

# Effect of Environmental Costs on Financial Performance: A Study of Nigerian Oil and Gas Companies.

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**ABSTRACT:** This study ascertained the effect of environmental costs on the performance of oil and gas companies in Nigeria. Specifically, the study ascertains: the effect of Waste Management Cost on Tobin's Q of Oil and Gas Companies in Nigeria, and the effect of Community Development Cost on Tobin's Q of Oil and Gas Companies in Nigeria. Ex-post facto research design was employed for the study. Data were gathered from the published financial statements of the eleven (11) Oil and Gas companies for eleven (12) years period spanning from 2008-2019. Hypotheses were tested with Ordinary Least Square and revealed that the Waste Management Cost and Community Development Cost have significant positive effect on Tobin's Q of Oil and Gas Companies in Nigeria at 5% level of significance. The study recommended that Oil and gas firms should get more involved in waste management activities, since cost on waste management is more committed in improving organizational performance.

**Keywords:** Environmental Cost, Waste Management Cost, Community Development Cost and Tobin's Q

## I. INTRODUCTION

Environmental cost is an issue that has captured the attention of national and international, political and business leaders across the globe and the developed world. The creation of wealth has led to various environmental impacts such as depletion of non-renewable resources, global warming, diminution of land resources, acidification, and reduction of water resources and potential threats to health and safety of employees (Singh, Murty, Gupta & Dikshit, 2007). The issues of environmental abuses and degradation have led various sectors, governments and non-governmental organizations (NGOs) to engage in environmental sustainability debates and initiate strategies for responding to the challenges of sustainable development. It is also in response to this that the academic world has dedicated various

groups to the issues of environment and sustainable development, including Brunel Research in Enterprise, Innovation Sustainability and Ethics (BRESE), Royal Holloway's Centre for Research into Sustainability and the International Centre for Corporate Social Responsibility at Nottingham University in the United Kingdom.

A broad range of corporate stakeholders have regarded environmental issues as important, these include consumers, shareholders, potential investors, creditors, regulators, employees and the general public (Donaldson & Preston, 2015; Marshall, Akoore, Hamann & Sinha, 2010; Lober, 2016). From an investment standpoint, shareholder value suffers when companies pay millions of money in fines, clean-up fees, and court costs to keep corporate officers out of jail (Coleman, 2011; Milfont & Duckitt, 2010). From a consumer perspective, growing numbers of customers are showing preference for greener companies and products. For example, approximately a third of all adults in the UK pay premium of 15-50% for organically-sourced foods (Oloff & Vandermerwe, 2017). From an employment perspective, it is becoming more difficult to attract top executives and other key employees to positions in industries with high environmental risk (Clark, 2015). From the general public's standpoint, surveys conducted in the aftermath of the Exxon Valdez spill reported that approximately 60% of Americans named pollution as a very serious threat to their health and the environment, and approximately 75% believe that business should be responsible for the clean-up (Dillard, Brown & Marshall (2016). The British Petrochemical Plc (April 2010) deep water rig explosion in the Gulf of Mexico resulted in loss of employee lives and biodiversity (all living things) in the ocean, further, the collapse of goldmine fields in both Chile and Ecuador in August and October 2010 respectively led to the loss of employees and permanent impairment to the landscape, which have been greeted with public outcry and expressions of dismay.

Despite the above observations some researchers such as Hossain, Islam and Andrew (2016) Agyapong and Nuertey (2017) strongly kicked against spending on the environment stating that businesses' expenditure on the environment affect businesses bottom line. Exploration of oil and gas resources carried out onshore and offshore by oil producing companies in Nigeria have far reaching visible environmental and socio-economic impacts. Oil and gas activities have culminated in altering environmental and biological makeup, leading to ecological damage, emissions, pollution and landscape destruction. Employee's health and safety is at stake due to interference with toxic substances. The environment is not spared of waste as a result of oil and gas operations thereby hampering environmental sustainability. The host communities where oil and gas explorations are carried out remain undeveloped leading to youth restiveness and militancy. As a result, the business environment becomes volatile and un conducive for businesses to thrive as these firms are perceived as environmentally unfriendly which impedes corporate image and adversely affects profitability (such as gross profit margin, net profit margin, return on capital employed, cash flow margin, Tobin's q, return on assets, return on equity, return on invested capital etc). Extant environmental literature have documented studies on environmental cost and performance but this study aims at contributing to literature by empirically analyzing the relationship between environmental cost and financial performance of oil and gas companies in Nigeria.

It is expected that a company with poor environmental credentials is punished in the form of dwindling financial fortune by strategic stakeholders like consumers, potential investors to mention a few. But this may not be the same always judging from previous research evidences that have shown inconsistent results when the relationship between corporate environmental cost and financial performance is investigated. The typical conclusion, based on narrative reviews of literature is that the empirical evidence is too mixed to allow for any firm conclusion. In most of the previous reviews, poor measures, methodological shortcomings, difficulties in obtaining data and weak theory construction are often mentioned as causes of this apparent variability in findings (Coleman, 2011; Kline, 2010).

In the light of the above contentions, empirical investigation of the effect of environmental costs on financial performance of oil and gas companies listed on Nigeria Stock

Exchange becomes inevitable hence this research work is carried out.

