

INSTITUTIONAL PRESSURE, COMPLIANCE AND TECHNICAL DECISION-MAKING IN NIGERIAN UPSTREAM OIL AND GAS PROJECTS: CHALLENGES, IMPACTS AND MITIGATION STRATEGIES

Author: ENGR. KINGSLEY OZINYEOWE AMAEHULE
oziny2001@yahoo.com

ABSTRACT

Upstream oil and gas technical decision making is not only technical and engineering driven, but is a product of the regulatory, organizational, professional, commercial and socio-political institutions. Nigeria has a more powerful institutional structure for making technical decisions with the enactment of Petroleum Industry Act (PIA) 2021; understanding the institutional pressures and compliance to project execution is important. This study explores the sources and nature of institutional pressures that affect technical decision making in the upstream oil and gas projects in Nigeria, evaluates the effects of the pressures on the implementation of the project, regulatory compliance and local content implementation and suggest solutions to manage the challenges. The secondary data obtained in the qualitative design approach is limited to the Nigerian petroleum legislation and regulations, publications of the regulatory and government authorities, industry reports, documents created by operators, publications of peer-reviewed scholarly articles since 2010 and more particularly since the inception of the post-PIA era with a particular focus on the post-PIA era. Analysis of the data was conducted in a thematic manner, using Institutional Theory, which focuses on the analysis of coercive, normative and mimetic pressure of the institution, as well as technical and organisational responses. The results show that regulatory, professional, local-content, environmental, and stakeholder requirements can be significant constraints on the technical options, project sequence, procurement and resource allocation. The impacts are not always detrimental, however: if institutional needs are clear and coordinated, safety, accountability and internal technical capacity and project legitimacy can be strengthened, while institution needs that are disjointed, lack institutional capacity, or are unclear can make decision making and project implementation more difficult. Based on the study, the key features of good upstream governance are regulatory predictability, early involvement in compliance, greater technical capacity in the country and institutional coordination and proactive engagement with stakeholders.

Keywords: Institutional Pressure; Regulatory Compliance; Technical Decision-Making; Upstream Oil and Gas; Petroleum Industry Act; Project Execution; Petroleum Governance.

INTRODUCTION

Despite the many challenges facing the industry, the upstream oil and gas sector continues to play a vital role in the Nigerian economy as it is the largest source of export earnings, government revenues and foreign-exchange receipts. While the petroleum sector has lost some of its significance in the Nigerian economy due to the diversification of the economy, the sector still has high fiscal and external economy significance. For instance, the oil sector accounted for 5.57% of the real Gross Domestic Product (GDP) of the Nigerian economy in the third quarter of 2024, while the average production of crude oil during the quarter was about 1.47 million barrels per day (MBPD) (National Bureau of Statistics, 2024). The role of petroleum continues to be important in government finances, too. Nonetheless, while the contribution of non-oil revenue is growing, IMF estimates at the consolidated-government level are at about 3.0 percent and 3.1 percent of GDP for 2024 and 2025, respectively. The Nigerian Upstream Petroleum Regulatory Commission (NUPRC) also revealed that Nigeria's total oil and condensate reserves were about 37.50 billion barrels and associated and non-associated gas reserves were 209.26 trillion standard cubic feet as at 1st January 2024 (NUPRC, 2025). The figures reflect the fact that the upstream petroleum sector continues to be an important strategic sector even in a changing economic landscape in Nigeria.

However, the institutional context of this sector has undergone much change. The management of petroleum operations has been largely through the Petroleum Act 1969 and various sub-legislative rules and institutional arrangements for several decades. The enactment of Petroleum Industry Act (PIA) 2021 was a significant revamp in petroleum governance as it introduced an entirely new set of laws, regulations and fiscal measures, and set up specialised institutions for various sectors of the petroleum industry. The PIA was established to create the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) as the main regulator for technical and

commercial regulation of the upstream petroleum industry in the country in the upstream sector (Federal Republic of Nigeria, 2021). The Act therefore moved upstream control to a more clearly differentiated regulatory structure where technical standards and operational requirements, commercial regulation, environmental obligations, host-community considerations and reporting requirements play a part in both the development and production of a project.

The PIA is particularly relevant for operators' technical decisions since they are not considered as internal decisions. As an example, a discovery made under the Act by a licensee who makes a commercial discovery must be accompanied by a Field Development Plan (FDP) that must be evaluated by the regulators. The applicable technical standards (based on good international petroleum industry practice) and matters such as recovery of petroleum resources, measurement arrangements, development infrastructure, environmental and other statutory obligations should be addressed by the FDP (Federal Republic of Nigeria, 2021). Therefore, there is a regulatory approval process that exists regarding decisions made for reservoir development, drilling sequences, production facilities, measurement systems and project configuration and related infrastructure. The technical team may therefore decide on a technically viable alternative but the realisation of this alternative may be subject to regulatory requirements and approvals, contractual obligations, environmental factors and commercial parameters and other institutional conditions.

The other big achievement is the Nigerian Oil and Gas Industry Content Development (NOGICD) Act 2010. The Act introduced new requirements to boost the Nigerian participation in the dimensions of the oil and gas industry – ownership, management, employment, procurement, contracting and technological – and created the Nigerian Content Development and Monitoring Board (NCDMB) (Federal Republic of Nigeria, 2010). The present monitoring system of the NCDMB reveals the level of inclusion of Nigerian-content in project execution. Compliance documents that may apply to upstream projects include Nigerian Content Plans, procurement plans, employment and training plans, project execution plans, work-breakdown

structures, performance reports and other compliance documents. The NCDMB also monitors and reviews operators' compliance to the Nigerian-content requirements during the project life cycles (NCDMB, 2026a). Technical project decisions around contractors, equipment, procurement, engineering services and project implementation, therefore, cannot always be set apart from institutional project decisions with regard to local involvement and capacity development of indigenous people.

Table 1: Major Institutional and Regulatory Sources of Pressure on Upstream Technical Decisions

Institutional instrument/institution	Principal area of oversight	Potential implications for technical decision-making
Petroleum Industry Act 2021	Governance, licensing, technical and commercial regulation, field development and petroleum operations	Requires technical and commercial decisions to conform to statutory standards and regulatory approval processes
NUPRC	Upstream technical and commercial regulation	Reviews FDPs, issues permits and approvals, establishes/enforces technical standards and oversees upstream operations
NOGICD Act 2010	Nigerian content and indigenous participation	Influences procurement, contracting, equipment sourcing, personnel, training, project execution and supplier selection
NCDMB	Nigerian-content monitoring and project certification	Requires project-specific Nigerian Content Plans, procurement and performance reporting and monitors compliance

NOSDRA 2006/NOSCP	Act	Oil-spill preparedness, detection, response and environmental monitoring	Influences spill prevention, emergency response, integrity management, damage assessment and remediation decisions
NUPRC environmental and safety regulations		Environmental protection, health, safety and operational risk	Introduces technical controls and risk-management requirements affecting facilities, wells, pipelines and operations
NEITI audit framework		Transparency, payments, production and compliance reporting	Creates an external accountability environment within which petroleum companies' operational and financial records are subject to audit and reconciliation

Source: Compiled from Federal Republic of Nigeria (2006, 2010, 2021); NUPRC (2024, 2025, 2026); NCDMB (2026a, 2026b); NEITI (2024).

Upstream oil and gas projects are very expensive, technically complex and there is a high operational risk due to uncertain geology. Therefore, the financial, safety and long-term aspects of technical decisions on exploration and appraisal, drilling, well completion, reservoir management, production optimisation, facilities design, pipeline integrity, environmental protection and decommissioning are important. The Field Development Plan (FDP) is an example of this. This is an integrated model that integrates subsurface information, reservoir characteristics, well designs, production forecasts, facilities requirements, environmental considerations, economics and project scheduling to develop a field development plan to meet project needs. Well-integration is a decision that will be made about wells, how they will be drilled, and how they will be controlled to ensure that they do not flow uncontrolled and pose a risk to people, assets and the environment. They are taken in an intricate institutional setting. In addition to the other regulatory requirements, NUPRC has requirements for drilling, production facilities, safety, environmental remediation, decommissioning, measurement, pipeline

operations and maintenance, safety cases, and methane and greenhouse-gas emissions for upstream activities, and a framework for Health, Safety, Environment and Communities, which includes technical safety control, risk-based inspections, pipeline operations and maintenance, safety cases, and methane and greenhouse-gas emissions (NUPRC, 2026a, 2026b). This includes the need for technical teams to work to a standard, approval, reporting and inspection protocols.

