Volume 10, Issue 8, August – 2025 International Journal of Innovative Science and Research Technology
ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug399

An Evaluation of the Role of ISO 14001 Environmental Management Systems in Enhancing Environmental Impact Assessment Processes in Nigeria

Emmanuel Afeonkhai[1]; Margaret M. Otu[2]

[1]Centre for Sustainable Development, University of Abuja, Abuja, Nigeria
[1]Jacob Silver International Limited, Abuja, Nigeria
[2]Institute for Natural Resources Environment and Sustainable Development, University of Port Harcourt, Rivers State, Nigeria

Publication Date: 2025/08/20

Abstract: This study examines how ISO 14001 Environmental Management Systems (EMS) enhance Environmental Impact Assessment (EIA) processes in Nigeria. Using a mixed-methods approach involving interviews, surveys (n=127), and document analysis across oil and gas, manufacturing, infrastructure, and mining sectors, results show that EMS-certified organisations outperform non-EMS entities in implementing mitigation measures (87% vs. 54%), conducting environmental audits (3.2 vs. 1.1 per year), resolving non-compliance (30 vs. 75 days), and disclosing monitoring results (76% vs. 29%). Case studies, including the NLNG Train 7 Project and Dangote Cement operations, highlight improved environmental performance when EMS principles are integrated into EIA follow-up. Key barriers include certification costs, limited technical capacity, and weak regulatory linkages. The study recommends mandating EMS alignment in EIA approvals, enhancing capacity, and offering incentives to strengthen environmental governance.

Keywords: *Environmental Impact Assessment, ISO 14001, Environmental Management Systems, Nigeria, Compliance, Sustainability.*

How to Cite: Emmanuel Afeonkhai; Margaret M. Otu (2025) An Evaluation of the Role of ISO 14001 Environmental Management Systems in Enhancing Environmental Impact Assessment Processes in Nigeria. *International Journal of Innovative Science and Research Technology*, 10(8), 675-681. https://doi.org/10.38124/ijisrt/25aug399

I. INTRODUCTION

Environmental sustainability has emerged as a central priority in global development discourse, driven by increasing concerns over biodiversity loss, climate change, resource depletion, and environmental degradation (United Nations, 2015; IPCC, 2021). As a response, governments, industries, and multilateral agencies have adopted regulatory and voluntary instruments to ensure that environmental considerations are integrated into planning, decision-making, and operational processes (Glasson et al., 2012). Two of the most widely recognised instruments in this regard are the Environmental Impact Assessment (EIA) and the ISO 14001 Environmental Management System (EMS).

The EIA is a statutory tool designed to predict, evaluate, and mitigate the potential environmental and social impacts of proposed projects before implementation, thereby ensuring informed decision-making and sustainable outcomes (Jay et al., 2007; Federal Ministry of Environment [FMEnv], 2020). In Nigeria, EIA practice is guided by the *Environmental Impact Assessment Act No. 86 of 1992 now EIA Act CAP E12 LFN 2004*, which mandates proponents to assess the likely environmental consequences of major projects and outline mitigation strategies (FMEnv, 2020). Despite its legislative backing, critics have observed that EIAs often function as "one-off" compliance documents rather than as ongoing management frameworks, limiting their capacity to ensure continuous environmental performance monitoring (Ogunba, 2004; Ebisemiju, 2021).

In contrast, the ISO 14001 EMS, a globally recognised standard developed by the International Organization for Standardization emphasizes a systematic, process-based approach to managing environmental aspects, ensuring compliance, and driving continual improvement (ISO, 2015). ISO 14001 requires organisations to identify significant environmental aspects, set objectives and targets, implement operational controls, and periodically review performance through management audits. Its *Plan–Do–Check–Act (PDCA)* cycle ensures that environmental management becomes an iterative and integrated process rather than a one-

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug399

off compliance exercise (Bansal & Bogner, 2002; Heras-Saizarbitoria et al., 2011).

