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Research Article

ENVIRONMENTAL ACCOUNTING PRACTICE AND SUSTAINABLE PERFORMANCE OF LISTED MANUFACTURING COMPANIES IN NIGERIA

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ABSTRACT

Striving to attain a significant sustainable performance has been complex and quite challenging for companies operating in most developing economies. Evidence from the research showed that listed manufacturing companies in Nigeria (LMCN)performed below their installed capacities due to infrastructural deficits, security challenges, and high cost of production. Some studies have shown that adequate environmental accounting practice has the capacity to enhance corporate legitimacy, productivity, and desired sustainable performance. Therefore, this study evaluated how environmental accounting practices affected listed manufacturing businesses in Nigeria's sustainable performance. An ex-post facto research design was adopted while data were gathered from the financial statements of the sampled companies using the sustainability index of the Global Reporting Initiative checklist during a 20-year period, from 2003 to 2022, as part of the study's expo facto research approach. 66 manufacturing companies made up the research population. While a total of 16 businesses were purposefully chosen, resulting in 300 observations. The reliability was premised on the external auditors' certification of financial statements. The study used inferential (multiple regression) statistics to analyze the data at a 0.05 level of significance. The study found that environmental accounting practice exerted a positive and significant effect on the sustainable performance of LMCN (Adj.R2 = 0.173; Wald-test (4, 295) = 68.20; $p < 0.05$). The study concluded that environmental accounting practices influenced the sustainable performance of listed manufacturing companies in Nigeria. The study recommended that managers should consider effective environmental accounting practices to deepen sustainable performance in Nigeria.

Keywords: Compliance with regulations and law, Environmental accounting, Environmental Protection Practice, Health and Safety Practice Index, Sustainable Performance Index, Social Responsibility Practice Index.

INTRODUCTION

Financial performance is extremely unsettling from a Nigerian standpoint since manufacturing businesses' sustainable performance levels are complicated and sustainable performance is complicated and there aren't any serious penalties for corporations that violate environmental regulations. The manufacturing companies' complacent attitude towards implementing the expected corporate compliance to environmental, economic, and social requirements capable of enhancing legitimacy and value creation for the stakeholders has stiffened the trajectory roadmap to achieving success in sustainable performance in Nigeria. The Nigerian experience is not an isolated case, but a common attitude of manufacturing companies in developing economies (Emeka-Nwokeji and Ossisioma, 2019; Owolabi *et al.,* 2020; Oyetunji *et al.,* 2020). The case of oil leakages, gas flaring, and air pollution with the oil communities in the Niger Delta of Nigeria is capable of creating harmful effects to the farmlands, and the inhabitants a Shell Producing pollution in Ogoni land in Rivers State, the Koko-Sapele toxic discharge in Delta State have been regular occurrences in the Nigerian (Obiora *et al.,* 2022).

Adegbie and Adesanmi (2020) submitted that Nigeria is confronted with the problem of non-compliance to sustainability disclosure and this has impacted all their operational performances. Akpan and Uwakmfonabasi (2021) noted that the case of water and air pollution, lead exposure and poor waste discharge management, incessant deforestation, land and wind erosion, and uncontrolled emissions have caused huge harmful effects on the citizen while manufacturing companies face legitimacy problems as the general public express resentments and bitters losing their water and farmland as a source of their livelihood. Aguguom *et al.,* (2018) opined that in Nigeria, synthetic environmental issues are the most prevalent and the manufacturing companies on their part do not exhibit corporate responsiveness and compliance to sustainability issues. Poor environmental challenges happen as a result of human mistakes, neglect, bad judgment, or human-made system failure. In Nigeria, environmental problems such as biodiversity loss, pollution, oil spills, floods, urban housing issues, and water scarcity are the result of human activity (Alsayegh *et al.,* 2020; Laskar *et al.,* 2017). In addition, Nosratabadi *et al.,* (2020) opined that other issues of sustainable concerns include environmental degradation, desert expansion, ozone layer loss, global warming, poor environmental cleanliness, unauthorized use of fossil fuel resources, oil spills, gas flare-ups, and several other issues related to oil exploration and production. Most of the time, poverty and the rapid rise in the human population make environmental problems worse. Based on the local geological, vegetal, hydrological, or climatic conditions, these issues are dispersed across the nation.

