

**ASSESSING COMPLIANCE AND IMPLEMENTATION CHALLENGES: A STUDY OF THE
PETROLEUM INDUSTRY ACT'S IMPACT ON OPERATIONAL EFFICIENCY IN NIGERIA'S
OIL AND GAS SECTOR**

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ABSTRACT

The Petroleum Industry Act represents one of the most significant reforms in Nigeria's oil and gas sector, aimed at improving governance, transparency, and operational efficiency within the petroleum industry. This study examined compliance with the provisions of the Petroleum Industry Act and assessed the implementation challenges affecting operational efficiency in Nigeria's oil and gas sector. The study adopted a descriptive survey research design. Data were collected from 150 respondents drawn from regulatory agencies, international oil companies, indigenous oil firms, and petroleum service providers using a structured questionnaire. The data collected were analyzed using descriptive statistics including frequency distribution, mean, and standard deviation. The findings revealed that petroleum operators demonstrate a moderate to high level of compliance with the provisions of the Petroleum Industry Act, particularly in areas related to regulatory guidelines, reporting requirements, and operational licensing. The study also found that several implementation challenges affect the effective execution of the Act, including regulatory transition difficulties, institutional capacity limitations, fiscal uncertainties, coordination challenges among regulatory institutions, and security threats such as oil theft and pipeline vandalism. Furthermore, the results showed that compliance with the Petroleum Industry Act positively influences operational efficiency in Nigeria's oil and gas sector through improved transparency, accountability, regulatory clarity, and more efficient licensing processes. The study concludes that while the Petroleum Industry Act has significantly improved regulatory governance within Nigeria's petroleum sector, its full benefits depend on effective implementation, stronger institutional capacity, and improved security in oil-producing regions. The study therefore recommends stronger regulatory enforcement, improved security measures in petroleum-producing areas, and enhanced institutional coordination among regulatory agencies to ensure the successful implementation of the Petroleum Industry Act and improved operational efficiency in Nigeria's oil and gas sector.

Keywords: Petroleum Industry Act, regulatory compliance, operational efficiency, oil and gas sector, petroleum sector reform, Nigeria.

INTRODUCTION

Nigeria's oil and gas sector has historically played a central role in the country's economic development, providing a substantial share of government revenue and foreign exchange earnings.

For decades, crude oil exports have dominated Nigeria's economic structure, accounting for a large proportion of national income and shaping fiscal policy and development planning. Prior to recent reforms, the petroleum industry operated under the Petroleum Act of 1969 and several fragmented regulatory frameworks which gradually became outdated and ineffective in addressing emerging governance, transparency, and operational challenges within the sector. These institutional weaknesses contributed to issues such as regulatory overlap, inefficient operational systems, corruption, and weak accountability structures that limited the sector's overall productivity and investment attractiveness (Green, 2024).

Despite being one of Africa's leading oil producers, Nigeria has struggled with persistent inefficiencies in petroleum operations, including declining crude oil production, pipeline vandalism, regulatory uncertainties, and insufficient transparency in resource management. The oil and gas industry also remains critical to Nigeria's macroeconomic stability, contributing significantly to government revenue and foreign exchange earnings, while influencing national budget performance and economic growth trajectories. In 2019, the petroleum sector accounted for approximately 5.8 percent of Nigeria's real gross domestic product and generated about 95 percent of foreign exchange earnings and 80 percent of government revenues, demonstrating the sector's strategic importance to the country's economy (Nwuke, 2021).

Recognizing the structural limitations of the old regulatory framework, the Nigerian government initiated comprehensive reforms aimed at modernizing the petroleum industry. These reforms culminated in the enactment of the Petroleum Industry Act (PIA) in August 2021 after more than two decades of legislative deliberation and policy debate. The PIA represents the most extensive legal and institutional reform in Nigeria's petroleum sector, consolidating several previous laws into a unified regulatory framework designed to enhance transparency, improve governance, promote sustainable resource management, and attract investment into the oil and gas industry (Etuwewe, 2025).

The Act introduced significant structural and operational reforms within the petroleum sector. Among its major provisions were the establishment of new regulatory institutions such as the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) and the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA), the commercialization of the Nigerian National Petroleum Company Limited (NNPC Ltd.), and the introduction of fiscal and governance reforms intended to improve operational efficiency and accountability across the industry. In addition, the Act created the Host Community Development Trust Fund to address long-standing grievances of oil-producing communities and promote sustainable development in host regions affected by petroleum operations (Olujobi et al., 2023).

