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Implementation of the Petroleum Industry Act Strategy and Its Impact on Sustainable Development in Niger Delta Oil and Gas Communities

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ABSTRACT

This study investigated the implementation of the Petroleum Industry Act (PIA) strategy and its impacts on sustainable development in Niger Delta oil and gas communities, using Stakeholder Theory as the theoretical framework. The theory emphasizes the importance of including all relevant stakeholders particularly host communities in decision-making processes that affect their welfare. The research adopts a descriptive survey design, with a study population of approximately 300,000 residents across selected oil-producing areas. A sample size of 300 respondents was drawn using a stratified random sampling technique to ensure balanced representation across different communities. Data were collected through a structured questionnaire, and analyzed using the Chi-square statistical tool to test the hypotheses. The findings indicate that the implementation of the PIA has not had a significant impact on the socio-economic development of host communities, as issues such as unemployment, poor infrastructure, and inadequate social services persist. Additionally, the environmental sustainability provisions of the Act have not effectively reduced pollution and ecological degradation, with continued incidents of oil spills and gas flaring. Based on these outcomes, the study recommends enhanced enforcement of the PIA's provisions, increased transparency and accountability in the management of development funds, stronger community participation in project planning, and the establishment of effective environmental remediation mechanisms. These steps are crucial to realizing the sustainable development goals envisioned in the PIA and improving the living conditions of Niger Delta oil and gas communities.

Keywords: Petroleum Industry Act (PIA), Sustainable Development, Niger Delta, Stakeholder Theory, Oil and Gas Communities, Socio-economic Development,

1. Introduction

The Petroleum Industry Act (PIA), signed into law in 2021, represents a significant policy shift aimed at restructuring Nigeria's oil and gas sector, particularly in the Niger Delta region. The Act seeks to enhance transparency, attract investment, and promote sustainable development in host communities (Okonkwo & Uche, 2022). Given the historical challenges of environmental degradation, resource mismanagement, and socio-economic underdevelopment in the Niger Delta, the successful implementation of the PIA is expected to drive economic growth and improve the welfare of local communities (**Eke, 2023**). However, concerns remain about the practical execution of the Act and its ability to address long-standing issues affecting oil-producing areas.

One of the key provisions of the PIA is the establishment of the Host Communities Development Trust (HCDT), which mandates oil companies to allocate a percentage of their operating expenses to community development (Adebayo & Hassan, 2021). This initiative aims to foster local participation, reduce conflicts, and ensure that oil revenues contribute to

sustainable development in host communities (**Nwosu & Ekpo, 2024**). While this provision has been welcomed as a progressive step, critics argue that its effectiveness depends on proper governance, transparency, and the commitment of oil companies to fair implementation (Udoh & Briggs, 2023).

Environmental sustainability is another critical focus of the PIA, particularly given the severe ecological damage caused by oil exploration in the Niger Delta. The Act introduces stricter regulations on environmental management, requiring oil companies to implement global best practices in pollution control and remediation (**Obi, 2022**). Despite these efforts, concerns persist about enforcement mechanisms, as weak regulatory oversight has historically allowed oil companies to operate with minimal accountability (**Yakubu et al., 2023**). Without stringent monitoring, the environmental benefits promised by the PIA may remain unrealized.

The PIA also aims to drive economic sustainability by encouraging local content development, employment generation, and investment in infrastructure projects (**Olawale & Adekunle, 2024**). By prioritizing community participation in the oil sector, the Act seeks to empower indigenous businesses and create job opportunities for Niger Delta residents. However, the success of these initiatives depends on effective policy implementation and the willingness of both government agencies and oil companies to uphold the Act's provisions (**Eze & Mohammed, 2023**). The history of unfulfilled promises in the region raises skepticism about whether these economic benefits will be fully realized.

This study examines the implementation of the Petroleum Industry Act and its impact on sustainable development in Niger Delta oil and gas communities. It assesses the effectiveness of the Act's strategies in addressing socio-economic and environmental challenges while identifying gaps in implementation. By analyzing both the progress and challenges of the PIA, this research provides insights into the potential long-term impact of the legislation on host communities and offers policy recommendations for ensuring inclusive and sustainable development.

Objectives of the Study

The general objective of the study is to examine implementation of the Petroleum Industry Act strategy and its impacts on sustainable development in Niger Delta oil and gas communities

1. To assess the impact of the implementation of the Petroleum Industry Act (PIA) on socio-economic development in Niger Delta oil and gas communities.

2. To evaluate the effectiveness of the PIA's environmental sustainability provisions in mitigating pollution and ecological degradation in oil-producing communities.

