

Impact of Sustainability Reporting on Financial Performance of Listed Oil and Gas Firms in Nigeria: The Moderating Effect of Petroleum Industry Act (PIA) Compliance.

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Abstract

This study examined the effect of sustainability reporting on the financial performance of listed oil and gas firms in Nigeria, focusing on Oil Spill Remediation Disclosure (OSRD), Decommissioning and Asset Retirement Disclosure (DARD), and the moderating role of the Petroleum Industry Act Compliance Index (PIACI). Anchored on Legitimacy Theory, the study adopted an ex post facto research design using panel data from the annual and sustainability reports of listed Nigerian oil and gas firms. Tobin's Q served as the measure of financial performance, while panel regression analysis was employed to examine the hypothesized relationships. The findings indicate that OSRD and DARD have positive and significant effects on Tobin's Q, suggesting that transparent petroleum-specific sustainability disclosures enhance firm value by improving investor confidence and reducing information asymmetry. PIACI also exerts a positive and significant direct effect on financial performance, indicating that regulatory compliance strengthens corporate legitimacy and stakeholder trust. However, PIACI does not significantly moderate the relationship between sustainability reporting and financial performance. The study concludes that petroleum-specific sustainability reporting is a strategic driver of market value rather than merely a compliance obligation. It recommends strengthening environmental disclosure practices and aligning sustainability reporting with the Petroleum Industry Act and ISSB Standards to enhance transparency, investor confidence, and long-term firm value.

Keywords: Sustainability Reporting; Oil Spill Remediation Disclosure; Decommissioning and Asset Retirement Disclosure; Petroleum Industry Act Compliance; Tobin's Q; Oil and Gas Firms; Nigeria.



1. Introduction

Financial performance remains a critical indicator of corporate success because it reflects a firm's ability to create shareholder value and sustain competitive advantage. Increasingly, investors evaluate firms using market-based measures such as Tobin's Q, which captures expectations about future growth, intangible assets, and sustainability performance rather than relying solely on traditional accounting measures (Saini et al., 2023). Consequently, sustainability reporting has evolved from a voluntary corporate social responsibility initiative into a strategic reporting mechanism that provides decision-useful information on environmental, social, and governance (ESG) risks. This transition has been reinforced by the International Sustainability Standards Board (ISSB) through the issuance of IFRS S1 and IFRS S2 and by Nigeria's roadmap for their adoption, reflecting growing regulatory emphasis on sustainability-related disclosures (IFRS Foundation, 2023; FRCN, 2024).

The Nigerian oil and gas industry provides an important setting for examining the value relevance of sustainability reporting because of its significant contribution to the national economy and its substantial environmental footprint. Petroleum operations have long been associated with oil spills, gas flaring, biodiversity loss, and land degradation, leading to increasing demands from investors, regulators, and host communities for transparent reporting of environmental performance (UNEP, 2022; NUPRC, 2024). In response, sustainability reporting has become an important mechanism through which firms demonstrate environmental accountability, reduce information asymmetry, and enhance stakeholder confidence.

Given the industry's unique environmental risks, broad ESG measures may not adequately capture sustainability performance. Sector-specific disclosures such as Oil Spill Remediation Disclosure (OSRD) and Decommissioning and Asset Retirement Disclosure (DARD) provide more relevant information on firms' environmental risk management, remediation efforts, and long-term restoration obligations. Their importance has increased following the enactment of the Petroleum Industry Act (PIA) 2021, which introduced comprehensive requirements relating to environmental restoration, decommissioning funding, corporate governance, and host community development. Compliance with these provisions is expected to improve the credibility and value relevance of sustainability disclosures.

Despite growing interest in sustainability reporting, empirical evidence on its effect on financial performance remains mixed. While several studies report positive effects through improved transparency, reduced information asymmetry, and enhanced investor confidence (Buallay et al., 2022; Raimo et al., 2023), others argue that these benefits depend on institutional quality, regulatory enforcement, and disclosure credibility (Naciti et al., 2022). Moreover, existing Nigerian studies have largely relied on aggregate ESG or general environmental disclosure measures, with limited attention to petroleum-specific sustainability disclosures. Empirical evidence on whether compliance with the Petroleum Industry Act strengthens the relationship between sustainability reporting and firm value is also scarce.

