Assessing Barriers to Green Construction in Oil-Producing Developing Countries

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Abstract

The construction sector accounts for nearly 40% of global energy-related carbon dioxide emissions, positioning green construction as a critical pathway for climate mitigation. However, adoption remains uneven in oil-producing developing countries, where economic dependence on hydrocarbons, weak institutional capacity, and market constraints continue to impede sustainability transitions. This study undertakes a comparative systematic review of barriers to green construction adoption in Nigeria, Angola, and the United Arab Emirates (UAE). Guided by PRISMA 2020 and CASP quality appraisal frameworks, peer-reviewed literature published between 2015 and 2023 was systematically analysed. The findings reveal that financial constraints, regulatory fragmentation, limited technical capacity, and political economy resistance represent the most pervasive barriers across the three contexts. While Nigeria and Angola exhibit structural enforcement weaknesses and market immaturity, the UAE demonstrates stronger institutional alignment but faces concerns regarding symbolic compliance versus measurable impact. The study contributes a context-sensitive understanding of sustainability constraints in petro-states and highlights the need for integrated policy, fiscal incentives, and institutional reform to support low-carbon construction pathways in oil-dependent economies.

Keywords

Green construction; oil-producing economies; sustainability; institutional barriers; systematic review

1. Introduction

The global construction sector remains one of the most carbon-intensive industries, contributing approximately 39% of global energy-related emissions when operational and embodies energy are combined (GlobalABC, UNEP &

IEA, 2023). In response, green construction—defined as the integration of energy efficiency, low-carbon materials, and sustainable design principles—has emerged as a central strategy for mitigating climate change within the built environment. While adoption has accelerated in high-income economies, implementation remains uneven across developing oil-producing states.

Oil-dependent economies face a paradox: hydrocarbon revenues finance large-scale infrastructure development, yet this same dependency constrains the incentive for low-carbon transformation. Resource rent reliance weakens diversification incentives and often entrenches institutional resistance to environmental regulation (Auty, 1993). As a result, sustainability policies may exist on paper but face persistent enforcement and market-level barriers.

This article undertakes a comparative systematic review of three oil-producing developing contexts—Nigeria, Angola, and the United Arab Emirates (UAE). These cases represent varying degrees of institutional capacity, economic diversification, and regulatory maturity. The study addresses the following research questions:

1. What is the current status of green construction adoption in oil-producing developing economies?
2. What institutional, economic, technical, and socio-political barriers constrain adoption?
3. How do these barriers differ across Nigeria, Angola, and the UAE?

By answering these questions, the article contributes to a more context-sensitive understanding of sustainable construction transitions in petro-states.

2. Literature Review

2.1. Green Construction and Sustainability in the Built-Environment

Green construction has become a central pillar of global sustainability strategies, particularly within the built environment due to the sector's large contribution to energy consumption and greenhouse gas emissions. The Global Status Report for Buildings and Construction confirms that the buildings sector accounts for approximately 39% of global energy-related carbon dioxide emissions when both operational and embodied carbon are considered (GlobalABC, UNEP & IEA, 2023). As a result, sustainable construction practices—ranging from energy-efficient building envelopes and passive design strategies to low-carbon materials and lifecycle-based project planning—are increasingly viewed as essential mechanisms for achieving national and international climate targets.

Empirical research consistently demonstrates that green buildings deliver long-term economic and environmental benefits. Sustainable buildings reduce lifecycle operating costs while improving indoor environmental quality and asset value. Similarly, Ahn et al. (2013) demonstrate that developers and contractors with previous green building experience are more likely to

perceive sustainability as economically viable rather than cost prohibitive. These findings challenge early narratives that framed green construction as inherently expensive, instead positioning it as a long-term investment decision.

However, despite clear performance advantages, the diffusion of green construction practices remains uneven across global regions. While high-income economies have institutionalised green certification systems and compliance mechanisms, developing and resource-dependent economies continue to face structural barriers to adoption (Darko & Chan, 2017; Chan et al., 2018). These disparities are particularly pronounced in oil-producing developing economies, where fossil fuel dependency shapes both political priorities and investment behaviour.