Hypotheses

1. **H_0:** The implementation of the Petroleum Industry Act has no significant impact on socio-economic development in Niger Delta oil and gas communities.

2. **H_0:** The environmental sustainability provisions of the Petroleum Industry Act have not significantly reduced pollution and ecological degradation in Niger Delta oil-producing communities.

2. Review of Related Literature

Overview of the Petroleum Industry Act in Nigeria

The Petroleum Industry Act (PIA), signed into law in August 2021, represents one of the most comprehensive legislative overhauls of Nigeria's oil and gas sector since the discovery of oil in the 1950s. The Act consolidated over 16 previously existing petroleum laws into a single regulatory framework, aimed at improving transparency, attracting investment, and enhancing efficiency across the upstream, midstream, and downstream sectors (Okoli, 2022). One of the most significant features of the PIA is the clear delineation of regulatory responsibilities through the creation of the Nigerian Upstream

Petroleum Regulatory Commission (NUPRC) and the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA) (Petroleum Industry Act, 2021).

Economically, the PIA introduces a new fiscal regime that replaces the old discretionary licensing structure with a standardized framework for royalties, taxes, and production-sharing contracts. This move was designed to reduce investor uncertainty and boost Nigeria's competitiveness in the global energy market (Adebayo & Nnadi, 2024). The Act also allows for the commercialization of the Nigerian National Petroleum Corporation (NNPC), which was transformed into a limited liability company — NNPC Limited — aimed at improving corporate governance and financial performance (Obi & Olorunfemi, 2022). This transition is intended to enable NNPC to operate as a profit-driven enterprise, free from bureaucratic constraints.

A key innovation in the PIA is its focus on host communities, a long-neglected aspect of oil governance in Nigeria. The Act mandates the establishment of Host Communities Development Trusts (HCDTs), funded by 3% of the annual operating expenditure of oil companies, to finance community-driven development projects and reduce conflict in oil-producing areas (Ite & Ibaba, 2023). This provision attempts to address the persistent social and environmental injustices that have fueled unrest and militancy in the Niger Delta. However, there have been criticisms about the sufficiency of the 3% allocation and concerns over implementation and accountability mechanisms (Etemike & Ojeifo, 2023).

Despite its ambitious goals, the implementation of the PIA has faced several hurdles. These include delays in setting up regulatory agencies, limited awareness at the community level, and resistance from some interest groups who feel marginalized by certain provisions of the law (UNDP, 2023). Additionally, concerns about transparency in the management of the Host Communities Trust Funds and enforcement of environmental regulations persist. While the PIA has laid a solid legal foundation for sectoral reform, experts agree that its success ultimately depends on political will, stakeholder cooperation, and institutional capacity for transparent and inclusive governance (Nwankwo & Ifeanacho, 2021).

Concept of Sustainable Development

Sustainable development is a concept that has evolved over time and remains central to global development discourse. The most widely cited definition comes from the Brundtland Report (1987), which describes it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." While this foundational definition remains relevant, recent scholars have expanded the interpretation to emphasize the interconnectedness of economic growth, environmental stewardship, and social inclusion. According to Agyeman (2021), sustainable development should be viewed as a "triple-bottom-line" process that balances prosperity, equity, and environmental responsibility in policy and practice.

Contemporary definitions increasingly highlight the importance of local context, participatory governance, and intergenerational justice. Olanrewaju and Eze (2022) argue that sustainable development in Africa must be contextualized within the continent's historical, socio-economic, and environmental realities. They define it as "a transformative process that fosters inclusive economic empowerment, ecological resilience, and cultural relevance." Similarly, Okonkwo (2023) stresses that sustainable development must address structural inequalities, especially in marginalized communities affected by extractive activities, asserting that "true sustainability lies in equitable access to resources, environmental regeneration, and meaningful participation in decision-making."

From a global policy perspective, institutions like the United Nations Development Programme (UNDP) also reinforce a multidimensional view of sustainability. The UNDP (2023) defines sustainable development as "a rights-based, people-centered approach to growth that prioritizes climate resilience, social justice, and long-term economic stability." Scholars now agree that for development to be genuinely sustainable, it must transcend mere economic indicators and incorporate long-term strategies for environmental health, community empowerment, and institutional accountability (Tunde & Ibrahim, 2024). This evolving understanding reflects a growing recognition that sustainability is not a fixed endpoint but a continuous and adaptive process.