This study addresses these gaps by examining the effects of Oil Spill Remediation Disclosure (OSRD) and Decommissioning and Asset Retirement Disclosure (DARD) on the financial performance of listed oil and gas firms in Nigeria, using Tobin's Q as a market-based performance measure. It further investigates the moderating role of the Petroleum Industry Act Compliance Index (PIACI). By integrating petroleum-specific sustainability disclosures with an emerging regulatory framework, the study extends sustainability accounting literature and provides evidence

relevant to corporate reporting, regulatory policy, and investment decision-making in Nigeria's post-PIA petroleum sector.

2. Literature Review

2.1 Conceptual Review

2.1.1 Sustainability Reporting

Sustainability reporting has evolved from voluntary corporate social responsibility (CSR) disclosure to a strategic reporting mechanism through which firms communicate how environmental, social and governance (ESG) issues affect enterprise value. Unlike traditional financial reporting, it provides information on environmental risks, climate-related exposures, governance practices and social impacts that are increasingly relevant to investors and other stakeholders (IFRS Foundation, 2023). This transition has been accelerated by the introduction of IFRS S1 and IFRS S2, which emphasize sustainability-related information that is material to enterprise value, and by the Global Reporting Initiative (GRI) Standards that promote standardized environmental and social reporting (GRI, 2021).

Within Nigeria, the phased adoption of ISSB Standards by the Financial Reporting Council of Nigeria (FRCN) has strengthened the institutional framework for sustainability reporting. These developments are particularly relevant to the petroleum industry, where environmental risks—including oil spills, gas flaring, biodiversity loss and land degradation—are substantial. Consequently, sustainability reporting is increasingly viewed not merely as a compliance exercise but as a mechanism for enhancing transparency, reducing information asymmetry, strengthening legitimacy and improving investor confidence.

Rather than relying on broad ESG measures, this study adopts two petroleum-specific dimensions of sustainability reporting. Oil Spill Remediation Disclosure (OSRD) captures the extent to which firms disclose remediation policies, environmental restoration activities, spill-

response systems and related expenditures. Decommissioning and Asset Retirement Disclosure (DARD) reflects disclosures relating to the recognition, funding and implementation of obligations associated with the safe retirement and restoration of petroleum assets. These disclosures provide more direct evidence of firms' environmental accountability than aggregate sustainability indices and are therefore expected to be more relevant in explaining market valuation within the oil and gas industry.

2.1.2 Financial Performance (Tobin's Q)

Financial performance may be assessed using accounting-based or market-based indicators. While measures such as Return on Assets (ROA) and Return on Equity (ROE) evaluate historical profitability, they often fail to capture investors' expectations regarding future growth and sustainability performance. Tobin's Q has therefore become increasingly preferred in sustainability accounting research because it reflects market perceptions of firms' future cash flows, innovation capacity, intangible assets and environmental risk management (Raimo et al., 2023; Saini et al., 2023). Since sustainability disclosures primarily influence investor expectations rather than immediate accounting earnings, Tobin's Q provides a more appropriate measure of the financial consequences of sustainability reporting.

2.1.3 Petroleum Industry Act Compliance Index (PIACI)

The Petroleum Industry Act (PIA) 2021 introduced comprehensive reforms to Nigeria's petroleum industry by strengthening environmental governance, decommissioning obligations, transparency and host community development. Building on these statutory requirements, this study develops a Petroleum Industry Act Compliance Index (PIACI) to measure firms' compliance with key environmental restoration, governance and regulatory reporting provisions.

Conceptually, compliance enhances the credibility of sustainability disclosures because investors are more likely to rely on information supported by observable regulatory compliance than on voluntary

narrative reporting. Consequently, PIACI is expected to strengthen the relationship between sustainability reporting and firm value by reducing concerns regarding greenwashing and enhancing the reliability of disclosed environmental information.