The institutional pressure might be considerable when the option of the project is not technically efficient and also regulatory. Depending on cost, schedule, familiarity of the operator with the technology and equipment involved, and expected production performance, the operator may prefer certain technologies or contractors, equipment configurations or project sequences, but this may necessitate changes to meet Nigerian-content requirements, environmental criteria, approved development plans, safety criteria or regulatory directions. Examples of such interaction are the Nigerian Content Plans, procurement plans, project execution plans and project performance reports, which should be developed as part of the Nigerian Content Rules of the NCDMB, and the Nigerian content commitments to be executed before execution of the contract to the contracting agency for certification and authorisation (NCDMB, 2026a; 2026b). Another institutional layer is environmental governance which have statutory roles for oil-spill surveillance, compliance, oil-spill reporting, joint investigation, monitoring and restoration of ecosystem after oil-spill (Federal Republic of Nigeria, 2006; NOSDRA, 2026a, 2026b). NEITI's audits also help to promote transparency and accountability in the petroleum operations (NEITI, 2024). Thus, regulation cannot be a negative influence on technical performance, requirements can be clear and can reinforce safety, accountability, protection of environment and can contribute to a building domestic technical capacity. However, conflicting and inconsistent requirements may result in increased compliance expenses, delays or approvals may be affected and uncertainty.

The problem of this study is then the technical and institutional rationality linkage, however. Technical rationality aspects that focus on the engineering aspects of feasibility, safety, reliability, reservoir performance, asset integrity, cost and operational efficiency are complemented by the institutional rationality aspects which include legal compliance aspects, environmental aspects, regulatory aspects, Nigerian-content, stakeholder aspects and accountability aspects. Both dimensions need to be taken into account when making decisions on upstream projects and the importance of the relation may continue to grow as Nigeria's regulatory regime is evolving under the Petroleum Industry Act (PIA) 2021. Regulations and Guidelines on various aspects of host communities, royalties, gas flaring & methane, decommissioning and abandonment, measurement, unitisation, drilling and environmental remediation and safety have been undergoing evolutionary changes over the years (NUPRC, 2026a). This research aims to explore how institutional pressures and compliance requirements could be converted into technical choices and what potential impact institutional pressures may have on the project schedule, cost, efficiency, safety, environmental performance, integrity and accountability of the assets. It then discusses the options for improving regulatory coordination, integrating compliance into the engineering process, enhancing technical and institutional capacity, documenting and monitoring, and good communication between regulators, operators, contractors and other stakeholders.

STATEMENT OF THE PROBLEM

In Nigerian upstream oil and gas projects, technical decision making occurs in a rather complicated institutional setting created by the Petroleum Industry Act (PIA) 2021, the Nigerian Oil and Gas Industry Content Development (NOGICD) Act 2010, environmental legislation/regulations under the control of institutions like the Nigerian Upstream Petroleum Regulatory Commission (NUPRC), National Oil Spill Detection and Response Agency (NOSDRA), Nigerian Content Development and Monitoring Board (NCDMB) and the Federal Ministry of Environment. Institutions provide important technical, environmental, safety and accountability measures but can sometimes have

resource and time requirements that are conflicting with upstream operations. Several approvals, technical reviews and compliance documentation might be needed for decisions on Field Development Plans (FDPs), drilling, well integrity, production facilities, procurement, and environmental remediation. The Nigerian-content requirement in project planning for project procurement and also for facility development for NCDMB have been tied to FDP and environmental requirements, while the procedures for NCDMB lendings have been tied to Nigerian-content requirement in facility development (Federal Republic of Nigeria, 2021; NUPRC, 2023; NCDMB, 2026). This regulatory-operational interface can lead to a lag-time in management and approval processes, especially when there is no co-ordination in documenting the requirements, and where there is no institutionalisation in terms of responsibilities. All of these can lead to delays, extra compliance costs, modifications to the technically preferred solutions, investment timing, project schedules and even the cash flow of the petroleum assets, and could take place at the wrong time. The effects, however, should not be blamed on the regulation per se: NUPRC is convinced that there are other sources of delay, such as incomplete submissions and inadequate scope of works (NUPRC, 2025).

While there are many publications on governance in the petroleum industry, there is limited work on qualitative and documentary studies of the impact of institutional pressures on technical decision making of post-PIA projects in the Nigerian upstream sector. The extant literature in Nigeria has not investigated the effects of coercive, mimetic and normative influences on technical decisions at the engineering project level but only at other aspects such as sustainability, supply-chain management and organisational practice (Abubakar et al., 2025; Aina et al., 2026). As a result, little focus has been placed on the inevitable conflicts between the regulatory, environmental, Nigerian-content, professional and project-specific technical considerations upstream operators must consider in their decision-making process in the current conditions of geological, financial and operational uncertainty. This study seeks to address this, through a qualitative documentary analysis of the PIA 2021 and NCDMB regulations and guidelines, compliance documents, environmental regulatory documents,

NOGIAR and NEITI's audits in addition to a review of industry and operator disclosure on the challenges and impacts of institutional pressure on technical decision making and the identification of potential mitigating strategies that can enhance the efficiency of regulatory coordination, compliance effectiveness, project efficiency and technical accountability in the upstream petroleum industry in Nigeria.

OBJECTIVES OF THE STUDY

The major aim of this study is to explore the effect of institutional pressure on regulatory compliance and the technical decision making process in the upstream oil and gas projects of Nigeria. The particular Objectives are:

- i To explore the institutional pressures that affect the nature and key actors of technical decision making in upstream oil and gas projects in Nigeria.
- ii To determine the impact of institutional pressures and regulatory compliance requirements on project timelines, engineering decisions, capital allocation and implementation of local content.
- iii The operational, legal and institutional challenges of compliance-based decision making in the upstream oil and gas projects in Nigeria were explored.
- iv To find strategic solutions to meet institutional and regulatory needs while ensuring technical integrity, compliance and project execution efficiency.

CONCEPTUAL FRAMEWORK

Institutional Pressure

Institutional pressure is the pressure an organization would experience from external actors, e.g., the expectations the actors have for how an

organisation should behave, engage in their activities and be legitimate. It has a strong link with the institutional theory, specifically the theories of Meyer and Rowan (1977) and DiMaggio and Powell (1983). A formal structure is one of the reasons why the organisations are adopted, because it is a marker of conform to the institutional expectations of society and provides legitimacy (Meyer and Rowan, 1977). These are later expanded upon by DiMaggio and Powell (1983) who explain three types of institutional isomorphism: coercive, mimetic and normative pressures. There are three forms of pressures - coercive, mimetic and normative. Coercive pressure are political influence, regulation and dependency on organisations with authority, mimetic pressure from mimicking practices seen as legitimate/successful under conditions of uncertainty and normative pressure from education/occupation and standards. These differences offer some useful insights in the Nigerian's challenges faced by petroleum operators.

Upstream operation of oil and gas in Nigeria (Nigeria) is not only subject to statutory requirements, it is also subject to a lot of institutional pressures. Formal institutional pressure is the result of the legislation, regulations, licences, permits, technical standards, reporting requirements and directives from institutions which have a legally recognised authority. For example, the NUPRC was established in the PIA 2021 which among others, appointed the upstream petroleum activities' regulatory body and provides the legal framework for regulation of the upstream petroleum activities (Federal Republic of Nigeria, 2021). The following regulatory framework will encompass acreage management and drilling, measurement, environmental remediation, safety, decommissioning and abandonment, gas flaring, methane, as well as other areas (NUPRC, 2026a).