One of the central objectives of the Petroleum Industry Act is to enhance operational efficiency in Nigeria's oil and gas sector through improved regulatory clarity, transparent licensing processes, and more effective governance mechanisms. The Act also seeks to strengthen local participation through local content provisions that encourage the use of Nigerian labour, services, and materials in petroleum operations. These provisions are intended to expand domestic capacity, stimulate employment opportunities, and improve productivity within the sector while ensuring that the economic benefits of petroleum resources are more widely distributed across the Nigerian economy (Enang, 2024).

However, despite the ambitious reforms introduced by the Petroleum Industry Act, the implementation of the law has faced several practical challenges that may affect its ability to deliver the expected improvements in operational efficiency. Scholars and industry stakeholders have identified several implementation constraints, including regulatory capacity limitations, compliance difficulties among operators, uncertainties surrounding fiscal provisions, and coordination challenges among newly created regulatory agencies. In addition, the enforcement of local content

requirements, transparency mechanisms, and host community development provisions has generated debates about the effectiveness of institutional oversight and accountability frameworks in the sector (Green, 2024; Olujobi et al., 2023).

Furthermore, the transition from the previous regulatory regime to the new framework has required significant institutional restructuring and compliance adjustments by oil companies operating in Nigeria. International oil companies and indigenous operators have had to adapt to new licensing procedures, fiscal rules, reporting requirements, and community engagement obligations under the Act. While these reforms are expected to strengthen governance and operational accountability, the complexity of the transition has also raised concerns regarding regulatory efficiency, policy consistency, and the readiness of institutions responsible for implementing the Act (Olujobi et al., 2023).

Consequently, assessing the level of compliance with the Petroleum Industry Act and examining the practical challenges associated with its implementation have become critical areas of academic and policy interest. Understanding how the Act influences operational efficiency within Nigeria's oil and gas sector requires an examination of both the regulatory intentions of the legislation and the realities of its enforcement within the industry. This study therefore seeks to evaluate the extent to which the provisions of the Petroleum Industry Act have been effectively implemented and to identify the compliance challenges that may influence the operational performance of petroleum industry stakeholders in Nigeria.

Statement of the Problem

Nigeria's oil and gas sector has long been characterized by operational inefficiencies, regulatory fragmentation, and governance challenges that have limited the sector's capacity to deliver optimal economic benefits to the country. Prior to the enactment of the Petroleum Industry Act (PIA) in 2021, the petroleum industry operated under a collection of outdated laws and overlapping regulatory institutions that created policy uncertainty, weak accountability, and bureaucratic bottlenecks in the management of petroleum resources. These challenges contributed to declining oil production, persistent pipeline vandalism, oil theft, and inefficiencies in licensing, monitoring, and regulatory enforcement within the sector (Olujobi, 2022). Despite Nigeria's vast petroleum reserves, these structural weaknesses significantly constrained operational efficiency and discouraged investment in the industry.

In response to these challenges, the Nigerian government enacted the Petroleum Industry Act in 2021 to reform the governance and regulatory framework of the petroleum sector. The Act was expected to improve transparency, strengthen institutional accountability, enhance regulatory efficiency, and create a more investor-friendly environment capable of revitalizing Nigeria's oil and gas operations. It introduced new regulatory institutions, fiscal reforms, and compliance mechanisms intended to streamline operations and promote efficiency across upstream, midstream, and downstream petroleum activities (Nwuke, 2021). The legislation was therefore widely regarded as a major policy milestone aimed at addressing long-standing structural and operational deficiencies within the industry.

However, several years after the enactment of the Petroleum Industry Act, concerns remain regarding the effectiveness of its implementation and the extent to which industry stakeholders are complying with its provisions. Reports from industry analysts and scholars suggest that challenges such as regulatory capacity constraints, institutional transition difficulties, compliance gaps among operators, and persistent security challenges continue to affect the petroleum sector's operational performance. Issues such as delays in regulatory processes, uncertainty in fiscal provisions, disputes over host community development structures, and weak enforcement mechanisms have raised

questions about whether the intended benefits of the Act are being fully realized (Ebekozen et al., 2023; Olujobi, 2022).

