Educational Administration: Theory and Practice
2025, 31(2), 385-398
ISSN: 2148-2403
https://kuey.net/

Research Article

Assessing the Implication of Environmental Internal and External Failure costs on Return on Equity Capital of listed chemical manufacturing companies in Nigeria.

Enya, Francis Ejeje[1*], Prof G.N. Ofoegbu[2], Love Ogochukwu Ude[3], OKO, John Odama[4], NYANG, Inyang Ochi[5]

[1*]Department of Accounting University of Calabar, Calabar, Cross River State Email: enyafrancisejeje4pdd@gmail.com enyafrancisejeje@unical.edu.ng
[2]Department of Accountancy University of Nigeria, Enugu Campus, Enugu State. Email: graceofuegbu@unn.edu.ng
[3]Department of Accountancy University of Nigeria, Enugu Campus, Enugu State. Email: ogochukwu.ude@unn.edu.ng
[4]Department of Accounting University of Calabar, Calabar, Cross River State Email: oko.johnodama@gmail.com
[5]Department of Accounting University of Calabar, Calabar, Cross River State Email: inyangochi@gmail.com

Citation: Enya, Francis Ejeje, et.al (2025). Assessing the Implication of Environmental Internal and External Failure costs on Return on Equity Capital of listed chemical manufacturing companies in Nigeria., *Educational Administration: Theory and Practice*, 31(2) 385-398 Doi: 10.53555/kuey.v31i2.10848

ARTICLE INFO

ABSTRACT

The study examined the Implication of Environmental Internal and External failure costs on Return on Equity Capital of selected listed chemical manufacturing companies in Nigerian. specifically, the paper examines pollution control equipment maintenance, environmental audits and assessments, waste reduction and recycling program and chemical plant explosion cost on Return on Equity Capital. Ex-post facto and content analysis research designs were adopted. Data collected from audited annual financial statements and sustainability reports of 8 listed chemical manufacturing firms for a period of 12 years from 2013 – 2024 was analyze using Ordinary least square regression model to estimate the influence of the independent variable on the dependent variables The results reveal that pollution control equipment maintenance, environmental audits and assessments, waste reduction and recycling program cost are positively associated with Return on Equity Capital whereas chemical plant explosion cost has a negative relationship on Return on equity. In view of the findings, the researcher concludes that effective management of Environmental Internal cost positively influences return on equity. The researcher recommends that, Chemical manufacturing industries should invest more on sustainable technology and also demonstrate responsible corporate governance, that can attract investors seeking ethically sound and profitable opportunities. Also, that, Chemical industries should improve on environmental cost management and increase their corporate image by augmenting the business's legitimacy.

Keywords: Environmental Internal, External failure costs, Return on Equity Capital, pollution control equipment maintenance, environmental audits and assessments, waste reduction and recycling program and chemical plant explosion cost

Introduction

Environmental sustainability has become a critical issue for industrial sectors globally, particularly in the chemical manufacturing industry, which is known for its significant environmental footprint. Many business stakeholders, particularly in developed countries, have become more conscious of their company's environmental sustainability in recent years, including government agencies, non-governmental institutions, community groups in local areas, consumers, business associates, staff members, funding institutions, and shareholders. In recent years, increasing regulatory scrutiny, public awareness, and investor demand for sustainable business practices have compelled firms to account more explicitly for their environmental impacts. This, in whatever form it takes, has an impact on an organization's financial success. For instance, if a firm who as a result of contravening environmental laws bring about an environmental hazard, such organization will not only have to be fined and penalized but have to incur loss of confidence and status or a

loss of customers' patronage. It is possible that these uncertainties will have a negative impact on a company's future profits worth. Conversely, Iwata and Okada (2010) submitted that an organization that is vigorously concerned about her environmental responsibilities will undoubtedly advance positive reputation amongst stakeholders and this may perhaps impact them to be successful in reducing environmental hazards and in the long run reduce production costs.
Environmental internal failure costs refer to expenses related to managing and controlling environmental issues within the company before they affect the external environment, such as waste treatment, emissions control, and equipment maintenance. In contrast, external failure costs involve expenses arising after environmental damage has occurred, including regulatory fines, litigation costs, environmental remediation, and damage to a company's reputation. These costs can have profound implications for the financial health of companies, particularly in emerging economies where environmental regulations are evolving and enforcement may be inconsistent. The activities of some industrial businesses in Nigeria, have far-reaching visible environmental and socio-economic consequences throughout the country. These activities have led to the altering of environmental and biological makeup, culminating into ecological damage, emissions, pollution and landscape destruction which undoubtedly put the safety of employee's health with toxic substances into risk. These industries' activities are frequently linked to serious environmental deterioration, which has resulted in societal unrest and the disruption of several businesses' operations in the recent past (Uwaoma & Ordu, 2016). As the local populace has become more aware of environmental issues such as discharge of pollutants from powerful industrial machinery, a shortage of pure clean water, the disappearance of marine seafood due to oil leakage, and so on, the concerns have intensified (Uwuigbe & Jimoh, 2012).

In Nigeria, the chemical manufacturing sector plays a vital role in the economy, contributing to industrial development, employment, and exports. However, this sector is also associated with significant environmental risks, such as chemical spills, air and water pollution, and hazardous waste generation. These risks have led to increased concerns among stakeholders about the sustainability of chemical manufacturing practices in the country. Despite these concerns, there remains limited empirical research on how environmental failure costs—both internal and external—affect key financial performance indicators, especially Return on Equity (ROE). ROE is a fundamental metric for evaluating a firm's profitability relative to its shareholders' equity. It reflects how efficiently a company utilizes its equity capital to generate net income. As environmental costs rise, especially those not efficiently managed or anticipated, they may erode a firm's profitability and consequently reduce ROE. Conversely, firms that proactively manage environmental risks and integrate environmental cost accounting into their operations may protect or even enhance their ROE through operational efficiency, regulatory compliance, and enhanced reputation.
Given the strategic importance of the chemical manufacturing sector in Nigeria and the growing relevance of environmental accountability, this study seeks to assess the implication of environmental internal and external failure costs on the return on equity capital of listed chemical manufacturing companies. Understanding this relationship is crucial for corporate managers aiming to balance environmental performance with financial returns, investors evaluating risk-adjusted returns, and policymakers striving to enhance environmental governance in Nigeria.