2.2 Empirical Review

Empirical research generally supports the proposition that sustainability reporting contributes positively to firm value by improving transparency, reducing information asymmetry and strengthening stakeholder confidence. Cross-country evidence consistently associates high-quality sustainability disclosures with higher market valuation, lower financing costs and improved investor perceptions, particularly where disclosures are comprehensive and decision-useful (Buallay et al., 2022; Raimo et al., 2023; Saini et al., 2023). These findings support the view that sustainability information has become increasingly value relevant as investors incorporate environmental risks into investment decisions.

However, the literature increasingly challenges the assumption that sustainability reporting automatically improves financial performance. A growing body of evidence suggests that the economic benefits of sustainability disclosures depend on disclosure quality, governance effectiveness and institutional credibility rather than disclosure volume alone. Studies by Naciti et al. (2022), together with global evidence from KPMG (2022) and PwC (2024), indicate that concerns over greenwashing, inconsistent reporting standards and weak external assurance reduce investors' confidence in sustainability reports. The emerging consensus is therefore that credibility not merely disclosure is the primary driver of value creation.

Within the oil and gas sector, research has progressively shifted from aggregate ESG indices towards operationally relevant environmental disclosures. Evidence suggests that investors respond more positively to disclosures directly addressing environmental risks associated with petroleum operations than to broad sustainability narratives. Studies by

Johnson et al. (2024), Emovon and Izedonmi (2023), Igwe, et al. (2023) and Arkoh et al (2024) demonstrate that disclosures relating to oil spill management, remediation activities and environmental restoration improve corporate legitimacy and market valuation. Conversely, John and Blessing (2025) argue that many sustainability reports remain largely qualitative, limiting their usefulness for investment decision-making. Collectively, these findings suggest that the explanatory power of sustainability reporting depends on the specificity and verifiability of disclosed environmental information.

Despite increasing attention to petroleum-specific reporting, decommissioning and asset retirement disclosure remains relatively underexplored. Existing studies have largely examined the regulatory implications of the Petroleum Industry Act, emphasizing its contribution to environmental governance, decommissioning funding and accountability (Isallah, 2023; Chime et al., 2024). Similarly, Deloitte (2023) argues that transparent disclosure of decommissioning obligations reduces uncertainty surrounding future environmental liabilities. Nevertheless, empirical evidence directly linking decommissioning disclosure to market-based financial performance remains limited, leaving an important gap in sustainability accounting literature.

Another emerging theme concerns the moderating role of institutional and regulatory quality. Evidence increasingly suggests that sustainability disclosures generate stronger financial benefits when supported by effective governance, regulatory enforcement and external assurance (Naciti et al., 2022; Raimo et al., 2023; PwC, 2024). Yet these studies focus primarily on broad governance mechanisms rather than sector-specific legislation. Consequently, little empirical evidence exists on whether compliance with the Petroleum Industry Act strengthens the value relevance of sustainability reporting within Nigeria's petroleum industry.

The Nigerian literature exhibits similar limitations. Existing studies predominantly employ aggregate ESG measures or general environmental disclosure indices and rely largely on accounting-based performance

indicators such as ROA and ROE (Akinleye & Owoniya, 2024; Otalor & Modugu, 2025). Consequently, three important gaps remain. First, limited attention has been devoted to petroleum-specific sustainability disclosures such as Oil Spill Remediation Disclosure (OSRD) and Decommissioning and Asset Retirement Disclosure (DARD). Second, market-based performance measures such as Tobin's Q remain underutilized despite their greater ability to capture investors' valuation of sustainability information. Third, no known study has examined whether compliance with the Petroleum Industry Act moderates the relationship between petroleum-specific sustainability reporting and firm value.

The literature suggests that sustainability reporting enhances financial performance only when disclosures are credible, industry-specific and supported by effective institutional frameworks. However, existing evidence remains fragmented regarding petroleum-specific environmental disclosures and the role of the Petroleum Industry Act in strengthening their value relevance. This study addresses these gaps by examining the effects of Oil Spill Remediation Disclosure and Decommissioning and Asset Retirement Disclosure on Tobin's Q while testing the moderating influence of the Petroleum Industry Act Compliance Index among listed Nigerian oil and gas firms.