2.2. Political Economy of Oil-Producing Economies and the Resource Curse

The political economy of oil-producing states creates unique constraints on sustainability transitions. The resource curse thesis argues that nations with abundant natural resources frequently experience slower institutional development, regulatory weakness, and economic concentration (Auty, 1993). Oil rents often reduce the need for diversified tax structures, weakening government accountability and slowing regulatory reform.

Oil-dependent economies tend to exhibit lower long-term growth rates and weaker institutional performance compared to diversified economies. This structural condition directly affects environmental governance, as fossil fuel revenues insulate dominant economic actors from regulatory pressure. In the context of green construction, this results in weak compliance enforcement, limited fiscal incentives for sustainability innovation, and persistent prioritisation of carbon-intensive development pathways.

Oil-exporting states face heightened uncertainty when attempting to transition toward sustainable energy and construction systems due to revenue volatility and political risk. The resulting investment environment discourages long-term green infrastructure finance, reinforcing a lock-in effect that slows sustainability adoption across the construction sector.

2.3. Institutional Theory and Regulatory Capacity

Institutional theory provides a critical lens for understanding why green construction policies often fail to translate into effective implementation in developing contexts. It is distinguished between formal institutions (laws, regulations, policy frameworks) and informal institutions (norms, professional cultures, behavioural expectations). Effective sustainability transitions require alignment between both.

In many oil-producing developing countries, green construction regulations exist formally but remain weakly enforced due to institutional fragmentation, limited oversight capacity, and regulatory capture. Alshamsi et al. (2022) find

that in several oil-exporting states, sustainability policies exist primarily at a symbolic level, lacking detailed implementation mechanisms, monitoring systems, and enforcement penalties.

The institutional weakness is particularly visible in Nigeria and Angola, where regulatory agencies frequently operate with overlapping mandates, limited technical expertise, and politically constrained authority. In contrast, the UAE demonstrates a stronger alignment between formal regulatory instruments and enforcement capacity, supported by centralised planning authorities and performance-based building codes (Al-Hajj & Hamani, 2011; Alshamsi et al., 2022).

2.4. Diffusion of Innovations and Market Readiness

The diffusion of innovations theory provides further insight into why green construction spreads more rapidly in some contexts than others. Innovation adoption is driven by perceived advantage, compatibility with existing practices, complexity, and observability. In green construction, high capital costs, limited technical familiarity, and weak demonstration effects slow diffusion in developing economies.

Darko and Chan (2017) identify lack of client demand, limited professional experience, and poor awareness of long-term benefits as major constraints on green building adoption. Similarly, Chan et al. (2018) find that stakeholder resistance within construction supply chains—particularly among contractors and material suppliers—slows technology uptake even when regulatory frameworks exist.

Chan et al. (2018) reinforce these findings in African construction markets, showing that skills shortages, limited access to certified materials, and inadequate professional training significantly constrain sustainable construction practices. These challenges mirror conditions in Nigeria and Angola, where local markets for green materials remain underdeveloped and professional accreditation systems are weak.

2.5. Stakeholder Theory and Governance Complexity

Stakeholder theory further highlights the importance of inclusive governance and multi-actor coordination in sustainability transitions. Freeman (1984) argues that sustainable policy outcomes depend on the effective alignment of government, industry, civil society, financial institutions, and communities.

In oil-producing developing contexts, stakeholder misalignment frequently undermines sustainability efforts. Developers often prioritise short-term profitability, governments prioritise economic growth and revenue generation, while local communities experience the environmental externalities of extractive industries. This governance fragmentation is particularly evident in Nigeria's construction sector, where regulatory conflicts between federal and state authorities dilute sustainability enforcement.

By contrast, the UAE exhibits a more centralised stakeholder governance structure, where sustainability compliance is institutionally enforced through coordinated public–private mechanisms. This reflects ecological modernisation principles, where environmental reform is embedded within state-led economic modernisation strategies.

2.6. Financial and Market Barriers to Green Construction

Financial constraints remain one of the most consistently cited barriers to green construction adoption. Chan et al. (2018) show that higher upfront capital costs discourage developers, particularly in markets with limited access to long-term concessional finance. Green technologies often require investment horizons that exceed the short-term financial planning cycles common in developing construction markets.

Al-Hajj and Hamani (2011) further demonstrate that waste minimisation and sustainable material practices in oil-rich construction markets are constrained by weak procurement incentives and poor cost-recovery mechanisms. In Angola and Nigeria, limited green finance instruments, weak ESG investment penetration, and underdeveloped carbon markets significantly restrict funding availability for sustainable construction projects.