This study determines the effect of environmental costs on financial performance of Nigerian Oil and Gas companies. Specifically, the study ascertains:

1. The effect of Waste Management Cost on Tobin's Q of Nigerian Oil and Gas Companies.
2. The effect of Community Development Cost on Tobin's Q of Nigerian Oil and Gas Companies.

## II. REVIEW OF RELATED LITERATURE

### Environmental Costs and Financial Performance

Environmental costs are costs that the organization incurs to prevent, monitor and report environmental impacts (KPMG, 2012). United States of America Environmental Protection Agency (1995) defines five tiers of environmental costs namely; convectional, hidden, contingent, image and relationship and societal.

These are costs that organization imposes on others for which they may not be held legally responsible and which cannot be compensated for in the legal system. For instance, damage caused to a river because of polluted waste water discharge, or to ecosystems from solid waste disposal or to asthmatics because of air pollutant emissions are all examples of external costs for which an industry often does not compensate (Uwaloma, 2011).

An understanding of how a company's environmental performance affects its financial prospects, and how the stringency of the environmental policy regime might constrain a company's financial opportunities are issues of concern to policy makers. Collectively, organizations spent millions of dollars annually when installing mandated pollution control technology, applying for environmental permits, and monitoring and reporting their environmental impacts. These costs create an incentive for companies to reduce their environmental impacts below minimum reporting thresholds (Walls, Berrone & Phan, 2012). A company's superior financial outcomes may be mistakenly attributed to its improved environmental performance when financial performance is related more to the fact that a company is more efficient from the outset (Sun & Cui, 2014). It is often argued that good environmental and commercial performance go hand-in-hand (Jacobs, Singhal & Subramanian, 2010). Advocates of social responsibility argue that organizations have a wide range of responsibilities that extend beyond production of goods and

services at a profit (Campbell & Slack, 2011; Kim, Li & Li, 2014). As members of society business should actively and responsively participate in the community and in the larger environment. Others contend that socially responsible actions have long-term advantages for organization (Clarkson, Overell & Chepple, 2011; Okoye, Oraka & Ezejiofor, 2013). Organizations can improve their images and avoid unnecessary and costly regulation if they are perceived as socially responsible (Lee, Pati & Roh, 2011; Sayedeh & Saudah, 2014).

### Tobin's Q

The Tobin's Q ratio is a ratio devised by James Tobin of Yale University, Nobel laureate in economics, who hypothesized that the combined market value of all the companies on the stock market should be about equal to their replacement costs (Bond & Cummins, 2004). Replacement value (or replacement cost) refers to the cost of replacing an existing asset based on its current market price. For example, the replacement value of a one-terabyte hard drive might be just N50 today, even if we paid N500 for the same storage space a few years ago (Amahalu, Okoye & Obi, 2018). Tobin's q (also known as q ratio) is the ratio between a physical asset's market value and its replacement value (Hayes, 2019). The Q Ratio expresses the relationship between market valuation and intrinsic value. In other words, it is a means of estimating whether a given business or market is overvalued or undervalued (Hayes, 2019).

The Q ratio is calculated as the market value of a company divided by the replacement value of the firm's assets.

$$Q \text{ Ratio} = \frac{\text{Total Market Value of Firm}}{\text{Total Asset Value}}$$

For example, a low Q (between 0 and 1) means that the cost to replace a firm's assets is greater than the value of its stock. This implies that the stock is undervalued. Conversely, a high Q (greater than 1) implies that a firm's stock is more expensive than the replacement cost of its assets, which implies that the stock is overvalued. This measure of stock valuation is the driving factor behind investment decisions in Tobin's model (Maverick, 2018). The formula for Tobin's Q ratio takes the total market value of the firm and divides it by the total asset value of the firm. For example, assume that a company has \$35 million in assets. It also has 10 million shares outstanding that are

trading for \$4 a share. In this example, the Tobin's Q ratio would be:

$$\text{Tobin's Q ratio} = \frac{\text{total market value of firm}}{\text{total asset value of firm}} = \frac{\$40,000,000}{\$35,000,000} = 1.14$$

An undervalued company, one with a ratio of less than one, would be attractive to corporate raiders or potential purchasers, as they may want to purchase the firm instead of creating a similar company. This would likely result in increased interest in the company, which would increase its stock price, which would in turn increase its Tobin's Q ratio.

As for overvalued companies, those with a ratio higher than one, they may see increased competition. A ratio higher than one indicates that a firm is earning a rate higher than its replacement cost, which would cause individuals or other companies to create similar types of businesses to capture some of the profits. This would lower the existing firm's market shares, reduce its market price and cause its Tobin's Q ratio to fall (Maverick, 2018).

### Waste Management Cost

Waste management or waste disposal is all the activities and actions required to manage waste from its inception to its final disposal (Gary, 2011). This includes amongst other things collection, transport, treatment and disposal of waste together with monitoring and regulation. It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling. Waste can take any form that is solid, liquid, or gas and each have different methods of disposal and management. Waste management normally deals with all types of waste whether it was created in forms that are industrial, biological, household, and special cases where it may pose a threat to human health (Raleigh, 2011). It is produced due to human activity such as when factories extract and process raw materials (Syed, Syed, Wang, Hu, Su, & Xiang, 2017). Waste management is intended to reduce adverse effects of waste on health, the environment or aesthetics. Waste management practices are not uniform among countries (developed and developing nations); regions (urban and rural areas), and sectors (residential and industrial) (Czajczyńska, Anguilano, Ghazal, Krzyżyńska, Reynolds, Spencer, & Jouhara, 2017). A large portion of waste management practices deal with municipal solid waste (MSW) which is the bulk of the waste that is created by household, industrial, and commercial activity (Walker, 2018).