Statement of the Problem

Chemical manufacturing companies often operate in processes that generate environmental risks and pollution. While companies incur costs to prevent, control, and remediate environmental damage, many of these costs are not explicit or fully accounted for in financial statements. Specifically, internal failure costs (such as costs of waste treatment, pollution control equipment, process inefficiencies, regulatory compliance, etc.) and external failure costs (such as community health impacts, environmental degradation, remediation after accidents, fines, reputation loss, litigation) may significantly affect firm profitability.
For listed chemical manufacturing firms in Nigeria, there is limited empirical evidence on how these environmental failure costs influence financial outcomes, particularly Return on Equity (ROE). ROE is a critical metric for shareholders and investors; it reflects how effectively a company is generating profits from its equity base. If environmental failure costs are large, inefficiently managed, or unpredictable, they may reduce net income and thus lower ROE. Moreover, Nigeria's regulatory environment, environmental enforcement mechanisms, and public awareness are evolving. Companies may incur internal failure costs proactively or reactively, but external failure costs often manifest erratically or are borne by third parties until litigation or regulatory action forces recognition. This mismatch may lead to information asymmetry, unpriced risks, and possibly undervaluation of environmental liabilities in the firms' equity.

Several studies, such as (Wagner, Phu, Azomahou & Wehrmeyer, 2002; Nyirenda, Ngwakwe & Ambe, 2013; Rajashekar & Keshavarz, 2019) have used different measures such as sulfur dioxide, nitric oxide, chemical oxygen demand, carbon emissions, energy usage, water usage, biodiversity, effluents and waste to capture environmental costs or management. Limited existing literature have focused on the cost incurred on internal and external environmental activities which include but not limited to employee health and safety, staff training and development, community development in form of access to good road, provision of health

facilities, donations and other company's community responsibility costs and the relationship these have on return on financial performance. However, this paper examined the implication of internal and external environmental costs using proxies such as pollution control equipment maintenance, environmental audits and assessments, waste reduction and recycling program cost for internal environmental failure cost and chemical plant explosion cost for external environmental failure cost on return on equity capital of selected listed chemical manufacturing companies in Nigeria. Specifically, this study intends to:

(i) Examine the Effect of pollution control equipment maintenance on return on equity capital of selected listed chemical manufacturing companies in Nigeria.
(ii) Examine the Effect of environmental audits and assessments on return on equity capital of selected listed chemical manufacturing companies in Nigeria.
(iii) Examine the Effect of waste reduction and recycling program cost on return on equity capital of selected listed chemical manufacturing companies in Nigeria.
(iv) Investigate the influence of chemical plant explosion cost on return on equity of selected listed chemical manufacturing companies in Nigeria.

Hypotheses

The following hypotheses were formulated for the study:

HO1: pollution control equipment maintenance has no significant influence on return on equity capital of selected listed chemical manufacturing companies in Nigeria.
HO2: environmental audits and assessments has no significant influence on return on equity capital of selected listed chemical manufacturing companies in Nigeria.
HO3: waste reduction and recycling program cost has no significant influence on return on equity capital of selected listed chemical manufacturing companies in Nigeria.
HO4: chemical plant explosion cost has no significant influence on return on equity of selected listed chemical manufacturing companies in Nigeria.

2.0 Literature Review

Internal Environmental Failure Costs

These are the costs of activities that have to be performed when contaminants and waste have been produced by a company but not discharged into the environment. Examples include treating toxic waste and maintaining pollution equipment. Traditional accounting systems may fail to account for environmental costs, losses, or advantages in a variety of ways. Another technique to measuring total environmental costs is to make an assumption that there is correlation between internal costs (those absorbed by the firm) and external costs (those absorbed by the environment). While internal environmental costs are all costs incurred within an organization to avert or reduce the effects of business activities on the immediate environment, which is primarily concerned with employees' health and safety, external environmental costs are concerned with the extended environment, specifically the impact of a company's operations on the community and its nascent environment, whereas internal environmental costs are concerned with employees' health and safety. Internal environmental costs are classified into three categories which are direct, indirect, and contingent. Direct expenses include things like recovery and repair, waste management, and other expenditures related to safety and environmental management. Internal costs are typically calculated and distributed using common costing models applicable to the company. Direct costs, such as waste disposal or remediation costs at a specific location, can be attributed to a specific product, operation and form of pollution or pollution control program. Indirect costs like environmental education, research and development, employee's health and safety, data collection and monitoring are assigned to cost centers like goods, offices and activities or projects.

External Environmental Costs

environmental external failure costs. These are the costs incurred by a company if it discharges waste into the environment. Examples include the costs of cleaning up oil spills or cleaning a polluted river. A company may also incur fines or other penalties or lose sales if it acquires a poor environmental reputation. An external cost refers to the cost of environmental harm that occurs outside the control of the firm. Those costs can indeed be paid for such that their financial equivalent amounts can also be estimated through cost management which estimates the full value individual company will be prepared to pay to lessen the suffering or accept the minimal amount of recompense if they must experience it. Full environmental cost is the addition of internal and external costs, where the internal costs are comprised of direct, indirect, and contingent charges. External costs include the unpaid expenses of prospective health and environmental repercussions (excluding stratospheric ozone depletion), as well as the costs of external environmental health impacts, such as global warming and biodiversity loss. Economic efficiency is attained from the perspective of the entire society, including the enterprise and the rest of society. In this circumstance, total environmental expenses are reduced, especially if the company extends internal environmental initiatives to the point that both internal and external expenses are reduced. Environmental expenses that are uncertain or unknown are costs that may develop in the future and have an influence on the operations of company. Adjustments in the quality of a product as a result of

legislative changes that impact negatively on the cost of raw materials, production techniques, permissible greenhouse gases, unexpected exposure to recovery expenses, employee benefits and sense of achievement, customer expectation and commitment costs and capital operating expenses or the desire to mobilize capital are indeed examples of contingent costs. External costs are usually somewhat vital to a business than internal costs, only if the external costs result in liabilities.

Pollution Control Equipment Maintenance

Today's rapidly changing technologies and industrial products and practices carry the risk of generating materials that, if improperly managed, can threaten public health and the environment. With the Pollution Prevention Act of 1990, the U.S. Congress established pollution prevention as a "national objective" and the most important component of the environmental management hierarchy. Thus, national policy declares that the creation of potential pollutants should be prevented or reduced during the production cycle whenever feasible. In carrying out its program to encourage the adoption of Pollution Prevention, the Risk Reduction Engineering Laboratory and the Office of Solid Waste offer this Facility Pollution Prevention Guide. The Guide's predecessor, the Waste Minimization Opportunity Assessment Manual, published in 1988, concentrated primarily on the waste types covered in the Resource Conservation and Recovery Act (RCRA). In contrast, this edition deals with "multimedia" pollution prevention. This reflects our national realization, as demonstrated in the 1990 legislation, that we must look at wastes more broadly if we are to protect the environment adequately. That is, it is important to minimize all pollutants, including air emissions, wastewater discharges, and solid wastes as well as energy and water consumption. In addition to controlling waste creation during the production process, we need to design products that will have less impact on the environment while in use and after disposal. he Guide is written for those individuals responsible for implementing pollution prevention in their facilities. It is intended to help small- to medium-sized production facilities develop broad-based, multimedia pollution prevention programs. It describes how to identify, assess, and implement opportunities for preventing pollution and how to stimulate the ongoing search for such opportunities. Companies that adopt this approach typically find that they reduce both their operating costs and their potential liabilities, in addition to helping to preserve the environment.