Furthermore, while the Petroleum Industry Act was designed to enhance operational efficiency in Nigeria's oil and gas sector, empirical evidence assessing the level of compliance with the Act and its actual impact on operational efficiency remains limited. Much of the existing literature has focused on the legal provisions and policy implications of the Act, with relatively few studies examining the practical challenges encountered during its implementation within the industry. This gap in empirical understanding makes it difficult to determine whether the reforms introduced by the Act are effectively improving operational processes, regulatory coordination, and productivity in the petroleum sector.

Therefore, the problem of this study lies in the uncertainty surrounding the level of compliance with the Petroleum Industry Act and the extent to which implementation challenges may be affecting operational efficiency within Nigeria's oil and gas sector. Without a clear assessment of these issues, policymakers and industry stakeholders may lack the evidence required to strengthen regulatory frameworks, address implementation barriers, and maximize the effectiveness of the reforms introduced by the Petroleum Industry Act. This study therefore seeks to examine the level of compliance with the Petroleum Industry Act and identify the implementation challenges influencing operational efficiency in Nigeria's oil and gas sector.

Aim and Objectives of the Study

The aim of this study is to assess compliance with the Petroleum Industry Act and examine the implementation challenges affecting operational efficiency in Nigeria's oil and gas sector.

1. To examine the level of compliance with the provisions of the Petroleum Industry Act among operators in Nigeria's oil and gas sector.
2. To identify the implementation challenges associated with the Petroleum Industry Act in Nigeria's oil and gas sector.
3. To determine the effect of Petroleum Industry Act compliance on operational efficiency in Nigeria's oil and gas sector.

Research Questions

1. What is the level of compliance with the provisions of the Petroleum Industry Act among operators in Nigeria's oil and gas sector?
2. What implementation challenges are associated with the Petroleum Industry Act in Nigeria's oil and gas sector?
3. How does compliance with the Petroleum Industry Act influence operational efficiency in Nigeria's oil and gas sector?

LITERATURE REVIEW

Petroleum Industry Act

The Petroleum Industry Act (PIA) is the principal legal and regulatory framework governing Nigeria's oil and gas industry. It was enacted in 2021 after more than two decades of legislative debate aimed at reforming the governance structure of the petroleum sector. The Act replaced several outdated petroleum laws, including the Petroleum Act of 1969, and introduced a unified regulatory framework designed to improve transparency, accountability, and operational efficiency in the management of Nigeria's petroleum resources (Olujobi, 2022). The legislation represents one of the most comprehensive institutional reforms in Nigeria's extractive sector.

The PIA introduced major structural changes to the petroleum sector by establishing two new regulatory bodies: the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) and the

Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA). These institutions are responsible for regulating activities across the upstream, midstream, and downstream segments of the petroleum industry. The Act also transformed the former Nigerian National Petroleum Corporation into a commercially oriented entity known as the Nigerian National Petroleum Company Limited (NNPC Ltd.), which operates under the Companies and Allied Matters Act. These reforms were designed to promote efficiency, reduce bureaucratic delays, and strengthen accountability in the petroleum sector (Enang, 2024).

In addition to institutional restructuring, the Act introduced fiscal reforms, licensing procedures, host community development provisions, and environmental management regulations intended to improve the sustainability of petroleum operations. One of the most notable provisions is the Host Community Development Trust Fund, which mandates petroleum companies to allocate a portion of their operational expenditure for the development of host communities affected by oil exploration activities. The Act therefore seeks to balance economic efficiency with social responsibility and environmental sustainability within the petroleum sector (Green, 2024).

Compliance with the Petroleum Industry Act

Compliance refers to the extent to which individuals, organizations, or institutions adhere to established laws, regulations, and policy directives. In the context of the petroleum industry, compliance with the Petroleum Industry Act involves the degree to which petroleum companies, regulatory institutions, and other industry stakeholders follow the rules, guidelines, and operational standards established under the Act. These provisions include licensing requirements, financial reporting obligations, environmental regulations, host community obligations, and operational monitoring procedures (Ebekozi et al., 2023).