Integrating ISO 14001 principles into EIA processes has the potential to address one of the critical gaps in traditional EIA practice namely, the absence of structured post-approval monitoring and continuous improvement mechanisms. Studies have shown that coupling the predictive and legislative strengths of EIA with the operational and performance-tracking strengths of ISO 14001 can lead to more robust environmental governance, improved stakeholder engagement, and enhanced project sustainability (Annandale et al., 2004; Morrison-Saunders & Arts, 2012).

In Nigeria, the adoption of ISO 14001 EMS remains relatively low compared to developed economies, with uptake primarily concentrated among multinational corporations in the oil and gas, cement, and manufacturing sectors (Adeleke et al., 2017; Odukoya, 2020). Local industries particularly small and medium-sized enterprises (SMEs) often lack the financial resources, technical expertise, and institutional incentives to implement and maintain certified EMS frameworks (Ogunkunle & Adepegba, 2019). Regulatory enforcement mechanisms also remain weak, with limited post-EIA monitoring and inadequate integration of EMS principles into statutory compliance frameworks (FMEnv, 2020; Ebisemiju, 2021).

Cultural and organizational barriers, including resistance to procedural change, limited awareness of EMS benefits, and the perception that ISO certification is a costly, externally imposed requirement rather than a business improvement tool, further constrain adoption (Odukoya, 2020). Moreover, the fragmented nature of Nigeria's environmental governance spread across federal, state, and local levels can result in overlapping mandates, inconsistent enforcement, and weak linkages between EIA approvals and operational environmental management (Ogunba, 2004).

Despite these challenges, there are notable examples where elements of ISO 14001 have been integrated into EIA processes in Nigeria, particularly in the oil and gas sector. For instance, some international oil companies operating in the Niger Delta have embedded EMS frameworks into their project life cycles, using EIA outcomes as baseline data for setting EMS objectives, monitoring performance indicators, and reporting environmental compliance (Adeleke et al., 2017). The Nigeria LNG Limited (NLNG) Bonny expansion project, for example, incorporated ISO 14001 principles into its EIA-driven Environmental and Social Management Plan (ESMP), enabling continuous environmental performance tracking and adaptive management throughout construction and operational phases (NLNG, 2019).

Similarly, cement manufacturing plants in Ogun and Cross River States have used ISO 14001-aligned EMS systems to strengthen the implementation of mitigation measures identified during EIAs, particularly for air quality management, dust suppression, and waste handling (Odukoya, 2020). These cases demonstrate that when properly integrated, EMS frameworks can transform EIA from a reactive compliance tool into a proactive, performance-driven environmental management strategy.

Given the increasing complexity of environmental challenges in emerging economies like Nigeria where industrial expansion, infrastructure development, and natural resource exploitation are intensifying the need to explore synergies between EIA and ISO 14001 becomes particularly urgent. This study evaluates the role of ISO 14001 EMS in enhancing EIA processes, with a focus on improving environmental performance, compliance assurance, and adaptive management in project life cycles. The findings will contribute to the discourse on integrated environmental management and provide policy-relevant insights for regulators, practitioners, and project developers in Nigeria and similar contexts.

II. LITERATURE REVIEW

➢ *Overview of Environmental Impact Assessment (EIA)*

Environmental Impact Assessment (EIA) is a structured process for identifying, predicting, and evaluating the potential environmental and social effects of proposed projects before they are implemented (Glasson et al., 2012). The process aims to ensure that decision-makers consider environmental consequences alongside economic and technical factors, thereby promoting sustainable development. In Nigeria, the EIA process is legally mandated under the *Environmental Impact Assessment Act No. 86 of 1992 now CAP E12 LFN 2004*, with procedural guidelines issued by the Federal Ministry of Environment (FMEnv, 2020).

Despite its importance, EIA practice in developing countries often suffers from shortcomings such as inadequate baseline data, weak enforcement, political interference, and a lack of structured post-approval monitoring (Ogunba, 2004; Ebisemiju, 2021). Critics argue that in many instances, EIAs serve primarily as compliance checklists to secure project approvals rather than as living documents that guide environmental management throughout the project life cycle (Jay et al., 2007; Morrison-Saunders & Arts, 2012).