Environmental Audits and Assessments,

Environmental audits can serve many purposes, but they are generally conducted to evaluate the environmental impact of your operations. This helps you identify potentially damaging activities through excessive energy consumption, pollution, or hazardous material use, for example. What you do with this information will depend on whether you're performing a compliance audit or a management system audit. Environmental audit helps organizations meet climate requirements for the protection of the environment and boost their reputation among customers, suppliers, and other stakeholders. These assessments provide a systematic evaluation of the business's environmental performance, revealing whether its documentation and on-site practices work as intended. The auditor will ensure that all relevant environmental risks have been accounted for and highlight any opportunities for improvement. management system audit is conducted against the specifications of standards such as ISO 14001, the international standard for environmental management. Like other ISO standards, auditing is an essential part of the certification process, with the assessor checking to ensure that the management system has been properly implemented and meets its desired outcomes. Environmental audits can also include broader objectives, such as assessing compliance with company policies, evaluating the effectiveness of environmental management systems, and contributing to continuous improvement initiatives.

Benefits of an Environmental Audit

Beyond their ability to help you meet legal requirements or certify to ISO 14001, there are also broader business benefits of environmental audits. For example, the process can pinpoint ways for an organization to cut its carbon footprint and operate more sustainably, which can have direct financial benefits from reduced energy costs. For instance, reducing waste output and energy use can drive efficiency and save money. Similarly, many clients and customers value environmentally responsible practices—with a Harris Poll survey revealing that 55% of respondents would pay more for sustainable products. ISO 14001 audits can also highlight opportunities for the organization to strengthen its EMS. Continual improvement is a key principle of ISO management systems, and it helps organizations ensure that they are not simply conforming with their requirements but doing so as efficiently as possible.

Waste Reduction and Recycling Program Cost

In a production sector of the economy, waste is inevitable; waste is a component of economic activities carried out by households, firms, the government which is a contribution to economic activities through resource recovery (material or energy) Akinlo and Iredele (2014). Waste management involves implementing the waste order through the 3Rs (reduce, reuse and recycle) in order to promote a clean environment and a healthy society. According to Miradha et al., (2017), waste minimization may be done by lowering material inputs to high-waste-potential commodities and deploying improved waste processing facilities. Reuse of waste involves

utilization of waste as materials for the same or other purposes while recycling comprises of further processing of waste for several other functions. The EPA reports more than 30% of the carbon footprint for the average American is a result of manufacturing. Waste produced in the manufacturing industry presents a large burden and operational efficiencies are often sacrificed as a result. Manufacturing waste streams can vary widely from seasonal volume changes to the variety of materials that need to be processed. Poorly managed production waste can cost more money, harm employees, and lead to violations. Manufacturing waste and recycling management program can reduce operational costs.

Ensuring your business has the right equipment and service schedule to fit your needs is a good first step in reducing operational costs related to waste. If your dumpster is too big and your service schedule is too frequent, your business ends up overpaying. It's an underutilized space that is not needed. If the space is too small, you face extra fees from vendors who may charge extra to haul away excess materials. Optimized equipment and service schedules are necessary to keep costs in check while making sure your operations continue to run smoothly. Having the data on how much and what type of waste your business generates means you'll be able to decide what size equipment and schedule is ideal for your operation. Conduct a waste audit of your business. You'll find out if your current manufacturing waste and recycling program works or needs tweaked for optimization. In fact, waste metering technology, like dumpster sensors and cameras, can help automate the waste auditing process. Third party comprehensive waste management service providers, like RoadRunner, can help analyze and implement the right waste program, often at lower prices than a business pays today.

Recycling can help reduce the amount of waste your company produces and save on disposal costs. Consider setting up a recycling program for paper, plastic, glass, and other materials. Implementing a recycling program can be a simple and effective way to reduce the amount of waste your company produces, save money on disposal costs, and help the environment. Recycling involves collecting and processing materials that would otherwise be discarded and turning them into new products. By setting up a recycling program for common materials like paper, plastic, glass, and metal, your company can make a significant impact on reducing waste and conserving natural resources. Not only will a recycling program help reduce your company's environmental footprint, it can also improve your company's image and potentially save you money on waste disposal costs. Setting up a recycling program can be as simple as providing bins for employees to recycle their waste and partnering with a waste management company that offers recycling services. Overall, implementing a recycling program is a simple and effective way for your company to reduce its waste and make a positive impact on the environment.

Implementing a composting program is a great way for your company to reduce the amount of waste it produces and save on disposal costs. Composting is the process of breaking down organic materials, such as food scraps and yard waste, into a rich, soil-like substance called compost. This compost can then be used to fertilize gardens, landscaping, and agriculture. By composting food and other organic waste, your company can significantly reduce the amount of waste it sends to landfills, where it can take decades to break down. In addition to reducing waste, composting can also save your company money on disposal costs. Instead of paying to dispose of organic waste, you can use the compost produced on-site or sell it to others who can use it. Setting up a composting program can be as simple as providing bins for employees to compost their organic waste and partnering with a waste management company that offers composting services. Overall, implementing a composting program is a simple and effective way for your company to reduce its waste, save money, and support the environment. Composting food and other organic waste can reduce the amount of waste your company produces and save on disposal costs.

Chemical Plant Explosion Cost

Increased industrialization and economic development have increased the number of industrial accidents and exposure to hazardous chemicals and poisonous compounds, all of which have negative health consequences for workers and the environment. Accidents at industrial chemical facilities occur with a frequency and intensity that may impose substantial social costs. These accidents involve fires, explosions, and drifting toxic vapors, all of which can directly impact nearby populations. Impacts can include injuries and deaths, damages to nearby properties and the environment, and requirements that the surrounding community evacuate or take shelter to avoid potential harm. In 2016, the U.S. Environmental Protection Agency (EPA) estimated that at least 40 million people (or about 12% of the U.S. population), and perhaps as many as 177 million (55%), were at risk of experiencing impacts from an accident at these facilities (U.S. EPA, 2016).[1] Evidence suggests that environmental justice is a concern as communities located near industrial chemical facilities have disproportionately larger income disparities, higher proportions of minority households, and live in houses with already depressed values (Guignet et al., 2023; Elliot et al. 2004). The social costs imposed by accidental chemical releases can exacerbate existing inequalities.