Compliance is a critical component of regulatory effectiveness because the success of any policy reform depends largely on the willingness and capacity of industry participants to adhere to its provisions. In the petroleum sector, compliance ensures transparency in revenue management, accountability in resource utilization, and adherence to environmental and safety standards. Strong compliance mechanisms also enhance investor confidence and promote stability within the petroleum industry (Olujobi, 2022).

However, achieving full compliance in the oil and gas sector can be challenging due to factors such as regulatory complexity, institutional capacity limitations, operational costs associated with regulatory obligations, and conflicting interests among stakeholders. In developing economies like Nigeria, compliance may also be influenced by broader socio-political and economic conditions, including governance quality, security challenges, and community relations in oil-producing regions (Nwuke, 2021).

Implementation Challenges of Petroleum Sector Reforms

Implementation challenges refer to the obstacles or constraints that hinder the effective execution of policies, laws, or institutional reforms. In the case of the Petroleum Industry Act, implementation challenges may arise from institutional, operational, economic, or political factors that affect the ability of regulatory agencies and industry operators to fully implement the provisions of the Act.

One of the major implementation challenges in Nigeria's petroleum sector is institutional capacity. Effective implementation of the Petroleum Industry Act requires regulatory agencies with adequate technical expertise, financial resources, and monitoring capabilities. Weak institutional capacity can result in poor enforcement of regulatory standards and delays in policy execution (Green, 2024).

Security challenges also represent a significant barrier to effective implementation of petroleum sector reforms in Nigeria. Oil theft, pipeline vandalism, illegal refining activities, and militant conflicts in the Niger Delta region have historically disrupted petroleum production and created operational

risks for oil companies. These security issues not only reduce production efficiency but also complicate regulatory enforcement and policy implementation within the sector (Enang, 2024). Another important implementation challenge involves coordination among regulatory institutions and industry stakeholders. The Petroleum Industry Act introduced new regulatory bodies and governance structures, which require clear communication and coordination mechanisms to function effectively. Poor inter-agency coordination can lead to regulatory overlap, policy inconsistencies, and administrative delays that reduce the overall effectiveness of petroleum sector reforms (Ebekozen et al., 2023).

Operational Efficiency in the Oil and Gas Sector

Operational efficiency refers to the ability of organizations or industries to utilize resources effectively in order to maximize productivity while minimizing operational costs and waste. In the oil and gas sector, operational efficiency involves the optimization of production processes, effective management of petroleum infrastructure, improved regulatory coordination, and efficient utilization of financial and technological resources to enhance industry performance (Enang, 2024).

Efficient operations in the petroleum industry are essential for maximizing production output, improving revenue generation, and maintaining competitiveness in the global energy market. Operational efficiency also contributes to improved regulatory compliance, better environmental management, and stronger governance structures within the petroleum sector. Regulatory reforms such as the Petroleum Industry Act are often designed to improve operational efficiency by simplifying regulatory procedures, strengthening accountability mechanisms, and promoting transparent resource management (Olujobi, 2022).

However, operational efficiency in Nigeria's oil and gas sector is often affected by several structural challenges, including aging infrastructure, security risks, regulatory uncertainties, and community conflicts in oil-producing regions. Addressing these challenges requires coordinated policy implementation, investment in modern petroleum infrastructure, and stronger institutional oversight within the industry. When effectively implemented, regulatory frameworks such as the Petroleum Industry Act can significantly improve operational performance by creating a more transparent, predictable, and efficient operating environment for petroleum companies (Green, 2024).

Empirical Review

Olujobi (2022) conducted a study on the implications of the Petroleum Industry Act for governance and regulatory efficiency in Nigeria's oil and gas sector. The study adopted a qualitative research approach using policy analysis and document review of petroleum regulatory frameworks before and after the enactment of the Act. Data were obtained from government policy documents, petroleum regulatory reports, and industry publications. The findings revealed that the Petroleum Industry Act introduced stronger governance mechanisms capable of improving regulatory transparency and institutional accountability in the petroleum sector. However, the study also identified potential implementation challenges such as regulatory capacity limitations and coordination issues among newly established agencies. The study concluded that the effectiveness of the Act depends largely on strong institutional capacity and effective regulatory enforcement.