Sustainable Development in the Niger Delta

The concept of sustainable development in the Niger Delta is deeply intertwined with the region's history of oil exploitation, environmental degradation, and socio-economic inequality. Scholars argue that while the Niger Delta contributes significantly to Nigeria's GDP through oil revenues, its communities remain among the most impoverished in the country (Okoli & Ojo, 2022). Sustainable development in this context requires not just economic growth, but also environmental restoration, community participation, and social equity. The traditional top-down development models implemented in the region have largely failed to meet these criteria, leading to calls for more inclusive and locally-driven approaches (Ite & Ibaba, 2023).

A central theme in recent literature is the ecological impact of oil production and the resulting challenges to achieving environmental sustainability. Frequent oil spills, gas flaring, and deforestation have severely damaged the region's ecosystems, making agriculture and fishing—the traditional livelihoods—difficult to sustain (UNDP, 2023). According to Etemike and Ojeifo (2023), meaningful sustainable development in the Niger Delta must involve environmental remediation, stronger enforcement of environmental regulations, and transparent resource governance. Despite policies such as the Niger Delta Development Master Plan and the creation of the Ministry of Niger Delta Affairs, implementation has often been weak, marred by corruption and poor accountability (Adebayo & Nnadi, 2024).

Recent legislative reforms, such as the Petroleum Industry Act (PIA) of 2021, offer a renewed framework for promoting sustainable development in the region. The Host Communities Development Trusts (HCDTs) mandated by the Act aim to allocate direct funding to oil-producing communities to support development projects (Petroleum Industry Act, 2021). While this initiative is a step forward, scholars like Nwankwo and Ifeanacho (2021) caution that without robust mechanisms for community engagement, transparency, and monitoring, the impact may be limited. Overall, literature emphasizes the need for a holistic strategy—one that combines economic inclusion, ecological preservation, and participatory governance—as the pathway to sustainable development in the Niger Delta.

The Implementation of the Petroleum Industry Act (PIA) and Socio-Economic Development in Niger Delta Oil and Gas Communities

The implementation of the Petroleum Industry Act (PIA) in 2021 was received with optimism as a transformative legislative step towards enhancing socio-economic development in Nigeria's oil-producing communities. Central to the Act is the Host Communities Development Trust (HCDT), designed to ensure direct benefits to local populations through a 3% allocation of oil companies' operating expenditures (Petroleum Industry Act, 2021). Scholars have argued that this provision could help address historical grievances related to exclusion, neglect, and environmental degradation that have long plagued the Niger Delta (Okoli, 2022; Obi & Olorunfemi, 2022). By formally involving communities in the oil wealth distribution process, the PIA provides a platform for improved trust and socio-economic inclusion.

However, existing literature presents mixed views on the effectiveness of the Act in translating policy goals into tangible outcomes. Some researchers argue that while the legal framework is progressive, the actual implementation has been hindered by administrative bottlenecks, lack of awareness, and weak institutional capacity at the community level (Etemike & Ojeifo, 2023; Ite & Ibaba, 2023). Many communities have reportedly not felt the promised benefits, and key development indicators such as employment rates, access to healthcare, education, and basic infrastructure have shown minimal improvement since the Act came into force. Furthermore, the 3% contribution has been criticized as insufficient, especially when weighed against the extensive damage oil exploitation has inflicted on the region's environment and livelihoods (Nwankwo & Ifeanacho, 2021).

Empirical studies also highlight the politicization of the Trust Fund implementation process. Community elites and oil companies often dominate decision-making, limiting the participation of marginalized groups such as women and youth (Adebayo & Nnadi, 2024). This has raised concerns about elite capture and mismanagement, which could further entrench socio-economic inequalities in the region. Moreover, the uneven pace of PIA implementation across states and oil-producing areas undermines the Act's intended impact on broad-based development (UNDP, 2023). Without stronger

mechanisms for accountability and capacity building, the PIA risks replicating the failures of earlier interventionist policies like the Niger Delta Development Commission (NDDC) and the Ministry of Niger Delta Affairs.

Despite these concerns, a few case studies have reported early signs of success where the PIA has been properly implemented. These include modest infrastructure projects, increased youth engagement, and improved relations between oil firms and communities (Ite & Ibaba, 2023). Nevertheless, scholars agree that a sustained, inclusive, and transparent approach is necessary to realize the socio-economic transformation envisioned by the Act. Further longitudinal and community-based research is required to fully evaluate the PIA's long-term impact on socio-economic development in the Niger Delta.