To reduce the probability and severity of chemical accidents and the impacts experienced by nearby communities, the U.S. EPA administers the Risk Management Plan (RMP) program.[2] Section 112(r) of the 1990 Clean Air Act Amendments required EPA to publish regulations and guidelines to prevent accidents at facilities using certain hazardous chemicals. The Amendments followed public outrage at the mid-1980s catastrophe in Bhopal, India, where a pesticide production facility accidentally released a toxic cloud that killed thousands of

people.[3] In 1996, EPA published a rule that established the RMP Program, requiring regulated facilities to (1) undertake hazard assessment; (2) develop an accident prevention program; and (3) plan emergency response activities in case of an accident. Facilities are covered by the program if they hold above a threshold quantity of a regulated substance.[4] At present, 140 toxic chemicals, including potentially harmful substances like ammonia, chlorine, hydrofluoric acid, and methane, are regulated under the RMP Program.
EPA updated the accident prevention program requirements for facilities in 2017 and 2019, and most recently, proposed amendments in August 2022 (US EPA 2022a, 2022b). Among other provisions, the 2022 proposal would require root cause analysis of most accidents, third party compliance audits for certain facilities with multiple accidents, and analysis of safer technology alternatives for many chemical processes. Regulatory analyses accompanying these updates included a comparison of facility costs to estimates of the monetary value of many of the reported damages from past accidents, but lacked estimates of the social benefits of reducing accident risks (US EPA 2016, 2019, 2022b). Our estimates of a nationally representative average change in nearby property values from chemical facility accidents significantly expands policymakers' understanding of the social benefits attributable to reducing the risk and severity of these accidents.

Equity Capital

Equity capital refers to the ownership interest that shareholders have in a corporation. Going by equity capital definition, it represents the residual claim that shareholders have on the company's assets after all debts have been settled. In simpler terms, it's the difference between a company's total assets and its total liabilities. Equity capital is a crucial source of funding for businesses. Companies can raise equity by issuing shares of stock. When investors purchase these shares, they become part owners of the company. They are entitled to a portion of the company's profits (dividends) and any capital gains if the company is sold. Key characteristics of Equity Capital includes the fact that, Equity capital holders have the last claim on a company's assets after all debts have been settled. Equity capital is essential for businesses for several reasons: Equity capital provides companies with a way to raise funds for growth, expansion, and new investments. A strong equity capital base can signal to investors that a company is well-managed and has good growth prospects. Equity capital aligns the interests of shareholders with the interests of management. Shareholders are incentivized to see the company succeed because their investment value is tied to the company's performance. In all, Companies need to maintain good relationships with their shareholders to keep them invested in the company and to attract new investors.

Return on equity ratio

This ratio indicates the margin available for the shareholders after satisfying all other obligations and taxes as well. Return on equity measures the degree of profitability to shareholders the firm after expenses and taxes are paid. It measures how much a shareholder is earning as profit after tax for each amount invested in the firm. In other words, return on equity indicates the net earnings per equity capital invested. (Ross, Westerfeld and Jaffe 2005). It is regarded as an indicator of evaluating managerial efficiency. It is assumed that the higher return on equity the better managerial performance and a vice versa; But however, a higher return on equity may be as a result of debt capital (Financial leverage) or as a result of higher returns on assets (Ross, Westerfield and Jaffe 2005). Usually there is higher return on Earnings per Share Ratio: equity for higher growing companies. ROE is expressed as: ROE = Net Profit after Tax / Shareholders' Equity.

Theoretical Framework

Stakeholder Theory

The concept of Stakeholder Theory was first described by Freeman (1984), in his book titled "Strategic Management: A Stakeholder Approach". The basic proposition of the stakeholder's theory is that the firm's success is dependent upon the successful management of all the relationships that a firm has with its stakeholders. It was a term originally introduced by Stanford research institute (SRI) to refer to those groups without whose support the organization would cease to exist. (Freeman, 1984) In a follow-up study, Freeman (1984) revisited stakeholder theory and redefined stakeholders as any individual or group who has an interest in the firm because he (or she) can affect or is affected by the firm's activities. Carroll (1991) defines a stakeholder as any individual or group who can or is affected by the actions, policies, practices or goals of the organization.
Stakeholder theory views corporations as part of a social system while focusing on the various stakeholder groups within society (Ratanajongkol, Davey, & Low, 2006). According to Gray, Owen & Adams (1996), stakeholders are identified by companies to ascertain which groups need to be managed in order to further the interest of the corporation. Stakeholder theory suggests that companies will manage these relationships based on different factors such as the nature of the task environment, the salience of stakeholder groups and the values of decision makers who determine the shareholder ranking process (Donaldson & Preston, 1995). Stakeholder theory explains specific corporate actions and activities using a stakeholder-agency approach, and is concerned with how relationships with stakeholders are managed by companies in terms of the acknowledgement of the society where they operate.

Stakeholders can be divided into various groups such as internal or external; primary or secondary; owners or non-owners of the firm; owners of the capital or owners of less tangible assets; actors or those acted upon; those existing in a voluntary or an involuntary relationship with the firm; and resource providers to or dependents of the firm etc. Freeman divided the stakeholders in two categories i.e. primary stakeholders and secondary stakeholders. According to him the primary stakeholders are those stakeholders without continuous support and participation of which a company cannot survive as a 'going concern'. These are the persons who have either direct economic stake in the business or have a direct impact of functioning or decision making of the business such as shareholders, creditors, managers and employees, customers, suppliers, and regulatory stakeholders. Shareholders provide capital to the firm and in return expect a risk-adjusted fair return from the business. Similarly, creditors provide finance to the business and expect fair return, safety of funds and repayment as per agreed schedule. Managers and employees are very important part of the business and provide the firm with time, skills, commitment etc. and in return expect a remuneration which is in proportion to their efforts and also expects fair working conditions. Consumers are very important for the business as they provide revenue but at the same time they expect value of their money. Suppliers provide the firm with the required inputs and similarly they seek fair price of their goods and services. Regulatory stakeholders include government and other regulatory bodies. On one side government provides required infrastructure for the business and on the other side, they expect business to pay tax honestly.

This study is anchored on this theory because the effective management of internal and external environmental cost decisions taken by management is majorly centered on stakeholders' perceptions haven realize that the success or failure of the firm is dependent on how the stakeholders. This theory has a direct relationship between internal and external environment cost decisions of all chemical manufacturing companies.

Empirical Review

Akinleye (2022) examined internal environmental cost and financial performance of selected listed firms in Nigeria. This study's population included all oil and gas and industrial goods companies registered on the Nigerian Exchange Group. Multistage and purposive sampling approaches were used to select the study's sample. Financial statements and annual financial reports of the evaluated listed corporations on the Nigerian Exchange Group from 2005 to 2019 were used to compile the data for the study. The estimation technique adopted included correlation, static panel estimation which consists of pooled, fixed and random effects estimation techniques as well as post-estimation tests such as the restricted F-test and Hausman test. The results of findings indicated that internal environmental cost had a significant negative effect on return on asset of listed firms sampled in the study and that internal environmental expenditures had a significant negative impact on listed companies' performance when assessed in terms of return on equity. However, this study sought to investigate the effect of external environmental costs on performance of selected manufacturing companies as well as oil and gas companies listed on Nigerian Exchange Group market.

