



Technological and Financial Sovereignty as Catalysts for the Industrialisation of the Nigerian Oil and Gas Industry

Abstract

Nigeria's oil and gas industry remains largely extractive despite decades of production, with limited industrial development. This comes with persistent reliance on foreign technologies and external financing. This study examined how technological and financial sovereignty can serve as catalysts for transforming the sector into a value-driven industrial base. It aimed to explore the extent to which local control over technology and capital can enable sustainable industrialisation. The study addressed the problem of structural dependency, which constrains domestic capacity and weakens economic autonomy. Employing the Dependency Theory and the Resource Curse Thesis, the study adopted a qualitative approach based entirely on secondary data, including policy documents, industry reports, and scholarly works, analysed thematically. Findings indicated that continued reliance on foreign expertise and capital limits industrial growth, although recent local content initiatives show emerging progress. The study concluded that genuine industrialisation requires deliberate investment in indigenous technology and domestic financing systems. The study recommended the development of a coordinated national framework that will integrate local technological innovation with stratified indigenous financial institutions to drive long-term sectoral transformation.

Keywords: Technical Education, Vocational Education, Formal and Informal Apprenticeship, Curriculum Integration, Hybrid Curriculum Framework

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Introduction

Nigeria's oil and gas industry contributes significantly to national revenue, but it has not translated into sustained industrial growth. Crude oil

export still dominates the sector, while refined petroleum products, technical expertise, and critical infrastructure are largely imported. This contradiction reflects a deeper structural condition as the country participates actively in extraction but remains marginal in value

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creation. Data from the Organization of the Petroleum Exporting Countries show that Nigeria consistently ranks among the leading crude exporters, without domestic refining and value addition remain limited (OPEC, 2023).

This condition is not simply technical but tied to limited control over the technologies that drive production and the financial systems that sustain it. Technological sovereignty, in this sense, goes beyond the use of imported tools involving the ability to design, adapt, and own critical production technologies. Financial sovereignty has to do with the capacity to mobilise and retain capital within the domestic economy. In Nigeria, the upstream operations are still largely dependent on multinational firms with proprietary technologies, while major investments are often financed externally, determining both ownership structures and profit flows (UNCTAD 2022).

This study shifts attention from output to control, from production to capacity. The concern is not whether Nigeria produces oil, but whether it possesses the means to industrialise around it. Examining technological and financial sovereignty, the study argues that industrialisation is not an automatic outcome of resource extraction, but a deliberate process designed by who controls knowledge, tools, and capital within the sector.

Objectives of the Study

The objectives of this study are to:

- i. Examine the extent of technological dependence in Nigeria's oil and gas industry and its implications for industrial development.
- ii. Analyse the structure of financial control within the sector and how it shapes capital retention and reinvestment.
- iii. Evaluate the effectiveness of existing local content policies in promoting technological and financial sovereignty.

3. Research Questions

- i. To what extent does technological dependence affect industrialisation in Nigeria's oil and gas industry?
- ii. How does the structure of financial control influence capital mobilisation and retention within the sector?
- iii. How effective are existing local content policies in advancing technological and financial sovereignty?

Statement of the Problem

Nigeria's oil and gas sector undoubtedly generates substantial revenue, while its contribution to industrial development remains limited. The issue is not simply that crude oil is exported while refined products are imported. It is that the country does not sufficiently control the systems that transform crude into industrial value. Production exists, but control over the technologies, capital structures, and knowledge systems that

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define industrial capacity remains largely external. This creates a situation where economic activity is present without corresponding industrial depth.

The problem, therefore, lies in the disconnect between resource extraction and industrial transformation. Nigeria produces oil, but does not sufficiently control the technologies that process it or the financial systems that sustain its development. This dual dependence on external technology and capital limits the country's ability to internalise value chains and build a self-sustaining industrial base. With this kind of structure, industrialisation within the oil and gas sector will remain limited, regardless of output levels or policy declarations.

Literature Review

Most literature does not treat Nigeria's oil and gas problem as a simple matter of output. It treats it as a problem of transformation. Across the field, one broad line of argument holds that extractive sectors can support industrialisation only when they generate domestic linkages, with technological learning, and local supplier development. Hilson and Ovadia (2020) push this argument beyond narrow procurement targets by calling for a more holistic understanding of local content, one that links employment and contracting to wider industrial strategy. Lebdioui (2020), comparative work shows that local content delivers stronger outcomes when it is embedded in deliberate

industrial policy and supported by institutions that promote learning and supplier upgrading, not just market access. Nwankwo and Iyeke (2022) provide evidence that Nigeria's oil and gas local content laws have had measurable positive effects on engineering development and GDP, which suggests that policy intervention can matter in concrete terms. However, their contribution also reveals a limitation in part of the Nigerian literature.