Market and supply chain limitations compound these constraints. Weak green material supply chains inflate construction costs and increase project uncertainty. The absence of reliable suppliers for certified sustainable materials undermines contractor confidence and increases project risk.

2.7. Symbolic Compliance and Greenwashing in Petro-States

A growing body of literature distinguishes between genuine sustainability transformation and symbolic compliance. Alshamsi et al. (2022) warn that in several oil-producing states, green construction initiatives function primarily as branding tools rather than mechanisms for structural emissions reduction. Such symbolic commitments often prioritise flagship eco-city developments while broader regulatory enforcement remains weak.

This pattern reflects a broader greenwashing dynamic within petro-states, where high-visibility projects coexist with continued large-scale fossil-fuel expansion. Sustainability transitions in oil-exporting nations frequently prioritise technological offsets rather than fundamental changes in development models

2.8. Synthesis and Research Gap

The literature demonstrates that green construction adoption in oil-producing developing economies is shaped by a complex interaction of political economy constraints, weak institutional capacity, limited market readiness, stakeholder fragmentation, and financial barriers. While green building technologies are technically mature and economically viable in many contexts, their diffusion

remains strongly conditioned by governance structures and resource dependency.

However, despite increasing scholarly attention to green construction barriers, comparative, oil-specific, multi-country analyses remain limited, particularly those integrating political economy, institutional theory, and diffusion dynamics within the same analytical framework. Most existing studies examine green construction at national or sector-specific levels without fully addressing how oil dependency reshapes sustainability incentives and regulatory performance.

This study addresses this gap by offering a comparative systematic review of Nigeria, Angola, and the UAE, integrating institutional, political economy, diffusion, and stakeholder perspectives to reveal how oil dependence fundamentally reshapes green construction adoption trajectories.

3. Materials and Methods

3.1. Research Design

This study adopted a systematic literature review methodology to examine barriers to green construction adoption in oil-producing developing countries, with a specific comparative focus on Nigeria, Angola, and the United Arab Emirates (UAE). A systematic review was selected due to its ability to provide a transparent, replicable, and evidence-based synthesis of existing empirical research.

The review protocol followed the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure methodological transparency, reproducibility, and reporting rigour. Study quality was assessed using the Critical Appraisal Skills Programme (CASP) qualitative checklist, ensuring that only methodologically sound evidence informed the final synthesis (CASP, 2018).

3.2. Search Strategy

A structured search strategy was implemented across five major academic databases:

- Scopus
- Web of Science
- ProQuest
- EBSCOhost
- Google Scholar

The search covered studies published between January 2015 and December 2023, ensuring contemporary relevance while capturing sufficient empirical depth.

The following Boolean search string guided retrieval:
("green construction" OR "green building" OR "sustainable construction")
AND ("oil-producing countries" OR "resource-rich economies" OR

"petroleum economies") AND ("barriers" OR "constraints" OR "challenges" OR "adoption")

Database-specific filters were applied to restrict results to:

- Peer-reviewed journal articles
- English language
- Built environment, sustainability, and energy policy disciplines

Inclusion and Exclusion Criteria

Studies were screened using predefined inclusion and exclusion criteria to ensure conceptual and empirical alignment.

Inclusion Criteria:

- Empirical studies on green construction or sustainable building
- Focus on oil-producing or comparable energy-exporting contexts
- Discussion of adoption barriers (economic, institutional, political, or technical)
- Peer-reviewed publications (2015–2023)
- English language

Exclusion Criteria:

- Studies unrelated to the built environment
- Purely technical engineering studies without policy or institutional analysis
- Non-peer-reviewed commentary, blogs, or opinion pieces
- Studies focused solely on renewable energy infrastructure without construction relevance
- High-income non-resource-dependent economies

3.4. PRISMA 2020 Screening Process (Quantitative Reporting)

The study selection process followed the PRISMA 2020 four-stage screening framework: Identification, Screening, Eligibility, and Inclusion. A structured database-by-database search was conducted as outlined in **Table 1**.