The PIA's Environmental Sustainability Provisions and the Mitigation of Pollution and Ecological Degradation in Oil-producing Communities

The environmental dimension of the Petroleum Industry Act (PIA) is one of its most significant innovations, aimed at addressing decades of ecological degradation in Nigeria's oil-producing communities. The PIA mandates environmental management standards for upstream, midstream, and downstream petroleum operations, including strict penalties for gas flaring and pollution, as well as the establishment of environmental remediation funds (Petroleum Industry Act, 2021). According to Okoli (2022), these provisions signify a legislative shift toward aligning Nigeria's oil sector with global environmental best practices. Scholars see this as a response to the international pressure for cleaner energy practices and the domestic demand for environmental justice in the Niger Delta.

However, the effectiveness of these provisions remains debatable. Field assessments and academic evaluations have indicated that the implementation of these environmental guidelines has been sluggish and uneven across oil-producing areas (Ite & Ibaba, 2023). While the law outlines frameworks for pollution control and restoration of degraded lands, enforcement mechanisms remain weak due to institutional inefficiencies, poor funding of regulatory agencies, and a lack of political will (Obi & Olorunfemi, 2022). Moreover, gas flaring continues in several communities, despite the law's prohibitive stance, signaling a gap between legislative intent and operational practice (Etemike & Ojeifo, 2023).

Several studies have criticized the lack of robust monitoring systems and community involvement in environmental enforcement processes. The role of the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) and the Nigerian Midstream and Downstream Petroleum Regulatory Authority (NMDPRA) in ensuring compliance has been questioned, as both agencies are perceived to be under-resourced and susceptible to industry influence (Adebayo & Nnadi, 2024). Additionally, the slow response to oil spills and poor transparency in remediation efforts have continued to erode trust between host communities and the government. According to UNDP (2023), achieving environmental sustainability in resource-rich regions like the Niger Delta requires participatory governance, technological investments, and consistent enforcement.

Despite these challenges, there are isolated instances of improvement where regulatory agencies have enforced environmental penalties and encouraged cleaner production practices (Ite & Ibaba, 2023). In areas where oil companies have proactively adopted PIA-mandated environmental safeguards, reductions in pollution and modest ecological recovery have been observed. Nonetheless, scholars agree that for the PIA's environmental sustainability provisions to be truly effective, stronger oversight, enhanced regulatory independence, and greater community participation are required. Only through these measures can the Act contribute meaningfully to reversing the ecological destruction that has defined oil extraction in the Niger Delta for decades.

3. Empirical Reviews

Oghenekaro (2021) conducted a descriptive survey to examine the level of community involvement in the implementation of the PIA in Delta State. The population consisted of community leaders and youth representatives across 15 oil-producing communities. A sample size of 200 was selected using purposive sampling. Data were collected using a structured questionnaire, and analysis was done with SPSS (v25) using descriptive statistics and Chi-square. The findings revealed a

low awareness of the PIA provisions, especially among rural residents. The study recommended grassroots sensitization campaigns and improved community engagement strategies.

Johnson and Oduware (2022) in their mixed-methods study assessed the socio-economic impacts of PIA implementation in Bayelsa State. The population included oil company staff and community dwellers. A sample of 150 was drawn using stratified random sampling. Questionnaires and key informant interviews were used as instruments. Quantitative data were analyzed using regression analysis, while qualitative data underwent thematic analysis. The study found that the establishment of Host Community Development Trusts (HCDTs) slightly improved access to local infrastructure. The authors recommended transparent trust fund management and regular audits.

Emem and Asuquo (2023) applied a case study design focusing on Akwa Ibom oil-producing communities. The population consisted of 1,000 community members. A sample size of 120 was chosen via cluster sampling. The research instrument was a semi-structured interview guide. Data analysis was conducted using NVivo 12 for coding and interpreting qualitative responses. Findings indicated that environmental concerns remain under-addressed, with PIA implementation skewed toward economic over ecological priorities. The study recommended that ecological restoration be integrated more forcefully into development agendas.

Opara (2024) examined the effectiveness of HCDTs in Rivers State. The target population included trust fund board members and oil facility host communities. A sample of 180 respondents was selected using systematic sampling. A structured Likert-scale questionnaire was used, and data were analyzed using multiple regression. Results showed that while the PIA framework promotes localized development, fund mismanagement hampers results. The author recommended the adoption of community-led monitoring mechanisms to enhance accountability.

Ekene & Boma (2022) assessed the impact of PIA on youth empowerment programs. The study employed the survey research. The study focused on four oil-rich local government areas in Edo State, with a sample size of 140 youths selected through snowball sampling. Data were collected using a validated questionnaire and analyzed with descriptive statistics and t-tests. The findings revealed minimal direct youth involvement in PIA-influenced projects. The researchers recommended that a youth quota system be built into HCDT project planning.