There can also be informal, socio-political and/or institutional pressures. Petroleum firms are not only compelled to deal with the regulators and shareholders in host communities. They operate in a social environment where communities, traditional institutions, civil-society organisations, employees, contracts and other stakeholders have a voice in the needs, expectations, and aspirations related to employment, infrastructure,

environment, compensation, participation, and community development. Part of this relationship has been institutionalised by the PIA in the Host Communities Development Trust. As an institutional obligation, community expectations, as described in the Act, include the 3% levy on operators of the specified upstream facilities to pay towards the development of the host community. Host-community obligations continue to be a part of the governance of the upstream areas as shown in NUPRC's implementation activities.

The institutional pressure is thus more wide-spread than regulatory pressure. This encompasses the expectations that the operators have to keep the organization legal, accepted (or legitimate) and credible in their profession. The institutional pressure in this study is the impact of the statutory and regulatory framework, professional/industry norms and socio-political expectations of relevant stakeholders that influence the project decision makers on the upstream face options that they consider. The definition is especially relevant since most of the technical aspects of petroleum projects are not looked at alone when decisions are made. The NUPRC guidelines for production facilities, particularly as regards the economic, technical and non-technical aspects, should be taken into production design, construction, installation, commissioning and operation.

Table 2: Dimensions of Institutional Pressure in Nigerian Upstream Operations

Dimension	Principal sources	Illustrative pressure on technical decisions
Coercive	PIA 2021, NUPRC regulations, environmental legislation, permits and statutory directives	Compliance with design, drilling, safety, environmental and reporting requirements
Normative	Professional standards, engineering codes, industry	Adoption of accepted engineering, HSE and

	practices and specialist expertise	asset-integrity practices
Mimetic	Industry peers, established operators and responses to technical uncertainty	Adoption or adaptation of technologies and practices used by comparable operators
Socio-political	Host communities, traditional institutions, civil society and local stakeholders	Community development, employment, environmental protection and stakeholder-sensitive project choices
Nigerian-content	NOGICD Act, NCDMB guidelines and project requirements	Contractor selection, procurement, local sourcing, training and technology-transfer decisions

Source: Author's synthesis based on DiMaggio and Powell (1983), Federal Republic of Nigeria (2010, 2021), NUPRC (2026a) and NCDMB (2026).

An awareness of these differences is essential so as to not reinforce or counteract the other. Statutory requirements may include a lower level of technical standard, a professional norm may indicate a higher standard of practice and a host community may have higher expectations for a project configuration that provides additional employment or environmental protection. If there is doubt and especially when the risk is reputational, an operator might be tempted to engage in industry practices to reduce the risk from a technical or reputational standpoint. This study, therefore, had a multi-dimensional understanding of institutional pressure which does not conflict with the petroleum companies, but is actually an institutional pressure against the petroleum companies.

Regulatory Compliance in Upstream Operations

Regulatory compliance is a measure of how well an organisation's activities meet the requirements of the laws and regulations, standards, licence

conditions, permits and directives set by the competent authorities. Compliance is more than just conforming to the laws. It involves establishing any legal requirements as organisation procedures, engineering specifications, operating controls, documentation, monitoring and reporting systems. Compliance is a part of governance that's utilized to help control technical and operational threats; particularly in highly regulated industries.

The PIA 2021 is the main modern-day law in the upstream petroleum sector in Nigeria. The Act creates institutional duties for upstream regulation, and sets the legal framework for technical, operational, environmental and commercial oversight (Federal Republic of Nigeria, 2021). The NUPRC have then worked out rules to clarify some of the upstream activities, and published these rules in the government gazette. There are currently regulations regulating petroleum licensing, host communities, royalty, gas flaring and methane, decommissioning and abandonment, measurement, unitisation, drilling, environmental remediation and safety. Compliance then is an ongoing process, not just undertaken at the time of approval of a project.

This includes one of the most important, being able to be in harmony with the environment. The Environmental Impact Assessment Act calls for environmental impact assessment of projects that are likely to cause significant environmental impacts; and provides procedures for environmental assessment and decision making (Federal Republic of Nigeria, 2004). The environmental-management requirements of upstream petroleum operations and for petroleum projects, the environmental-management plans, are also included in the PIA. The NUPRC framework, in the then form, then includes environmental remediation and environmental considerations in the upstream governance of the project.

The role of the National Environmental Standards and Regulations Enforcement Agency (NESREA) needs to be well conceptualised. NESREA has several roles and responsibilities in the field of the environment such as implementation of environmental requirements, encirclement of pollution and

compliance with environment regulations. But it has a limited statutory mandate including a list of activities which are specifically excluded from its mandate in the oil and gas sector. Hence, with this premise it would be analytically wrong to consider that NESREA is the environmental regulator of the activities of the upstream petroleum sector. The bigger environmental regime, which includes the environmental requirements of the petroleum industry, the environmental standards and the environmental impact assessment act, are administered by the institutions to which the concept of relevance have legal responsibility, and therefore comprise this study's definition of the concept of relevance.

Another regulatory compliance is Nigerian-content requirements. The Nigerian oil and gas industry content development and management (NOGICD Act) 2010, mandates Nigerian content as one of the requirements of regulatory authorities, operators and contractors that participate in the development of the projects (Federal Republic of Nigeria, 2010). The NCDMB has the responsibility to review and approve Nigerian Content Plans, establish guidelines and minimum content level, as well as ensure compliance of operators and service providers. This compliance can then impact on the procurement/contruction process, choice of engineering services, equipment planning and technology transfer and workforce planning.

Regulatory compliance of the upstream operation in this research is considered the standardization of activities, technical design, operation procedure, environmental measures, procurement system, safety system and reporting system of petroleum project with relevant statutory and regulatory, professional or licence requirements. This conceptualization is wider than just a legalistic view of 'compliance' as there could be multiple regulatory aspects to be considered for technical decision.

Technical Decision-Making

Technical decision making involves project teams considering the different courses of action that are technically possible (technically viable) and/or

technically and economically acceptable (technically feasible) for meeting the project and asset objectives, and selecting the course or courses of action. Upstream oil and gas on the other hand is a decision making process where certainty is lacking due to uncertainty of subsurface conditions, reservoir behavior, production performance, technological needs, environmental risks and future economic conditions. The systematic review of decision-support methods for upstream oil and gas industry conducted by Shafiee et al. (2019) shows the use of decision-making in technical, economic, social and environmental evaluations throughout the exploration, development and production stages.

Technical decision making is thus the function of decisions made throughout the whole life cycle of the petroleum asset. Seismic interpretation, well location, appraisal drilling and reservoir characterisation are some of the decisions made during exploration and appraisal. Reservoir-development strategies, well architecture, drilling programmes, production facilities, subsea systems, pipelines, flow assurance, processing capacity and production optimisation can be among the various decisions during field development. Technical activities in operations can include integrity management, process optimisation and HSE controls, well intervention, corrosion management, maintenance and inspection. Decommission, abandon, site remediation and removal/reuse are the end of the asset lifecycle.

One important type of technical decision making is in the form of reservoir management. Reservoir engineers need to consider different development options based on the geological data and the recovery, production profiles, pressure changes, well configuration and economics. The aim is not to get the quickest return on immediate revenues, but to secure the most economically and technically feasible way of utilizing the petroleum resource and handling the risks of the reservoir and of the operation of the field.

Another big category of drilling decisions are the decisions regarding drilling. Location, well trajectory, casing, well completion, cementing, and drilling

fluids, pressure management, well control systems and well completion strategy are all technical risks and big capital investment in determining the location of wells. NUPRC's existing structure explicitly involves in its upstream regulatory structure both acreage-management and petroleum-drilling regulations. Hence the decisions made for drilling are engineering decisions and regulated activities.