2.3 Theoretical Framework

This study is anchored on Legitimacy Theory (Suchman, 1995), which argues that organizations continually seek societal acceptance by aligning their operations and disclosures with prevailing social values, stakeholder expectations and regulatory requirements. Sustainability reporting therefore serves as a legitimacy mechanism through which firms demonstrate responsible environmental and governance practices.

Within the petroleum industry, legitimacy pressures are particularly intense because exploration and production activities generate significant environmental externalities. The enactment of the Petroleum Industry Act (PIA) 2021 further elevated expectations regarding environmental

restoration, decommissioning and corporate transparency. Consequently, firms that provide credible disclosures on oil spill remediation and asset retirement while demonstrating compliance with the PIA are more likely to strengthen stakeholder confidence and enhance market valuation.

Legitimacy Theory therefore explains not only why firms disclose sustainability information but also why the credibility of such disclosures depends on regulatory compliance. It provides a suitable theoretical basis for examining the moderating effect of the Petroleum Industry Act Compliance Index on the relationship between sustainability reporting and financial performance.

2.4 Hypotheses Development

Legitimacy Theory posits that firms enhance market value by demonstrating responsible environmental practices through credible sustainability reporting. However, the financial benefits of such reporting depend on its quality, relevance and credibility. In the petroleum industry, disclosures on oil spill remediation and decommissioning are particularly important because they address key environmental risks and provide investors with information on firms' environmental stewardship.

Oil Spill Remediation Disclosure (OSRD) signals effective environmental risk management by communicating firms' spill prevention, response and restoration efforts. Likewise, Decommissioning and Asset Retirement Disclosure (DARD) reduces uncertainty about future environmental liabilities by demonstrating preparedness to meet restoration obligations. Both disclosures are expected to improve investor confidence and market valuation.

The Petroleum Industry Act (PIA) 2021 strengthened environmental governance and accountability in Nigeria's petroleum sector. Firms with higher compliance are expected to achieve stronger financial performance because compliance enhances the credibility of sustainability disclosures and reduces concerns about symbolic reporting. Consequently, regulatory

compliance is also expected to strengthen the positive relationship between sustainability reporting and firm value.

Accordingly, this study proposes the following null hypotheses:

H0₁: Oil Spill Remediation Disclosure (OSRD) has no significant effect on the Tobin's Q of listed oil and gas firms in Nigeria.

H0₂: Decommissioning and Asset Retirement Disclosure (DARD) has no significant effect on the Tobin's Q of listed oil and gas firms in Nigeria.

H0₃: Petroleum Industry Act Compliance Index (PIACI) has no significant effect on the Tobin's Q of listed oil and gas firms in Nigeria.

H0₄: Petroleum Industry Act Compliance Index (PIACI) does not moderate the relationship between Oil Spill Remediation Disclosure (OSRD) and the Tobin's Q of listed oil and gas firms in Nigeria.

H0₅: Petroleum Industry Act Compliance Index (PIACI) does not moderate the relationship between Decommissioning and Asset Retirement Disclosure (DARD) and the Tobin's Q of listed oil and gas firms in Nigeria.

3. Methodology

3.1 Research Design

This study adopts an ex post facto longitudinal research design using panel data to examine the impact of sustainability reporting on the financial performance of listed oil and gas firms in Nigeria and the moderating effect of Petroleum Industry Act (PIA) compliance. The design is appropriate because it utilizes historical firm-level data without manipulating the study variables. Panel data provide greater variability, control for unobserved firm-specific heterogeneity, and improve the efficiency of parameter estimates (Baltagi, 2021).

The study covers the period 2015–2024, capturing both the pre- and post-enactment periods of the Petroleum Industry Act (2021). The population comprises all oil and gas firms listed on the Nigerian Exchange Group

(NGX) as of 31 December 2024. Given the relatively small number of listed firms, a census approach was adopted. Firms with incomplete financial or sustainability information during the study period were excluded.

Secondary data were extracted from audited annual reports, sustainability reports, company websites, NGX publications, and relevant regulatory reports issued by the Financial Reporting Council of Nigeria (FRCN) and the Nigerian Upstream Petroleum Regulatory Commission (NUPRC).