Wilhelm (2023), writing on Guinea, shows that local content policy is shaped by political negotiation, contestation, and institutional interests, not merely by developmental logic. Even though the empirical setting is different, the conceptual point matters for Nigeria. It suggests that local content frameworks may be designed and implemented in ways that satisfy political demands for inclusion without necessarily restructuring production. Ba *et al.* (2022) and Arias Loyala, and Lufin (2020) in their study of West Africa's mining sector, similarly show that local content outcomes depend heavily on institutional capacity and policy coherence. These works complicate optimistic readings of local content by showing that its developmental effects are conditional and uneven. They are especially useful because they expose the gap between legislative ambition and actual industrial upgrading.

Tsani, Chitou, and Overland (2024) in their systematic review shows that the field is increasingly moving away from narrow legal and operational questions

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toward sustainability, policy design, and long-term transformation. Their review makes clear that the central debate is no longer whether local content should exist, but what kind of local content can genuinely counter the resource curse and support structural change. Itaman and Awopegba (2021) address this omission by arguing that finance and oil rents in Nigeria have often reinforced premature deindustrialisation rather than supported manufacturing expansion. Their contribution is important because it shows that industrial weakness is not only a problem of technological dependence but also of capital allocation.

Theoretical Framework

The problem this study addresses cannot be understood at the level of policy description alone. It requires a framework that explains why resource-rich economies like Nigeria still struggles to convert extraction into industrial capacity. Dependency Theory and the Resource Curse Thesis both provide a way of interpreting technological and financial dependence as structural conditions that shape the limits of industrialisation. Dependency Theory argues that global economic relations are middle-income countries in ways that position some countries as producers of raw materials and others as controllers of technology, capital, and industrial production (Prebisch, 1950). Morris, Kaplinsky, and Kaplan (2012) show that integration into global value chains does not automatically lead to upgrading. Instead, firms in resource-

dependent economies often remain locked into low-value segments unless deliberate efforts are made to build domestic capabilities.

While Dependency Theory emphasises external structures, the resource curse thesis focuses more on internal dynamics within resource-rich economies. It argues that reliance on natural resource rents can distort economic incentives, weaken institutions, and crowd out industrial development (Sachs & Warner, 2001). Mehlum, Moene, and Torvik (2006) demonstrate that outcomes depend on institutional quality, particularly whether economic systems encourage productive activity or rent seeking.

Methodology

Research Design

The nature of the problem under investigation requires an approach that goes beyond measurement and engages structure, policy, and institutional dynamics. This study adopts a qualitative research design because the core issues which are technological dependence, financial control, and industrial capacity are embedded in systems that are better interpreted than quantified. The aim is not to test variables in isolation, but to understand how patterns of dependence and limited sovereignty influence industrial outcomes within Nigeria's oil and gas sector.

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*Technological and Financial Sovereignty as Catalysts for the Industrialisation of the Nigerian Oil and Gas Industry**Data Sources and Collection*

The study relies entirely on documentary sources, including government policy documents, industry reports, and peer-reviewed academic literature. Key materials include national policy frameworks such as the Nigerian Oil and Gas Industry Content Development Act, reports from regulatory and industry bodies, and international datasets and analyses on extractive industries and development. These sources are selected because they provide insight into both the formal structure of the sector and the underlying patterns that shape its operation. Bowen (2009 p.27) explains that, document analysis is particularly useful for studies that seek to understand policy, institutional behaviour, and historical patterns, since documents “contain text that can be interpreted to give voice and meaning around an assessment topic”. The method of data collection follows a systematic document review process. Sources are identified based on relevance to three core themes which are technological capacity, financial structures, and industrialisation within the oil and gas sector. Priority is given to recent materials from 2020 to 2025 to reflect current developments, while earlier foundational works are included where necessary to provide conceptual footing. To maintain rigour, documents are cross-checked across multiple sources to reduce bias and ensure consistency in interpretation.

Method of Data Analysis

Data analysis is conducted using thematic analysis. This method allows the study to identify, organise, and interpret recurring patterns across the selected materials. Braun and Clarke (2006) describe thematic analysis as a flexible approach that enables the researcher to move from raw textual data to meaningful patterns that reflect underlying structures. In this study, themes are developed around key analytical categories derived from the theoretical framework, including technological dependence, financial dependence, local content effectiveness, and pathways to industrialisation. The analysis proceeds through coding, categorisation, and interpretation of patterns across the dataset.