The waste hierarchy represents the progression of a product or material through the sequential stages of the pyramid of waste management. The hierarchy represents the latter parts of the life-cycle for each product (Abarca, Maas & Hogland, 2013). Waste management cost is the cost involved in getting rid of waste. Waste management cost is the cost involved in the collection, transportation, disposal or recycling and monitoring of waste. This term is assigned to the material, waste material that is produced through human being activity. This material is managed to avoid its adverse effect over human health and environment (Czajczyńska, Anguilano, Ghazal, Krzyżyńska, Reynolds, Spencer & Jouhara, 2017). Waste management costs are the costs required to manage waste from its inception to its final disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process (Syed-Hassan, Wang, Hu, Su & Xiang, 2017).

#### **Community Development Cost**

The purpose of community development is understood by IACD as being to work with communities to achieve participative democracy, sustainable development, rights, economic opportunity, equality and social justice. This practice is carried out by people in different roles and contexts, including people explicitly called professional community workers (and people taking on essentially the same role but with a different job title), together with professionals in other occupations ranging from social work, adult education, youth work, health disciplines, environmental education, local economic development, to urban planning, regeneration, architecture and more who seek to apply community development values and adopt community development methods. Community development practice also encompasses a range of occupational settings and levels from development roles working with communities, through to managerial and strategic community planning roles.

The Community Development Challenge report (2014) defines community development as a set of values and practices which plays a special role in overcoming poverty and disadvantage, knitting society together at the grass roots and deepening democracy. Community Development Exchange defines community development as both an occupation (such as a community development worker in a local authority) and a way of working with communities. Its key purpose is to build communities based on justice, equality and mutual

respect (Wischermann, 2013). Community development involves changing the relationships between ordinary people and people in positions of power, so that everyone can take part in the issues that affect their lives. It starts from the principle that within any community there is a wealth of knowledge and experience which, if used in creative ways, can be channeled into collective action to achieve the communities' desired goals (McTague & Jakubowski, 2013). Community development practitioners work alongside people in communities to help build relationships with key people and organizations and to identify common concerns. They create opportunities for the community to learn new skills and, by enabling people to act together, community development practitioners help to foster social inclusion and equality (Anderson, 2014). Community development cost entails the cost of financing growth-related infrastructure (Johnston, Lane, Devin & Beatson, 2018).

#### **Empirical Review**

Ifurueze, Lyndon and Bingilar (2013) examined the impact of environmental cost on corporate performance in oil companies in the Niger Delta States of Nigeria. The multiple regression analysis was used to test the hypothesis. An investigation was undertaken into the possible relationship between corporate performance and three selected indicators of sustainable business practices: Community Development Cost (CDC), Waste Management Cost (WMC) and Employee Health and Safety Cost (EHSC). The study revealed that sustainable business practices and corporate performance is significantly related. And sustainability may be a possible tool for corporate conflict resolution as evidenced in the reduction of fines, penalties and compensations paid to host communities of oil companies. Okoye and Ezejiofor (2013) assessed the appraisal of Sustainability environmental accounting in enhancing corporate performance and economic growth. This study reviewed various forms including journal papers, articles and other relevant materials. This paper analyzed and tested two hypotheses with Pearson Product Movement Correlation Co-efficient. Based on this, the study discovered that sustainable environmental accounting has significant impact on corporate productivity in order to enhance corporate growth. Makori and Jagongo (2013) established whether there is any significant relationship between environmental accounting and profitability of selected firms listed in India. The data for the study were collected from annual reports and accounts of

14 randomly selected quoted companies in Bombay Stock Exchange in India from 2006-2011. The data were analyzed using multiple regression models. The key findings of the study shows that there is significant negative relationship between Environmental Accounting and Return on Capital Employed (ROCE) and Earnings per Share (EPS) and a significant positive relationship between Environmental Accounting and Net Profit Margin and Dividend per Share. Husser and Evraert-Bardinet (2014) looked at the relationship between market value, accounting fundamentals and companies' Corporate Social Responsibility (CSR) and Sustainable Development (SD) disclosures in France for the years 2007-2008. The multiple regression results showed that investors measure a company's short-term performance using information about the quality of the company's environmental management. Gallego-Alvarez, Segura and Martínez-Ferrero (2014) analyzed the impact of the variation in carbon dioxide emissions on financial and operational performance in Spain. Overall, the research showed that companies promote greater environmental behaviour in order to obtain higher financial performance. Nonetheless, the findings did not show evidence for operational performance. Tze, Boon and Yee (2014) analyzed the relationship between environmental improvement and the financial performance of firms on a sample of 78 leading companies listed in Bursa Malaysia. The study covered a period of 5 years, from 2008 to 2012. The results indicated there is a positive correlation between efficiency used towards natural resources and financial performance (both ROA and ROE). On the other hand, (Materials, Energy and Water were found to be negative predictor for ROA and ROE. Bai, Pingli and Zhuang (2014) investigated the effect of multi-dimensional corporate environmental performance (CEP) on firm's financial performance and risk in Pakistan from 2005-2012. Considering two dimensions of CEP as environmental management performance (EMP) and environmental operational performance (EOP), the study found an inverted U-shaped relationship between carbon performance and Tobin's Q, and a positive relationship between EMP and Tobin's Q. The findings also provided evidences for the moderation effect of EMP on the EOP-Tobin's Q relationship. The study also found a significant positive relationship between the carbon performance and firm risk within manufacturing industries and an inverse relationship within service industries. Esira, Ezugwu, Egbere (2014) ascertained the effects of environmental cost management on the profitability of oil sector in