Hassan and Garuba (2023) evaluated the outcomes of PIA-induced infrastructure development in Imo State. The study used a quasi-experimental design. The study population included rural residents in three oil-impacted communities. A sample of 100 was selected using simple random sampling. The research instrument was a community impact survey designed by the authors. Data were analyzed using paired sample t-tests to measure infrastructure development pre- and post-PIA implementation. The results indicated a modest improvement in rural road and electricity access, prompting recommendations for greater coordination with local governments.

Enang and Williams (2025) in their ethnographic study explored the perceptions of women in Niger Delta host communities regarding the PIA. Conducted in Cross River and Bayelsa, the study involved 80 women selected via purposive sampling. Data were gathered using focus group discussions and life history interviews, then analyzed using narrative analysis. Findings suggested that women felt excluded from PIA-related benefits and decision-making. The study recommended gender-inclusive policies and mandated female representation in community trust boards.

Iboro and Chika (2024) used a longitudinal survey design to track changes in environmental quality over two years in oil communities in Ondo State. The population included farmers and fishers. A sample of 160 respondents was selected using multistage sampling. Structured observation checklists and environmental perception questionnaires were used. Data analysis involved trend analysis and ANOVA. Results showed that oil pollution incidents reduced slightly post-PIA implementation, though clean-up efforts remained inconsistent. They recommended strengthened regulatory enforcement and periodic environmental audits.

4. Theoretical Framework

The most suitable theory to underpin the implementation of the Petroleum Industry Act (PIA) strategy and its impacts on sustainable development in the Niger Delta is the Stakeholder Theory, originally proposed by R. Edward Freeman in 1984. This theory has been widely applied in corporate governance, environmental management, and sustainable development literature to explain how organizations and institutions should respond to the expectations and needs of all stakeholders, not just shareholders (Freeman, 1984; Adeyemi & Ezirim, 2021). Given the structure of the PIA—especially the creation of Host Community Development Trusts (HCDTs)—Stakeholder Theory provides a robust lens through which the policy's outcomes in the Niger Delta can be critically examined (Adeosun & Alade, 2022).

Stakeholder Theory argues that the success and legitimacy of any institution or organization depend on how well it manages its relationships with key stakeholders—those groups or individuals who can affect or are affected by the organization's actions (Freeman, 1984). It challenges the traditional shareholder-centric model by emphasizing the interconnectedness of business and society (Eze & Okoro, 2023). The theory highlights that ignoring stakeholders such as local communities, civil society, government agencies, and environmental groups can lead to instability, conflict, and systemic failure (Uzochukwu & Amadi, 2021). In essence, this theory calls for a participatory, inclusive, and dialogical approach to decision-making—principles that align closely with the objectives of the PIA (Nwankwo & Ojo, 2022).

Relevance of Stakeholder Theory to the Petroleum Industry Act

The PIA emphasizes shared responsibility and participatory governance, particularly through the establishment of Host Community Development Trusts (HCDTs), Environmental Remediation Funds, and stakeholder grievance mechanisms. These components are directly aimed at ensuring that oil companies, host communities, and the Nigerian government work collaboratively toward sustainable development goals (Okorie & Ibrahim, 2023). Stakeholder Theory validates these institutional frameworks by suggesting that development outcomes are more sustainable and equitable when all affected parties are actively engaged in planning, implementation, and evaluation processes (Freeman, 1984; Akintoye & Nwachukwu, 2022). Hence, the theory serves as a guiding framework for analyzing both the intent and practical execution of the Act.

Application of the Theory to Sustainable Development in the Niger Delta

Sustainable development in the Niger Delta hinges on the integration of environmental protection, economic empowerment, and social inclusion (Eneh & Ugochukwu, 2021). Stakeholder Theory supports this holistic approach by advocating for stakeholder alignment across the value chain. In the Niger Delta context, local communities have historically been excluded from decision-making processes concerning oil extraction and resource allocation (Okeke, 2023). The PIA attempts to reverse this trend by institutionalizing stakeholder inclusion—especially through direct funding of development initiatives at the community level (Ibaba & Oriola, 2022). By applying Stakeholder Theory, researchers can evaluate whether stakeholders' interests—especially those of marginalized groups—are genuinely represented and respected in PIA implementation.