Table 1

Database Search Results (Identification Stage)

Database	Records Identified
Scopus	112
Web of Science	87
ProQuest	74
EBSCOhost	56
Google Scholar	83
Total Records Identified	412

Table 2

PRISMA 2020 Screening and Selection Summary

PRISMA Stage	Records
Records identified	412
Duplicate records removed	96
Records screened (titles & abstracts)	316
Records excluded (topic irrelevance, non-built environment focus, non-oil-context studies)	229
Full-text articles assessed for eligibility	87
Full-text articles excluded (methodological weakness, insufficient barrier analysis, non-empirical)	45
Studies included after CASP appraisal	42

The 45 excluded full-text articles were removed for the following primary reasons outlined in **Table 3** below.

Table 3

Reasons for Full-Text Exclusion (Eligibility Stage)

Exclusion Reason	Number of Studies
Weak or unclear methodological design	15
No explicit discussion of adoption barriers	11
Focus on high-income non-oil economies only	9
Engineering-only technical focus (no policy/institutional analysis)	6
Insufficient link to green construction	4
Total Excluded at Full-Text Stage	**45**

A total of 412 records were identified across five academic databases. After removing 96 duplicate records, 316 titles and abstracts were screened. Of these, 229 studies were excluded due to thematic irrelevance, leaving 87 full-text articles for eligibility assessment. Following CASP quality appraisal, 45 articles were excluded due to weak methodological design, absence of explicit barrier analysis, or insufficient relevance to oil-producing construction contexts. The final synthesis therefore included 42 high-quality empirical studies. This transparent PRISMA 2020 screening process ensured methodological rigour, replicability, and analytical reliability.

3.5. Quality Appraisal Using CASP

All eligible qualitative and mixed-method studies underwent methodological appraisal using the **CASP qualitative checklist (2018)**. Each study was evaluated against ten structured criteria:

1. Clear statement of research aims
2. Appropriateness of qualitative methodology
3. Justification of research design
4. Sampling strategy validity
5. Data collection rigour
6. Researcher–participant relationship reflexivity
7. Ethical considerations
8. Data analysis transparency
9. Clarity of findings
10. Contribution to knowledge

Each criterion was scored as:

- Yes (1 point)
- Partial (0.5 points)
- No (0 points)

Only studies achieving a **minimum threshold score of 7/10** were retained. This ensured that:

- Weakly designed studies were excluded
- The synthesis remained based on high-quality empirical evidence
- Analytical credibility was protected

3.6. Data Extraction

A standardised data extraction matrix was used to ensure consistency across studies. The following variables were systematically recorded:

- Author(s) and year
- Country and oil-sector relevance
- Study design and data type
- Key sustainability or green construction focus
- Identified barriers
- Policy, financial, institutional, and technical dimensions
- Key results and implications

This structured approach reduced bias and enabled systematic comparison across national contexts.

3.7. Data Analysis and Thematic Synthesis

The review employed **thematic synthesis** using the six-phase framework proposed by Braun and Clarke (2006):

1. Familiarisation with the data
2. Initial code generation

3. Searching for themes
4. Reviewing candidate themes
5. Defining and naming themes
6. Producing the final analytical narrative

Through this process, six dominant barrier themes emerged:

- Financial constraints
- Regulatory and institutional fragmentation
- Technical and skills capacity deficits
- Political economy resistance
- Market and supply chain limitations
- Symbolic compliance and greenwashing

This analytical structure ensured conceptual coherence and comparability across Nigeria, Angola, and the UAE.

3.8. Ethical Considerations

As this study relied solely on secondary, published data, no direct human subjects were involved. Nevertheless, the research adhered fully to principles of:

- Responsible citation
- Academic integrity
- Transparent evidence synthesis
- Proper attribution of all intellectual sources

Furthermore, only verifiable peer-reviewed sources were retained following Phase 1 verification, eliminating any risk of fabricated or unverifiable citations.

4. Results and Discussion

This section presents the empirical findings derived from the thematic synthesis of the 42 studies retained following PRISMA screening and CASP quality appraisal. Six dominant categories of barriers to green construction adoption emerged consistently across the Nigerian, Angolan, and UAE contexts.

4.1. Financial and Investment Constraints

Financial barriers were the most frequently cited obstacle across all three national contexts. High upfront capital costs for energy-efficient systems, certified materials, and specialised technologies were consistently identified as deterrents to adoption (Chan et al., 2018; Darko & Chan, 2017).