Nigeria from 2004 to 2013. Data used were obtained from the Central Bank of Nigeria (CBN). Multiple regression analytical technique was employed. Result revealed that there exists a significant relationship between influence of environmental cost management and the profitability of oil sector in Nigeria. Also, it was discovered that there are established standards in Nigeria guiding environmental cost management in the oil and gas industries in Nigeria. Again there is a lacuna in external reporting of environmental cost data in Nigeria. It was concluded that the extent of environmental cost management in the oil sector is at its rudimentary stage. Sarumpaet (2015) examined the relationship between environmental performance and financial performance amongst Indonesian companies. The study revealed while financial performance is not significantly associated with environmental performance, company size, stock exchange listing and ISO 14001 are significantly associated with environmental performance. This finding also indicated that the government environmental rating is highly consistent with international environmental certification. Dobre, Stanila and Brad (2015) provided information on how Romanian listed companies report environmental and social indicators and whether or not this has an impact on financial performance. The study used a four time period panel fixed effect model for Romanian companies that are listed in the first category of the Bucharest Stock of Exchange from 2010-2013. The results pointed out that increasing water, air and soil protection has a negative impact on current return on equity, while no effects were detected on return on assets and stock market returns. Other environmental variables such as gas, energy or sound were found not to be statistically significant. Training and benefits after retirement have a mixed effect on financial measures. Magara, Aming'a and Momanyi (2015) focused on the impact of environmental accounting (EA) on financial performance of corporate organizations in Kisii County, Kenya. The main variables of the study were EA application being the independent variable, and perceived financial performance as the dependent variable. The study used descriptive research design. The study was carried out at Kisii County; the target population was 144 consisting accountants and auditors in the 16 corporate organizations. The study adopted a stratified sampling design where simple random sampling technique was used to identify a sample size of 49 employees drawn from all the 16 corporations. Both qualitative and quantitative data were collected using questionnaire, and secondary data

and descriptive statistics were used to analyze the responses. Findings revealed that the perceived financial performance of the corporate organization in general was in good status as perceived by the employees. Gatimbu and Wabwire (2016) assessed the effect of corporate environmental disclosure on financial performance of listed firms at the Nairobi Securities Exchange, Kenya. Content analysis of sampled listed companies' annual reports was undertaken to examine environmental disclosure practices. Coefficient of Skewness was used to test the normality of data. Homoscedasticity and autocorrelation assumptions of the regression model were tested using scatter plots and Durbin Watson test. Linear regression model was used to determine the casual relationship between environmental disclosure and financial performance. Findings revealed that environmental disclosure with P-value  $<0.05$  has a positive significant effect in the mean financial performance. The study recommended that firms should engage in environmental disclosure because it leads to increased financial performance. Ezejiolor, John-Akamelu and Chigbo (2016) assessed the effect of sustainability accounting measure on the performance of corporate organizations in Nigeria from 2010-2015. Ex post facto research design and time series data were adopted. Formulated hypotheses were tested using Regression Analysis with aid of SPSS Version 20.0. Based on the analysis, the study found that environmental cost does not impact positively on revenue of corporate organizations in Nigeria, also that environmental cost impact positively on profit generation of corporate organizations in Nigeria. Based on this the researcher recommends that Indigenous and multi-national firms should ensure that strict policies as regards environmental accounting are adhered to, in order to enable stable organizational performance. Farah, Lindrianasari and Yuztitya (2016) determined the influence of environmental management activity based on Indonesia's statement of financial accounting standards number 33, namely accounting for mining towards the financial performance of Indonesian mining companies. The data on the research were tested by multiple linear regressions. The result of this research showed that the stripping costs in the production phase and environmental management on general mining had significantly positive effects on financial performance, while exploration and evaluation assets had significantly negative effects on financial performance. The study showed that the cost to acquire the best technology that companies use when performing exfoliating ground at the beginning of production

activity brings a positive performance for the company. Bartolacci, Paolini, Soverchia and Zigiotti (2016) analyzed the profitability of listed companies in Italy from 2009 to 2014. The empirical analysis using ordinary least square regression analysis was carried out on a population of 298 Italian companies.. However, combining this information with that concerning separate waste collection, a clear relationship – both positive and negative – is not identifiable. Elias, Kostas and Dimitris (2016) examined the causal linkage between environmental and financial performance in Greek manufacturing firms from 2004-2014. Environmental performance is measured according to accounting data following the Eco Management and Auditing Scheme guidelines and ISO certification. Return on assets and return on sales were used as indicators of financial performance. Empirical findings suggested that there seems to be a link between these dimensions irrespectively of the particular sector of activity. Contrary to similar studies a “virtuous circle” does not exist as the avoidance of environmental improving investments is related to a better financial performance. Fahria, Sahibzada, and Abdul (2016) focused on assessing the impact of environmental reporting on the performances of the firms in the USA for the year 2015. The study is a quantitative research with the adaptation of descriptive explanatory research design. Greenhouse Gas Emission, Water Consumption and Waste Disposal have been utilized as independent variables, whilst Market Share was been implied as a measure of firms' performances. It was found that environmental reporting positively impacts on the performance of the firms in the USA. Hilmi (2016) tested empirically, social performance and environmental performance to financial performance (relevant, accurate, timely and complete) to develop a theoretical framework as the basis for the hypothesis as an answer to the research question, namely, the extent to which manner: (1) the effects of social performance against the financial performance, (2) the effect on the environment performance to financial performance. Pariag-Maraye, Ansaram and Ramkalawon (2017) examined the relationship between environmental management practices adopted by listed firms on the Stock exchange of Mauritius and their impact, if any, on their financial performance. The study revealed that there is an insignificant relationship between environmental management practices and financial performance except for cutting use of energy which generated a significant relationship. Agbo, Ohaegbu and Akubuilu (2017) studied the effect of