Umoren, Akpan, and Okafor (2018) discovered no significant relationship between environmental accounting and ROCE, NPM, DPS, or EPS. The study looks at Nigerian oil companies' performance as well as environmental accounting. Eleven (11) publicly listed oil companies were picked at random from the Nigerian Stock Exchange. Secondary data for the study was gathered from these firms' audited financial records over a three-year period and analyzed using a multiple regression analytical approach. Among the performance metrics are the costs of air pollution, water pollution, land degradation, employee welfare, community welfare, and litigations, with the costs of air pollution, water pollution, land degradation, employee welfare, community welfare, and litigations serving as explanatory factors. According to the study, environmental accounting expenditures showed no statistically significant associations with performance indicators like ROCE, NPM, DPS, or EPS.

Obara, Ohaka, Nangih, and Odinakachukwu (2017) found that waste management expenses had a direct and substantial influence on operating profit, ROA, and ROE, correlating with the findings of Odesa et al (2016). The research investigates the influence of waste management expenses on Nigeria's oil industry's success. The research used three organizations as a case study to look at four operational factors, including waste management cost, return on asset, return on equity, and operating profit. Statistical methods like simple linear regressions were utilized to construct and test research questions and hypotheses. Waste management has a positive and statistically significant influence on the return on assets, return on equity, and operational profit baseline, according to data examined at the 0.05 level of significance.

Agbiogwu, Ihendinihu, and Okafor (2016) investigated the effect of social and environmental investment on the performance of Nigerian manufacturing firms. The study investigated data from ten (10) randomly chosen firms' annual reports and financial statements for 2014 using the t-test and secondary data. NPM, ROCE, and EPS are used to evaluate performance. Environmental and social costs have a significant influence on NPM, ROCE, and EPS, according to the conclusions of the study. The Nigerian government may be able to assure that all environmental standards are satisfied by industrial businesses in the nation, according to the conclusions of this study. The t test used to examine data in this study may not be sufficient to achieve the study's results, necessitating the use of a more advanced data analysis technique.

Oti, Effiong, and Tiesieh (2012) expanded their research to include environmental costs and their influence on returns on investment: an examination of selected Nigerian manufacturing enterprises. The study is based on

two publicly listed manufacturing businesses on the NSE. The data for the study comes from these companies' year-end financial statements, which spanned the years 2001 through 2010. The data was analyzed using a regression analytical technique. Employee health and safety, waste management, and community development are explanatory factors, whereas returns on investment (ROI), fines, penalties, and compensation are dependent variables (FPC). Investing in social and environmental duties including employee health and safety, waste management, and community development, according to this study, is related with a better return on investment. According to this study, environmentally friendly policies have an influence on organizational performance and image. As a consequence of the study, environmental regulatory agencies may force industrial businesses to account for environmental expenditures in their financial accounts.

Okere, O. C., Nwite, S.C. & AGANA, O. J. (2022) Examined Environmental Accounting Costs and Financial Performance for quoted oil & gas companies, 2000-2020) find internal failure cost and external failure cost have positive and significant effects on financial performance for oil & gas. Meanwhile, environmental pollution prevention costs and detection costs were *insignificant*. Though oil & gas is not chemical manufacturing strictly, environmental risks and cost structures are similar in many respects (hazards, regulatory exposure). This suggests that internal and external failure costs, when recognized and managed, may not always be purely cost burdens—they can relate to better performance (possibly through investment in controls, avoiding penalties, etc.).

Worimegbe, T. M. (2021) Accesses the Impact of environmental cost on profitability of quoted manufacturing companies Using DuPont decomposition of ROE. Here environmental cost (in broad sense: training, community environmental initiatives) affects ROE, via its components. Specifically, asset-use efficiency and equity multiplier get significantly influenced by the environmental cost. Operating efficiency was not. Thus environmental costs have a statistically significant effect on ROE in manufacturing firms—partly mediated by how well assets are used and how leveraged the firm is.

Methodology

Model Specification

This study adapted the model of Akinleye (2022), which specified financial performance as a function of environmental cost as presented in equation (i).

$ROEit = \beta 0 + \beta 1INEVCit + \beta 2EXEVCit + \beta 3SIZit + \beta 4LEVit + eit$ ..... (i)

Where ROE represent return on equity, INEVC represents internal environmental cost, 1NEXEVC represents external environmental cost. While SIZ and LEV are size and leverage respectively as control variables.

This study modified the model stated in equation (i) by specifying return on equity (ROE) as a function of internal and external environmental cost (INEVC + EXEVC) measured in terms of pollution equipment control maintenance, environmental audit assessment, waste reduction and recycling program cost and chemical plant explosion cost. Thus, the model is presented in equations (ii) using actual proxies' variables representing inter and external environmental cost while keeping size and leverage of the sampled firms as control variables constant.

$ROEit = \beta 0 + \beta 1PECMit + \beta 2EAAit + \beta 3WRRPCit + \beta 4CPEC + eit$ ... (ii)

Population and Sample Size for the Study

This study's population included all industrial goods companies registered on the Nigerian Exchange Group. The Nigerian Exchange Group contains 12 listed industrial goods firms as of December 2024 out of which 8 firms were selected.

Sample Size and Sampling Techniques

purposive sampling approaches were used to select the study's sample. The study collected panel data from audited annual financial statements and sustainability reports of 8 listed chemical industrial firms listed on the Nigerian Exchange Group for a period of 12 years from 2013 - 2024. Purposive sampling was used to pick the sample on the basis that; some firm's financial statements were unavailable nor accessible on their website. As a result, this study purposefully chose 8 industrial goods companies whose financial statements were ready and accessible during the study's time frame.

Source(s) of data and Method of Data Analysis

Financial statements and annual financial reports of the evaluated listed corporations on the Nigerian Exchange Group from 2013 to 2024 were used to compile the data for this study. The information was gathered using the extraction approach. The estimation technique adopted included correlation, descriptive statistics and ordinary least square.

4.0 General description of research variables

The result in Table 1 presents the descriptive statistics of variables employed. A critical examination of the descriptive statistics for the dependent and explanatory variables revealed that the mean value which is the average value of series shows ROEC with the highest mean of 19.96%, followed by EAA of 1.53%, PECM of

1.51%, WRRPC of 1.49%, while CPEC of 0.98% has the least mean. The standard deviation which measures the deviation of the data set from the mean (volatility level of the variables employed/risk level) also revealed that, ROEC of 91830.17% is the most volatile variable, followed by WRRPC of 63.99%, PECM of 47.99%, EAA of 47.91%, while the least volatile variable is CPEC of 45.96%.

The result also showed that three variables are positively skewed (ROEC, 0.57%; WRRPC, 0.03%; CPEC, 0.03%;)while PECP and EAA with -0.21 and -0.11 are negatively skewed. This implies that the distribution has both left and right tail.