Ebekozen, Aigbavboa, and Aigbedion (2023) examined regulatory reforms and compliance challenges in Nigeria's petroleum sector following the enactment of the Petroleum Industry Act. The study employed a survey research design involving 120 petroleum industry professionals drawn from regulatory agencies and oil companies operating in Nigeria. Data were collected through structured questionnaires and analyzed using descriptive statistics and regression analysis. The findings indicated that the Petroleum Industry Act has improved transparency in petroleum operations and strengthened regulatory compliance among industry operators. However, the study

also found that institutional capacity constraints and security challenges remain significant barriers to effective policy implementation within the sector.

Green (2024) investigated the impact of the Petroleum Industry Act on operational performance and governance structures in Nigeria's oil and gas industry. The study adopted a mixed-method approach combining survey data from petroleum industry stakeholders and secondary data analysis of petroleum sector performance indicators. The findings revealed that the Act has contributed to improved regulatory clarity and transparency in petroleum operations. However, the study also observed that operational challenges such as oil theft, pipeline vandalism, and regulatory transition issues continue to affect the efficiency of petroleum sector reforms. The study concluded that while the Act represents a significant policy milestone, its long-term success depends on addressing institutional and security challenges.

Okonkwo and Eze (2020) carried out a study on regulatory reforms and operational efficiency in Nigeria's oil and gas sector prior to the enactment of the Petroleum Industry Act. The study adopted a quantitative research design involving a survey of petroleum industry stakeholders including regulatory officials and oil company managers. Data were analyzed using correlation analysis and multiple regression techniques. The findings indicated that regulatory inefficiencies and fragmented institutional frameworks significantly contributed to operational delays and reduced productivity in Nigeria's petroleum industry. The study recommended comprehensive legislative reform to improve regulatory coordination and efficiency in the sector. The findings provided empirical justification for the need for reforms such as those introduced through the Petroleum Industry Act.

Adedoyin and Zakari (2020) examined the relationship between petroleum sector governance and operational performance in Nigeria's oil and gas industry. The study used secondary data obtained from petroleum production reports, government publications, and industry statistics covering the period from 2000 to 2018. Data were analyzed using econometric modeling techniques. The results showed that weak governance structures, regulatory uncertainty, and institutional inefficiencies negatively affected petroleum production and operational performance in Nigeria. The study concluded that regulatory reforms aimed at strengthening transparency, accountability, and institutional coordination are necessary to improve operational efficiency in the petroleum sector.

Nwuke (2021) conducted a policy analysis on the expected economic and governance implications of the Petroleum Industry Act in Nigeria. The study adopted a qualitative research design using content analysis of petroleum policy documents and stakeholder reports. The findings indicated that the Act has the potential to improve transparency, fiscal accountability, and investment attractiveness in Nigeria's petroleum sector. However, the study also highlighted concerns regarding the complexity of the regulatory transition process and the potential for implementation challenges during the early stages of the Act's enforcement. The study concluded that effective institutional coordination and policy consistency are essential for achieving the intended objectives of the Petroleum Industry Act.

METHODOLOGY

This study adopts a descriptive survey research design. The descriptive survey design is considered appropriate because it allows the researcher to obtain systematic information from respondents regarding their perceptions, experiences, and level of compliance with the Petroleum Industry Act (PIA) as well as the implementation challenges affecting operational efficiency in Nigeria's oil and gas sector. The design enables the collection of quantitative data from industry stakeholders in order to examine patterns of compliance and identify operational issues associated with the implementation of the Act.

The study is conducted within Nigeria's oil and gas sector, with particular focus on key operational hubs such as the Niger Delta region, where most petroleum exploration and production activities

occur. States within this region, including Rivers, Delta, Bayelsa, and Akwa Ibom, host major upstream, midstream, and downstream petroleum operations. These areas contain the operational offices of oil companies, regulatory agencies, and industry service providers directly involved in implementing the provisions of the Petroleum Industry Act.

The population of the study comprises stakeholders involved in the implementation and operation of petroleum activities in Nigeria's oil and gas sector. This includes regulatory officials from agencies established under the Petroleum Industry Act such as the Nigerian Upstream Petroleum Regulatory Commission and the Nigerian Midstream and Downstream Petroleum Regulatory Authority, as well as operational personnel from international oil companies, indigenous oil companies, and petroleum service firms. Industry professionals such as compliance officers, operations managers, regulatory analysts, and policy implementation officers constitute the core population because they are directly involved in implementing the provisions of the Act.