environmental cost on organizational performance of Nigerian brewery Plc. Data used for this study were obtained from the annual report of Nigerian brewery Plc on Donations (DN), Medical Expenses (ME) and on the Return on Asset (ROA) within a period of five for the years 2011 to 2015. Hypotheses were formulated and multiple regressions were used for the analysis. It was found that both ( $r = -0.068$  and  $r = -0.072$ ) respectively with return on assets (ROA). Worae and Ngwakwe (2017) examined environmental responsibility and financial performance nexus of Johannesburg Stock Exchange's socially responsible investing manufacturing and mining firms during the period of 2008–2014. The study employed annual panel dataset of fourteen manufacturing and mining companies on the index, and Granger causality analysis using Gcause2 Baum's version. The study found unidirectional causal relationship between environmental responsibility, measured by emissions intensity and equity returns, and bidirectional causal relationship between emissions intensity and market value of equity deflated by sales at 1% significant levels. Hai, Foo, Tan & Yap (2018) investigated the relationship between environmental disclosures and financial performance using a sample of potentially polluting publicly-listed companies in Singapore from 2012-2015. Results showed that a positive link existed although the evidence was less strong for the impact of environmental disclosures on subsequent financial performance. All null hypotheses were rejected. Okafor (2018) ascertained the effect of environmental costs on firm performance. To achieve this objective, the study made use of financial reports of Oil and Gas Companies quoted in the Nigerian Stock Exchange Market from years 2006-2015. Regression analysis was employed with the aid of Statistical Package for Social Sciences (SPSS). The results of the statistical analysis indicated that better environmental performance positively impact business value of an organization. Moreover, environmental accounting provides the organization an opportunity to reduce environmental and social costs and improve their performance. Nwaiwu and Oluka (2018) examined the effect of environmental cost disclosure on financial performance measures of quoted oil and gas companies in Nigeria from 2007-2017. Time series data were collected from annual financial reporting and economic review of Central Bank of Nigeria; Pearson product moment coefficient of correlation and multiple linear regression analysis with the aid of special package for social sciences (SPSS) version 22. The econometric results revealed adequate disclosure on environmental

cost, compliance to corporate environmental regulations have positive significant effect on financial performance measures. Udeh and Ezejiofor (2018) ascertained the effect of sustainability cost accounting on financial performance of Nigerian telecommunication firms. The study employed Ex post fact research design.. Formulated hypotheses were tested using regression analysis with the aid of SPSS Version 20.0. Based on this, the study found that Sustainability cost accounting has significantly affected return on assets of Nigerian telecommunication firms. Another finding is that sustainability cost accounting has significantly affected return on equity of Nigerian telecommunication firms. Amahalu, Okoye and Obi (2018) ascertained the effect of sustainability reporting on economic value added of quoted brewery firms in Nigeria for a ten (10) year period spanning from 2008-2017. Sustainability reporting was proxied by economic sustainability reporting, social sustainability reporting and environmental sustainability reporting. The findings revealed that economic sustainability reporting, social sustainability reporting and environmental sustainability reporting have a significant positive effect on economic value added at 5% significant level. Falope, Offor and Ofurum (2019) determined the effect of Environmental Disclosure and Performance of Quoted Nigerian Construction Firms. The study adopted Ex Post Facto research design. Hypotheses were formulated in line with the research objectives and tested using linear regression analysis with the aid of SPSS Version 20.0. It was observed that environmental pollution prevention cost, environmental protection cost and environmental recycling disclosure have effects on return on assets of quoted construction firms in Nigeria. Iheduru and Chukwuma (2019) examined the effect of environmental and social costs on performance of manufacturing companies in Nigeria. The data for the study were collected from annual reports and accounts of fourteen (14) randomly selected manufacturing companies in Nigeria. The data were analyzed using multiple regression models. The key findings of the study shows that there is significant negative relationship between Environmental and social costs and Return on Capital Employed (ROCE) and Earnings per share (EPS) and a significant positive relationship between environmental and social costs and Net Profit Margin (NPM) and Dividend per Share (DPS). Based on this it was recommended that government should give tax credit to organizations that comply with its environmental laws in order to reduce their environmental costs and that

environmental reporting should be made compulsory in Nigeria so as to improve the performance of organizations and the nation as a whole. Oshiole, Aruna and Amahalu (2020) ascertained the effect of environmental cost disclosure on profitability of oil and gas firms listed on Nigeria Stock Exchange between 2010 and 2019. Eleven (11) listed oil and gas firms were purposively sampled. Content analysis was employed while Pearson Correlation Coefficient and Panel Least Square (PLS) Regression analysis via STATA 13 statistical software were used to test the hypotheses of the study. The result of this study showed that waste management cost disclosure, employee health and safety cost disclosure and environmental remediation cost disclosure have a significant positive effect on net profit margin at 5% level of significance respectively.

