

A Comparative Analysis of Effect of Environmental Accounting Cost on Productivity of Oil and Gas & Industrial Goods Firms in Nigeria

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Abstract

This study examined comparative analysis of effect of environmental accounting cost on productivity of oil and gas and industrial goods firms in Nigeria. The specific objective of this study was to determine effect of environmental accounting cost on the productivity of oil & gas and industrial goods firms in Nigeria for the period 2009 – 2018. The study adopted three specific objectives: to ascertain effect of economic accounting cost on firm productivity; to determine effect of discretionary accounting cost on firm productivity; and to examine effect of ethical accounting cost on firm productivity. The study employed the *ex-post facto* research design and data were collected on the annual reports and financial statements of six sampled firms in the two sectors. The 3 Oil and Gas firms that were purposively sampled include Mobil Nig. Plc, MRS and Total Nig. Plc, while the 3 industrial goods firms are Berger Paints PLC, Dangote Cement PLC and First Aluminum Nig. PLC. Data were analyzed using SPSS V. 20.0 and findings revealed that economic cost and ethical cost had significant effect on productivity while discretionary accounting cost had no significant effect on productivity of oil and gas firms in Nigeria. It was also found that economic, discretionary and ethical accounting costs had no significant effect on productivity of the industrial goods firms in Nigeria. The study recommended that management should consolidate effort on economic and ethical accounting costs in order to enhance productivity of the economy and to stabilize the communities where oil and gas as well as industries operate in Nigeria.

Keywords: Comparative Analysis, Environmental Accounting Cost, Oil & Gas, Industrial Goods firms, Nigeria.

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1. Background of the study

The environment of humans, other living things and industries the world over has continued to generate interesting but curious debates on how to improve on the quality and the standard of life. Nigeria is a member of the universe and it shares in the teething challenges that the universe is currently going through today. The Oil and Gas firms as well as the industrial companies in Nigeria are the two most referred sectors where environmental challenges are experienced on monumental proportion. The activities of firms in this have continued to cause deforestation, desertation, soil erosion, air and water pollution, etc. The Oil and Gas companies engage in oil exploration and onshore as well as off-shore drilling of crude oil in most of the Niger Delta region of Nigeria.

The industrial firms on the other hand, are highly concentrated in some of the industrial towns in Nigeria such as Lagos, Kaduna, Aba and parts of Ogun state. Nigeria is not yet a fully industrialized country but it is pertinent to say that industrial activities centering on manufacturing have been part of the environmental issues.

Their activities are intended to increase economic growth and development but the effect of their operations is something of great concern. These operations cause a lot of changes with their attendant consequences.

There are industries where soap and detergents, household wares, textiles, paints, pharmaceuticals, industrial chemicals, alkaline and salt, cement and spare parts, etc are produced. These industries emit industrial wastes and gases that affect the atmosphere, waterways and the entire ecosystem on annual bases.

Commenting on the Nigerian environment, Omofonmuan and Osa-Edo (2017) said that: “these changes occur as the people attempt to acquire their seemingly endless desire for food, shelter, recreation and infrastructural facilities. Though these wants and desires contribute to the development of the country, the unwise use of the land and its resources produce negative impacts on the environment.”

Nosakhare, Adam and Ahmad (2016) opined that the environmental situation when viewed from a legal point is not in any way encouraging as there is absence of legislation warranting companies to make any form of disclosure. Nevertheless, there is a legal provision companies must adhere to before they can embark on major projects. The researchers were of the view (citing Environmental Impact Assessment Act, 2003) that an environmental impact assessment must be carried out as guided by the Act. The increase in global environmental

awareness and the campaign for sustainable economic development is redirecting the attention of firms towards environmental sensitivity (Ngwakwe, 2008 cited in Ezeagba, Umeoduagu and John-Akamelu 2017).

The two sectors under study (industries and the oil and gas firms) are believed to be highly involved in annual reporting or disclosure of accounting practices on activities concerning the social, economic, ethical and even legal environments. These activities are examined in this study with a view to having a comparative understanding of disclosures of social responsibilities in these two sectors of the Nigerian economy.

1.2 Statement of the Problem

The word ‘environment’ is used to explain all that nature provides, vis-à-vis, the activities of individual firms and the economy. Environment accounting disclosure or practices has been the main focus of many researchers in the very recent times due to the importance attached to firm performance.