Technical project design aspects of health, safety and environmental (HSE) issues are also there. Technical safety control, risk-based inspections, pipeline operation and maintenance, safety-case guidelines, offshore safety permits, lifting operations and methane/ GHG reporting requirements are included in NUPRC's HSEC framework. Commission's production facilities guidelines also cover the design, construction and operation of facilities to protect people and the environment considering economic, technical and non-technical aspects. So, decisions made regarding HSE are not made in isolation, but as part of the technical underpinning which results in the design of facilities and operating systems.

Another example of multiple constraint technical decision making is decommissioning. Potential choices to consider are: Well plugging and abandonment, Facility removal, Subsea infrastructure, Pipeline removal, Waste management and Site restoration. The decisions are made based on technical, economic and environmental, legal and stakeholder issues. Oil and gas decommissioning decisions are considered multi-criteria decisions with multiple stakeholders who may have differing and conflicting interests by research (Martins et al., 2020). There are also specific provisions in the existing regulatory regime for decommissioning and abandoning wells, which also include amended provisions in place for the upstream in 2026.

The Connection between Institutional Pressure, Compliance and Technical Decision-Making

The conceptual focus of this study is the relationship between institutional pressure and regulatory compliance and technical decision making. Technical decisions cannot be made outside of the institutional context.

Instead, institutional requirements to project teams are a set of boundary conditions which the project teams may use to identify, evaluate and select technical alternatives. The boundary condition argument implies that even though technically viable solutions exist, they might be modified, narrowed or have extra conditions applied due to the fact that they don't meet relevant laws, regulations, standards, permits or stakeholder expectations.

This is clearly demonstrated in the production-facilities guidelines of NUPRC. The guidelines establish minimum design, construction and installation requirements for operators that are required to obtain regulatory approval; and suggest that variations from the minimum considerations may require other interaction with the Commission. Concurrently, the guidelines make clear that economic, technical and non-technical considerations need to be taken into account when delivering projects. Thus, regulation can take place not just at the end of the engineering process, but be a part of it from the beginning.

The goal of institutional requirements can be a stimulus as well; institutional requirements may not just be constraints. Provision of safety regulation that encourages the use of better barriers and risk controls, environmental requirements that provide the incentive for investment in spill prevention and remediation technology, Nigerian content requirements that provide incentive for development of local engineering, fabrication and servicing capabilities, and decommissioning requirements that provide incentive for operators to build in lifecycle considerations during the original design. This approach considers institutional pressure as a means to support technical decision making (information or minimum standards included, implementation of risk controls, or accountability measures not otherwise addressed).

Meanwhile, institutional needs can result in other priorities. A technically preferred solution may be in conflict with a local content requirement, a cost-minimising solution may need more environmental controls, a fast production solution may not be safe and a technically preferred decommissioning

solution may have environmental or stakeholder constraints. In these scenarios, project teams need to integrate multiple institutional logics, rather than just find one technically best solution.

The other explanation is the institutional theory which tries to explain the response of the organisation to this environment. There are specific instances of coercive pressures, such as mandatory regulations, permits, directions and sanctions that can have a direct impact on technical decisions. The influence of normative pressures on decisions can be achieved via the professional engineering standards, technical know-how, HSE principles and codes of industry. When there is uncertainty, choices may be made for technology, procedures, or organizational practices that are then used by other operators in the industry, and which appear to be a success (DiMaggio & Powell, 1983). All three pressures can be in effect at the same time, but should be taken to mean that they are not necessarily acting with the same effect.

Within this type of relationship, institutional pressures are shaping compliance requirements, compliance requirements are shaping constraints and incentives, and technical decision makers are shaping and interpreting the compliance requirements in the project level decision making. It is not necessary to perform the process in any particular order. Technical decisions can also trigger additional regulatory needs, guidelines, comments from stakeholders and/or environmental assessment and comment, that are then incorporated into the decision making process.

Table 3: Conceptual Nexus between Institutional Pressure and Technical Decision-Making

Institutional influence	Compliance mechanism	Potential effect on technical decisions	Possible project implication
Statutory/regulatory requirements	Permits, approvals, technical	Establishes minimum acceptable	Greater standardisation and regulatory

	standards and reporting	design/operational conditions	assurance; possible additional approval time
Environmental requirements	EIA, environmental management, remediation and monitoring	Influences facility design, location, technology and operating procedures	Improved environmental risk management; possible additional technical and financial requirements
Nigerian-content requirements	Content plans, procurement rules and monitoring	Influences contractor, equipment, procurement and workforce choices	Local capacity development; possible changes in sourcing and project execution
HSE requirements	Safety cases, risk assessments, inspections and operating standards	Influences equipment specifications, barriers, maintenance and operating procedures	Improved risk control and asset integrity
Professional norms	Engineering standards, codes and specialist practices	Influences technical methods and accepted engineering solutions	Professional consistency and risk reduction
Mimetic pressures	Imitation of established industry practices under uncertainty	Encourages adoption/adaptation of technologies and procedures used by peers	Reduced uncertainty but potential replication of unsuitable practices

Host-community expectations	Consultation, development obligations and stakeholder engagement	Influences project location, access, environmental measures and community-related infrastructure	Improved social legitimacy; possible modifications to project design or sequencing
-----------------------------	--	--	--

Source: Author's synthesis based on DiMaggio and Powell (1983), Federal Republic of Nigeria (2010, 2021), NUPRC (2026a, 2026b), NCDMB (2026) and Shafiee et al. (2019).

This study, however, takes a different approach to the conceptualization, which involves the elimination of two assumptions. The first is that regulation does not necessarily have a negative effect on technical decision making. Regulatory requirements can have a positive impact on safety, environmental performance, accountability and asset integrity. Secondly, technical decision making is not seen as a purely rational exercise of maximizing the potential of engineering. The possible alternatives that might be considered acceptable are shaped by the legal authority, professional norms, the legitimacy of the organizations, uncertainty, expectations of stakeholders and resource dependencies within an institutional field.

The main conceptual argument is thus that the quality of the upstream technical decision making partly depends on the level of facilitation of institutional requirements into the engineering processes involved in the project level. Coordinated, predictable and clear regulatory requirements can offer beneficial boundary conditions to enhance technical governance where they are clearly defined. Requirements not integrated, ambiguous and/or having multiple goals, not in the project plan can result in opportunities for delay, redesign and/or compliance post facto. In this study, the above mentioned relations would therefore be manifested in the post-PIA institutional set-up in the Nigerian upstream petroleum projects, which is the empirical part of the study.

THEORETICAL FRAMEWORK

The study rests on the bases of the Institutional Theory with the emphasis of the institutional isomorphism perspective which was developed by DiMaggio and Powell (1983). Institutional Theory is a theory that focuses on the effect that institutions have on organizations based on their formal and informal expectations. In addition to being used for technical efficiency, Meyer and Rowan (1977) say that organizations tend to have formal structures, procedures and practices in order to gain legitimacy and meet institutional norms. This is applicable to Upstream Petroleum industry in Nigeria because Technical activities are performed in an environment that is highly regulated with Statutory requirements, Regulatory approvals, Professional standards, Environmental obligations, Nigerian-content requirements and Community expectations. Technical decision making is therefore not a strictly technical and/or economic choice of the “best” option suggested, but also an institutional process in which petroleum projects are planned, approved and implemented.

Coercive, mimetic and normative pressures are the main pressures that shape institutional environments (DiMaggio & Powell, 1983). Coercive pressure is the pressure that is applied by government institutions, regulators and other actors having institutional power. The Petroleum Industry Act (PIA) 2021 and various regulations by the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) are some of the important examples in the Nigerian upstream sector which include requirements on petroleum operations, health and safety, environmental management, decommissioning and host community development. Mimetic pressure is the pressure that is experienced when organisations emulate others' practices, especially in cases of uncertainty. Therefore, the project operators have the opportunity to use all known engineering practices, technologies, project management methods or industry templates they think are credible or risk-reducing as they see fit. Normative pressure, on the other hand, is generated by the professionalization process, technical education, engineering standards, certification, health, safety and environmental expectations and

norms from within the professional communities. While mimetic pressure is believed to be more influential in some organisational practices, such as in the case of oil and gas, coercive and normative pressures are found to have a stronger influence in other practices, findings from Nigeria suggest (Abubakar et al., 2025; Aina et al., 2026).