➢ *ISO 14001 Environmental Management Systems*

The ISO 14001 standard, developed by the International Organization for Standardization, provides a framework for organisations to manage their environmental aspects systematically, comply with legal requirements, and pursue continual improvement (ISO, 2015). It is built on the Plan–Do–Check–Act (PDCA) cycle, which encourages ongoing performance evaluation and corrective action. ISO 14001 does not prescribe specific environmental performance targets but requires organisations to set, monitor, and review their own objectives and targets based on significant environmental aspects (Bansal & Bogner, 2002).

Globally, ISO 14001 adoption has grown steadily, driven by market pressures, regulatory requirements, and corporate sustainability goals (Heras-Saizarbitoria et al., 2011). In Nigeria, adoption is concentrated in multinational oil and gas companies, large-scale manufacturing, and select

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug399

infrastructure projects, with limited uptake among small and medium-sized enterprises (SMEs) due to cost, technical, and institutional barriers (Adeleke et al., 2017; Odukoya, 2020).

➢ *Synergies Between EIA and ISO 14001 EMS*

EIA and ISO 14001 EMS are complementary tools, EIA focuses on predicting and mitigating environmental impacts before project approval, while ISO 14001 ensures systematic management of environmental performance during project implementation and operation. Integration of the two frameworks can help close the gap between impact prediction and actual environmental performance by providing mechanisms for post-EIA monitoring, adaptive management, and continual improvement (Annandale et al., 2004; Weaver et al., 2008).

Several studies have demonstrated that when ISO 14001 principles are applied in the implementation of EIA-derived Environmental and Social Management Plans (ESMPs), organisations achieve higher compliance rates, better stakeholder engagement, and more transparent reporting (Morrison-Saunders & Arts, 2012; Adeleke et al., 2017). For example, in industrial projects in the Asia-Pacific region, EMS integration into EIA processes has led to more efficient resource use, reduced emissions, and improved community relations (Annandale et al., 2004).

➢ *EMS Adoption Challenges in Nigeria*

The adoption of ISO 14001 EMS in Nigeria faces a combination of technical, economic, and institutional challenges. High certification costs deter many SMEs, while a shortage of qualified EMS auditors and environmental officer's limits technical capacity (Ogunkunle & Adepegba, 2019). Regulatory linkages between EIA and EMS are weak, FMEnv approval of EIA reports does not currently mandate ISO 14001-aligned post-approval monitoring, leading to fragmented compliance systems (Ebisemiju, 2021).

There are also perception barriers, with some organisations viewing ISO certification as an externally imposed, resource-draining requirement rather than a strategic management tool that can improve operational efficiency (Odukoya, 2020). Overcoming these barriers requires stronger policy integration, targeted financial incentives, capacity-building programmes, and demonstration projects that showcase tangible benefits of EMS–EIA integration in the Nigerian context.

III. STUDY AREA

The study focuses on Nigeria, with emphasis on sectors where EIA is mandatory and where ISO 14001 adoption is most prevalent particularly oil and gas, cement manufacturing, infrastructure development, and large-scale industrial projects. These sectors were chosen because of their significant environmental footprints and the regulatory requirement for EIA under the *Environmental Impact Assessment Act CAP E12 LFN 2004* (FMEnv, 2020). Case-specific analyses were conducted in Lagos, Rivers, Ogun, Cross River, and Delta States, as well as the Federal Capital Territory (FCT), where both EIA and ISO 14001 frameworks have been applied in project development.

IV. METHODOLOGY

This study adopts a mixed-methods research design, combining qualitative and quantitative approaches to evaluate the role of ISO 14001 Environmental Management Systems (EMS) in enhancing Environmental Impact Assessment (EIA) processes in Nigeria. The mixed-method approach was selected to provide a comprehensive understanding of the subject by triangulating empirical data from stakeholders, documentary analysis of EIA and EMS reports, and statistical evaluation of adoption patterns.