The kurtosis statistics revealed that ROEC have kurtosis value that is greater than 3 while PECM, EAA, WRRPC and CPEC has kurtosis value of 2. This is an indication that the distribution is peaked hence relative to normal distribution.

Jarque Bera is used to test normality, that is, whether data are normally distributed. The Jarque Bera statistics of this series revealed that the P-value of the variables are less than 10%, that is the data are normally distributed. The P-value of the series ROEC (0.000000), PECM (0.419984), EAA (0.314638), WRRPC (0.384185) and CPEC (0.188756) are normally distributed since P-values are less than 10%. The number of observations is ninety-six (96).

Table 1: Descriptive statistics of the variables

	ROEC	PECM	EAA	WRRPC	CPEC
Mean	19.96406	1.510417	1.531250	1.489583	0.979167
Median	14.79000	2.000000	2.000000	1.000000	1.000000
Maximum	140.8200	3.000000	3.000000	3.000000	2.000000
Minimum	-93.08000	0.000000	0.000000	0.000000	0.000000
Std. Dev.	31.09073	0.710742	0.710124	0.820716	0.695537
Skewness	0.571502	-0.213668	-0.110637	0.033493	0.027462
Kurtosis	8.126105	2.762483	2.768605	2.485916	2.088609
Jarque-Bera	110.3337	0.956123	0.410022	1.075076	3.334598
Probability	0.000000	0.419984	0.314638	0.384185	0.188756
Sum	1916.550	145.0000	147.0000	143.0000	94.00000
Sum Sq. Dev.	91830.17	47.98958	47.90625	63.98958	45.95833
Observations	96	96	96	96	96

EVIEW 9.0 2025

Presentation of Results

TABLE 2:Regression Result of Pollution Equipment Control Maintenance (PECM) on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group.

Dependent Variable: ROEC
Method: Least Squares
Date: 20/08/25 Time: 10:43
Sample: 196
Included observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PECM	3.524704	4.497186	0.783758	0.4352
C	25.28783	7.499993	3.371714	0.0011
R-squared	0.066492	Mean dependent var		19.96406
Adjusted R-squared	0.054077	S.D. dependent var		31.09073
S.E. of regression	31.15404	Akaike info criterion		9.736378
Sum squared resid	91233.97	Schwarz criterion		9.789802
Log likelihood	465.3462	Hannan-Quinn criter.		9.757973
F-statistic	0.614276	Durbin-Watson stat		0.881648
Prob(F-statistic)	0.035153			

EVIEW 9.0 2025: Model Equation ROEC= 25.28783 + 3.524704PECM + μ (t-value = 0.783758).

The result in Table 2 revealed that Pollution Equipment Control Maintenance (PECM) has significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group (coefficient of PECM = 3.525, t-value = 0.784). The probability value of 0.0352 ≤ 0.05 further indicates that, this is significant.

TABLE 3: Regression result of Environmental Audit Assessment (EAA) on Return on Equity Capital (ROEC)

Dependent Variable: ROEC
Method: Least Squares
Date: 20/08/25 Time: 10:48
Sample: 1 96
Included observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EAA	-11.78629	4.349071	-2.710072	0.0080
C	38.01183	7.334023	5.182944	0.0000

R-squared	0.072471	Mean dependent var	19.96406
Adjusted R-squared	0.062603	S.D. dependent var	31.09073
S.E. of regression	30.10181	Akaike info criterion	9.667661
Sum squared resid	85175.19	Schwarz criterion	9.721085
Log likelihood	-462.0477	Hannan-Quinn criter.	9.689256
F-statistic	7.344488	Durbin-Watson stat	0.811737
Prob(F-statistic)	0.007996		

EVIEW 9.0 2025: Model Equation ROEC= 38.01183 + -11.78629EAA + μ (t-value = -2.710072).
The result in Table 3 revealed that Environmental Audit Assessment (EAA) has a significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group (coefficient of EAA = -11.78629, t-value = -2.710072). The probability value of 0.0080 < 0.05 further indicates that, this is significant.

TABLE 4: Regression result of waste reduction and recycling program cost (WRRPC) on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group.

Dependent Variable: ROEC
Method: Least Squares
Date: 20/08/25 Time: 10:54
Sample: 1 96
Included observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
WRRPC	-7.595001	3.827943	-1.984094	0.0502
C	31.27745	6.502341	4.810183	0.0000

R-squared	0.040196	Mean dependent var	19.96406
Adjusted R-squared	0.029985	S.D. dependent var	31.09073
S.E. of regression	30.62105	Akaike info criterion	9.701866
Sum squared resid	88138.99	Schwarz criterion	9.755290
Log likelihood	-463.6896	Hannan-Quinn criter.	9.723461
F-statistic	3.936631	Durbin-Watson stat	0.825225
Prob(F-statistic)	0.050162		

EVIEW 9.0 2025: Model Equation ROEC= 31.27745+ -7.595001WRRPC + μ (t-value = -1.984094).
The result in Table 4 revealed that waste reduction and recycling program cost (WRRPC) has a significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group (coefficient of WRRPC = -7.595001, t-value = -1.984094). The probability value of 0.0502 ≤ 0.05 further indicates that, this is significant. This result negates the findings of the study of Aklmleye, M. J. (2022) who assert that internal environmental cost negatively influence return on equity.

Dependent Variable: ROEC

Method: Least Squares

Date: 20/08/25 Time: 10:56

Sample: 1 96

Included observations: 96

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPEC	-1.828001	4.606628	-0.396820	0.6924
C	21.75398	5.523153	3.938688	0.0002

R-squared	0.001672	Mean dependent var	19.96406
Adjusted R-squared	-0.008948	S.D. dependent var	31.09073
S.E. of regression	31.22952	Akaike info criterion	9.741218
Sum squared resid	91676.60	Schwarz criterion	9.794642
Log likelihood	-465.5785	Hannan-Quinn criter.	9.762813
F-statistic	0.157466	Durbin-Watson stat	0.878727
Prob(F-statistic)	0.692400		

TABLE 5:Regression result of chemical plant explosion cost (CPEC) on Return on Equity Capital

EVIEW 9.0 2025: Model Equation ROEC= 21.75398 + -1.828001CPEC+ μ (t-value = -0.396820).
The result in Table 5 revealed that Chemical plant explosion cost (CPEC) has no significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group (coefficient of CPEC= -1.828001, t-value = -0.396820). The probability value of 0.6924 > 0.05 further indicates that, this is not significant. This result contradicts the result of findings in the study of Raymond et.al. (2016) and Charles et.al. (2017) who all asserts that, External environmental cost had a significant positive effect on return on equity.

Test of Hypotheses

Hypothesis one

Pollution Equipment Control Maintenance (PECM) has significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group.