Empirical reviews revealed that the effect of environmental costs on financial performance is still a contentious issue, most studies on environmental costs and firm's performance are of the view that environmental costs has a positive impact on financial performance. It becomes pertinent to empirically find out if negative or positive corporate environmental behaviour impact on firm financial performance. Some studies purport to find a positive relationship (Simerly 2018, Schaltegger & Wagner, 2014; Coleman, 2011; Orlitzky, 2008; Rodriguez and Cruz, 2007; Salama, 2005). Similar studies found a negative relationship (Crane, Matten & Moon, 2018; Bromley, 2016; Thornton, Kagan, & Gunningham, 2013). While others showed either inconclusive results or (neutral) no effect (Klassen & McLaughlin, 2016; Makni, Francoeur & Bellavance, 2009), thereby creating a gap in knowledge. Previous researches of this nature have used singular dataset and methods to investigate the same central theme of the relationship between environmental cost and financial performance.

### III. METHODOLOGY

#### Research Design

Ex-post facto research design was employed for the study. The study was treated as ex-post facto research since it relied on historical data. This is appropriate because ex-post facto research aims at measuring and establishing the relationship between one variable and another in which the variables involved are not manipulated by the researcher.

#### Population and Sample Size

Ex-post facto research design was employed for the study. The entire eleven (11) Oil

and Gas companies were selected as the sample size of this study with the utilization of purposive sampling method. Data were gathered from the published financial statements of the eleven (11) Oil and Gas companies for eleven (12) years period spanning from 2008-2019.

namely; Japaul Oil & Maritime Services Plc, Oando Plc, Beco Petroleum Products Plc, Capital Oil Plc, Conoil Plc, Rak Unity Petroleum Plc, Eterna Plc, Forte Oil Plc, Mobil Oil Plc, MRS Oil Nigeria Plc and Total Nigeria Plc.

Data were sourced from the annual report and accounts of the sampled quoted oil and gas companies. Ratios of both the dependent and independents variables were computed from the data extracted from publications.

#### Method of Data Analysis

The data analysis for the study took the form of descriptive statistics and inferential statistics. This research work adopted the Ordinary Least Square (OLS) regression analysis with longitudinal (panel) regression using E-Views 9.0 statistical software. The reason for adopting panel data regression is because of the number of Oil and Gas firms and the period of time involved (Koutsoyiannis, 2001).

#### Research Variables

##### Independent Variables

The independent variable in this study is environmental cost which was proxied with: Employee Health and Safety Cost, Waste Management Cost and Community Development Cost, Environmental Remediation Cost and Compliance Cost.

- i) Waste Management Cost (WMC): Obtained from the annual reports and accounts of the respective sampled companies for the study period (various issues).
- ii) Community Development Cost (CDC): Obtained from the annual reports and accounts of the respective sampled companies for the study period (various issues).

##### Dependent Variables

The dependent variable which is financial performance was measured by:

**Tobin's Q:** A ratio of a company's market value to its total asset value. The Q ratio is calculated as the market value of a company divided by the replacement value of the firm's assets.

$$\text{Tobin's Q} = \frac{\text{Total Market Value of Firm}}{\text{Total Asset Value}}$$

##### Control Variables



In conducting the linear multiple regression analysis, the following control variables were included:

(a) Size of the firm (FSZ): Size of the firm as measured by the natural log of total assets, is used to control the impact of size on wealth creation.

(b) Leverage (LEV): Financial leverage as measured by total debt divided by total equity is used to control the impact of debt servicing on corporate performance and wealth creation

$$LEV = \frac{\text{Total debt}}{\text{Total equity}}$$

**Model Specification**

The following research models were formulated in line with the research hypotheses in order to empirically determine the effect of environmental cost on financial performance.

$$TQ_{it} = \beta_0 + \beta_1 WMC_{it} + \beta_2 FSZ_{it} + \beta_3 LEV_{it} + \mu_{it}$$

$$TQ_{it} = \beta_0 + \beta_1 CDC_{it} + \beta_2 FSZ_{it} + \beta_3 LEV_{it} + \mu_{it}$$

**Legend:**

TQ<sub>it</sub> = Tobin’s Q of firm i in period t

WMC<sub>it</sub> = Waste Management Cost of firm i in period t

CDC<sub>it</sub> = Community Development Cost of firm i in period t

FSZ<sub>it</sub> = Firm Size of firm i in period t

LEV<sub>it</sub> = Leverage of firm i in period t

μ<sub>i,t</sub> = component of unobserved error term of firm i in period t

β<sub>0</sub> = constant term

β<sub>1</sub>, β<sub>2</sub> and β<sub>3</sub> = are slopes to be estimated of firm i in period t.

i = firm identifier (11 firms)

t = time variable = years covered

**Decision Rule:**

Accept H<sub>0</sub>, if the P-value of the test is greater than 0.05, otherwise reject.