3.2 Measurement of Variables

The study employs one dependent variable, two independent variables, one moderating variable, and two control variables. Financial performance is proxied by Tobin's Q, measured as the ratio of the market value of equity plus book value of debt to total assets.

The independent variables are Oil Spill Remediation Disclosure (OSRD) and Decommissioning and Asset Retirement Disclosure (DARD). These variables were measured using disclosure indices developed through content analysis of corporate reports based on the Global Reporting Initiative (GRI) Standards, IFRS Sustainability Disclosure Standards (IFRS S1 and IFRS S2), IAS 37, IFRIC 1, and the Petroleum Industry Act (2021). Each disclosure item was assigned a score of one if disclosed and zero otherwise, and the aggregate score was expressed as a normalized disclosure index.

The moderating variable, Petroleum Industry Act Compliance Index (PIACI), was constructed as a composite index capturing firms' compliance with key statutory provisions relating to environmental management, decommissioning obligations, host community development, governance, and regulatory reporting. Firm size (natural logarithm of total assets) and leverage (total liabilities divided by total assets) were included as control variables.

Table 1

Summarizes the operationalization of the study variables.

Variable	Symb ol	Measurement
Tobin's Q	TQ	(Market value of equity + Book value of debt)/Total assets
Oil Spill Remediation Disclosure	OSRD	Petroleum-specific disclosure index
Decommissioning and Asset Retirement Disclosure	DARD	Petroleum-specific disclosure index
PIA Compliance Index	PIACI	Composite compliance index
Firm Size	SIZE	Natural logarithm of total assets
Leverage	LEV	Total liabilities/Total assets

Author, 2026

3.3 Model Specification

To examine the direct and moderating effects of sustainability reporting on firm value, the following panel regression model was estimated:

$$TQ_{it} = \beta_0 + \beta_1 OSRD_{it} + \beta_2 DARD_{it} + \beta_3 PIACI_{it} + \beta_4 (OSRD \times PIACI)_{it} + \beta_5 (DARD \times PIACI)_{it} + \beta_6 SIZE_{it} + \beta_7 LEV_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where TQ denotes Tobin's Q; $OSRD$ is Oil Spill Remediation Disclosure; $DARD$ represents Decommissioning and Asset Retirement Disclosure; $PIACI$ is the Petroleum Industry Act Compliance Index; $PIACI$ is the Petroleum Industry Act Compliance Index; μ_i captures firm-specific effects; λ_t denotes year effects; and ε_{it} is the error term.

3.4 Estimation Technique

The analysis was conducted using EViews 13. Descriptive statistics and Pearson correlation analysis were first employed to summarize the data

and examine the relationships among the variables. Multicollinearity was assessed using the Variance Inflation Factor (VIF), while panel diagnostic tests, including the Hausman specification test, Breusch-Pagan test, Wooldridge test for serial correlation, and Pesaran cross-sectional dependence test, were performed to determine the appropriate estimation technique and validate the regression assumptions.

The study estimated pooled ordinary least squares (POLS), fixed-effects (FE), and random-effects (RE) models, with the Hausman test guiding model selection. Where necessary, robust standard errors were employed to correct for heteroskedasticity and serial correlation. Statistical significance was evaluated at the 1%, 5%, and 10% levels.

4. Results and Discussion

4.1 Descriptive Statistics

Table 2

Descriptive Statistics

Variab le	Mean	Std. Dev.	Min	Max
Tobin's Q (TQ)	1.646	0.17	1.294	2.056
OSRD	3.071	1.418	1	5
DARD	2.914	1.406	1	5
PIACI	5.843	2.01	3	10
SIZE	15.94	0.97	14.51	17.63
LEV	0.497	0.151	0.253	0.749

Output from Eview 13

From Table 2, the average Tobin's Q of 1.646 suggests that, on average, oil and gas firms in Nigeria are valued above the book value of their assets. The disclosure variables exhibit reasonable variation, indicating differences in sustainability reporting practices across firms and years. The average PIA Compliance Index suggests a moderate level of compliance during the study period.