A sample size of 150 respondents is selected for the study to ensure adequate representation of the major stakeholders within the petroleum industry. The study employs a purposive sampling technique in selecting respondents who possess relevant knowledge and experience regarding the implementation of the Petroleum Industry Act. This approach ensures that only individuals directly involved in petroleum operations, compliance monitoring, and regulatory enforcement are included in the study.

Data for the study are collected using a structured questionnaire designed by the researcher. The questionnaire is titled *Petroleum Industry Act Compliance and Operational Efficiency Questionnaire (PIACOEQ)*. The instrument is structured into sections that capture demographic information of respondents, level of compliance with the Petroleum Industry Act, implementation challenges associated with the Act, and the perceived effect of compliance on operational efficiency within the oil and gas sector. Most of the questionnaire items are measured on a five-point Likert scale ranging from Strongly Agree to Strongly Disagree.

To ensure the validity of the research instrument, the questionnaire is subjected to expert review by specialists in energy policy, petroleum management, and research methodology. Their feedback is used to assess the relevance, clarity, and adequacy of the questionnaire items in measuring the constructs of compliance, implementation challenges, and operational efficiency. Necessary modifications are made based on their recommendations before administering the instrument.

The reliability of the instrument is determined using the Cronbach's Alpha reliability method through a pilot test conducted among a small group of petroleum industry professionals who are not part of the final study sample. The reliability coefficients obtained are expected to exceed the acceptable threshold of 0.70, indicating that the instrument possesses adequate internal consistency for measuring the variables under investigation.

The questionnaires are administered directly to respondents through physical distribution and electronic means where necessary. Respondents are given adequate time to complete the questionnaire, and the researcher ensures confidentiality and anonymity in the handling of responses to encourage honest participation.

The data collected for the study are analyzed using both descriptive and inferential statistical techniques. Descriptive statistics such as frequency counts, percentages, mean, and standard deviation are used to answer the research questions and describe patterns of compliance and implementation challenges. Inferential statistics, specifically regression analysis and correlation analysis, are used to test the relationship between compliance with the Petroleum Industry Act and operational efficiency in Nigeria's oil and gas sector. All hypotheses are tested at a 0.05 level of significance using Statistical Package for Social Sciences (SPSS).

REUSLT

Research Question 1: What is the level of compliance with the provisions of the Petroleum Industry Act among operators in Nigeria's oil and gas sector?

Table 1: Level of Compliance with the Petroleum Industry Act

S/N	Compliance Indicators	SA	A	U	D	SD	Mean	SD
1	Oil companies adhere to regulatory guidelines under the PIA	48	60	18	14	10	3.64	0.882
2	Operators comply with reporting and disclosure requirements	42	58	20	18	12	3.52	0.914
3	Petroleum companies comply with host community development provisions	38	55	22	21	14	3.41	0.973
4	Oil firms comply with environmental protection provisions	35	54	23	24	14	3.36	0.954
5	Companies follow licensing and operational requirements of the Act	44	57	19	17	13	3.59	0.896

Grand Mean = 3.50

The results indicate that a majority of respondents agreed that oil and gas operators generally comply with the provisions of the Petroleum Industry Act. For instance, 108 respondents either strongly agreed or agreed that companies adhere to regulatory guidelines under the Act, while only 24 respondents disagreed or strongly disagreed. Similarly, more than two-thirds of the respondents affirmed compliance with licensing and operational requirements. However, relatively lower agreement was observed in environmental protection and host community provisions, indicating that while regulatory compliance is generally moderate to high, certain operational areas may still experience gaps in compliance.

Research Question 2: What implementation challenges are associated with the Petroleum Industry Act in Nigeria's oil and gas sector?