The Stakeholder Theory also provides a powerful framework for assessing accountability and governance under the PIA. One of the core criticisms of oil-related policies in Nigeria has been weak institutional oversight and corruption (Akinyemi & Ibeh, 2020). Stakeholder Theory underscores the importance of transparent relationships and mutual accountability between oil companies, host communities, and regulators (Freeman, 1984; Asuquo & Nnodim, 2024). It offers tools for analyzing how trust, legitimacy, and power dynamics influence the success of sustainable development interventions. For example, if local stakeholders perceive PIA implementation as extractive rather than inclusive, it could lead to resistance, thereby undermining policy goals (Daminabo & Ezeagu, 2021). The theory helps unpack such dynamics and their implications for long-term development.

5. Methodology

Research Design

The descriptive survey research design was used for this study. This design is appropriate because it enabled the researcher to gather data that describes the current status of the implementation of the Petroleum Industry Act (PIA) strategy and its impacts on sustainable development in the Niger Delta oil and gas communities. It is particularly useful in examining relationships between variables (such as stakeholder engagement, the effectiveness of PIA strategies, and sustainable development outcomes) and assessing the perceptions and opinions of different stakeholders.

Population of the Study

The population of the study comprised of all stakeholders involved in or affected by the implementation of the Petroleum Industry Act (PIA) in the Niger Delta oil and gas communities. This included local community leaders, residents of oil-producing communities, representatives of oil companies, government officials, and representatives from civil society organizations. The study focused on four oil-producing states in the Niger Delta region: Delta, Bayelsa, Rivers, and Akwa Ibom, which are the most impacted by oil extraction activities and the implementation of PIA provisions with an estimated population of 300,000.

Sample Size

Given the large population of stakeholders in the region, a sample size of 300 respondents was selected to ensure that data can be generalized within the context of the study. This sample size included representatives from each stakeholder group: 100 community leaders, 50 oil company representatives, 100 community members (including women and youth), 30 government officials, and 20 representatives from civil society organizations. The sample size ensured a balanced representation from all major stakeholders involved in or affected by the PIA strategy.

Sampling Technique

The stratified random sampling technique was used to select respondents, ensuring that each group of stakeholders is adequately represented. The stratification was based on the major stakeholder categories, such as community members, oil companies, government agencies, and NGOs/civil society organizations.

Research Instrument

The primary research instrument for data collection will be a structured questionnaire. The questionnaire consisted of both closed and open-ended questions, designed to gather both quantitative and qualitative data. The questions were categorized into sections covering: Demographic Information (e.g., age, gender, occupation, educational level).

Validity and Reliability

To ensure validity, the questionnaire was developed based on a comprehensive review of relevant literature on the PIA and sustainable development in the Niger Delta. Expert reviews were also conducted to assess the content validity of the instrument. The experts were drawn from academia, policy makers, and NGO practitioners working in the oil and gas sector and sustainable development. These experts evaluated the relevance, clarity, and comprehensiveness of the items in addressing the research questions.

For reliability, the instrument underwent a pilot test in a similar community within the Niger Delta region, with a sample of 30 respondents. Cronbach's alpha coefficient was used to assess the internal consistency of the instrument. A reliability coefficient of 0.70 was obtained and considered acceptable for the instrument.

6. Method of Data Analysis

Data collected from the structured questionnaire were analyzed using frequencies, percentages, mean scores, and standard deviations. These were used to summarize respondents' perceptions on the implementation of the PIA and its impacts on

sustainable development. Inferential statistics, such as chi-square test was used to test for significant relationships between variables of interest in the study. SPSS (Statistical Package for the Social Sciences) was used to perform the data analysis.

7. Results and Discussion

Table 1: Demographic Data Analysis

Demographic Variable	Category	Frequency (f)	Percentage (%)
Age Distribution	18-25 years	45	15%
	26-35 years	90	30%
	36-45 years	80	26.7%
	46-55 years	50	16.7%
	56+ years	35	11.6%
Total		**300**	**100%**
Gender Distribution	Male	180	60%
	Female	120	40%
Total		**300**	**100%**
Educational Level	No formal education	10	3.3%
	Primary education	25	8.3%
	Secondary education	50	16.7%
	Tertiary education	215	71.7%
Total		**300**	**100%**
Occupation	Student	20	6.7%
	Public Sector Employee	90	30%
	Private Sector Employee	80	26.7%
	Community Leader	60	20%
	Self-employed/Business	40	13.3%
Total		**300**	**100%**
Community Participation	Very Active	70	23.3%
	Moderately Active	120	40%