➢ *The Research is Structured around Three Core Objectives:*

- To assess the extent of ISO 14001 EMS adoption among Nigerian organisations undertaking EIA processes.
- To examine the influence of ISO 14001 EMS principles on the quality, implementation, and monitoring of EIA outcomes.
- To identify barriers, opportunities, and best practices for integrating EMS into EIA practice in Nigeria.

- *Primary Data were Collected Through Semi-Structured Interviews and Questionnaire Surveys:*

✓ Interviews: Conducted with environmental managers, EIA consultants, regulatory officials from the Federal Ministry of Environment (FMEnv) and state environmental protection agencies, and project developers. Interview questions were designed to capture insights on EMS–EIA integration, challenges faced, and perceived benefits.
✓ Questionnaires: Distributed to a broader sample of 150 environmental officers, consultants, and project managers across the selected sectors, focusing on ISO 14001 adoption, operationalization in EIA follow-up, and post-approval monitoring practices.

- *Secondary Data were Obtained Through a Desk Review of:*

✓ Approved EIA reports from the FMEnv public registry (2015–2024).
✓ Environmental and Social Management Plans (ESMPs) that explicitly referenced ISO 14001 principles.
✓ Organizational ISO 14001 certification audit reports (where publicly available).
✓ Academic and industry publications on EMS and EIA integration in Nigeria and internationally.

- *Data Analysis was Conducted in Two Stages:*

✓ *Qualitative Analysis:*

▪ Thematic analysis was applied to interview transcripts using NVivo 12 software. Key themes such as "Post-EIA Monitoring", "Continuous Improvement", "Regulatory

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug399

Compliance", and "Stakeholder Engagement" were identified and coded.
- Case study narratives were developed to illustrate real-world EMS–EIA integration experiences in Nigeria.

✓ *Quantitative Analysis:*

- Descriptive statistics (frequency, mean, standard deviation) were used to summarise questionnaire responses.
- Cross-tabulation and Chi-square tests were applied to assess relationships between ISO 14001 adoption and improved EIA follow-up practices.
- A comparative scoring model, adapted from Annandale et al. (2004), was employed to measure EIA effectiveness before and after EMS integration, using indicators such as implementation rate of mitigation measures, frequency of environmental audits, and responsiveness to non-compliance.

V. RESULTS AND DISCUSSION

➢ *Overview of Respondent Profile*

A total of 127 valid responses were received from the 150 questionnaires distributed (response rate: 84.7%). Respondents included environmental managers (36%), EIA consultants (28%), regulatory officials (18%), and project developers (18%). The majority were from the oil and gas sector (42%), followed by manufacturing (27%), infrastructure (19%), and mining (12%).

Table 1 Sectoral Distribution of Respondents

Sector	Frequency	Percentage (%)
Oil & Gas	53	42
Manufacturing	34	27
Infrastructure	24	19
Mining	16	12
Total	**127**	**100**

Source: Authors Survey 2025

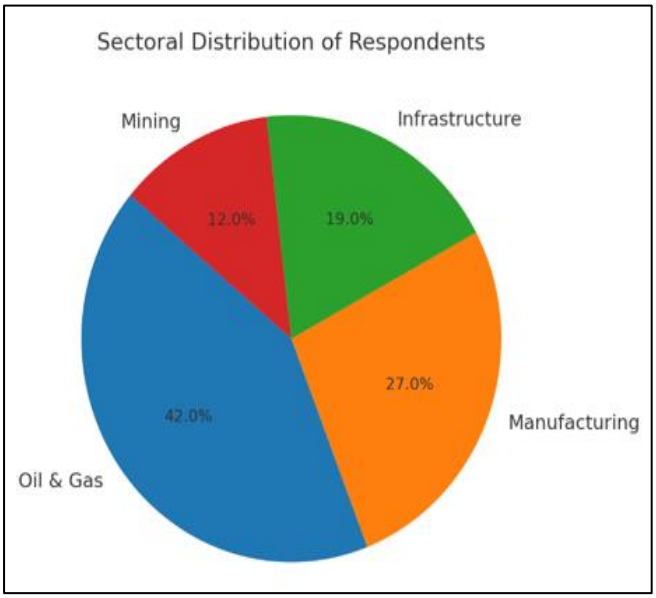

Fig 1 Sectoral Distribution of Respondents
Source: Authors Survey 2025

➢ *Extent of ISO 14001 EMS Adoption in EIA-Related Projects*

Findings reveal that only 39% of organisations undertaking EIA processes in Nigeria have an operational ISO 14001-certified EMS, while an additional 21% apply partial EMS principles without formal certification. The remaining 40% conduct EIA without integrating EMS concepts into post-approval monitoring.