The problem of sustainable performance in many forms is complex and multidimensional considering the peculiarity of Nigeria where corporate organization do nit attach any significant concern on sustainable performance in their operational activities (Asuquo *et al.,* 2018; Otuya *et al.,* 2019). This attitude of the manufacturing companies in Nigeria is common in developing economies where the companies lack the will to adhere to legal and regulatory requirements in keeping with internal best standards. Incidentally, these companies downplay huge gains and importance of effective environmental accounting practice. Environmental accounting practices enhance better reputation and corporate image of the organization that are sensitive to environmental accounting practice

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(Olasupo and Akinselure, 2017; Owolabi and Adetayo, 2020). Nwaiwu and Oluka (2018) noted that meeting the expectation of employees, fair treatment and friendly policies that improves career development roadmaps of the employees are some of the means of exhibiting acceptable sustainable performance. Akpan and Uwakmfonabasi (2021) revealed that environmental accounting practice are closely connected with sustainable performance among the manufacturing companies in Nigeria.

Environmental accounting practice sometimes referred to as green accounting is concerned with accounting for the use of natural resources or accounting for the depletion of natural resources. A crucial tool for managing the environmental and operational costs of natural resources is environmental accounting. In the discipline of environmental accounting, resource consumption is tracked, costs associated with a company's or a country's economic impact on the environment are calculated, and charges are communicated Oncioiu *et al.,* 2020). Costs for waste management, environmental fines, penalties, and taxes are also included. Costs for cleaning up or remediating polluted areas are also included. An effective environmental accounting practice enhances access to capital as well as increases efficient and successful waste reduction. More so, it increases awareness of possibilities and threats; draws attention to the connection between financial and non-financial success; influences corporate strategies, long-term management strategy, and policy; streamlines operations, cutting costs and boosting effectiveness; evaluates and benchmarks sustainability performance in relation to regulations, codes, performance benchmarks, and activities are undertaken voluntarily; aids businesses in avoiding widely reported failures in governance, the environment, and society; allows for internal and external performance comparisons between organizations and industries (Kabiru *et al.,* 2019; Amina *et al.,* 2021).

Consequent to the Koko Toxic Discharge in the Delta State of Nigeria, the Nigerian government in an effort to ensure environmental protection practices in Nigeria, issued a series of environmental policies and regulations to protect the citizens from environmental pollution. For example, the Harmful Waste Decree 42 of 1988 as part of its customary fire brigade response to issues (Eneh and Amakor, 2019). Through Decrees 58 of 1988 and 59 modified) of 1992, the incident also made it easier to create the Federal Environmental Protection Agency (FEPA). After that, FEPA was given complete control of environmental management and protection across the nation. This lasted up until 1999 when the Federal Ministry of Environment (now the Federal Ministry of Environment, Housing, and Urban Development) was created by the merger of FEPA and other pertinent Departments from other Ministries (Asuquo *et al.,* 2018; Otuya *et al.,* 2019; Oyetunji *et al.,* 2020). According to Nwaiwu and Oluka (2018), the challenges of noncompliance is worrisome in the midst of several environmental policies, laws, and regulation in Nigeria. For instance, the National environment standards and regulations enforcement agency, National effluent limitations regulations, the Environmental impact assessment, the Nigerian Urban and regional planning Act, the human waste special criminal provision Act and the Hydrocarbon oil refinery Act, and many others.

Incidentally, despite these environmental laws, regulations, policies, and reforms, the companies had continually undermined these policies and had failed to comply. The problem of sustainable performance of the companies has remained low. Considering the critical significance of environmental disclosure practice in Nigeria, this study becomes vital to establish the extent of environmental disclosure practice in Nigeria. In extending the frontiers in knowledge, this study contributes this knowledge and extending the frontiers in environmental accounting, and considered this research objective and hypothesis.

Research Objective: Examine the effect of environmental accounting practices on the sustainable performance of manufacturing companies listed in Nigeria.

Research Hypothesis (H_0): Environmental accounting practice does not significantly effect on the sustainable performance of manufacturing companies listed in Nigeria.

Other component had the following structure: The study offered a literature review in section two and its methods in part three. Data analysis, results, and discussions were covered in part four, and the conclusion, suggestions, and addition to knowledge were covered in section five.