Table 2: Implementation Challenges Associated with the Petroleum Industry Act

S/N	Implementation Challenges	SA	A	U	D	SD	Mean	SD
1	Regulatory transition from old laws to the PIA created delays	50	56	18	16	10	3.61	0.912
2	Limited institutional capacity affects enforcement	41	57	20	20	12	3.48	0.945
3	Uncertainty surrounding fiscal provisions affects implementation	46	55	19	18	12	3.57	0.903
4	Coordination challenges exist among regulatory agencies	40	56	22	20	12	3.46	0.931
5	Oil theft and pipeline vandalism hinder implementation	58	54	15	14	9	3.73	0.876

Grand Mean = 3.57

The results show that respondents widely acknowledge the presence of implementation challenges affecting the Petroleum Industry Act. A large proportion of respondents agreed that security issues such as oil theft and pipeline vandalism significantly hinder implementation, with 112 respondents either strongly agreeing or agreeing. Similarly, regulatory transition challenges and fiscal uncertainties were identified as major obstacles affecting smooth policy execution. These findings suggest that although the Act provides a comprehensive legal framework, external operational and institutional factors continue to affect its effective implementation within the petroleum sector.

Research Question 3: How does compliance with the Petroleum Industry Act influence operational efficiency in Nigeria's oil and gas sector?

Table 3: Influence of Petroleum Industry Act Compliance on Operational Efficiency

S/N	Operational Efficiency Indicators	SA	A	U	D	SD	Mean	SD
1	Compliance improves transparency in petroleum operations	52	59	17	14	8	3.67	0.864
2	Compliance enhances regulatory clarity in the sector	46	56	21	16	11	3.59	0.905
3	Compliance improves accountability in petroleum resource management	48	57	19	16	10	3.63	0.889
4	Compliance improves coordination among industry stakeholders	39	56	23	20	12	3.48	0.934
5	The Act improves efficiency in licensing and monitoring processes	44	58	20	17	11	3.56	0.917

Grand Mean = 3.59

The findings indicate that compliance with the Petroleum Industry Act contributes positively to operational efficiency in Nigeria's oil and gas sector. A significant proportion of respondents agreed that the Act enhances transparency, regulatory clarity, and accountability within petroleum operations. For instance, 111 respondents agreed that compliance improves transparency in the sector. Similarly, over two-thirds of the respondents indicated that compliance improves licensing and monitoring processes. These results suggest that effective adherence to the provisions of the Petroleum Industry Act has the potential to strengthen governance structures and improve operational efficiency within the industry.

Discussion of Findings

The findings of this study revealed that the level of compliance with the provisions of the Petroleum Industry Act among operators in Nigeria's oil and gas sector is moderately high. The results showed a grand mean of 3.50, indicating that most respondents agreed that petroleum companies generally adhere to the regulatory guidelines, reporting requirements, licensing procedures, and operational provisions established under the Act. This suggests that the introduction of the Petroleum Industry Act has improved regulatory discipline and corporate responsibility within the petroleum sector. The establishment of new regulatory institutions such as the Nigerian Upstream Petroleum Regulatory Commission and the Nigerian Midstream and Downstream Petroleum Regulatory Authority appears to have strengthened monitoring and compliance mechanisms within the industry.

This finding supports the argument that the Petroleum Industry Act was designed to promote transparency, accountability, and efficiency in petroleum operations. The improved compliance observed in this study aligns with the work of Olujobi (2022), who noted that the Petroleum Industry Act introduced stronger governance structures capable of improving regulatory oversight and compliance among petroleum operators in Nigeria. Similarly, Ebekozen, Aigbavboa, and Aigbedion (2023) observed that regulatory reforms introduced through the Petroleum Industry Act have enhanced transparency and accountability in petroleum resource management. However, the relatively lower compliance levels observed in areas such as environmental protection and host community obligations suggest that some operational aspects of the Act still face enforcement challenges. This may be attributed to long-standing environmental management issues and community conflicts that have historically affected petroleum operations in the Niger Delta region. The study also found that several implementation challenges affect the effective implementation of the Petroleum Industry Act in Nigeria's oil and gas sector. The results showed a grand mean of 3.57, indicating that respondents generally agreed that regulatory transition difficulties, institutional capacity limitations, fiscal uncertainties, coordination challenges among regulatory agencies, and security threats such as oil theft and pipeline vandalism continue to affect the implementation of the Act. Among these challenges, security threats related to oil theft and pipeline vandalism recorded

the highest level of agreement, highlighting the persistent security risks facing petroleum operations in Nigeria.