4.2 Correlation Analysis

The Pearson correlation matrix provides preliminary evidence regarding the association among the study variables. Oil Spill Remediation Disclosure exhibits a moderate positive correlation with Tobin's Q ($r = 0.515$), suggesting that firms providing more comprehensive remediation disclosures tend to experience higher market valuation. Likewise, Decommissioning and Asset Retirement Disclosure ($r = 0.483$) and the Petroleum Industry Act Compliance Index ($r = 0.491$) are positively associated with firm value, providing initial evidence that transparent sustainability reporting and regulatory compliance contribute to investors' favourable perceptions of petroleum companies.

None of the pairwise correlations among the explanatory variables exceed the commonly accepted threshold of 0.80, indicating the absence of severe multicollinearity (Gujarati & Porter, 2009). Although the interaction terms exhibit relatively higher correlations with their constituent variables, such relationships are expected in moderated regression models and do not necessarily indicate estimation bias. Consequently, the correlation results provide preliminary support for the hypothesized relationships while confirming the suitability of the variables for multivariate analysis.

4.3 Regression Results

Table 3

Regression Results

Variable	Coefficient	t-statistic	Probability	Decision
Constant	0.724	3.858	0.000	Significant
OSRD	0.0705	4.24	0.000	Significant
DARD	0.084	5.522	0.000	Significant
PIACI	0.056	4.609	0.000	Significant
OSRD × PIACI	-0.0012	-0.452	0.653	Not Significant
DARD × PIACI	-0.0023	-0.908	0.368	Not Significant
SIZE	0.019	1.765	0.082	Marginally Significant (10%)

LEV	-0.2253	-4.113	0.000	Significant
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Output from E-view 13

The regression results in table 3 demonstrate that the estimated model possesses substantial explanatory power, with an R^2 of 0.871 and an adjusted R^2 of 0.856, indicating that approximately 87.1% of the variation in Tobin's Q is jointly explained by sustainability reporting variables, Petroleum Industry Act compliance, and the control variables. The overall model is statistically significant ($F = 59.63$; $p < 0.001$), confirming that the explanatory variables jointly influence market-based financial performance. Furthermore, the Durbin-Watson statistic of 2.18 suggests the absence of first-order serial correlation, thereby supporting the reliability of the regression estimates.

4.3.1 Effect of Oil Spill Remediation Disclosure on Tobin's Q

Oil Spill Remediation Disclosure exerts a positive and statistically significant influence on Tobin's Q ($\beta = 0.0705$, $t = 4.240$, $p < 0.001$). The positive coefficient implies that improvements in firms' disclosure of oil spill prevention measures, remediation expenditures, environmental restoration initiatives, and ecosystem recovery programs are associated with increases in market valuation. Economically, this finding suggests that investors perceive transparent environmental remediation practices as signals of superior environmental risk management, lower expected litigation costs, and stronger long-term sustainability performance.

The finding aligns with Legitimacy Theory, which posits that organizations maintain societal acceptance by demonstrating responsible environmental behaviour through transparent disclosure practices (Suchman, 1995). Within the Nigerian petroleum industry, where environmental degradation has generated persistent stakeholder concerns, comprehensive remediation reporting appears to reduce information asymmetry and strengthen investors' confidence regarding firms' environmental liabilities.

The result corroborates recent empirical evidence reported by Bualalay et al. (2022), Raimo et al. (2023), and Johnson et al. (2024), who found that environmental disclosure contributes positively to market valuation by improving corporate transparency and reducing perceived environmental risk. It also supports the growing argument that industry-specific sustainability disclosures provide greater explanatory power than aggregate ESG measures because they directly address operational risks associated with petroleum production.

Accordingly, the null hypothesis that Oil Spill Remediation Disclosure has no significant effect on Tobin's Q is rejected.

4.3.2 Effect of Decommissioning and Asset Retirement Disclosure on Tobin's Q

The estimated coefficient of Decommissioning and Asset Retirement Disclosure is positive and highly significant ($\beta = 0.0840$, $t = 5.522$, $p < 0.001$), indicating that firms providing more comprehensive disclosures regarding decommissioning obligations, abandonment programmes, environmental restoration liabilities, and asset retirement funding enjoy superior market valuation.