The result in Table 2 revealed that Pollution Equipment Control Maintenance (PECM)) has significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group (coefficient of PECM = 3.525, t-value = 0.784). The probability value of 0.0352 ≤ 0.05 further indicates that, this is significant. Therefore, the Null hypothesis was rejected, and the alternative hypothesis was accepted. This result therefore signifies that Pollution Equipment Control Maintenance (PECM)) has significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group.

Hypothesis two

Environmental Audit Assessment (EAA) has no significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group.

The result shown in Table 3 revealed that Environmental Audit Assessment (EAA) has a significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange (coefficient of EAA = -11.78629, t-value = -2.710072). The probability value of 0.0080 < 0.05 further indicates that, this is significant. Therefore, the Null hypothesis was rejected, and the alternative hypothesis was retained. This result therefore signifies that Environmental Audit Assessment (EAA) has a significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group.

Hypothesis three

Waste Reduction and Recycling Program Cost (WRRPC) has no significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group…

The result shown in Table 4 revealed that waste reduction and recycling program cost (WRRPC) has a significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Stock Exchange (coefficient of WRRPC = -7.595001, t-value = -1.984094). The probability value of 0.0502 ≤ 0.05 further indicates that, this is significant. Therefore, the Null hypothesis was rejected, and the alternative hypothesis was retained. This result therefore signifies that waste reduction and recycling program cost

(WRRPC) has a significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group.

Hypothesis four

Chemical Plant Explosion Cost (CPEC) has no significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group.

The result in Table 5 revealed that Chemical Plant Explosion Cost (CPEC) has no significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Stock Exchange (coefficient of CPEC = -1.828001, t-value = -0.396820). The probability value of 0.6924 > 0.05 further indicates that, this is not significant. Therefore, the Null hypothesis was retained, and the alternative hypothesis was rejected. This result therefore signifies that Chemical Plant Explosion Cost (CPEC) has no significant influence on Return on Equity Capital (ROEC) of listed chemical industries on Nigerian Exchange Group.

Discussion of Findings:

The result of these findings negates the findings of Osemene et.al., (2016), Obara et.al., (2017), Umoren et.al., (2018), Oti and Mbu-Ogar, (2018), Akinleye and Olaoye, (2021) and Akinleye, (2022) who all found a negative impact of environmental costs on corporate performance of listed firms. While on the other hand, Raymond et.al. (2016) and Charles et.al. (2017) both asserts that, External environmental cost had a significant positive effect on return on equity.

5.0 Conclusion and Recommendation

In view of the above findings, Internal environmental failure (i.e, pecm, eaa and wrrpc) cost has positive significant influence on return on equity capital of chemical manufacturing companies whereas external environmental failure cost (cpec) has positive but no significant influence on return on equity of chemical manufacturing companies listed on the Nigerian Exchange Group. The significance influence of internal environmental failure cost on return on equity reflects the potential for sustainable practices to create value for shareholders. Drawing from the findings, the study recommends that, Chemical manufacturing industries should invest more on sustainable technology and also demonstrate responsible corporate governance that can attract investors seeking ethically sound and profitable opportunities. Also, that, Chemical industries should improve on environmental cost management and increase their corporate image by augmenting the business's legitimacy.

REFERENCES

1. Adams, M., & Hardwick, P. (1998). An analysis of corporate donations: United Kingdom evidence. *Journal of Management Studies, 35*(5), 641–654. https://doi.org/10.1111/1467-6486.00114
2. Adediran, S. A., & Alade, S. O. (2013). The impact of environmental accounting on corporate performance in Nigeria. *European Journal of Business and Management, 5*(23), 141–153.
3. Adejumo, V., & Adejumo, O. (2014). Prospects for achieving sustainable development through the Millennium Development Goals in Nigeria. *European Journal of Sustainable Development, 3*(1), 33–46. https://doi.org/10.14207/ejsd.2014.v3n1p33
4. Agbiogwu, A. A., Ihendinihu, J. U., & Okafor, M. C. (2016). Impact of environmental and social costs on performance of Nigerian manufacturing companies. *International Journal of Economics and Finance, 8*(9), 173–180. https://doi.org/10.5539/ijef.v8n9p173
5. Akinleye, M. J. (2022). Internal environmental cost and financial performance of selected listed firms in Nigeria. *FUOYE Journal of Accounting and Management, 5*(2), 95–114.
6. Akinleye, M. J., & Olaoye, C. O. (2021). Community development cost and financial performance of oil and gas firms in Nigeria. *KIU Interdisciplinary Journal of Humanities and Social Sciences, 2*(3), 43–56.
7. Akinlo, O. O., & Iredele, O. O. (2014). Corporate environmental disclosures and market value of quoted companies in Nigeria. *The Business & Management Review, 5*(3), 14–31.
8. Amponsah-Tawiah, K., & Dartey-Baah, K. (2011). Occupational health and safety: Key issues and concerns in Ghana. *International Journal of Business and Social Science, 2*(14), 119–126.
9. Amponsah-Tawiah, K., & Mensah, T. (2016). Occupational health and safety and organizational commitment: Evidence from the Ghanaian mining industry. *Safety and Health at Work, 7*(3), 225–230. https://doi.org/10.1016/j.shaw.2016.02.004
10. Asuquo, A. I. (2012). Environmentally friendly policies and their financial effects on corporate performance of selected oil and gas companies in Niger Delta region of Nigeria. *American International Journal of Contemporary Research, 2*(1), 168–173.
11. Banwarie, U. R. (2011). The relationship between ownership structure and CSR disclosure [Unpublished doctoral thesis]. Erasmus National University, Rotterdam, Netherlands.