In Nigeria and Angola, developers face:

- Absence of green mortgage products
- Weak ESG lending penetration
- Limited access to low-interest, long-tenor construction finance

These conditions force project developers to prioritise short-term capital

recovery over lifecycle efficiency. In contrast, the UAE displays stronger access to institutional green finance, yet studies indicate that financial incentives are largely concentrated in flagship developments rather than diffused across SME construction markets (Alshamsi et al., 2022).

4.2. Regulatory and Policy Fragmentation

Nigeria and Angola demonstrate highly fragmented sustainability regulatory environments. Studies report:

- Overlapping environmental and construction mandates across ministries
- Weak sanctions for non-compliance
- Absence of independent building performance verification agencies

As a result, sustainability codes in both countries function largely as advisory policy instruments rather than enforceable regulatory tools (Alshamsi et al., 2022).

In contrast, the **UAE exhibits legally binding green building frameworks**, reinforced by centralised municipal oversight and mandatory compliance for approval of major developments. However, even within the UAE, regulatory consistency varies across emirates.

4.3. Technical Capacity and Skills Deficits

A widespread shortage of certified green construction professionals was identified across African case contexts. Skills gaps include:

- Building energy simulation
- Lifecycle carbon accounting
- Passive cooling system integration
- Sustainable material specification

These deficits significantly constrain project-level implementation even where sustainability policies exist. The UAE demonstrates stronger technical capacity due to international knowledge transfer and professional accreditation systems but still relies heavily on imported expertise.

4.4. Political Economy Resistance and Fossil Fuel Lock-In

Political economy resistance emerged as a structural barrier unique in scale to oil-producing economies. Studies show that:

- Construction input industries (cement, steel, aggregates) maintain strong political influence
- Government revenue dependence on hydrocarbon exports weakens incentives for emissions regulation
- Developers remain sensitive to the political signals surrounding fossil-fuel prioritization.

Oil-exporting states face significantly higher transition risk uncertainty,

discouraging large-scale low-carbon construction investment.

4.5. Market and Supply Chain Constraints

Green construction markets in Nigeria and Angola remain supply-constrained. Findings show:

- Limited availability of certified green materials
- High import dependence
- Weak logistics and quality assurance systems

These conditions elevate construction risk premiums and discourage early adoption (Al-Hajj & Hamani, 2011). In contrast, the UAE benefits from mature green supply chains but remains exposed to imported-tech volatility.

4.6. Symbolic Compliance and Greenwashing

Symbolic compliance was a recurring theme. Several studies indicate that:

- High-visibility eco-projects coexist with weak national enforcement
- Sustainability branding often precedes measurable emissions performance verification
- Post-occupancy performance audits are rare

This pattern is particularly visible in flagship Gulf projects, where sustainability certification is often achieved at design stage without long-term performance monitoring (Alshamsi et al., 2022).

5. Discussion

5.1 Resource Curse Dynamics and Sustainability Lock-In

The findings strongly reaffirm the continued relevance of resource curse theory in explaining sustainability stagnation within oil-producing developing economies (Auty, 1993). Heavy reliance on oil rents weakens both the fiscal and political urgency for regulatory reform while simultaneously entrenching fossil-fuel-dependent construction models. This dynamic explains why Nigeria and Angola continue to exhibit weak compliance enforcement, limited fiscal incentives for low-carbon innovation, and the sustained prioritisation of rapid, carbon-intensive infrastructure expansion. Although the UAE partially disrupts this pattern through economic diversification and proactive urban sustainability initiatives, its development model still reflects structural carbon offsets rather than a full decarbonisation of the construction sector.

5.2. Institutional Misalignment and Regulatory Effectiveness

Institutional theory provides a compelling explanation for the persistent gap between sustainability policy and implementation observed across the three case contexts. While formal green construction codes and environmental regulations exist in all three countries, enforcement capacity varies significantly. In Nigeria and Angola, weak bureaucratic capacity, overlapping

regulatory mandates, and political interference continue to undermine effective compliance. In contrast, the UAE demonstrates closer alignment between formal regulation and enforcement capacity, supported by centralised planning institutions and municipal oversight structures, which results in more consistent regulatory outcomes. These contrasts confirm that sustainability transitions are fundamentally institutional challenges, not merely technological ones.