The researchers have found a common understanding among previous empirical works that disclosures of environmental accounting practices have helped firms to gainfully exploit or raise the level of performance. The review of most researchers’ works seem to be more concentrated on the aspect of environment accounting practices that disclose only social responsibility on donations, gifts, scholarships, health and educations as pertaining to the environments where the firms operate. Quite a number of the firms studied in the past are those from the oil and gas sector but a few from the industrial goods firms sub-sector.

From the empirical evidence on the studies made on disclosures of accounting practices, it was found that no comparison has been made on these two important sub-sectors in Nigeria. This research is focused on comparison between disclosure on oil and gas firms and accounting practices by industrial goods firms in Nigeria.

1.3 Objectives of the Study

The broad objective of this study is to analysis, in comparative terms, effect of environmental accounting cost on the productivity of oil and gas and industrial goods firms in Nigeria. To achieve this objective, the study has been decomposed into the following specific objectives for the two sectors:

- i) To ascertain effect of economic accounting cost on firm productivity
- ii) To determine effect of discretionary accounting cost on firm productivity
- iii) To examine effect of ethical accounting cost on firm productivity

1.4 Research Questions

- i. What effect does economic accounting cost have on firm productivity?
- ii. To what extent does discretionary accounting cost have on firm productivity?
- iii. What effect does ethical accounting cost have on firm productivity?

1.5 Statement of Hypotheses

The answers to the research questions were tested using the following statement of hypotheses

- i. Economic accounting cost does not have significant effect on firm productivity in Nigeria
- ii. Discretionary accounting cost does not have significant effect on firm productivity in Nigeria
- iii. Ethical accounting cost does not have significant effect on firm productivity in Nigeria

1.6 Significance of the Study

The study is significant because it is going to be of benefit to the following:

Management

The findings will assist the management of both Oil and Gas firms as well as the Industrial companies to make decisions on how to handle future disclosures of their accounting practices. The study is capable of drawing the attention of those managements to the need for proper and effective disclosure of the firms’ accounting practices.

Researchers

The outcome and recommendations will provide some clue to future researchers. The literature and comments of the researcher will add knowledge to the subject matter of this research. The information obtained is capable of helping future investigators get quality data for better research process.

Analysts

The study will enhance the ability of analysts to give true meaning to the interpretations or judgments served by the researcher on similar reports. This approach is capable of mirroring into the future to see the prospects and challenges that such effort entails.

The General Public

The general public is capable of benefitting from the findings of this study. It will give a broader understanding of what obtains in the oil and gas industry as well as the industrial goods sector of Nigeria.

Other Users of Accounting Information

The recommendations from this study will be of benefit to users of accounting information. It is capable of assisting such one to be refreshed about the subject of disclosure of accounting practices and the effect it has on the Nigerian environment.

1.7 Scope of the Study

The study was carried out in Nigeria on the disclosure of accounting practices in two sectors, namely, oil and gas firms and the industrial sector. The specific areas covered are three, that is, disclosures on ethical accounting practices, economic accounting practices and discretionary accounting practices of the firms in those two sectors of the Nigerian economy. The study covered a period of 10 years, i.e. 2009-2018. The choice of 2009 - 2018 was informed by the intention to cover a period of 10 years up to the time when we embarked on the research work in 2019. The period of 10 years, in our estimation, is fair enough for the assessment of a reporting entity.

1.8 Limitation of the Study

Despite the efforts made by the researcher, it was not possible to obtain a complete set of data in respect of some the companies under study, hence a small size of the sample firms under study in each of the two sectors. The larger the size of the samples, the higher the expected results in the analyses for decision purposes.

2. Review of Related Literature

2.1 Conceptual Review

Since the study is concerned with the costs of environment accounting practices. The following concepts are hereby examined:

2.1.1 Accounting Cost

Bragg (2019) defines Accounting Cost as the recorded cost of an activity. An accounting cost is recorded in the ledgers of a business, so the cost appears in an entity's financial statements. If an accounting cost has not yet been consumed and is equal to or greater than the capitalization limit of a business, the cost is recorded in the balance sheet. If an accounting cost has been consumed, the cost is recorded in the income statement. If cash has been expended in association with an accounting cost, the related cash outflow appears in the statement of cash flows. A dividend has no accounting cost, since it is a distribution of earnings to investors.

An accounting cost is most typically recorded via the accounts payable system. It can also be recorded through a journal entry for individual transactions, or through the payroll system for compensation-related costs.

The scope of an accounting cost can change, depending on the situation. For example, a manager wants to know the accounting cost of a product. If this information is needed for a short-term pricing decision, only the variable costs associated with the product need to be included in the accounting cost. However, if the information is needed to set a long-term price that will cover the company's overhead costs, the scope of the accounting cost will be broadened to include an allocation of fixed costs.