LITERATURE REVIEW

Conceptual Review

Sustainable Performance

The delivery of key company operations while balancing environmental and financial goals in order to maximise value is known as sustainable performance. According to –Ogbonna *et al.,* (2020; Nobanee and Ellili (2017), sustainable performance is the relationship between an organization's commercial performance and its (environmental, economic, and social) performance. The capacity of the organisation to accomplish its goals and boost value for shareholders while taking long-term economic, environmental, and social responsibility into consideration. In prior studies, sustainable performance has been considered from the perspective from the point of the management considering the interest of the stakeholders in terms of quality products and service delivery while making the strategic decisions of value creation for the owners of the business. Obeitoh *et al.,* (2017) noted that sustainability performance would require the concerned manufacturing companies to put into proper perspectives the environmental protection of the locality where they ply their trade, the extent of waste and air pollution control, and customers satisfaction and information content of their policies and implementations from the point of view of environmental, social and economic interest of every stakeholder.

Ouvrard *et al.,* (2020) reported that sustainability performance entails how transparent and accountable companies have considered in strategic planning and in the decision when making production and distribution plans. The Nigerian experience is quite worrisome and the manufacturing companies and pollution-sensitivities companies hardly prioritize the critical significance of environmental protection and when they do, the inability to comply with regulatory disclosure requirements has been neglected in the financial statement considering the scanty posture of the reported annual financial statements. From the literature, a company could be adjudged to have attained a sustainable performance when there is evidence of financial performance on a consistent basis over years without a profile of financial distress (Adegbie and Adesanmi, 2020; Xing *et al.,* 2019). Following prior studies this study measured sustainability performance from environmental, economic and social perspectives.

Environmental: In this consideration, the manufacturing companies in Nigeria have not exercise adequate corporate discipline in environmental protection and reporting (Nwaiwu and Oluka, 2018). Evidences have shown that lack of environmental protection compliance to regulatory requirement is a concern and the level of corporate disclosure in Nigeria is unsatisfactory low compared with other developing economies.

Economic: Omoloso *et al.,* (2020) noted that companies have consistently undermined the negative effect of supporting long-term economic growth attributable to the companies without negatively impacting social economic and cultural perspective of the society. The companies' possibilities to ensure safety and clean environment while undertaking product recycling in Nigeria remain uncertain unless compliance to regulatory requirement are respected by the companies. Laskar *et al.,* (2017); Eneh and Amakor, 2019) showed that effective economic sustainability is connected with effective corporate economic growth and value creation for the stakeholders, while Akpan and Uwakmfonabasi (2021) revealed that consistent practice of pollution reduction and policies are significant in efficient quality products production.

Society: Companies influence the lives of their employees, value chain workers, consumers, and local communities directly or indirectly, thus it's critical to control effects early on. Understanding what people require from the places they live and work allows us to create socially viable communities that encourage wellness. Physical and social design are combined in social sustainability to create spaces for people and places to grow and develop, as well as the infrastructure necessary to support social and cultural activity (Saman, 2019; Maundu, 2020).

Environmental Protection Practice Index

Environmental protection practice is a given opportunities of the Nigerian manufacturing companies to rebrand their cultural competitiveness in the industry and create high reputation of stakeholders legitimacy and corporate reputation. Mukherjee and Sen (2019) noted that there is an association between environmental protection practice and sustainable practice in the manufacturing industry (Kaur and Lodhia, 2019). The demands of population expansion, overconsumption, and technology are causing the biophysical environment to deteriorate, sometimes irreversibly. Environmental movements have raised awareness of the many environmental issues since the 1960s. Protection measures are periodically contested because there is dispute about how much human activity has an influence on the environment (Lu, and Herremans, 2019).

Social Responsibility Practice Index: In order to be socially responsible, a company must operate in a way that benefits society as a whole as well as its shareholders. Investors and consumers who seek investments that not only are lucrative but also contribute to the welfare of society and the environment place a growing emphasis on social responsibility. Despite historical criticism that society is not fundamentally considered a shareholder in business, newer generations are embracing social responsibility and promoting change (Buallay, 2020; AlJaifi, 2020).

