4.5), campaigns should be redesigned around hands-on exposure such as site visits, training workshops, and material-handling demonstrations, rather than passive information dissemination alone.
- Invest in skilled-labour training for local-material construction techniques, to address the perceived-behavioural-control barrier (45.3% citing lack of skilled labour) identified in section 4.5.2, independent of the subjective-norm interventions above.
- Reinstate subsidy-based policy interventions, which respondents ranked lowest among proposed incentives (40.6%), behind quality, awareness, training, and demonstration measures, suggesting that policy resources may currently be better spent on the enablement measures above than on direct financial subsidy alone.

### 5.5 Limitations of the Study

This study is limited by its reliance on a single, non-probability sample of 106 respondents, skewed toward architects and students of the built environment (67.0% combined), which may not fully represent the perspectives of clients, artisans, or end-users with less formal construction training. Finally, local building materials were treated as a single broad category in the questionnaire; perception may vary meaningfully across specific material types (e.g., laterite versus bamboo versus timber), a distinction this study was not designed to isolate.

### 5.6 Suggestions for Further Research

Future research should consider;

- A probability-based, larger national sample stratified to include clients, artisans, and building users more fully
- Longitudinal or experimental designs capable of testing whether demonstration-project exposure causally shifts subjective norms and adoption behaviour, as this study's cross-sectional design could only suggest
- Material-specific perception studies that disaggregate the broad "local materials" category used here, to determine whether the subjective-norm barrier identified in this study applies uniformly across laterite, bamboo, timber, and other local materials, or is concentrated in specific material types.

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## APPENDIX

## SURVEY QUESTIONNAIRE

### SECTION A: General Information

1. What is your occupation?
2. Have you ever been involved in the design, construction, or use of a building that uses local materials (e.g., mud blocks, bamboo, laterite, timber)?
3. If yes, what type of local material was used?

### SECTION B: Awareness and Perception of Local/ Indigenous materials

This section explores people's awareness and attitudes toward local building materials.

4. How familiar are you with the use of local building materials?
5. In your opinion, how would you describe the durability of local materials compared to concrete?
6. What words come to mind when you think about local building materials?
7. Do you think local building materials can meet modern design and aesthetic standards?

### SECTION C: Reasons for Material Preference

This section focuses on understanding the reasons behind people's material choices.

8. What type of building materials do you prefer for construction?
9. Why do you prefer your chosen material? (answers are not included)
10. What are the main reasons people avoid using local materials?
11. Do you think using local materials affects the social status or image of a building owner?

### SECTION D: Sustainability and Future Adoption

This section explores how sustainability and innovation could influence the use of local materials in the future.

12. How important is environmental sustainability in your choice of building materials?
13. Would you consider using local materials if they were improved in quality and standardized?
14. What incentives do you think could encourage people to use more local materials?
15. In your opinion, what can be done to promote the use of local materials in the construction industry? (answers are not included)

### THANK YOU

Your participation and responses are highly appreciated and will contribute significantly to the success of this research.