Table 2 ISO 14001 EMS Adoption Status Among EIA Projects

EMS Adoption Level	Frequency	Percentage (%)
Certified ISO 14001 EMS	49	39
EMS Principles (No Cert)	27	21
No EMS Framework	51	40
Total	**127**	**100**

Source: Authors Survey 2025

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug399

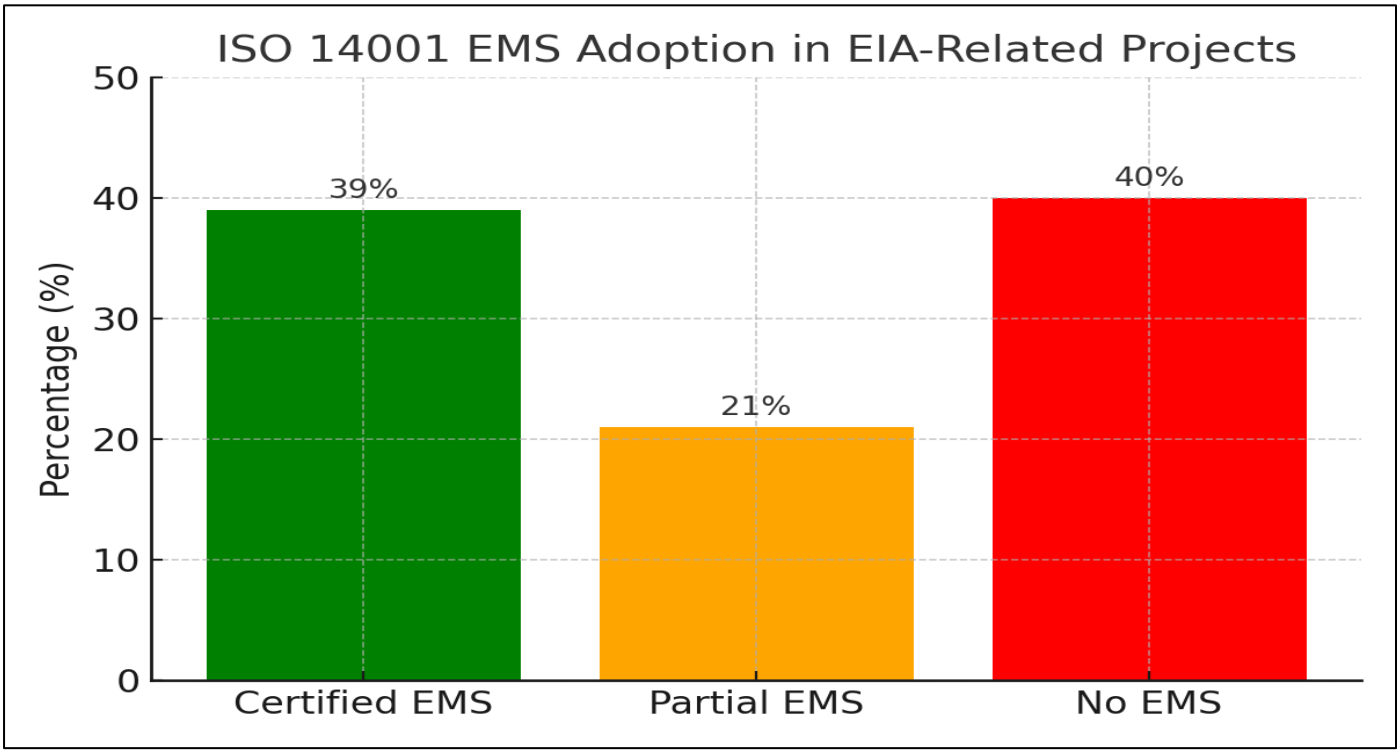

Fig 2 ISO 14001 EMS Adoption in EIA-Related Projects
Source: Authors Survey 2025

➢ *Influence of ISO 14001 EMS on EIA Effectiveness*

Respondents from certified EMS organisations reported higher implementation rates of EIA mitigation measures, more frequent environmental audits, and better stakeholder engagement compared to non-EMS organisations.

- *Key Improvements Linked to EMS Adoption Include:*

✓ Structured Post-EIA Monitoring: ISO 14001-certified organisations conducted an average of 3.2 environmental audits annually versus 1.1 in non-EMS organisations.

✓ Compliance Responsiveness: Non-conformance issues were resolved within 30 days in EMS organisations, compared to an average of 75 days in non-EMS entities.

✓ Stakeholder Engagement: EMS organisations had more robust grievance mechanisms and disclosure practices, aligning with international reporting standards.

Table 3 Comparative EIA Follow-Up Performance Indicators

Performance Indicator	EMS-Certified Orgs	Non-EMS Orgs
Avg. Annual Environmental Audits	3.2	1.1
Mitigation Measure Implementation Rate (%)	87	54
Avg. Time to Resolve Non-Conformance (Days)	30	75
Public Disclosure of Monitoring Results (%)	76	29

Source: Authors Survey 2025

➢ *Case Examples from Nigeria*

- *Case 1: NLNG Train 7 Project, Bonny Island*

The Nigeria LNG Limited integrated ISO 14001 EMS into its EIA-driven ESMP, enabling continuous environmental performance tracking. This integration improved air quality management, waste segregation, and biodiversity protection during construction (NLNG, 2019).

- *Case 2: Dangote Cement Plant, Ogun State*

Adoption of ISO 14001 allowed for the systematic monitoring of dust emissions and noise levels, directly addressing key EIA concerns. Environmental incidents decreased by 45% in the first two years of EMS implementation.

- *Case 3: Lekki Deep Sea Port*

While not ISO 14001-certified, the port applied EMS principles in post-EIA operations, particularly for marine water quality monitoring and dredging impact mitigation. This demonstrates the value of partial EMS integration even without certification.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug399