Compliance with regulations and laws Practice Index Environmental regulations, standards and laws were meant to regulate environmental protection, sustainability reporting and compliance by corporate bodies and individual (Al-Amin *et al.,* 2019). Incidentally, while regulatory and legal framework were being intensified, the level of compliance has not improved, in spite of environmental regulation, standards and laws. Most corporate bodies were averse to investing in appropriately to enhance environmental protection and reporting sustainability, rather it was seen as passive and unnecessary compulsory mechanism that was likely to impact on management cost and negates corporate profitability objective and reduce corporate performance (Endiana *et al.,* 2021). On the contrary, -Amina *et al.,* (2021) expressed concern why corporate bodies should be afraid of compliance with standards and laws regulation the environment where the corporate organization operate

Theoretical Review

Signaling Theory: Spence (1973) created the signalling theory in the literature on capital market dynamics to explain the driving factors and market behaviour at the time of writing (Weng *et al.,* 2015). The signalling theory proposed that the shortcomings of information asymmetry (Saona *et al.,* (2019) made information declaration vital to the reactions of the stock market players. Laskar *et al.,* (2017) believed that voluntary disclosure was a form of signalling that was related to information asymmetry in the market and that signalling theory could be used to address the likely effects and potential issues of information asymmetry in order to lessen disproportionate behaviour by those who were privileged to more information signalling. According to this view, the corporation used accounting information to communicate to investors that the needed rate of return should be lowered. According to Sanman (2019), the theory explains the information asymmetry between parties, which can be reduced through signalling, that is, the part which has superior information signals it to others. This can be used to understand why firms release signals to their investors as opposed to the conduct when two parties have access to different information. Because investment decisions and share price were strongly associated, the theory is relevant to this study. The quality, timing, and volume of information provided reflect the expectations of the management, while the managers' inclination to hide information from shareholders out of self-interest makes the theory applicable.

Stakeholder Theory: Stakeholder theory submitted that corporate organizations and their corporate governance should channel their efforts towards empowering those stakeholders who contribute or control the company resources and skills to ensure wealth creation for both the shareholders as well as the stakeholders. In other words, the stakeholder theory, in essence, proposed that every corporate entity should endeavour to create value for all stakeholders and see this as the fundamental reason for its existence. In addition, to fulfilling its economic responsibilities to the owners, the company and its management should obligate fulfill the legal and ethical responsibilities to society, the government, and creditors or customers in order to attain sustainable long-term value creation. Xing *et al.,* (2019) documented that failure to meet this performance and responsibilities, there were chances that the value creation objective of the company may be jeopardized. It coordinates the leadership position to achieve a synergetic effect between the managers and shareholders including stakeholders who have a direct or indirect interest in the fortunes or misfortunes consequences of the company.

Lending Credibility Theory: The theory of inspired confidence was developed and brought to literature by Limperg in the year 1932 (Mukherjee and Sen, 2019). The lending credibility theory suggested that the need for inspired confidence in the manufacturing companies' statements prepared by the management arose due to shareholders' lack of absolute trust and confidence in the possible accuracy and liability of such reports. This was in response to obvious conflicts of interest existing between the principal (shareholders) and agents (managers) shareholders. These conflicts of interest and the possibilities that the managers may be pursuing their own interests make it expedient that independent third-party statutory auditors to lend credence and credibility to the manufacturing companies' statement prepared by the managers.

Empirical Review

Amina *et al.,* (2021) studied implication of bad trends of insensitivity and lack of environmental conservation policies in many corporate bodies' policies and safety work plan in their operations. Secondary data were collected of the environmental disclosure policies and level of compliance to legal and regulatory requirements. Arising from regression analysis of the extracted annual financial information of the bank's performance in relation to sustainable performance, the study showed a significant effect, but weak association was revealed in relation with effective environment protections expenditure.

Akpan and Uwakmfonabasi (2021) considered the extend of responsiveness of the manufacturing companies in waste disposal management and the influence on the annual cash flow and return on investment and value creation for the owners of the corporate companies operating in Nigeria. Data for the analysis were obtained from the selected companies published financial records for the period under investigation. Consequently to the panel data analysis, the result of the analysis were found significant. This is in tandem with the results documented in the studies Xing *et al.,* 2019; Amina *et al.,* 2021; Weng *et al.,* 2015).