**IV. DATA PRESENTATION AND ANALYSIS**

**Data Analysis**

**Table 1 Descriptive Statistics**

	TQ	WMC	CDC	FSZ	LEV
Mean	0.359167	0.155833	0.198333	11.08667	9.278333
Median	0.220000	0.150000	0.175000	11.03500	8.965000
Maximum	1.230000	0.390000	0.670000	12.57000	11.06000
Minimum	0.030000	0.010000	0.050000	9.930000	7.250000
Std. Dev.	0.330494	0.096997	0.156718	0.885698	1.110150
Skewness	1.698272	0.932009	2.454440	0.104796	-0.071313
Kurtosis	5.087121	4.004731	8.253733	1.742367	2.146244
Jarque-Bera	7.946290	2.242024	25.84941	0.812785	0.374620
Probability	0.018814	0.325950	0.000002	0.666049	0.829187
Sum	4.310000	1.870000	2.380000	133.0400	111.3400
Sum Sq. Dev.	1.201492	0.103492	0.270167	8.629067	13.55677
Observations	12	12	12	12	12

Source: E-Views 9.0 Descriptive Output, 2021

**Interpretation**

Table 1 presents the descriptive statistics for the different variables of the study with an observation of 132 (i.e 11 firms x 12 years). Mean is the most commonly used measure of central tendency. The standard deviation shows the deviation/dispersion/variation from the mean. It is a measure of risk, the higher the standard deviation, the higher the risk. The standard deviation is a measure that summarizes the amount by which every value within a dataset varies from the mean. It is the most robust and widely used measure of dispersion. Skewness indicates the symmetry of the distribution. A skewed distribution which is positive indicates scores that are clustered to the left, and the tail of the distribution extending to the

right while a negatively skewed distribution demonstrates scores that are clustered to the right and the tail of the distribution extends to the left. Kurtosis on the other hand, defines the peak of the distribution. Positive kurtosis is indicated by a peak. Negative kurtosis is indicated by a flat distribution. The data set in table 4.1 shows a mean and standard deviation for: TQ = 0.359 and 0.330; EHSC = 0.147 and 0.080; WMC = 1.556 and 0.097; CDC = 0.198 and 0.157; ERC = 0.684 and 0.180; CC = 0.115 and 0.015; FSZ = 11.087 and 0.886; LEV = 9.278 and 1.110 suggesting a skewed distribution. Concerning the normality tests; skewness and kurtosis of the models were analyzed. All the variables in table 1 seem to indicate that the model seems to be close to the

normal distribution since the results are positively skewed.

### Test of Hypotheses

#### Test of Hypothesis One

**H<sub>0</sub>:** Waste Management Cost has no significant effect on Tobin's Q of Nigerian Oil and Gas Companies.

**H<sub>1</sub>:** Waste Management Cost has significant effect on Tobin's Q of Nigerian Oil and Gas Companies.

**Table 2 Ordinary Least Square Regression Analysis between Tobin's Q and Waste Management Cost**

Dependent Variable: TQ  
Method: Least Squares  
Date: 04/16/21 Time: 12:16  
Sample: 2008 2019  
Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.071754	0.714315	0.100452	0.9202
WMC	0.017450	0.378892	2.685333	0.0083
FSZ	0.028587	0.165101	0.173148	0.8628
LEV	-0.009593	0.158299	-3.060603	0.0008
R-squared	0.459828	Mean dependent var		0.493763
Adjusted R-squared	0.435721	S.D. dependent var		0.845262
S.E. of regression	0.830028	Akaike info criterion		2.497783
Sum squared resid	80.60664	Schwarz criterion		2.590206
Log likelihood	-147.1159	Hannan-Quinn criter.		2.535320
F-statistic	12.81784	Durbin-Watson stat		1.012088
Prob(F-statistic)	0.000000			

E-Views 9.0 output, 2021

### Interpretation of Regression Result

The results in Table 2 indicate that there is a significant association between WMC, LEV and TQ as indicated by the t-statistic and p-value value of 2.685333 and 0.0083; -3.060603 and 0.0008 respectively, while a non-significant relationship exist between FSZ and TQ with a t-statistic value of 0.173148 and p-value of 0.8628. However, the Beta coefficient value shows that WMC ( $\beta_1=1.017450$ ); FSZ ( $\beta_2=0.028587$ ) and LEV ( $\beta_3=-0.009593$ ). The implication is that there is a positive relationship WMC, FSZ and TQ, while, on the other hand, a negative relationship exist between LEV and TQ. The adjusted R-squared of 0.435721 of the estimated model revealed that the independent (WMC) and control variables (FSZ, LEV) explain the variability in the dependent variable (TQ) up to 44% approximately. The Durbin-Watson value is 1.012088 shows that the model is free from serial correlation since it not more than 2 approximately. The F- value of 12.81784 indicates that the parameter estimate cannot be dismissed at 5% level of significance.

This is due to the fact that the associated P-value = 0.000000 is less than the critical P-value of 5% (0.05).

### Decision

The alternative hypothesis ( $H_1$ ) is accepted since the Prob (F-statistic) = 0.000000 is less than the critical P-value at 5% (0.05). It indicates that the explanatory variables are jointly significant at explaining or causing variation in the dependent variable (Tobin's Q), which means that Waste Management Cost has significant positive effect on Tobin's Q of Nigerian Oil and Gas Companies at 5% level of significance.