In the current study, the Institutional Theory can be used to analyze the pressures that are introduced into the technical decision-making process. Engineering, safety, commercial and operational objectives may necessitate planning the development of fields, planning a drilling program, planning a production facility, ensuring the integrity of wells, environmental management, decommissioning and related activities in order to satisfy regulatory requirements. The boundaries for technical alternatives to be considered, approved and implemented might then be set by institutional requirements. The theory doesn't mean that institutional pressure have to have negative consequences though. The safety, environmental protection, accountability and technical standardisation will be reinforced by regulatory and professional requirements. Organisations may need to adjust project designs, revise documentation, request new approvals or revisions to the project implementation, if requirements are not clearly defined, are overlapping, are not predictable or well-coordinated. The theoretical question is not merely whether there is any regulation, but what institutional pressures would be anticipated to shape technical judgement and institutional reactions in certain contexts and with respect to a particular project.

The institutional concepts of decoupling and organisational adaptation of the Institutional Theory are also included in the study to explore the responses by the upstream operators to the different institutional demands. Meyer and Rowan (1977) propose that in some cases, organisations may have formal structures of compliance with operational practices not matching up with formal structure. Evidence of such gaps have been identified in the Nigerian oil and gas context, for instance, in green human-resource practices, but may not automatically be extended to the technical engineering decisions (Aina et al., 2026). Organisations can also be more proactive and look for 'active

compliance' – that is, compliance with the regulatory requirements, professional, environmental and community needs are integrated from an early stage of the project in the process of decision making and technical solutions. These concepts are explored to understand how much operators are able to integrate these concepts into their institutional requirements, how they incorporate these concepts into their technical decision making and/or how there is a mismatch between what is formally required and implemented. The main theoretical argument is thus that technical decision making is institutionally rooted, both in the sense that it is coerced and mimetic, implying that range of technical alternatives considered and how they are approved and implemented is influenced by coercive and mimetic pressures, and in the sense that it is normative, meaning that the way it is done influences the technical and institutional outcomes of petroleum projects in the Nigerian upstream sector.

METHODOLOGY

The research design used is qualitative approach and adopts documentary research design in analyzing the relationship between institutional pressure, regulatory compliance and the technical decision making in oil and gas upstream projects in Nigeria. The information available is all secondary information from primary legal and regulatory documents, official institutional publications, industry and project reports, operator disclosures and peer reviewed academic publications. Some of the relevant documents are the Petroleum Industry Act (PIA) 2021, Nigerian Oil and Gas Industry Content Development Act 2010, NUPRC regulations and guidelines, NCDMB publications, environmental and safety regulations, and reports from different petroleum industry bodies. Academic literature was searched from the following sources; Scopus, Web of Science, ScienceDirect, JSTOR, SpringerLink, Taylor & Francis, Google Scholar and African Journals Online databases/repositories and other relevant Nigerian institutional websites. The empirical review is a principle one, and covers the period 2010-2026, but has a specific focus on the period 2021-2026, reflecting the new regulatory environment after PIA. Institutional pressure, coercive pressure,

normative pressure, mimetic pressure, regulatory compliance, technical decision making, petroleum upstream industry in Nigeria, performance of petroleum and gas project, local content, Petroleum Industry Act and NUPRC were the search terms used.

The analysis of the data was carried out qualitatively through thematic content analysis which was developed based on the four research objectives in this study and the Institutional Theory. It was decided to include documents that included relevant information relating to institutional pressures, regulations, decisions (technical or project), operational or legal issues, or mitigation strategies were purposively selected. Coded evidence was grouped around the themes of coercive pressure, mimetic/normative pressure, regulatory compliance, project timelines and implementation, capital allocation, local-content requirements, environmental and community obligations, regulatory coordination, institutional capacity, decoupling and active compliance. The findings of the legislation and regulatory documents as well as those from the empirical studies and industry materials were compared to identify similarities and differences. Avoiding causality was achieved by ensuring that particular attention was given to distinguishing formal regulatory requirements and documented organisational responses, and reported project outcomes. The study will emphasize the post-PIA era, but will create historical and empirical context using evidence from previous eras.

EMPIRICAL LITERATURE REVIEW

The empirical literature reflecting the institution pressure, regulatory compliance and technical decision-making in the petroleum industry in Nigeria is fragmented among literature on institutional behaviour, project performance, environmental governance, local-content development, supply-chain management and petroleum regulation. There is little research that specifically addresses the impact of institutional pressures on engineering choices in upstream projects, but what there is provides important insights into the impact of regulatory, professional, organisational

and socio-institutional needs on petroleum operations. The review is then focused on the four research goals of the study: nature and sources of institutional pressures, impact of institutional pressures on technical decisions and on project decisions, operational and legal aspects of complying with institutional requirements, and strategies for dealing with institutional requirements without impacting the efficiency of the projects.

Nature and Sources of Institutional Pressures on the Making of Technical Decision

The empirical study by Okeke (2025) which is immediately related to the oil and gas industry in Nigeria is one of the useful studies to begin with and is in the lens of Institutional Theory. Okeke analysed the effects of the coercive, normative and mimetic pressures on the practices of sustainability and supply-chain management among 144 oil and gas companies using survey findings. In the case of supply chains, where mimetic pressure is not significant, coercive pressure and normative pressure are significant and can be used to increase sustainability and practices. The moderating variable of size of the firms turned out not to be a significant influence on any of the relationships. The current study is important as it indicates that institution influence in petroleum organisations in Nigeria is not just being imitated from the competitors. Mimetic conformity may not be the most important part of other formal aspects of regulatory practice and/or of professional expectation in other aspects of petroleum sector practice. The study conducted by Okeke, however, was not directly connected with the technical aspects of the question of the decision making that was investigated in this study, which was on sustainability and supply-chain practices.

Aina et al (2026) also provide further evidence of pressures in the oil and gas industry in Nigeria. They conducted 25 qualitative interviews with professionals from all phases of upstream (56 per cent), midstream and downstream operations. The study results indicated that coercive and normative pressures had a greater impact on green HRM practices than mimetic pressures. Most importantly, the researchers discovered gaps in policy and practice, organisation and implementation and formal objectives

and substantive outcomes. It is especially important for the present study that this finding shows that the institutional requirements do not necessarily imply the way they are operationalised. But the evidence is not a decoupling in technical engineering projects in Nigeria per se, but rather evidence of green human resource management and should not be taken as a decoupling in upstream technical projects in Nigeria. Instead, it creates an empirically based potential which needs to be explored in the technical and project-management space.

In this new, post-PIA regulatory framework, this kind of pressure can more clearly be seen, a framework where institutional tools are applied to force. The NUPRC has been established under the Petroleum Industry Act 2021 as the main regulator of the upstream petroleum industry and the petroleum governance institutional framework was broken up. NUPRC has issued various regulations and guidelines since the Act was implemented, such as the Licensing Regulations, Drilling Regulations, Production Regulations, Decommissioning and Abandonment Regulations, Environmental Remediation Regulations, Gas flaring and Methane Regulations, and Measurement Regulations, Unitisation Regulations and others. A policy inventory suggests that, while technical decision-making occurs at increasingly fine-grained policy context, it is not occurring in an institutionally neutral context.

Technical decision making is also being institutionalised as is evident in the development and production guidelines of NUPRC. For example, design, construction and operation of oil & gas production facilities have guidelines that call for Field Development Plan and environmental screening approval to be submitted as evidence for conceptual design approval. Also, a series of concept management workshops are arranged for a number of projects related to modification of facilities. The needs expressed, such as for regulatory requirements, also suggest another way in which regulatory institutions can be directly linked to engineering designs: regulatory approval for a technical solution is not an end-of-an-engineering-process administrative task, but rather it can be a part of the engineering process,

where engineering alternatives are considered and approved for regulatory clearance.