This finding demonstrates that investors recognize transparent reporting of future environmental obligations as an indicator of prudent financial planning, sound environmental governance, and effective long-term risk management. Since decommissioning costs constitute significant future liabilities within the petroleum industry, comprehensive disclosure reduces uncertainty regarding firms' capacity to meet statutory restoration obligations.

The result is consistent with recent studies by Chime et al. (2024), Deloitte (2023), and Isallah (2023), which emphasize that transparent decommissioning disclosures enhance accountability, improve stakeholder confidence, and strengthen firms' environmental legitimacy. The finding further supports recent international evidence suggesting that investors increasingly reward companies capable of demonstrating preparedness

for long-term environmental obligations under evolving sustainability reporting standards.

Consequently, the second null hypothesis is rejected.

4.3.3 Effect of Petroleum Industry Act Compliance on Tobin's Q

The Petroleum Industry Act Compliance Index exhibits a positive and statistically significant relationship with Tobin's Q ($\beta = 0.0560$, $p < 0.001$), indicating that firms demonstrating stronger compliance with statutory environmental restoration, host community development, governance, and reporting requirements enjoy higher market valuation.

This finding suggests that regulatory compliance constitutes an important intangible asset capable of enhancing corporate legitimacy and reducing institutional risk. Since the enactment of the Petroleum Industry Act represents one of the most comprehensive regulatory reforms in Nigeria's petroleum sector, compliance signals responsible corporate conduct, thereby strengthening stakeholder confidence and reducing regulatory uncertainty.

The result is consistent with institutional and legitimacy perspectives, which argue that firms operating within robust regulatory environments are more likely to receive favourable market evaluations because compliance reduces uncertainty regarding future operational risks (Naciti et al., 2022; PwC, 2024).

4.3.4 Moderating Effect of Petroleum Industry Act Compliance

Contrary to expectations, neither interaction term is statistically significant. The interaction between Oil Spill Remediation Disclosure and the Petroleum Industry Act Compliance Index ($\beta = -0.0012$, $p = 0.653$) and the interaction between Decommissioning and Asset Retirement Disclosure and the Compliance Index ($\beta = -0.0023$, $p = 0.368$) fail to reach conventional significance levels.

The absence of a significant moderating effect suggests that, although compliance with the Petroleum Industry Act independently enhances firm value, it does not significantly strengthen or weaken the influence of sustainability disclosure on market valuation within the study period. A plausible explanation is that the Petroleum Industry Act is still in its early implementation stage, and investors may not yet differentiate firms based on varying levels of compliance. Additionally, many statutory provisions relating to decommissioning, host community development, and environmental restoration are still undergoing gradual implementation across the Nigerian petroleum sector.

This finding is consistent with the observations of Isallah (2023) and Chime et al. (2024), who argue that while the Petroleum Industry Act establishes a comprehensive legal framework for environmental governance, effective implementation and enforcement remain ongoing challenges. Consequently, the anticipated complementary effect between sustainability reporting and regulatory compliance may require a longer period before becoming observable in capital markets.

The null hypotheses relating to the moderating effects are not rejected.

4.3.5 Effect of Control Variables

Among the control variables, firm size exhibits a positive coefficient ($\beta = 0.0190$) and is marginally significant at the 10% level, suggesting that larger firms tend to command higher market valuation due to economies of scale, greater disclosure capacity, and stronger institutional legitimacy. Conversely, leverage records a negative and statistically significant coefficient ($\beta = -0.2253$, $p < 0.001$), indicating that higher debt financing reduces firm value because investors perceive highly leveraged firms as being exposed to greater financial and environmental risk. This finding is consistent with corporate finance literature, which argues that excessive leverage increases financial distress costs and reduces firms' strategic flexibility in managing long-term sustainability investments.

4.4 Discussion

The findings provide robust evidence that industry-specific sustainability reporting enhances market-based financial performance within Nigeria's oil and gas industry. Specifically, disclosures relating to oil spill remediation and decommissioning obligations significantly improve firm value, suggesting that investors increasingly reward transparent reporting of environmental risk management rather than generic sustainability narratives. Furthermore, compliance with the Petroleum Industry Act independently contributes to higher market valuation by strengthening corporate legitimacy and reducing regulatory uncertainty. However, the absence of significant moderating effects indicates that the economic benefits of sustainability reporting currently operate largely independent of firms' levels of PIA compliance, possibly reflecting the relatively recent implementation of the Act and the gradual evolution of sustainability reporting practices within Nigeria's petroleum industry.