Both studies' results of Nwaiwu and Oluka and that of Susanto and Meiryanti (2019) were consistent, though carried out from different backgrounds. As Nwaiwu and Oluka (2018) and Sussnto and Meiryani (2019) findings were consistent revealing that companies' compliance with environmental sustainability reporting had a positive effect on the general performance both in manufacturing companies performance and environmental performance, as shareholders and other stakeholders were motivated to a favourable interest towards these companies. It has been revealed that responsive corporate governance and corporate decision towards strict compliance with environmental sustainability reports have a significant effect in improving manufacturing companies' performance of corporate bodies.

Xing *et al.,* Zhu (2019) investigated the effects of environmental indexes on business performance. The study explores environmental committees, environmental regulations, sustainable exploration innovation, and sustainable exploration development environmental performance, using multiple mediating effect models. A survey research design, using a structured question was administered to 380 respondents from Chinese manufacturing companies. The study found that environmental regulation had no significant effect on environmental performance as well as on business performances of sustainability exploration and exploitation. Also environmental regulation had no positive effect on environmental performance through environmental committees and sustainability. The results obtained by Weng *et al.,* (2015) revealed that pressure on the companies in China resulted in a positive significant effect on green innovation practices and protection of environmental sustainability reporting, while that of Xing *et al.,* (2019) also revealed that environmental regulation had no significant effect on environmental performance as well as on business performances of sustainability exploration and exploitation. Also environmental regulation had no positive effect on environmental performance through environmental committees and sustainability

Saman (2019) conducted an examination to determine the effect of environmental accounting reporting on the manufacturing companies' performance of manufacturing companies in Nigeria. The study employed the use of a survey research design, using a questionnaire to obtain data from respondents of companies that produce environmentally friendly related products. The study documented that impressive returns were recorded from the respondents to the questionnaires that were administered. The study found that the lack of environmental reporting and disclosure standards had a positive significant effect on manufacturing companies' performance and also affects the reporting and disclosure uniformity of environmental-related information in manufacturing companies' statements, annual reports and accounts. Furthermore, environmentally responsive companies that comply with voluntary environmental disclosures had a high competitive advantage. The study recommended that the government and its manufacturing companies' regulatory agencies should ensure strict compliance with environmental reporting in the annual manufacturing companies' statements, since many companies may not comply with voluntary environmental reporting as expected.

Olasupo and Akinselure (2017) examined the effect of environmental accounting on corporate manufacturing companies' performance of manufacturing companies in Nigeria. The study adopted a survey research design technique and the secondary data for the study was obtained from questionnaires distributed to respondents from the companies surveyed, using linear regression analysis to analyze the data so obtained from the respondents. The variables of environmental accounting and manufacturing companies' performance were used as proxies of environmental accounting relating to environmental costs in the questionnaires, while profit after tax from the annual report of the selected quoted companies was employed to measure manufacturing companies' performance. The study found that there was a significant relationship between environmental disclosure and the return on equity of the selected manufacturing companies quoted in Nigeria. The study recommended that manufacturing companies in Nigeria should give priority to the issue of environmental disclosure reporting as it affects their manufacturing company's performance. The findings of Olasupo and Akinselure (2017) were similar to the result of the study of Laskar *et al.,* (2017). Effect of accounting practice on sustainability performance is not very popular in the Nigeria literature notwithstanding that a good number of studies have considered environmental accounting. Some studies Obiora *et al.,* (2022); Ojera and Odoyo (2020); Pobbi *et al.,* (2020) have focused environmental disclosure and the implications, but there is a dearth of studies researching green accounting from the Nigeria literature domain. In addition, the significance of environmental accounting on effective sustainable performance of the manufacturing companies in Nigeria motivated this study, considering the level of water and air pollution occasioned by poor environmental control among the manufacturing companies in Nigeria particularly, those pollution sensitive manufacturing companies. Green accounting is moderately a novel literature in Nigeria notwithstanding the level of emissions the Nigerian citizens inhale on the daily basis, poor waste discharges, used plastic and water pollution contaminating the environment. Huge gap need to bridge researching the creating effective awareness and exposure the implications and dangers of unchecked sustainable practice

METHODOLOGY

The study considered the effect of environmental accounting practice on the sustainable performance of listed manufacturing companies in Nigeria. The study employed an *expo facto* research design, using secondary data to extract data from the annual financial statements of the companies. The population 66 manufacturing companies, 16 companies were selected for a period of 20 years from 2003 to 2022 were explored. A purposive sampling technique was explored in selecting the sample size, giving a firm year observation of 320 for the study. The study employed inferential statistics using a random effect cluster option for the regression analysis.