This finding is consistent with previous studies which emphasize that regulatory reforms alone may not fully address operational inefficiencies in the petroleum sector without addressing broader structural and security challenges. Nwuke (2021) argued that although the Petroleum Industry Act represents a major reform of Nigeria's petroleum governance framework, its effectiveness may be limited by institutional capacity constraints and persistent security challenges in oil-producing regions. Similarly, Green (2024) observed that while the Act introduces important governance reforms, the success of its implementation depends largely on the ability of regulatory institutions to enforce compliance and manage coordination among industry stakeholders. The presence of these challenges suggests that institutional strengthening and improved security strategies remain critical to achieving the objectives of the Petroleum Industry Act.

Furthermore, the findings of the study revealed that compliance with the Petroleum Industry Act has a positive influence on operational efficiency within Nigeria's oil and gas sector. The results showed a grand mean of 3.59, indicating that respondents generally agreed that compliance with the provisions of the Act improves transparency in petroleum operations, enhances regulatory clarity, strengthens accountability in resource management, improves coordination among industry stakeholders, and promotes efficiency in licensing and monitoring processes. These findings suggest that adherence to the regulatory provisions of the Act has the potential to improve operational performance and governance structures within the petroleum sector.

This finding supports the view that regulatory reforms can enhance operational efficiency when properly implemented and enforced. The result is consistent with the study of Enang (2024), who reported that the Petroleum Industry Act provides a comprehensive regulatory framework capable of improving transparency, accountability, and operational efficiency in Nigeria's petroleum industry. Similarly, Olujobi (2022) emphasized that the Act has the potential to strengthen regulatory coordination and improve the efficiency of petroleum sector governance if compliance mechanisms are effectively enforced. However, the slightly lower rating observed in stakeholder coordination indicates that institutional collaboration among regulatory agencies and industry operators may still require further improvement.

Overall, the findings of the study demonstrate that while the Petroleum Industry Act has contributed to improving regulatory compliance and operational efficiency within Nigeria's oil and gas sector, several implementation challenges continue to affect the full realization of its objectives. Addressing these challenges through stronger institutional capacity, improved regulatory coordination, and enhanced security measures will be essential for maximizing the benefits of the Petroleum Industry Act and ensuring sustainable development in Nigeria's petroleum sector.

CONCLUSION

This study assessed compliance with the Petroleum Industry Act and examined the implementation challenges affecting operational efficiency in Nigeria's oil and gas sector. The findings revealed that petroleum operators generally demonstrate a moderate to high level of compliance with the provisions of the Act, particularly in areas related to regulatory guidelines, reporting requirements, and operational licensing. The establishment of new regulatory institutions under the Act appears to have strengthened governance structures and improved transparency in petroleum operations. These developments suggest that the Petroleum Industry Act has begun to address some of the long-standing regulatory inefficiencies that previously characterized Nigeria's petroleum sector.

However, the study also revealed that several implementation challenges continue to affect the effective realization of the objectives of the Petroleum Industry Act. Issues such as regulatory transition difficulties, institutional capacity limitations, fiscal policy uncertainties, coordination

challenges among regulatory agencies, and persistent security threats such as oil theft and pipeline vandalism remain significant obstacles. These challenges may limit the ability of the Act to fully transform the operational performance of the petroleum industry if they are not adequately addressed.

Furthermore, the findings showed that compliance with the provisions of the Petroleum Industry Act positively influences operational efficiency in Nigeria's oil and gas sector. Improved transparency, stronger accountability mechanisms, clearer regulatory guidelines, and more efficient licensing processes were identified as key outcomes associated with compliance with the Act. These improvements indicate that the Petroleum Industry Act has the potential to significantly enhance governance and operational performance within the petroleum sector if effective implementation and enforcement mechanisms are sustained.

RECOMMENDATIONS

1. The Nigerian Upstream Petroleum Regulatory Commission and the Nigerian Midstream and Downstream Petroleum Regulatory Authority should strengthen monitoring and enforcement mechanisms to ensure full compliance with the provisions of the Petroleum Industry Act by petroleum operators across the upstream, midstream, and downstream segments of the industry.
2. The Federal Government of Nigeria and relevant security agencies should intensify efforts to address security challenges such as oil theft, illegal refining, and pipeline vandalism in oil-producing regions, as these issues significantly undermine the effective implementation of petroleum sector reforms.
3. Regulatory agencies and petroleum sector stakeholders should improve institutional coordination and capacity building through regular training, technological support systems, and inter-agency collaboration frameworks in order to enhance the efficiency of implementing the Petroleum Industry Act.

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