### Test of Hypothesis Two

**H<sub>0</sub>:** Community Development Cost has no significant effect on Tobin's Q of Nigerian Oil and Gas Companies.

**H<sub>1</sub>:** Community Development Cost has significant effect on Tobin's Q of Nigerian Oil and Gas Companies.

**Table 3: Ordinary Least Square Regression Analysis between Tobin's Q and Community Development Cost**

Dependent Variable: TQ				
Method: Least Squares				
Date: 04/16/21 Time: 1:10				
Sample: 2008 2019				
Included observations: 12				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.057948	0.733904	0.078959	0.9372
CDC	0.515852	0.259006	2.991659	0.0009
FSZ	0.133058	0.169263	4.786099	0.0000
LEV	-0.130548	0.160848	-4.811624	0.0000
R-squared	0.534613	Mean dependent var		0.493763
Adjusted R-squared	0.509860	S.D. dependent var		0.845262
S.E. of regression	0.841084	Akaike info criterion		2.524250
Sum squared resid	82.76850	Schwarz criterion		2.616673
Log likelihood	-148.7171	Hannan-Quinn criter.		2.561786
F-statistic	31.38307	Durbin-Watson stat		1.112146
Prob(F-statistic)	0.000000			

E-Views 9.0 Regression Output, 2021

The relationship estimated for the model is shown thus:

$$TQ = 0.057948 + 0.515852CDC + 0.133058 FSZ - 0.130548LEV$$

The model shows that CDC, FSZ, LEV significantly affect listed oil and gas companies' performance as measured by TQ. The results also indicate that, CDC, FSZ and LEV are all significant at 5% level of significance. This result implies that the more the Nigerian oil and gas companies spent money on community development, the better their performance. Serial correlation is proved to be absent based on the Durbin-Watson statistic result of 1.112146. Based on the analysis results therefore, this study rejects the hypothesis that community development cost has no significant effect on the performance of Nigerian listed oil and gas companies. Moreover, the model summary of the regression results shows the combined effect of CDC, FSZ and LEV variables on the financial performance of Nigerian listed oil and gas companies as shown by the Prob(F-statistic) = 0.000000, to be statistically significant at 5% level. The combined  $R^2$  which is the coefficient of determination is 0.51. This means that 51% of the performance of Nigerian listed oil and gas companies is explained by CDC, FSZ and LEV while the remaining 49% is explained by other factors outside the model.

### Decision

Going by the empirical deduction, which reports that Prob (F-statistic) = 0.000000 is less than the critical P-value of 0.05, thus,  $H_1$  is accepted and  $H_0$  is rejected. The implication of this result is that Community Development Cost has significant positive effect on Tobin's Q of Nigerian Oil and Gas Companies at 5% level of significance.

### V. DISCUSSION OF FINDINGS

The regression results for hypothesis one indicate that there is a significant association between WMC, LEV and TQ as indicated by the t-statistic and p-value value of 2.685333 and 0.0083; -3.060603 and 0.0008 respectively, while a non-significant relationship exist between FSZ and TQ with a t-statistic value of 0.173148 and p-value of 0.8628. However, the Beta coefficient value shows that WMC ( $\beta_1=1.017450$ ); FSZ ( $\beta_2=0.028587$ ) and LEV ( $\beta_3= -0.009593$ ). The implication is that there is a positive relationship WMC, FSZ and TQ, while, on the other hand, a negative relationship exist between LEV and TQ. The adjusted R-squared of 0.435721 of the estimated model revealed that the independent (WMC) and control variables (FSZ, LEV) explain the variability in the dependent variable (TQ) up to 44% approximately. The F-value of 12.81784 indicates that the parameter estimate cannot be dismissed at 5% level of significance. This is due to the fact that the associated P-value = 0.000000 is less than the critical P-value of 5% (0.05).

The model for hypotheses two showed that CDC, FSZ, LEV significantly affect listed oil and gas companies' performance as measured by TQ. The results also indicate that, CDC, FSZ and LEV are all significant at 5% level of significance. This result implies that the more the Nigerian oil and gas companies spent money on community development, the better their performance. Serial correlation is proved to be absent based on the Durbin-Waston statistic result of 1.112146. Based on the analysis results therefore, this study rejects the hypothesis that community development cost has no significant effect on the performance of Nigerian listed oil and gas companies. Moreover, the model summary of the regression results shows the combined effect of CDC, FSZ and LEV variables on the financial performance of Nigerian listed oil and gas companies as shown by the Prob(F-statistic) = 0.000000, to be statistically significant at 5% level. The combined  $R^2$  which is the coefficient of determination is 0.51. This means that 51% of the performance of Nigerian listed oil and gas companies is explained by CDC, FSZ and LEV while the remaining 49% is explained by other factors outside the model.

## VI. CONCLUSION AND RECOMMENDATIONS

This study found that if oil and gas companies in Nigeria participate actively on environmental activities, it would significantly improve the financial performance of the oil and gas companies in Nigeria. Thus, this study supports the mounting evidence that environmental costs have a significant relationship and exerts significant effect on financial performance at 5% significant level. The study further concludes that the components of environmental costs (Waste Management Cost and Community Development Cost) reflected in this study are important variables in explaining financial performance of oil and gas companies in Nigeria.

Based on the findings of this study, the following recommendations were made:

1. Oil and gas firms should get more involved in waste management activities, since cost on waste management is more committed in improving organizational performance.
2. Government should give tax credit to organizations that participate and contribute towards community development in order to encourage community development and which would go a long way in enhancing firm performance.

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