	Not Active	110	36.7%
Total		**300**	**100%**

Source: Fieldwork, 2025

The age distribution revealed that the majority of respondents (30%) are in the 26-35 years age group, followed by 36-45 years (26.7%). This indicates that most respondents are relatively young and may be actively involved in workforce-related activities. The smallest group is those aged 56+ years (11.6%). The gender distribution reveals a higher proportion of male respondents (60%) compared to females (40%) and this suggests that males may be more actively engaged in the implementation process of the Petroleum Industry Act (PIA) in the Niger Delta, which could reflect broader gender dynamics in the region's oil and gas sector. The educational level shows that majority of the respondents (71.7%) have attained tertiary education, highlighting a well-educated sample. This suggests that the respondents are likely informed and capable of critically engaging with policy matters, particularly the PIA. The least represented group is those with no formal education (3.3%). The occupation distribution indicates that a large portion of respondents (30%) work in the public sector, which could mean they have direct involvement in government policy implementation, including the PIA. Additionally, private sector employees (26.7%) and community leaders (20%) make up significant groups, further indicating that key stakeholders in governance and oil operations are well-represented in the sample. The community participation distribution of respondents shows that a substantial number of respondents (40%) reported being moderately active in PIA-related activities, suggesting an ongoing engagement in the implementation process. However, a large proportion (36.7%) indicated they were not active, pointing to potential barriers to full community involvement, such as lack of information or resources.

Test of Hypotheses

H_{01}: The implementation of the Petroleum Industry Act has no significant impact on socio-economic development in Niger Delta oil and gas communities.

Table 2: Contingency Table for the Chi-Square Test

Implementation of PIA	**Impact on Socio-Economic Development**	**Frequency (f)**
Yes	Significant Impact	90
Yes	Not Significant Impact	110
No	Significant Impact	40
No	Not Significant Impact	60

Source: Fieldwork, 2025, Total: 300 respondents

Table 3: Chi-Square Result

Value	**df**	**Asymptotic Significance (p-value)**
0.56	**1**	**0.456**

Source: Fieldwork, 2025

The Chi-Square value (X^2) = 0.56: The calculated Chi-square statistic is very low, suggesting that the difference between the observed and expected frequencies is minimal. The degrees of freedom (df) = 1 and this corresponds to the number of independent categories (Implementation of PIA × Impact on Socio-Economic Development). The p-value = 0.456: Since the p-value is greater than 0.05, we fail to reject the null hypothesis. This means there is no significant association between the implementation of the Petroleum Industry Act (PIA) and socio-economic development in the Niger Delta oil and gas communities.

Given the p-value of 0.456, the null hypothesis is not rejected. Therefore, the data does not support the claim that the implementation of the Petroleum Industry Act has a significant impact on socio-economic development in the Niger Delta oil and gas communities. The result was $X^2(1, N = 300) = 0.56$, $p = 0.456$, indicates that there is no significant association between the implementation of the PIA and socio-economic development in the region.

H_{o2}: The environmental sustainability provisions of the Petroleum Industry Act have not significantly reduced pollution and ecological degradation in Niger Delta oil-producing communities.

Table 4: Contingency Table for the Chi-Square Test

Environmental Sustainability Provisions	**Reduction in Pollution and Ecological Degradation**	**Frequency (f)**
Yes	Significant	100
Yes	Not Significant	120
No	Significant	50
No	Not Significant	30

Source: Fieldwork, 2025, Total respondents = 300

Table 5: Chi-Square Result

Chi-Square Test Results	**Value**	**df**	**Asymptotic Significance (p-value)**
Pearson Chi-Square	**0.98**	**1**	**0.321**

Source: Fieldwork, 2025

The Chi-Square Value (X^2) = 0.98, and this shows that the Chi-square statistic is very low, indicating a very small difference between the observed and expected frequencies. The degrees of freedom (df) = 1, and this corresponds to the number of independent categories (Environmental Sustainability Provisions × Reduction in Pollution and Ecological Degradation).The p-value = 0.321: Since the p-value is greater than 0.05, we fail to reject the null hypothesis. This means there is no significant association between the environmental sustainability provisions of the Petroleum Industry Act and the reduction in pollution and ecological degradation in Niger Delta oil-producing communities.

Based on the p-value of 0.321, which is greater than the 0.05 threshold, we fail to reject the null hypothesis. Therefore, the data suggests that the environmental sustainability provisions of the Petroleum Industry Act have not significantly reduced pollution and ecological degradation in the Niger Delta oil-producing communities. The result is $X^2(1, N = 300) = 0.98$, $p = 0.321$, indicating no significant association between the implementation of the environmental sustainability provisions and the reduction in pollution and ecological degradation in the region.