According to Sineriz (2018) when it comes to corporations, social responsibility may not be the first thing that comes to mind. While some corporations are focused exclusively on the bottom line, many businesses adopt a broader view of their mission. Different models of corporate social responsibility exist, but a common one focuses on four components: economic, legal, ethical and discretionary. These are the areas (except legal social responsibility) where the disclosures in this study are centred on.

2.1.2 Economic accounting cost

These are the costs associated with statutory payments to governments by firms e.g. paying business taxes and other financial obligations usually disclosed in the annual financial statements of firms. The disclosure of economic accounting costs are usually contained in the annual reports of the firms as required under the law. It is a social responsibility companies owe to government of a country.

Sineriz (2018) in Akparhuere (2019) describes economic social responsibility reporting or disclosure as responsibility that begins with being profitable in business and capable of sustaining payment of employees' salaries and wages, paying business taxes and other financial obligations.

2.1.3 Discretionary accounting cost

This has to do with reporting based on firms' ability to apply discretion in disbursement of part of their income to their immediate communities with respect to giving of gifts, donations, provision of electricity, water, scholarships, medical facilities and building of schools, etc. This may include providing your employees with opportunities to volunteer; donating money, services or products to charitable organizations; or initiating your own charitable organization that ties into your company's mission and goals (Sineriz, 2018).

2.1.4 Ethical accounting cost

It is ethical accounting cost if firms faithfully report or disclose their financial obligations towards staff or workers. Firms that pay staff salaries and wages, and other entitlements are ethically responsible.

Sineriz (2018) opined that "economic and legal corporate responsibility provides the groundwork for

corporations to move into ethical social responsibility, which means doing the right thing at all levels of your business. This ranges from paying employees a living wage to ensuring that the companies you work with and buy materials from are abiding by all labor laws. In addition to ensuring ethical workplace practices, you should also look at the environmental impact your business makes.”

2.2 Theoretical Framework

Legitimacy Theory

This study was anchored on the legitimacy theory propounded by Mark CSuchman (1995). The theory according to Aghdam (2015), cited by Akparhuere (2019) simply implies that companies’ consideration, concern and expectation should appear legitimate in stakeholders’ point of view and to pledge that their activities are in socially and acceptable and safe manner. As the organization continues to operate within the domain and norms of society and predicts a firm will use many disclosure strategies to preserve an image of a socially responsible corporate citizen to ensure continued access to resources needed for the success of the business.

2.3 Empirical Review

Nosakhare et al (2016) provided a detailed description of the length of Nigerian companies that disclose environmental information. The research design adopted by this study is basically descriptive in nature. The study utilized an unbalanced panel data structure of 142 sampled companies for a five year period (2009-2013). The study followed a checklist to identify the sentences related to environmental information from the annual reports with the aid of content analysis. It was found out that the length of disclosure of environmental information is approximately three sentences per company which is very low, especially in comparison with other developed and developing countries. It was also found that following the events that led to the revision of the code of corporate governance that occurred in 2011, there was a steady increase in the quantity disclosed over time.

Akparhuere (2019) carried out a comparative study on Environment Reporting in Annual Reports of Listed Firms in Nigeria. The broad objective of this study was to carry out a comparative analysis of reporting practices and its effect on performance (proxy by total assets) of listed oil and gas firms on the one hand and consumer goods firms in Nigeria (on the other hand). The study adopted the *ex-post facto* research design whereby existing and published data of reporting companies have been sought through their annual reports. Data for analyses were obtained through secondary sources, namely, the annual reports and accounts of the sampled companies. The Nigerian oil and gas subsector has 12 listed firms while the manufacturing sub-sector has 31 companies, from which three firms each (total of six) were sampled for the study. The purposive sampling technique was adopted in the choice of firm to be included in the study; Mobil oil and gas, MRS Oil Nig plc and Total Nig plc were chosen from the oil and gas sector while Nestle Nig plc, Nigerian Breweries plc, and Dangote flour Mills were selected from the consumer goods industry. The analyses adopted the use of SPSS version 20.0 and the essential tools were the correlation coefficient, the coefficient of determination and the simple regression analysis model. It was found that discretionary social responsibility reporting practices (donations and gifts) have significant effects on performance of both oil and gas firms and consumer goods companies in Nigeria. The study recommended that firms should consolidate on discretionary SR practices to ward off restiveness in the communities where they operate.