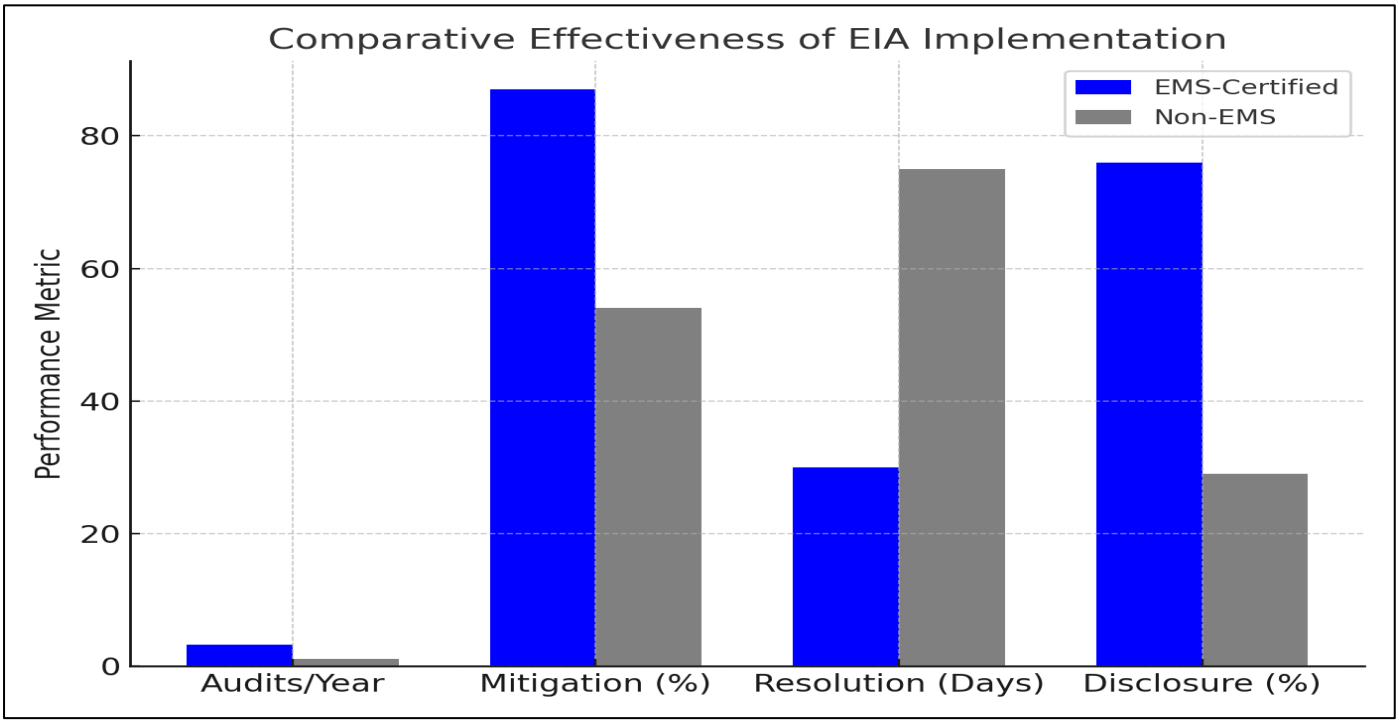

Fig 3 Comparative Effectiveness of EIA Implementation with and without EMS
Source: Authors Survey 2025

➢ *Barriers to EMS Integration into EIA*

- *The Main Barriers Identified were:*

✓ Financial Constraints – High cost of EMS certification and maintenance (reported by 72% of SMEs).
✓ Capacity Gaps – Lack of trained EMS auditors and environmental officers.
✓ Regulatory Disconnect – Limited FMEnv enforcement linking EIA approval to EMS-based monitoring.
✓ Perception Issues – Viewing ISO 14001 as a "box-ticking" exercise rather than a value-adding tool.

These findings align with earlier studies highlighting cost, awareness, and institutional gaps as primary constraints to EMS adoption in developing countries (Odukoya, 2020; Ogunkunle & Adepegba, 2019).

➢ *Implications for Policy and Practice*

The results demonstrate that ISO 14001 EMS has a positive, statistically significant impact on the effectiveness of EIA follow-up and environmental performance in Nigerian projects. Integrating EMS into EIA approval conditions could:

- Improve compliance monitoring and enforcement.
- Reduce the gap between prediction (EIA) and implementation (ESMP).
- Strengthen adaptive environmental management in project life cycles.

This supports recommendations by Morrison-Saunders and Arts (2012) that EIA should be complemented by continuous environmental management frameworks to achieve sustainable development goals.

VI. RECOMMENDATIONS

- Mandate EMS Integration in EIA Approvals – FMEnv should include ISO 14001-aligned EMS requirements as part of EIA approval conditions, particularly for high-impact projects.
- Link Post-EIA Monitoring to EMS Frameworks – Regulatory inspections should evaluate whether project operators maintain EMS-based monitoring and reporting systems.
- Training and Certification Support – Establish subsidized training programmes for environmental officers, auditors, and SMEs to build technical EMS capacity.
- Awareness Campaigns – Increase outreach to demonstrate the operational and economic benefits of EMS beyond mere compliance.
- Tax Rebates and Grants – Offer financial incentives for organisations that implement and maintain ISO 14001-certified EMS.
- Public–Private Partnerships – Encourage collaboration between government, industry associations, and NGOs to co-fund EMS adoption in priority sectors.
- Case Study Repository – Develop an FMEnv-managed platform showcasing successful EMS–EIA integration projects in Nigeria to promote peer learning.