Justification of Methodological Approach

The choice of this methodology is directly informed by the theoretical framework. Dependency Theory and the Resource Curse Thesis both emphasise structural relationships, institutional dynamics, and historical patterns rather than isolated numerical indicators. A qualitative approach makes it possible to trace these relationships across policy documents, industry practices, and scholarly interpretations.

Limitations of the Study

While the reliance on secondary data allows for broad coverage and depth of analysis, it also introduces certain limitations. The study depends on the availability and quality of existing

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materials, which may reflect institutional biases or gaps in reporting. However, this limitation is mitigated through careful source selection and cross-comparison of multiple materials. The aim is not to produce a definitive measurement, but to provide a coherent and critically grounded interpretation of the structural conditions affecting industrialisation in Nigeria's oil and gas sector.

Findings

Technological Dependence and Limited Domestic Capability

The analysis shows that Nigeria's oil and gas industry remains significantly dependent on foreign technologies, particularly in upstream operations such as exploration, drilling, and reservoir management. Multinational oil companies continue to dominate high-value technical processes, limiting the extent of indigenous technological control and learning. Evidence from existing studies indicates that local firms are largely concentrated in low to mid-level service provision, while advanced engineering and proprietary technologies remain externally controlled (Ovadia, 2016; Lebdioui, 2020).

This creates a stratified industry structure where participation does not mean capability. Although local content policies have expanded opportunities for Nigerian firms, the absence of deep technological ownership restricts innovation and long-term industrial growth. This supports broader findings

that integration into global extractive value chains does not automatically result in technological upgrading unless deliberate capability-building measures are in place (Morris *et al.*, 2012).

External Financing and Weak Capital Retention

Findings further reveal that financial dependence is a critical constraint on industrialisation within the sector. Large-scale oil and gas projects are predominantly financed through foreign capital, determining ownership structures and influencing how value is distributed. This results in significant capital outflows, as profits are often repatriated rather than reinvested locally. Empirical studies suggest that such financial arrangements weaken domestic capital accumulation and limit the ability of local firms to compete. Itaman and Awopegba (2021) show that oil rents, when combined with externally oriented financial systems, can reinforce patterns of premature deindustrialisation in Nigeria. At the same time, indigenous firms face serious barriers in accessing long-term financing, which constrains their capacity to invest in technology and expand operations (Odeleye, 2014). This dual structure undermines the financial foundations required for industrial transformation.

Partial Gains from Local Content Policies

The findings indicate that local content policies have produced measurable improvements in domestic participation, particularly in employment, service

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delivery, and basic technical functions. There is evidence that these policies have contributed to increased involvement of Nigerian firms and professionals within the sector (Nwankwo & Iyeke, 2022). However, these gains remain limited in scope as local participation has not been matched by equivalent progress in technological sovereignty or financial control. Studies emphasise that local content frameworks often improve inclusion without fundamentally altering production structures (Hilson & Ovadia, 2020). As a result, local firms frequently operate within systems that is still defined by foreign technology and capital, limiting their ability to move into higher value segments of the industry.

Weak Integration Across the Value Chain

Another key finding is the limited integration across the oil and gas value chain. Upstream activities dominate the sector, while downstream operations such as refining and petrochemicals remain underdeveloped relative to production capacity. This imbalance restricts domestic value addition and reduces opportunities for industrial spillovers. The literature on extractive industries points that industrialisation depends on the strength of linkages between different segments of production, including backwards, forward, and knowledge linkages (Weldegiorgis *et al.*, 2021). In Nigeria, these linkages remain weak, resulting in a sector that functions more as an enclave than as a driver of broader

industrial development. This explains why high levels of crude production have not translated into diversified industrial growth.

Emerging but Fragmented Efforts Toward Sovereignty

Despite these structural constraints, there are emerging efforts aimed at strengthening technological and financial sovereignty. Investments in modular refineries, local fabrication, and indigenous service companies suggest a growing recognition of the need for domestic capacity building. Policy reforms have also attempted to improve regulatory frameworks and encourage greater local participation. However, these efforts remain uneven and lack strategic coordination. Comparative studies show that successful local content outcomes depend on coherent policy plans between technology development, financing systems, and industrial strategy (Lebdioui, 2020; Tsani *et al.*, 2024). In the Nigerian context, the absence of such coordination limits the overall impact of ongoing initiatives and slows the pace of industrial transformation.