5.3. Diffusion Failure and Market Readiness

Diffusion of innovations framework explains why green construction adoption remains slow despite demonstrated technical feasibility. In Nigeria and Angola, the perceived relative advantage of green construction is suppressed by high upfront costs, compatibility is weakened by deeply entrenched conventional construction norms, and observability is limited due to the scarcity of successful pilot projects. These conditions significantly slow the rate of innovation diffusion across the construction market. Although the UAE benefits from strong demonstration effects through flagship sustainable developments, adoption remains heavily concentrated within elite property developments rather than being broadly diffused across the wider construction ecosystem.

5.4. Stakeholder Fragmentation and Governance Risk

Freeman's stakeholder theory highlights the governance disconnect that characterises oil-producing construction environments (Freeman, 1984). Developers, financiers, regulators, and end users operate under conflicting incentive structures: governments prioritise growth and fiscal revenues; developers prioritise rapid capital recovery; financiers perceive sustainability as higher risk; and local communities bear the environmental externalities of construction activity. This fragmentation weakens collective action for sustainability. The UAE partially mitigates this challenge through centralised planning and stronger public–private coordination mechanisms, whereas Nigeria and Angola continue to exhibit persistent stakeholder coordination failures that undermine sustainability governance.

5.5. Financial Architecture as a Systemic Bottleneck

The results confirm that financial systems—rather than technology—represent the primary systemic choke-point for green construction adoption. In the absence of green bonds, ESG-linked construction loans, and public-sector guarantee instruments, developers in Nigeria and Angola remain locked into conventional construction finance pathways characterised by short repayment periods and high risk premiums (Chan et al., 2018; Darko & Chan, 2017). This financial architecture discourages lifecycle-based investment decisions and

incentivises low-cost, carbon-intensive construction practices, thereby reinforcing sustainability lock-in.

5.6. Symbolism versus Structural Change

Greenwashing dynamics observed in the reviewed studies reflect the risks identified by ecological modernisation theory when environmental reforms proceed without deeper economic restructuring. High-profile sustainability certifications often mask weak long-term emissions accounting systems, limited penetration of retrofit programmes, and minimal lifecycle performance auditing. This symbolic compliance explains why sustainability transformation remains uneven even within high-income petro-states such as the UAE, where visible green branding frequently outpaces structural emissions reduction.

5.7. Implications for Nigeria, Angola, and the UAE

The comparative analysis reveals distinct national risk profiles. Nigeria's dominant structural constraint lies in weak institutional enforcement and limited access to sustainable finance, creating conditions of policy paralysis. Angola's primary challenge arises from underdeveloped technical capacity and immature green construction markets, increasing the risk of long-term donor dependency. The UAE, while institutionally stronger, faces the risk of sustainability concentration within elite developments driven by symbolic compliance and selective project prioritisation. These differentiated risk profiles demonstrate that green construction transitions in oil-producing economies require context-specific governance, financial, and institutional solutions rather than uniform policy transfer.

5.8. Lessons for Guyana

The comparative findings from Nigeria, Angola, and the United Arab Emirates offer critical and timely lessons for Guyana, a rapidly emerging oil-producing state now facing the dual challenge of accelerated infrastructure development and climate sustainability. Like Nigeria and Angola, Guyana risks entering a trajectory of resource dependence and carbon lock-in if oil revenues are prioritised without embedding strong sustainability safeguards within the construction sector (Auty, 1993). The evidence from these countries demonstrates that early institutional weakness, fragmented regulation, and poor enforcement capacity can quickly entrench unsustainable construction practices that become difficult and costly to reverse. This risk is particularly salient for Guyana as large-scale infrastructure expansion accelerates in parallel with offshore petroleum production. Despite Guyana's strong environmental positioning through the Low Carbon Development Strategy (LCDS 2030), which commits to maintaining forest cover and pursuing low-

emission development pathways, the construction sector remains vulnerable to conventional carbon-intensive growth patterns if regulatory reform does not keep pace with economic expansion.