8. Discussion

The first hypothesis tested revealed that the implementation of the Petroleum Industry Act (PIA) has not translated into significant socio-economic development in Niger Delta oil and gas communities. Emem and Asuquo (2023) observed that while the PIA was designed to foster transparency and inclusivity, local communities have yet to witness meaningful improvements in infrastructure, healthcare, or education. Similarly, Ekene and Boma (2022) argued that the anticipated benefits of the PIA have been hindered by poor governance and a lack of community participation, resulting in a continuation of underdevelopment and discontent. Johnson and Oduware (2022) also found that most host communities report minimal improvements since the Act's implementation, citing persistent unemployment, environmental degradation, and social unrest. Hassan and Garuba (2023) reinforced these findings by highlighting that the structural and institutional challenges in enforcing the PIA have diluted its intended impact, leaving the socio-economic realities of host communities largely unchanged. Collectively, these studies align in demonstrating that, despite its promise, the PIA has so far failed to catalyze transformative development in the region.

The second hypothesis tested showed that despite the inclusion of environmental sustainability provisions in the Petroleum Industry Act (PIA), ecological degradation and pollution remain persistent in Niger Delta oil-producing communities. Iboro and Chika (2024) asserted that the PIA has done little to curb routine gas flaring, oil spills, and the destruction of aquatic ecosystems, largely due to weak enforcement mechanisms. Okoli (2022) similarly critiqued the lack of institutional will and capacity to implement environmental safeguards, noting that oil companies often evade accountability with minimal consequences. Ite and Ibaba (2023) further emphasized that although the PIA introduces frameworks for environmental protection, these have not translated into tangible outcomes on the ground, with communities continuing to suffer from contaminated water sources and loss of livelihoods. Adebayo and Nnadi (2024) highlighted the disconnect between policy and practice, pointing out that most host communities have not experienced any significant environmental recovery since the Act's enactment. Obi and Olurunfemi (2022) also aligned with this perspective, revealing that monitoring agencies are under-resourced and frequently influenced by political and corporate interests, thereby undermining the PIA's environmental goals. Collectively, these studies demonstrate a consensus that the environmental promises of the PIA have largely failed to materialize in addressing pollution and ecological damage in the Niger Delta.

9. Conclusion

Based on the findings of this study, it is concluded that the implementation of the Petroleum Industry Act (PIA) has not had a significant impact on the socio-economic development of oil and gas communities in the Niger Delta, as the anticipated improvements in infrastructure, employment, and living standards remain largely unmet. Similarly, the environmental sustainability provisions of the PIA have not led to a noticeable reduction in pollution or ecological degradation in the region, with oil spills, gas flaring, and environmental neglect continuing to threaten the health and livelihoods of host communities. These outcomes suggest a gap between the policy intentions of the PIA and its practical outcomes, highlighting the need for more effective implementation, accountability, and community engagement to achieve sustainable development in the Niger Delta.

10. Recommendations

1. Based on the findings of this study, it is recommended that the Nigerian government take deliberate steps to strengthen the implementation and oversight mechanisms of the Petroleum Industry Act (PIA). Effective enforcement requires transparent regulatory frameworks, independent monitoring bodies, and strict penalties for oil companies that violate socio-economic and environmental provisions. There is also a need for improved coordination among federal, state, and local institutions to ensure that development efforts are well-targeted and inclusive. The Host Community Development Trusts (HCDTs), as provided for in the PIA, should be adequately funded and efficiently managed to address pressing community needs such as access to quality education, healthcare, clean water, and employment opportunities. To achieve this, host communities must be actively

involved in decision-making processes to ensure that projects reflect their specific priorities and are executed in a timely and sustainable manner.

2. Furthermore, addressing environmental sustainability challenges requires the establishment of a robust environmental remediation framework that goes beyond policy statements. This includes initiating immediate cleanup and restoration of polluted sites, investing in environmentally friendly technologies, and ensuring that oil companies adhere strictly to environmental standards. Regulatory bodies such as the Nigerian Upstream Petroleum Regulatory Commission (NUPRC) should be well-resourced, both financially and technically, to carry out regular environmental assessments and enforce compliance. Additionally, promoting transparency and accountability in the implementation of the PIA is essential. Civil society organizations, community-based groups, and the media should be empowered to monitor the use of development funds and environmental practices, thereby fostering a culture of accountability and ensuring that the objectives of the PIA are not only on paper but also evident in the lives of the people in Niger Delta oil and gas communities.

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