Model Specifications

$Y_{it} = \beta_o + \beta X_{it} + \mu_{it}$--- 1

Functional Relationship

STPE = *f*(EPP, SRP, SHSP, SRDI, CRP) ---------------------------------- 2

Model

$STPE_{it} = \alpha_0 + \beta_1 EPP_{it} + \beta_2 SRP_{it} + \beta_3 SHSP_{it} + \beta_4 SRDI_{it} + \beta_5 CRP_{it} + \mu_{it}$- 3

Where

STPE = Sustainable Performance (Environment e_1, Social e_2, & Economic e_3)EPP = Environmental Protection Practice Index, SRP = Social Responsibility Practice Index, HSP = Health and Safety Practice Index

Measurement of Variables

Dependent Variable

This study measured sustainable performance from the nexus between balancing environmental concerns with creating value for the stakeholders from the financial performance perspective. In this respect, the study considered the sustainable performance of the listed manufacturing companies listed in Nigeria from the threes perspective of environmental, economic, and social performances of the selected manufacturing companies in Nigeria.

Hence Sustainable Performance (STPE) = Environmental (e1), Economic (e2) + Social disclosure index (e3) as contained in the financial statements of the companies as contents of the financial statements indicate.

Independent Variable

The independent variable of environmental accounting practice is measured from the reporting ability of the companies from the perspective of the environmental protection practice index, health and safety practice index and social responsibility practice index.

Environmental Protection Practice Index (EPP) This was measured as a dummy variable "1" assigned when the financial statements of the companies tested reported evidence of corporate environmental protection as specified in the environmental protection requirement other the zero "0"

Health and Safety Practice Index (HSP): In this instance, the study measured the environmental safety disclosure index as a dummy variable using "1" where the financial statements of the selected companies reported evidence of environmental practice from the perspective of health and safety and where on the contrary that there was no evidence of health and safety disclosure in the reported financial statements, zero "0' was selected.

Social Responsibility Practice Index (SRP). In this case, the study also measured social responsibility practice using a dummy variable where "1" were selected where there clear evidence in the statement that the companies were engaged in social responsibility practice, however on the contrary, where there was no evidence of such practice, the selected "0" instead.

Compliance with regulations and laws Practice Index (CRP): The compliance to regulation is the extent of annual financial statements report environmental laws and regulatory compliance. The study measures this using a dummy variable where "1" were selected where there is evidence that the companies comply with regulations and laws reported in the financial statements.

DATA ANALYSIS, RESULTS AND DISCUSSION OF FINDINGS.

Regression Analysis

This section presented the regression analysis of the effect of environmental accounting practice on the sustainable performance of listed manufacturing companies in Nigeria.

Table 1. Environmental accounting practice on Sustainable Performance

Variables	Coefficient	Cluster Standard error	Z-test	Prob.
Constant	0.234	0.240	0.975	0.329
EPP	0.257**	0.102	2.520	0.021
HSP	0.084	0.084	1.010	0.312
CRP	0.181	0.265	0.683	0.495
SRP	0.237**	0.112	2.116	0.033
Observations	300	300	300	300
Adjusted R^2		0.173		
Wald-Test		66.20 (0.000)		
Hausman Test		0.34 (0.997)		
Bresuch-Pagan RE Test		96.35 (0.000)		
Heteroscedasticity Test		116.43 (0.000)		
Serial Correlation Test		16.297 (0.000)		
Pesaran CSI		-0.176 (0.861)		

Source: Researcher`s computation (2023)

Notes: Table 1 reports the cluster random effect model that corrects for autocorrelation and heteroscedasticity panel regression results of the effects of Environmental accounting practice on the sustainable performance of manufacturing companies listed in Nigeria. The dependent variable was sustainable performance (STPE). The independent variables were the Environmental protection practice index (EPP), Health and safety practice index (HSP)