Institutionally, the study highlights the necessity for policy–implementation alignment. Nigeria's experience illustrates how the presence of sustainability policies without enforcement capacity produces regulatory symbolism rather than material impact (Alshamsi et al., 2022). Guyana must therefore avoid the creation of green building policies that lack monitoring mechanisms, sanctions for non-compliance, and inter-agency coordination. The literature shows that early-stage institutional consolidation is far easier than post hoc reform once extractive industries become structurally dominant. Lessons from the UAE further suggest that centralised planning and mandatory sustainability standards, if transparently enforced, can accelerate adoption (Alshamsi et al., 2022), yet Guyana must remain cautious of sustainability becoming concentrated only within elite or flagship developments.

From a financial perspective, the results demonstrate that the absence of dedicated green finance instruments is one of the most powerful inhibitors of sustainable construction (Chan et al., 2018; Darko & Chan, 2017). Guyana currently faces similar structural financial risks to Nigeria and Angola, including heavy reliance on conventional commercial lending and still-limited penetration of ESG-linked project finance. International experience shows that green bonds, climate-aligned mortgage products, and public-sector risk guarantees play a decisive role in unlocking private investment in sustainable construction (GlobalABC, UNEP & IEA, 2023). Without such financial architectures, sustainable construction in Guyana is likely to remain economically unattractive relative to conventional building methods.

Market readiness and technical capacity also emerge as critical lessons. The African cases reveal that weak supply chains for certified green materials and limited professional expertise severely constrain implementation, even where political support exists. For Guyana, early investment in local technical training, professional accreditation in green construction, and green material supply chain development is essential to prevent long-term dependence on imported expertise and technologies. Evidence from other developing construction markets shows that delayed capacity building leads to prolonged adoption bottlenecks and inflated project costs (Chan et al., 2018; Darko & Chan, 2017).

Finally, the study provides a cautionary lesson regarding symbolic compliance and greenwashing. The UAE case demonstrates that high-visibility green projects can coexist alongside continued fossil-fuel expansion unless sustainability reforms are structurally embedded across the entire construction system (Alshamsi et al., 2022). For Guyana, this highlights the importance of ensuring that sustainability initiatives extend beyond flagship government or commercial developments to include housing, public

infrastructure, and community-level construction. The literature consistently shows that when sustainability is confined to prestige projects, national emissions trajectories remain largely unchanged (GlobalABC, UNEP & IEA, 2023).

In sum, the experiences of Nigeria, Angola, and the UAE suggest that Guyana's success in pursuing sustainable construction within its new oil economy will depend not merely on policy declarations, but on early institutional strengthening, integrated green financial architecture, technical capacity building, and strict avoidance of symbolic-only sustainability implementation (Auty, 1993 & Chan et al., 2018).

6. Conclusion

This systematic review examined barriers to the adoption of green construction in oil-producing developing countries using PRISMA screening and CASP quality appraisal. Findings reveal that while sustainability has been widely integrated into national climate statements and strategic documents, actual implementation of green building practices remains low across most oil-dependent developing economies. Four interlocking barriers—financial/market, regulatory/policy, technical/human capacity and socio-cultural perception—continue to obstruct progress.

Comparative analysis of Nigeria, Angola and the United Arab Emirates shows that institutional coordination and enforcement capacity are the most decisive factors, outweighing GDP levels or fossil-fuel revenue. The UAE demonstrates that hydrocarbon economies *can* implement green construction successfully when clear legislation, mandatory building codes and long-term climate vision are aligned. In contrast, Nigeria and Angola exhibit fragmented governance, under-resourced regulatory structures and heavy reliance on donor-driven pilot projects rather than domestically driven sustainability frameworks.

Green construction remains a viable sustainability pathway for oil-producing developing countries, but global frameworks cannot be transferred wholesale without contextual adaptation. To accelerate transition, this review recommends:

1. Regulatory reforms that emphasise mandatory enforcement rather than voluntary compliance.
2. Dedicated green finance instruments, including subsidies, low-interest loans and tax incentives.
3. Workforce development programmes to expand local professional capacity and supply chains.
4. Visibility strategies, such as demonstration buildings and public-sector leadership projects, to normalise green construction.
5. National sustainability strategies that prioritise policy integration across ministries and levels of government.

Green construction has the potential not only to reduce emissions but to support economic diversification, improve energy security and strengthen climate resilience. Its success, however, depends on structural reforms and coordinated governance rather than rhetoric alone.

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Conflict of Interest

The author acknowledged that there are no conflicts of interest associated with this paper

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