Through professional standards and technical expectations, too, normative pressures are in effect. Upstream engineering activities are undertaken by a range of multidisciplinary professionals with activities that are regulated by technical standards, health and safety requirements, management principles and existing professional practices. Institutionalization of expectations about acceptable technical and operational practice in the NUPRC's regulatory regime is evidenced in the presence of specific upstream safety regulations, environmental-remediation regulations and technical guidelines for production facilities. These findings concurred with other studies by Okeke (2025) who concluded that normative pressures was statistically significant to sustainability and supply-chain practices and Aina et al. (2026) which found that normative pressures was influential in organisational environmental practices.

Hence, the empirical evidence from literature revealed that there exist multiple and several sources of institutional pressures in petroleum operation in Nigeria which include statutory and regulatory institutions, professional and technical standards, petroleum industry practice, institutions relating to local content and institutions relating community obligations. A crucial, but missing, element is that. Some research studies already exist that focused on institutional pressures and how they relate to sustainability, supply chains and/or human-resource practices. Empirical studies following energy firms back to specific upstream engineering decisions, such as facility design, drilling, field development, production system selection, procurement specifications, well integrity and decommission decisions are somewhat limited.

Institutional Pressure in Terms of Compliance, Technical and Project Decisions

The literature of project performance in the Nigerian oil & gas project is more direct forum for discussion of the scrutiny process of institutional

requirements and project performance. Rui et al (2018) analyzed 65 oil and gas projects in Nigeria and found out the factors that affect project performance and these were classified into technical and non-technical factors. There was an average cost overrun of 38 per cent and an average time overrun of 37 per cent reported. Most importantly, the authors found that the high failure rates of projects are not due to technological difficulties or technological problems. Rather, there were identified issues that were not technical in nature that were important, such as local content, community issues, security and partnership arrangements. This evidence is relevant to the present study as it has shown that the outcomes of a project are not fully explained and understood by engineering variables. The study however did not include these non-tech factors on the concept of Institutional Theory as it was not conducted under the regulatory regime of PIA 2021. It thus serves as a good empirical reference as to pre-PIA outcomes but not as a reflection of the effects of post-PIA rules.

Linkage to technical is one of the most important aspect of local content regulation. The effect of the Nigerian laws on local content in engineering development and the national economic result was studied by Nwankwo and Iyeke (2022). They discovered that the Nigerian Oil and Gas Industry Content Development Act helped to build engineering capability within Nigeria and boost local companies' involvement. The authors also discovered that information on contracts is missing, such as local-content payments, as well. Based on this, their study finds it not to be an impediment to project implementation to have a local content policy. It may also have technical and industrial-development advantages, due to the involvement of local engineering companies, the development of supply chain and knowledge building.

Issues of technicality of local content are likely therefore to have a two-fold nature. The Nigerian market needs can increase the capacity of engineering in Nigeria, stimulate the procurement of engineering goods and engineering goods technological learning. Operators may need to perform further supplier qualification, capacity building, technology transfer and/or supplier

procurement efforts, however, if there is not enough capacity locally to meet the technical requirements and/or project schedule and/or size. The generalisation that local content requirements delay projects and its impact depends on the type of local content institution is not backed by empirical evidence, and only in part on the level of local capacity and institutionalisation.

This is reflected in recent evidence. In a comparative study of local-content development in Nigeria and other petroleum producing countries, Obakhume (2026) found that Nigeria was seen to have improved in terms of the role of locals, skills development and local procurement since the enactment of NOGICD Act but the implementation was not uniform because of lack of institutional coordination, technological challenges and inconsistencies in implementation. The study, thus, indicates that capacity and coordination within the institutions are important aspects which influence the effectiveness of local-content policy.

Technical decisions may be impacted by regulatory needs as well. This relationship exists in NUPRC's production-facility guidelines where the conceptual design approval is tied up with pre-approval by regulators such as Field Development Plan and environmental screening approval. This can result in the technical design process being tightly coupled with the EA and regulatory process and not being broken down into project stages. Technical project decisions also impact economic and regulatory assessment as can be seen by the fact that NUPRC's Economic Regulation and Strategic Planning Department also monitors strategic and budget planning, as well as approving commercial aspects of field development plans.

In the post-PIA context, the institutionalisation of the decisions made at the upstream project level is strengthened in other words. Specific acreage management and drilling, environmental remediation, safety, commercial activity, measurement, unitisation and decommissioning regulations are now part of the NUPRC regulatory inventory. The regulatory framework in 2026 is used as a basis to change the decommissioning and abandonment

framework. Operators' technical planning should, however, always be flexible to allow for changes in regulatory requirements, as well as reservoir, engineering and commercial considerations.

Operational, Legal and Institutional Challenges Associated with Compliance-Driven

One theme in the empirical literature is that the problems in the petroleum sector are often the result of the interaction of the institutional requirements, and not individual institutional requirements. Some earlier research works on petroleum regulations in Nigeria revealed that overlapping mandates, duplicating regulatory functions and conflicting regulatory functions were identified as problems in petroleum regulation. Some of this literature is pre-dating the PIA 2021 restructuring of the institutions while some of the literature reflect downstream aspects, but those that are useful in documenting historical evidence of coordinating the regulatory environment in the Nigerian petroleum sector are included. This has also inspired more recent legal studies that have considered the potential for overlap between NUPRC and NMDPRA due to the bifurcation of regulatory responsibilities in the PIA. The type of evidence is to be taken with a grain of salt as it is a form which could be measured, but the institutions in the condition it suggests do have a potential influence on the regulatory coordination.

Another important area is one of environmental governance. The study titled, "Corporate Environmental Accountability in the Oil and Gas, and Cement Industries in Nigeria" by Noah and others (2020) identified regulatory weaknesses, which include low enforcement capability, outdated regulations, institutional and political issues and lack of corporate accountability. There is no guarantee that formal rules in the environment will result in compliance behaviour towards the environment. The upstream petroleum environmental governance policy-practice gap is also investigated by Chinagorom et al. (2026) who surveyed and documented and analysed the environmental-performance records. The authors of the study found that environmental issues continue to be a problem, despite the wide-ranging regulatory measures in place. All of these studies highlight the necessity of

research on compliance requirements as well as on the ways in which they are put into practice, monitored and effective at institutional level.

This is also true of the non-technical conditions which impact on the projects performance in the same manner; and which impacts on the operational consequences of institutional conditions as discussed in the project-performance literature. Rui et al (2018) identified some factors that affected the performance of the project in Nigeria which are local content, community, security and partnership. This is important because the overarching operating context is often a factor in many decisions regarding technical issues in upstream projects. If the capability with respect to procurement, the community relations, the security conditions and the contractual conditions do not allow a realization of the design, then the technically optimal design can be adapted. Institutional pressure has then to be considered in the context of the project-governance: in which technical, commercial and socio-institutional aspects play.

PIA 2021 is a context where expectations of the community play a more important role. The Act was to create a concept of Host Communities Development Trust and in the following the NUPRC developed specific Host Communities Development Regulations. These clauses institutionalise expectations about development of the host community and create formal systems on how to implement operators' responsibilities to the host community. The regulatory regime thus brings community development issues into the sphere of the governance of upstream petroleum activities. However, if there are obligations that have to be different than the effects of such obligations that would require evidence of the individual project, but not assumption.

The second challenge of concern is if there is a gap between compliance and implementation or if they are the same? The concept of gap between policy and practice was also cited by Aina et al., (2026) who provided evidence of the decoupling between Nigeria oil and gas green human resource practice. Chinagorom et al. (2026) also consider the view point that

environmental governance is a policy-practice gap. Although it is not always clear that compliance to upstream engineering is always independent of other areas it does indicate there is a need to look for evidence of discrepancies between commitment in the regulatory documents and approved project arrangements and reported compliance in the document.

Overall, the empirical literature suggests that there are potential problems with the compliance approach to technical decision making in terms of coordinating the compliance process with the regulations, institutional capacity, changing needs, environmental governance and operationalization of the local content and of formal rules in practice, as well as community expectations. But when it comes to a clear exposition of the questions those challenges pose at the project level to engineering decision making, the literature is far skimpier.