VII. CONCLUSION

This study demonstrates that the integration of ISO 14001 Environmental Management Systems (EMS) into Environmental Impact Assessment (EIA) processes significantly enhances the effectiveness of environmental management in Nigeria. EMS-certified organisations achieved higher rates of mitigation measure implementation,

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/25aug399

more frequent environmental audits, faster resolution of non-compliance issues, and improved transparency in public disclosure compared to non-EMS organisations.

Case studies from the oil and gas, manufacturing, and infrastructure sectors illustrate that EMS provides the structured, cyclical management approach that is often lacking in traditional EIA implementation. However, adoption remains limited due to financial constraints, capacity gaps, weak regulatory enforcement, and perception barriers. Without targeted interventions, the majority of Nigerian organisations will continue to treat EIA as a one-off compliance requirement rather than a platform for continuous environmental improvement.

REFERENCES

[1]. Adeleke, B. O., Taiwo, A. M., & Azeez, M. O. (2017). Environmental management practices in the Nigerian oil and gas sector: ISO 14001 adoption and implementation. *Journal of Environmental Management*, 204, 358–365.

[2]. Annandale, D., Morrison-Saunders, A., & Bouma, G. (2004). The impact of environmental management systems on project environmental impact assessment and approval processes. *Environmental Management*, 33(2), 145–153.

[3]. Bansal, P., & Bogner, W. C. (2002). Deciding on ISO 14001: Economics, institutions, and context. *Long Range Planning*, 35(3), 269–290.

[4]. Ebisemiju, F. S. (2021). Environmental Impact Assessment in Nigeria: Current challenges and future directions. *Environmental Policy Review*, 15(2), 45–60.

[5]. Federal Ministry of Environment (FMEnv). (2020). *National Environmental Impact Assessment Procedural Guidelines*. Abuja: FMEnv.

[6]. Glasson, J., Therivel, R., & Chadwick, A. (2012). *Introduction to Environmental Impact Assessment* (4th ed.). London: Routledge.

[7]. Heras-Saizarbitoria, I., Arana, G., & Boiral, O. (2011). Do ISO 14001-certified companies manage their environmental aspects? *Journal of Environmental Management*, 92(3), 613–620.

[8]. International Organization for Standardization (ISO). (2015). *ISO 14001:2015 Environmental Management Systems — Requirements with guidance for use*. Geneva: ISO.

[9]. Intergovernmental Panel on Climate Change (IPCC). (2021). *Climate Change 2021: The Physical Science Basis*. Cambridge: Cambridge University Press.

[10]. Jay, S., Jones, C., Slinn, P., & Wood, C. (2007). Environmental impact assessment: Retrospect and prospect. *Environmental Impact Assessment Review*, 27(4), 287–300.

[11]. Morrison-Saunders, A., & Arts, J. (2012). Assessing impact: Handbook of EIA and SEA follow-up. London: Earthscan.

[12]. Nigeria LNG Limited (NLNG). (2019). *Environmental and Social Impact Assessment for NLNG Train 7 Project*. Bonny Island: Nigeria LNG Limited.

[13]. Odukoya, A. M. (2020). Uptake and effectiveness of ISO 14001 in Nigeria: Barriers and opportunities. *African Journal of Environmental Science and Technology*, 14(3), 85–94.

[14]. Ogunba, O. A. (2004). EIA systems in Nigeria: Evolution, current practice and shortcomings. *Environmental Impact Assessment Review*, 24(6), 643–660.

[15]. Ogunkunle, O. C., & Adepegba, D. (2019). The challenges of environmental management systems implementation in Nigeria's manufacturing sector. *Environmental Management and Sustainability Journal*, 8(1), 12–22.

[16]. United Nations. (2015). *Transforming our world: The 2030 Agenda for Sustainable Development*. New York: United Nations.

[17]. Weaver, A., Pope, J., Morrison-Saunders, A., & Lochner, P. (2008). Contributing to sustainability as an environmental impact assessment practitioner. *Impact Assessment and Project Appraisal*, 26(2), 91–98.