12. Campbell, D., Craven, B., & Shrives, P. (2003). Voluntary social reporting in three FTSE sectors: A comment on perception and legitimacy. *Accounting, Auditing & Accountability Journal, 16*(4), 558–581. https://doi.org/10.1108/09513570310492308
13. Carroll, A. B. (1991). The pyramid of corporate social responsibility: Toward the moral management of organizational stakeholders. *Business Horizons, 34*(4), 39–48. https://doi.org/10.1016/0007-6813(91)90005-G
14. Charles, E. E., John-Akamelu, C. R., & Umeoduagu, C. (2017). Environmental accounting disclosures and financial performance: A study of selected food and beverage companies in Nigeria (2006–2015). *International Journal of Academic Research in Business and Social Sciences, 7*(9), 162–174. https://doi.org/10.6007/IJARBSS/v7-i9/3325
15. Cho, C. H., & Patten, D. M. (2007). The role of environmental disclosure as legitimacy tools: A research note. *Accounting, Organizations and Society, 32*(7), 639–647. https://doi.org/10.1016/j.aos.2006.09.009
16. Cormier, D., & Magnan, M. (2007). Investors' assessment of implicit environmental liabilities: An empirical investigation. *Journal of Accounting and Public Policy, 16*(2), 215–241. https://doi.org/10.1016/S0278-4254(97)00017-0
17. Deegan, C. (2002). The legitimising effect of social and environmental disclosures – A theoretical foundation. *Accounting, Auditing & Accountability Journal, 15*(3), 282–311. https://doi.org/10.1108/09513570210435852
18. Dessy, A., & Rosita, S. (2015). The effect of environmental performance and corporate social responsibility disclosures towards financial performance. *2nd Global Conference on Business and Social Sciences (GCBSS)*, 17–18 September 2015, Bali, Indonesia.
19. Dowling, J., & Pfeffer, J. (1975). Organizational legitimacy: Social values and organizational behavior. *Pacific Sociological Review, 18*(1), 122–136. https://doi.org/10.2307/1388226
20. Cooper, C. (1995). Ideology, hegemony and accounting discourse: A case study of the National Union of Journalists. *Critical Perspectives on Accounting, 6*(2), 175–209. https://doi.org/10.1006/cpac.1995.1020
21. Ebieri, J. (2018). Effect of sustainability costs accounting on net worth of listed firms on Nigeria Stock Exchange. *International Journal of Economics and Business Management, 4*(7), 59–76.
22. Egwu, S. (2006). Beyond the revival of old hatreds: The state and conflict in Africa. In *Introduction to peace and conflict studies in West Africa* (pp. 13–30). Spectrum Books Limited.
23. Ifeanyi, E. (2002). Environmental impact assessment as a tool for sustainable development: The Nigerian experience. In *Proceedings of the FIG XXII International Congress* (pp. 1–13). Washington, D.C., USA.
24. Ifurueze, M. S. K. A., Lyndon, M. E., & Bingilar, P. F. (2013). The impact of environmental cost on corporate performance: A study of oil companies in Niger Delta states of Nigeria. *Journal of Accounting and Business Management, 12*(4), 328–401.
25. Iwata, H., & Okada, K. (2010). How does environmental performance affect financial performance? Evidence from Japanese manufacturing firms. *Ecological Economics, 70*(9), 1691–1700. https://doi.org/10.1016/j.ecolecon.2011.05.010
26. Kurawa, J. M., & Garba, S. (2014). An evaluation of the effect of credit risk management (CRM) on the profitability of Nigerian banks. *Journal of Modern Accounting and Auditing, 10*(1), 104–115.
27. Miradha, H. W., Syaiful, A., Ridho, P. O., Awang, A., Kevin, S. G., & Totok, R. B. (2017). 3R implementation in waste management at PT. PJB UP Muara Tawar. *Journal of Business and Management, 19*(6), 64–70.
28. Nyirenda, G., Ngwakwe, C. C., & Ambe, C. M. (2013). Environmental management practices and firm performance in a South African mining firm. *Managing Global Transitions, 11*(3), 243–260
29. Obara, L. C., Ohaka, J., Nangih, E., & Odinakachukwu, I. O. (2017). The effect of accounting for waste management expenditure on the profitability of oil and gas companies in Nigeria. *International Journal of Economics, Commerce and Management, 5*(3), 1–14.
30. Odesa, J., Igbru, O., & Agbasi, E. N. (2016). Effect of environmental cost on firm performance: A study of selected manufacturing and oil and gas companies in Nigeria. *Journal of Accounting, Business and Social Sciences, 1*(1), 1–10.
31. Okere O. C., Nwite , S.C & AGANA O.J. (2022). Environmental Accounting Costs and Financial Performance of Selected Quoted Oil and Gas Companies in Nigeria. International Journal of Research and Innovation in Social Science, *International Journal of Research and Innovation in Social Science* (IJRISS), vol. 6(10), pages 175-187, October.
32. Omoye, A. S., & Wilson-Oshilim, U. D. (2018). Antecedents of environmental disclosure in Nigeria. *Accounting & Taxation Review, 2*(2), 101–116.
33. Osemene, O. F., Kolawole, K. D., & Oyelakun, O. (2016). Effects of environmental accounting practices and sustainable development on the performance of Nigerian listed manufacturing companies. *International Journal of Business and Social Science, 7*(6), 118–128.
34. Oti, P. A., & Mbu-Ogar, G. B. (2018). Analysis of environmental and social disclosure and financial performance of selected quoted oil and gas companies in Nigeria (2012–2016). *Journal of Accounting and Financial Management, 4*(2), 1–12.

35. Oti, P. A., Effiong, S. A., & Tiesieh, T. A. (2012). Environmental costs and its implication on the returns on investment: An evaluation of selected manufacturing companies in Nigeria. *Global Journal of Management and Business Research, 12*(7), 17–22.
36. Preston, L. E., & O'Bannon, D. P. (1997). The corporate social-financial performance relationship: A typology and analysis. *Business and Society, 36*(4), 419–429. https://doi.org/10.1177/000765039703600406
37. Rahman, N. H. W. A., Zain, M. M., & Yahaya, N. H. Y. (2011). CSR disclosures and its determinants: Evidence from Malaysian government-linked companies. *Social Responsibility Journal, 7*(2), 181–201. https://doi.org/10.1108/17471111111141582
38. Richardson, A. J. (1987). Accounting as a legitimating institution. *Accounting, Organizations and Society, 12*(4), 341–355. https://doi.org/10.1016/0361-3682(87)90023-5
39. Suchman, M. C. (1995). Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review, 20*(3), 571–610. https://doi.org/10.5465/amr.1995.9508080331
40. Umoren, A. O., Akpan, M. O., & Okafor, L. N. (2018). Oil companies' performance and environmental accounting reporting in Nigeria. *Asian Journal of Economics, Business and Accounting, 8*(1), 1–8. https://doi.org/10.9734/AJEBA/2018/39174
41. Uwaoma, I., & Ordu, P. A. (2016). Environmental reporting in the oil and gas industry in Nigeria. *International Journal of Research in Business Studies and Management, 3*(11), 1–21.
42. Uwuigbe, U., & Jimoh, J. (2012). Corporate environmental disclosures in the Nigerian manufacturing industry: A study of selected firms. *An International Multidisciplinary Journal, Ethiopia, 6*(3), 71–83. https://doi.org/10.4314/afrrev.v6i3.6
43. Vishnani, S., & Shah, B. K. (2007). Impact of working capital management policies on corporate performance—An empirical study. *Global Business Review, 8*(2), 267–281. https://doi.org/10.1177/097215090700800205
44. Wagner, M., Phu, N. V., Azomahou, T., & Wehrmeyer, W. (2002). The relationship between the environmental and economic performance of firms: An empirical analysis of the European paper industry. *Corporate Social Responsibility and Environmental Management, 9*(3), 133–146. https://doi.org/10.1002/csr.22
45. Worimegbe, T. M. (2021). Impact of environmental cost on the profitability of quoted manufacturing companies in Nigeria. *Independent Journal of Management & Production12*(5):1518-1536. 10.14807/ijmp.v12i5.1428