Strategies for Dealing with Institutional Pressures and Maintaining Technical Efficiency

The empirical literature offers a number of clues to the better management of institutional requirements. Firstly, ensuring compliance needs are considered from an early stage of project planning will minimize the risk of any regulatory, environmental or local-content issues coming as a surprise after key technical decisions have been taken. NUPRC's production facility requirements provide examples of how institutional logic is emerging in this type of integration, in that the regulatory documentation is required at the conceptual design approval stage. This implies compliance might not only be a back-end engineering and design exercise, but can also be embedded at the front-end.

Second, capacity of technical / supplier institutions at home needs to be strengthened for the management of home content requirements. Nwankwo and Iyeke (2022) confirmed that the local-content rule had a positive impact on the growth of engineering capabilities in Nigeria, and Obakhume (2026) revealed technological capacity and institutional coordination were still important factors affecting the performance of local-content. It is assumed

that complying and being technically efficient need not be a trade-off. Capacity building of domestic firms through investments in their capabilities in suppliers, engineering, fabrication capability, technology transfer, research and development can help enhance their ability to meet the technical requirement and achieve the local-content target.

Thirdly, the coordination of the institutions is key. The experience on regulatory overlaps and uneven application indicates that better compliance can be achieved by more clearly defining responsibilities, ensuring uniform application of the regulations and the coordination of their interpretation and implementation by the relevant institutions. Based on the PIA 2021, the institutional consolidation process is still ongoing as reflected in the continued development of the NUPRC regulations and guidelines. Improved coordination could also limit the uncertainties, though it may not be possible to measure impacts of coordination on improved project schedules and costs, and this needs to be further investigated empirically.

Fourthly, there must be internal systems within the organizations that can convert external institutional demands into technical and operational systems. The results of Okeke (2025) and Aina et al. (2026) indicate that the reaction of the organisations to the institutional pressure is dependent on the nature of the pressure and institutional practice. It provides technical projects with a built-in compliance framework with the regulatory experts, engineers, procurement, HSE, project managers, and community-relations. This integration can enable the regulatory criteria to be taken into account at the same time as technical and commercial ones are assessed when evaluating project-options.

Last but not least, the project evidence of performance shows the need for systematic risk identification. Non-Technical Drivers of Project Performance were identified and used to create risk oriented recommendations by Rui et al. (2018). The results suggest that community, security, partnership and local-content risks should be taken into account when planning a project's implementation, in addition to the traditional technical risks. In the current

study, this applies to a mitigation framework, where institutional and compliance risks are detected as early as possible, allocated to the relevant organizational unit, followed up using project milestones, and included in decision gates.

Identified Gaps in the Research

The empirical literature has set forth a number of key points. First, in Nigeria's oil and gas sector, it is proven that institutional pressures are relevant to the practices of the institutions. Okeke (2025) also observed significant effect for coercive and normative pressures and Aina et al. (2026) also noted that the coercive and normative pressures were more significant than the mimetic pressure. Second, arrangements for petroleum projects can be affected by regulatory and institutional requirements not just in the technical field. Rui et al. (2018) found that the non-technical factors (local content, community, security and partnership) were also significant in determining the project performance. Thirdly, local content has resulted in a development of the engineering and industrial capacities in the country, albeit not uniformly. Fourth, the environment-governance literature reveals that formal regulatory architecture is not necessarily a legitimate means of making formal compliance a substantive reality.

Although these have been important contributions, there is still a great deal of empirical work to be done. Studies conducted in Nigeria hitherto have been either focusing on institutional pressure and sustainability, institutional pressure and supply-chain management or institutional pressure and human-resource practices; cost and schedule studies have been conducted on project-performance and the non-technical drivers have been examined but not in a systematic way using the Institutional Theory; engineering capacity and economic effects have been examined in the local-content studies; and policy-practice gaps and the effectiveness of the regulations have been the focus of environmental-governance studies. The extent of integrated research that provides an explanation of how the coercive, mimetic and normative institutional forces affect the actual technical decision in Nigerian upstream petroleum projects remains limited, however.

The second gap is related to the institutional environment after the PIA. A lot of the empirical evidence of project performance dates back to before the Petroleum Industry Act 2021 (PIA21). NUPRC regulations on drilling, production, safety, environmental remediation and decommissioning, as well as measurement, add a new layer of institutional context to the previous regulations. There has been a lack of literature to fully link this developing regulatory landscape to how a technical decision is developed, reviewed, revised and approved in practice.

A third gap is in the area of institutional pressure and the outcomes of the project. Previous studies have shown that non-technical factors are important to project performance but they do not sufficiently differentiate between institutional pressures which limit technical options, and those which raise the quality of technical options, and those which create further coordination needs. Hence, the relationship should not be thought of as a straightforward negative impact of regulation. The question that is more likely to be useful in the analysis is when and under what institutional circumstances do compliance requirements enable, limit or hinder technical decision-making and project implementation?

The current study responds to the identified gaps by adopting a qualitative documentary analysis approach in the study of Nigerian upstream petroleum projects and the institutional context within which they are sited. Rather than estimating a one-size-fits-all causal impact of regulation on technical decision-making, it is to uncover the mechanisms by which regulatory, professional and industry pressures come into play in technical decision-making, and to provide organisational and institutional pathways to managing those pressures.

CONCLUSION

Institutional theory was adopted in the analysis of this study which focused on institutional pressure, regulation compliance and decision making on the technical aspects of the Nigerian upstream oil and gas projects. Upstream petroleum activities are accompanied by a set of statutory regulations, regulatory approvals and professional standards, the local content obligations and expectations, as well as environmental obligations and expectations as revealed in the empirical literature. The result of the study shows coercive and normative pressures can have a significant impact on organisational practices, but that mimetic pressure can have different effects in different circumstances (Okeke, 2025; Aina et al., 2026). Therefore, one cannot solely look at technical decision making as an optimisation process of the engineering process, since technical alternatives are discussed in institutional conditions which set up requirements for safety, environmental protection, local participation, accountabilities and project approval.

The review also showed that the things other than technical can also play important role in the implementation of a petroleum project such as institutional factors. For the oil and gas projects, the results indicate the technical aspects of a project can be correlated to factors such as local content, community relationship, security and the partnership arrangement of a project (Rui et al., 2018). Meanwhile, the local-content regulations have helped to build domestic engineering participation and capability, and have shown that regulations can provide developmental and technical benefits other than just project obligations (Nwankwo & Iyeke 2022). Similarly, Project safeguards and accountability can be complemented by environmental and safety factors. Instead, the question is whether institutional pressure is good or bad in itself or how it is coordinated, designed and translated into project decisions.

Another important result from the study was that a formal compliance is followed by a substantive implementation. It is not enough to rely on the presence of legislation, regulations and guidelines to prove compliance is effective. However, there is evidence of gaps and decoupling between the policies and practices of Nigerian oil and gas organisations (Aina et al., 2026) and this study aims to look at how the institutional requirements are put into

practice. This difference is particularly significant in any project upstream because requirements for compliance can have an influence on the field-development plan, the design of the facilities, drilling, procurement, environmental management, local content, and decommissioning. This issue is more important today in the post-PIA regulatory environment with NUPRC in the process of developing and implementing regulations on various aspects of upstream petroleum operations.

There is an overall institutionalisation of the technical decision making process in the Nigerian upstream petroleum projects, the study concludes. Coercive pressures (legislation and regulators), normative pressures (professional and technical standards) and mimetic pressures (industry practices) affect the range of alternatives that is considered, the conditions for technical decisions to be approved and implemented. The relationship may, however, be non-linear, and need not be negative. When institutional need is well defined, well-coordinated, predictable and an early consideration in the planning of a project, safety, environmental protection, technical integrity and accountability can be promoted. On the other hand, lack of confidence, poor coordination, poor institutional capacity, or gaps between the requirements and implementation can add complexity to the organisation and project-management issues. The primary policy challenge then is to provide an institutional structure where regulation is not conflicted by stringency of regulation and its technical aspects.