Interpretation of Diagnostic Test

The diagnostic tests listed in Table 1 were the Hausman test, the Bresuch-Pagan RE Test for Random Effect Test, the heteroskedasticity, the Wooldridge Test for Autocorrelation, and the Pesaran's Test of Cross-Sectional Independence. These tests were conducted to ascertain whether the estimation technique was appropriate for the given model. First, the adequacy of the fixed effect and random effect models was assessed using the Hausman test. The fixed effect model was consistent and efficient, which was the alternative hypothesis to the null hypothesis that there was no correlation between the random effects and fixed effect models. As a result, the random effect estimates were efficient and consistent, while the fixed effect estimates were inefficient. The alternative hypothesis was not rejected, despite the Hausman statistic of 0.34 being larger than the 5% level of significance with a probability value of 0.997. This suggests that the random effect model was useful and efficient. The statistic of 96.35 with a probability value of 0.000 was less than the 5% threshold of significance, according to the Bresuch-Pagan RE Test for the Random Effect Model, which was used to assess the suitability of the random effect model. The random effect model was therefore suitable.

The Pesaran CD test was applied to ascertain the cross-sectional dependency between the manufacturing enterprises listed in Nigeria. At a 5% level of significance, the statistic of -0.176 with a probability value of 0.861 was not statistically significant. This suggests that the Nigerian industrial firms mentioned were cross-sectionally independent. To ascertain if the variance of the residual was constant, the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity was used. Heteroscedasticity, the alternative hypothesis, was accepted while homoscedasticity, the null hypothesis, was rejected. This was the case due to the test statistic's statistical significance at the 1% level of 116.43. The Wooldridge test was applied to examine the panel data for autocorrelation. The statistic of 16.297 with a probability value of 0.000, which was less than the 5% level of significance, led to the rejection of the null hypothesis that the subsequent error terms were not linked in favour of the alternative hypothesis that the subsequent error terms were serially associated. However, the study chose the cluster option for the random effect model due to the existence of autocorrelation and heteroscedasticity.

Result of Analysis

$$STPE_{it} = \alpha_1 + \beta_1 EPPit + \beta_2 HSP_{it} + \beta_3 CRP_{it} + \beta_{4it} + \beta_5 SRP_{it} + \mu_1$$

$$STPE_{it} = 0.234 + 0.257EPPit + 0.084HSP_{it} + 0.181CRP_{it} + 0.237SRP_{it}$$

T-test	0.975	2.520	1.010	0.683	2.116

Interpretation of Results

Table 1 displayed the findings of a regression study evaluating the impact of environmental accounting practices on the long-term success of Nigerian manufacturing firms. The findings reveal a positive relationship between the environmental protection practise index, health and safety practises index, women on the board, and social responsibility practise index and a negative relationship between s and the sustainable performance of manufacturing companies in Nigeria. Additionally, there was proof that the social responsibility practise index and environmental protection practise index have a significant impact on the long-term success of Nigerian manufacturing firms (EPP = 0.237, t-test= 2.116, p 0.05 and SRP = 0.257, t-test= 2.520, p 0.05, respectively). This suggests that changes in the sustainable performance of manufacturing enterprises in Nigeria were significantly influenced by the environmental protection practice index and the social responsibility practise index. Contrarily, there was evidence that the sustainability of manufacturing companies in Nigeria was not significantly impacted by the health and safety practise index, compliance with laws and regulations practise index, or the compliance with laws practise index (HSP= 0.084, t-test= 1.010, $p > 0.05$; CRP= 0.181, t-test= 0.683, $p > 0.05$; and = -0.034, t-test=, $p > 0.05$). This also suggests that changes in the sustainable performance of manufacturing enterprises in Nigeria were not significantly influenced by the health and safety practise index, compliance with regulations, or laws practise index.

Regarding the size of the estimated parameters for the regression analysis's coefficients, an increase of one unit in the change in the environmental protection practise index, health and safety practise index, women on the board, and social responsibility practise index will, respectively, result in increases of 0.257, 0.084, 0.181, and 0.237 in the manufacturing companies in Nigeria's sustainable performance and a decrease of 0.034 in the sustainable performance of manufacturing companies in Nigeria.