Discussion

The findings point to a structural contradiction that sits at the heart of Nigeria's oil and gas industry. Production has expanded, participation has increased, and policy frameworks have evolved, but industrial transformation remains limited. This reflects a deeper issue of control as Nigeria participates in extraction, but

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does not sufficiently control the technological and financial systems that determine how value is created and retained. Technological dependence, as revealed in the findings, is best understood within the logic of global production systems. Integration into global value chains has enabled continued extraction, but not necessarily domestic capability building. Gereffi and Fernandez-Stark (2016) explain that upgrading within global value chains is not automatic, noting that firms in developing economies often remain confined to lower value activities unless deliberate efforts are made to build capabilities.

The expansion of domestic participation has often been treated as evidence of progress. However, participation without capability does not produce industrialization as successful industrialisation depends on “policies that promote learning and technological capabilities,” rather than those that merely expand market participation. In Nigeria’s oil and gas sector, local content policies have opened space for domestic actors, but they have not fully moved into instruments of technological sovereignty. The result is a system where local firms operate within externally defined technological boundaries.

It is true that industrialisation requires long-term investment and the ability to direct capital toward productive activities. However, where financing is externally sourced, domestic control over investment decisions becomes limited. UNCTAD (2022 p.191)

emphasises that financial systems play a central role in structural transformation, noting that “access to finance is a key determinant of productive capacity and diversification”. In Nigeria, the dominance of external financing arrangements means that a significant portion of value generated in the sector is not retained within the domestic economy.

The findings of this study support that position that financial sovereignty is not simply about ownership of capital, but about the capacity to sustain industrial development over time. When technological and financial dependence are examined together, the limitations of current policy approaches become clearer. Local content policies have addressed participation, but they have not squarely integrated technology development and financial strategy into a unified industrial framework. This explains why progress remains uneven, with gains in employment and services not translating into deeper industrial capacity.

While existing literature has examined local content, linkages, and policy design, it has often treated technological capability and financial systems as separate domains. The findings and analysis here suggest that this separation is part of the problem. Industrialisation depends on the interaction between these two dimensions. Technological capability requires financing to develop and scale, while financial capacity depends on productive sectors that can generate sustainable returns. Where both are

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externally controlled, industrialisation becomes structurally constrained. This is where Dependency Theory and the Resource Curse Thesis converge. Dependency Theory explains the external control of technology and capital, while the Resource Curse Thesis explains the internal failure to convert resource wealth into productive capacity. The implication is clear as industrial transformation in Nigeria's oil and gas sector requires a shift from participation to control, from extraction to capability, and from fragmented policy to integrated strategy. Technological sovereignty and financial sovereignty are not abstract ideals but practical conditions under which industrialisation becomes possible.

Conclusion

What this study has shown in a step by step manner is that the problem is not production but control. The industry operates, generates revenue, and sustains economic activity but does not sufficiently root industrial transformation within the domestic economy. This gap is not accidental but rooted in a persistent condition where the key drivers of value creation remain largely external. The analysis has demonstrated that technological dependence limits the ability of the sector to evolve beyond extraction. Where core technologies are imported and controlled externally, domestic firms are restricted to lower-value activities, and opportunities for learning and innovation remain narrow. At the same time, financial dependence

weakens the capacity for reinvestment and long-term industrial growth. When capital is externally sourced and externally directed, value is not retained in ways that support domestic industrial expansion. The core argument therefore, is that technological sovereignty and financial sovereignty are not optional but necessary conditions for transforming the oil and gas sector into a driver of industrial development.

Recommendations

Government and industry stakeholders should move beyond basic participation targets and invest deliberately in indigenous technological development. This includes establishing specialised research and innovation centres focused on oil and gas engineering, supporting technology transfer frameworks that prioritise knowledge ownership, with partnerships that lead to local design and fabrication capabilities.

There is a need to expand domestic financial institutions capable of supporting long-term industrial investment. This can be achieved through strengthening development finance institutions, promoting sector-specific investment funds, and creating financial instruments that enable local firms to access affordable capital for expansion and technological upgrading. Finally, local content frameworks should be entrenched within a broader national industrial strategy. This means aligning participation requirements with clear targets for capability building, value addition, and sectoral linkages.

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Policy coordination across ministries and regulatory bodies is essential to ensure that local content contributes directly to industrial transformation.

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