RECOMMENDATIONS

- I Improve coordination and predictability of regulations: NUPRC and other relevant institutions should coordinate regulations, make clear the roles of the institutions, harmonise the rules applicable and ensure there is consistency in regulatory guidance. The goal should be to have effective regulatory oversight, reduce unnecessary uncertainty and duplication of effort for projects in the upstream sector.

- ii Regulatory and environmental, HSE, local-content and community requirements should be taken into account when selecting concepts and during front-end engineering and project design, by operators upstream. Early compliance planning will enable technical and regulatory requirements to be taken into account at the same time, and minimise the need for unnecessary changes in design or re-submission of designs.
- iii Capacity building of technical and local content: boost investments in local content development, local fabrication capacity, transfer of technology and engineering research by NCDMB, operators and Nigerian engineering and service companies. The ability to build domestic capacity would aid in achieving the goal of local content regulation and enhance Nigerian companies' capacity to deliver the technical, quality and schedule requirements of the upstream projects.
- iv Create holistic technical–regulatory decision making processes: Project teams should include multidisciplinary group of operators, engineers, project managers, HSE specialists, regulatory and legal experts, procurement and community relations specialists. This integration would help detect the institutional needs at an early stage, and help in assessing the technical, regulatory, commercial and stakeholder aspects in parallel.
- v Enhance evidence-based compliance monitoring and institutional learning: Compliance monitoring should not only focus on formal compliance but more importantly on the actual implementation and project outcomes which should be monitored by NUPRC and operators; enhance institutional learning. Processes of regulatory requirements, along with documented impacts on technical changes, regulatory approvals, safety, environmental performance, local-content implementation, project execution should all be included in compliance reviews. Learnings obtained from the work done in the completed projects should then be used as lessons learned for future regulatory and project-management practices.

- vi Implement proactive stakeholder and regulatory engagement: Foster proactive, institutionalized, early dialogue and consultation with stakeholders and regulatory bodies for complex technical and regulatory issues; incorporate host-community and other stakeholders' needs into project planning. Regular technical discussions, clarification and open and transparent stakeholder engagement can help to better understand the needs of the regulatory framework and can help to identify institutional or social risks at an early stage in the project process that would otherwise be challenges to project implementation.

REFERENCES

- Abubakar, A., et al. (2025). Navigating institutional pressures: Assessing sustainability and supply chain management practices in the oil and gas industry of a developing economy. *International Journal of Energy Sector Management*, 19(6), 1489–1513. <https://doi.org/10.1108/IJESM-09-2024-0022>.
- Aina, W., Takeda, S., & Yang, Y. (2026). Green human resource management in the Nigerian oil and gas industry: Context and implementation. *Business Strategy and the Environment*, 35(5), 7363–7377. <https://doi.org/10.1002/bse.70553>.
- DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organisational fields. *American Sociological Review*, 48(2), 147–160. <https://doi.org/10.2307/2095101>.
- Federal Republic of Nigeria. (2004). Environmental Impact Assessment Act, Cap. E12, Laws of the Federation of Nigeria. Abuja: Federal Government of Nigeria.
- Federal Republic of Nigeria. (2006). National Oil Spill Detection and Response Agency (Establishment) Act, 2006. Abuja: Federal Government of Nigeria.
- Federal Republic of Nigeria. (2010). Nigerian Oil and Gas Industry Content Development Act, 2010. Abuja: Federal Government of Nigeria.
- Federal Republic of Nigeria. (2021). Petroleum Industry Act, 2021 (No. 6). Abuja: Federal Government of Nigeria.
- International Monetary Fund. (2026). Nigeria: 2026 Article IV consultation—Press release; staff report; and statement by the Executive Director for Nigeria. Washington, DC: IMF.
- Martins, I. D., Moraes, F. F., Távora, F. F., Soares, H. L. F., Infante, E. F., Arruda, E. F., Bahiense, L., & Caprace, J. (2020). A review of the

multicriteria decision analysis applied to oil and gas decommissioning problems. *Ocean & Coastal Management*, 184, 105000.

Meyer, J. W., & Rowan, B. (1977). Institutionalised organisations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83(2), 340–363. <https://doi.org/10.1086/226550>.

Meyer, J. W., & Rowan, B. (1977). Institutionalised organisations: Formal structure as myth and ceremony. *American Journal of Sociology*, 83(2), 340–363. doi:10.1086/226550.

National Bureau of Statistics. (2024). Nigeria GDP report: Q3 2024. Abuja: NBS.

National Oil Spill Detection and Response Agency. (2026a). About NOSDRA. Abuja: NOSDRA.

National Oil Spill Detection and Response Agency. (2026b). Services and functions. Abuja: NOSDRA.

Nigerian Content Development and Monitoring Board. (2026). NCDMB overview and Nigerian content regulatory framework. Yenagoa: NCDMB.

Nigerian Content Development and Monitoring Board. (2026a). Monitoring and evaluation: Upstream projects monitoring. Yenagoa: NCDMB.

Nigerian Content Development and Monitoring Board. (2026b). Project certification and authorisation. Yenagoa: NCDMB.

Nigerian Extractive Industries Transparency Initiative. (2024). Nigeria 2023 EITI report: Oil and gas. Abuja: NEITI.

Nigerian Upstream Petroleum Regulatory Commission. (2022). Nigerian Upstream Petroleum Host Communities Development Regulations, 2022. Abuja: NUPRC.

Nigerian Upstream Petroleum Regulatory Commission. (2023). Guidelines for the design, construction and operation of oil and gas production facilities in Nigeria (Version 5). Abuja: NUPRC.

Nigerian Upstream Petroleum Regulatory Commission. (2024). Nigerian Upstream Petroleum Environmental Remediation Regulations, 2024. NUPRC.

Nigerian Upstream Petroleum Regulatory Commission. (2025). 2024 annual report. Abuja: NUPRC.

Nigerian Upstream Petroleum Regulatory Commission. (2026). Gazetted upstream petroleum regulations. NUPRC.

Nigerian Upstream Petroleum Regulatory Commission. (2026a). Gazetted regulations. Abuja: NUPRC.

Nigerian Upstream Petroleum Regulatory Commission. (2026b). Health, Safety, Environment and Communities (HSEC) guidelines. Abuja: NUPRC.

Noah, A. O., Adhikari, P., Ogundele, B. O., & Yazdifar, H. (2020). Corporate environmental accountability in Nigeria: An example of regulatory failure and regulatory capture. *Journal of Accounting in Emerging Economies*.
<http://www.epa.gov/ghg/emissions/global-greenhouse-gas-emissions-data>.

Nwankwo, E., & Iyeke, S. (2022). Analysing the impact of oil and gas local content laws on engineering development and the GDP of Nigeria. *Energy Policy*, 163, 112836. doi:10.1016/j.enpol.2022.112836.

Obakhume, K. A. (2026). Local content development and the resource curse in Nigeria: Comparative lessons and policy reform pathways. *Social Sciences & Humanities Open*, 13, 102291. doi:10.1016/j.ssaho.2025.102291.

Okeke, A. (2025). Navigating institutional pressures: Assessing sustainability and supply chain management practices in the oil and gas industry of a developing economy. *International Journal of Energy Sector Management*, 19(6), 1489–1513. doi:10.1108/IJESM-09-2024-0022.

Rui, Z., Cui, K., Wang, X., Chun, J.-H., Li, Y., Zhang, Z., Lu, J., Chen, G., Zhou, X., & Patil, S. (2018). A comprehensive investigation on performance of oil and gas development in Nigeria: Technical and non-technical analyses. *Energy*, 158, 666–680. doi:10.1016/j.energy.2018.06.027.

Shafiee, M., Animah, I., Alkali, B., & Baglee, D. (2019). Decision support methods and applications in the upstream oil and gas sector. *Journal of Petroleum Science and Engineering*, 173, 1173–1186. <https://doi.org/10.1016/j.petrol.2018.10.050>.