The balance indicates aspects that were not taken into account in the model, whereas the adjusted R2 assesses the composition of environmental accounting practise in environmental sustainability. In other words, it measured the changes in the sustainable performance of manufacturing companies in Nigeria as a result of changes in the environmental protection practise index, health and safety practise index, s, women on the board, and social responsibility practise index, which accounts for changes in the sustainable performance of manufacturing companies in Nigeria that are about 17.3% higher. While the other 82.7% were additional factors that the model could not account for and were responsible for variations in the sustainable performance of manufacturing enterprises in Nigeria. The Wald-Test result of 66.20 was statistically significant at the 5% level of significance, and the model's overall statistical significance indicated that the null hypothesis—that environmental accounting practise has no discernible impact on the sustainability of quoted manufacturing companies in Nigeria—was rejected. As a result, it was decided to adopt the alternative hypothesis that environmental accounting practises have a major impact on the sustainability of mentioned manufacturing businesses in Nigeria.

Discussion of Findings: The study looked at how environmental accounting practises affected listed Nigerian manufacturing businesses' ability to function sustainably. The study's findings were mixed, according to the analysis. While environmental protection practises and social responsibility practises showed substantial beneficial benefits, each of health and safety practises as well as compliance with rules and laws showed negative and negligible effects. Environmental accounting practise, nevertheless, had a positive substantial impact on the sustainable practise of listed manufacturing businesses listed in Nigeria, according to the overall joint statistics employing the combination of the explanatory factors of environmental accounting practi. The result was consistent with the results recorded in the studies of (Susanto and Meiryani, 2019; Weng *et al.,* 2015; Otuya *et al.,* 2019; Adediran and Alade, 2013; Burhan and Rahmanti, 2012, Saona *et al.,* 2019).

For instance, Saona *et al.,* (2019) looked into how diversifying the board composition on a balancing board affected earnings management practises. According to the study, there were less instances of profits manipulation in European nations where there were more female directors on corporate boards. Additionally, that balanced board was thought to be better at minimising profits management practises, highlighting the importance of the latest European rules. The study also showed that the regulatory framework on board gender diversity had a considerable beneficial impact on decision quality and that it has assisted businesses in making quality judgements. The findings of Obeitoh *et al.,* (2017)'s study and those of Saona, Muro *et al.,* (2019) were in agreement. On the contrary, the result of Saona, Muro, Martin and Baier-Fuentes (2019) was inconsistent with the result obtained in the study by (Eneh and Amakor, 2019).

CONCLUSION, RECOMMENDATIONS AND CONTRIBUTION TO KNOWLEDGE.

The implications and consequences of environmental accounting practise on the long-term success of listed industrial businesses in Nigeria were examined in the study. The study used measuring factors for each of the dependent variables of sustainable performance from the environment to address the issue of sustainable performance of the chosen manufacturing enterprises. Perspectives from the economic and social spheres, while the environmental accounting practice independent variable was assessed using the environmental protection practice index, social responsibility practise index, health and safety practice index, and compliance with rules and laws practise index. In light of the content examination of the firms under investigation's yearly reported financial statements, the Global Reporting Initiative checklist was investigated. The study discovered that environmental accounting practice has an impact on manufacturing companies in Nigeria's sustainability practice using panel data analysis.

Recommendations: Consequent to the negative and insignificant effect of compliance with regulations and laws reported, the study recommended that:

i. Managers of manufacturing companies in Nigeria should exercise honesty in environmental information disclosure.
ii. Ensure an effective corporate capable of instilling strict compliance with environmental accounting practices capable of improving transparency, legitimacy, corporate image and effective performance.
iii. Policymakers should exercise oversight monitoring functions as feedback to the performance of the existing environmental protection and conservation laws in place.

Contribution to Knowledge: In order to increase manufacturing businesses' sustainable performance, corporate legitimacy, and stakeholder recognition, this study explained the ramifications and vital functions of environmental accounting practice. The research's findings have added to the body of knowledge on the reactions to and impacts of environmental accounting practices on the long-term sustainability of listed industrial businesses in Nigeria throughout the study period.

Limitations/Suggestion for Future Studies: The study used GRI checklist content analysis of the annual financial statements of the selected companies to measure sustainable performance from the triple properties of environmental, economic, and social metrics. However, the study was unable to obtain much detailed information from the financial statements of the manufacturing companies in Nigeria because the environmental information content of the financial statements was scant and lacking in specificity. In addition, the study solely took into account manufacturing firms among those that are environmentally aware. Future research might broaden the field by taking additional factors into account, such as the manufacturing industry and Nigerian mining and extraction businesses.

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