From a policy perspective, these findings reinforce the importance of strengthening environmental disclosure requirements, enhancing enforcement of the Petroleum Industry Act, and encouraging petroleum companies to provide quantitative, verifiable, and industry-specific sustainability information that meets emerging ISSB reporting standards. Such initiatives are likely to improve market confidence, promote sustainable investment, and support the long-term competitiveness of Nigeria's petroleum sector.

5. Conclusion and Recommendations

5.1 Conclusion

The findings provide strong evidence that industry-specific sustainability disclosures constitute economically relevant information in the Nigerian petroleum sector. Firms that disclose comprehensive information regarding oil spill remediation and decommissioning obligations tend to enjoy superior market valuation, suggesting that investors increasingly reward transparent environmental risk management and long-term restoration planning. These results reinforce the argument that

sustainability reporting has evolved beyond a symbolic legitimacy exercise and has become an important mechanism for reducing information asymmetry, strengthening stakeholder confidence, and enhancing enterprise value.

The study also demonstrates that compliance with the Petroleum Industry Act independently contributes to higher firm value by improving perceptions of regulatory legitimacy, environmental accountability, and corporate governance quality. However, the absence of a significant moderating effect indicates that the market currently values sustainability disclosures and PIA compliance as separate sources of corporate credibility rather than as mutually reinforcing mechanisms. This outcome may reflect the relatively recent implementation of the PIA and the gradual evolution of sustainability reporting practices within Nigeria's petroleum industry.

From a theoretical perspective, the findings extend Legitimacy Theory by showing that petroleum-specific environmental disclosures, particularly those relating to remediation and decommissioning, play a significant role in maintaining organizational legitimacy and enhancing market valuation in an environmentally sensitive industry. The study therefore contributes to sustainability accounting literature by integrating industry-specific disclosure measures with an emerging regulatory framework in a developing economy context.

5.2 Recommendations

Based on the findings, the following recommendations are given:

1. Oil and gas firms should move beyond generic economic, social and governance (ESG) narratives and provide detailed, quantitative, and verifiable disclosures on oil spill remediation activities, environmental restoration expenditures, decommissioning provisions, and abandonment programs. Such disclosures are likely to improve the decision usefulness of sustainability reports and strengthen investor confidence.

2. Regulatory institutions, including the Nigerian Upstream Petroleum Regulatory Commission (NUPRC), the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA), and the Financial Reporting Council of Nigeria, should intensify monitoring of sustainability disclosures and decommissioning obligations. Greater emphasis should also be placed on independent assurance of sustainability reports to reduce concerns regarding greenwashing and disclosure credibility.
3. Petroleum firms should embed environmental remediation, decommissioning planning, and climate-related risk management within their core strategic and enterprise risk management frameworks rather than treating sustainability reporting as a compliance-oriented activity. This integration is likely to improve operational resilience and long-term value creation.
4. Firms should accelerate alignment with IFRS S1 and IFRS S2 requirements and ensure that sustainability disclosures are connected to financial reporting, governance structures, risk management processes, and performance metrics. Such alignment will improve comparability, transparency, and access to global capital markets.
5. Institutional investors, analysts, and lenders should incorporate oil spill remediation performance, decommissioning preparedness, and PIA compliance into their investment appraisal frameworks, as these factors appear to contain value-relevant information regarding firms' long-term sustainability and risk exposure.

5.3 Suggestions for Future Studies

Future research should be extended using longitudinal and multi-dimensional sustainability data. Future studies should employ panel data over a longer post-PIA period and incorporate additional petroleum-

specific sustainability indicators such as gas flaring reduction, methane emission management, biodiversity conservation, carbon transition investments, and host community development disclosures. Researchers may also explore alternative performance measures and apply advanced econometric techniques to assess the dynamic effects of sustainability reporting and regulatory compliance.

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