Bassey, Effiok and Eton (2013) examined the impact of environmental accounting and reporting on organizational performance with particular reference to oil and gas companies operating in the Niger Delta Region of Nigeria. The study was conducted using the Pearson’s Product Moment Correlation Co-efficient. The samples were selected by means of random and stratified sampling technique. Data were gathered from primary and secondary sources. Data collected were presented using tables. It was found from the study that environmental cost has satisfied relationship with firm’s profitability. The study concluded that environmentally friendly firms will significantly disclose environmental related information in financial statements and reports. The study recommended that firms should adopt a uniform method of reporting and disclosed environmental issues for the purpose of control and measurement of performance and that accounting standards should be published locally and internationally and reviewed continually to ensure dynamism and compliance to meet environmental and situational needs.

Nwaiwu and Oluka (2018) examined the effect of environmental cost disclosure and financial performance measures of quoted oil and gas companies in Nigeria. 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 reviewed showed adequate disclosure on environmental cost, compliance to corporate environmental regulations have positive significant effect on financial performance measures. Thus the study recommended regulatory enforcement for adequate environmental cost disclosure and proper reporting. Management of oil and gas companies in Nigeria should develop a well-articulated environmental costing

system in order to guarantee a conflict free corporate atmosphere for improved corporate performance.

Ezeagba, John-Akamelu and Umeoduagu (2017) investigated the relationship of environmental accounting disclosures and financial performance of food and beverage companies in Nigeria. Specifically, the study examined the relationship between environmental accounting disclosures and return on equity of food and beverage companies in Nigeria. It also examined the relationship between environmental accounting disclosures and return on capital employed of food and beverage companies in Nigeria, among others. Four hypotheses were formulated and tested in line with the objectives of the study. Data for the study were collected through secondary sources and analyzed using Pearson's correlation statistical technique and multiple regression, with the aid of SPSS version 20.00. The study revealed a significant relationship between environmental accounting disclosures and return on equity of selected companies. It also revealed a negative relationship between environmental accounting disclosures and return on capital employed and net profit margin of selected companies. Based on these findings, the researcher recommended among others, that firms should adopt uniform reporting and disclosure standards of environmental practices.

Etale and Otuya (2018) examined the relationship between environmental responsibility reporting and financial performance of quoted oil and gas companies in Nigeria. The study used secondary data obtained from the annual reports of 13 oil and gas companies quoted on the floor of the Nigeria Stock Exchange (NSE) for the years 2012-2017. The study adopted the ordinary least square (OLS) regression method as the basic technique of data analysis. The study found significant positive relationship between financial performance and environmental responsibility reporting in the oil and gas sector of Nigeria. However, the findings of the study indicate that environmental responsibility reporting in Nigeria is still developing and that organizations operating in the oil and gas sector report very little information about the impact of their operations on the environment. This finding is not quite surprising as most multinational oil and gas companies are not quoted on the NSE, as such were not included in the study. The study recommended, amongst others, that the relevant authorities in the country formulate regulatory policies for the oil and gas sector organizations to abide by in order to include more information on environmental responsibility practices in their annual reports.

Jerry, Teru and Musa (2015) analyzed environmental accounting disclosures practices of Nigerian quoted firms and see how it varies from one company to another since there are no mandatory disclosure guidelines. The sample size of 8 quoted companies was selected from 19 consumer goods companies listed on the Nigerian stock exchange. Content analysis was used to obtain data from annual reports of the selected firms. And the data obtained were analyzed using one way analysis of variance to test the hypothesis. The analysis revealed that accounting standards do not have significant influence on environmental accounting disclosures. The study therefore recommended that it would be proper if the international accounting standards setting body should formulate a uniform standard on how companies should disclose their environmental accounting information.

Nwobu (2017) carried out a study to assess how institutional field and internal organizational process factors determine sustainability reporting based on new institutional theory and legitimacy theory. The study employed longitudinal and survey research design to actualize its objectives. Primary data was collected using questionnaires administered to companies to decipher the importance and performance of factors that determine sustainability reporting in Nigeria. A total of fifty four (54) corporate participants responded to the survey. Secondary data from annual reports, sustainability reports of companies and organizations were also used to actualize the objectives in this study. Panel data regression techniques namely Fixed Effects estimation and Random Effects estimation in addition to Pooled Ordinary Least Squares regression was carried out on the secondary data collected from corporate reports. Based on the Hausmann specification tests, the fixed effects model was more appropriate. The results based on 2010 to 2014 data on sustainability reporting, institutional field factors and reporting process factors lend some support to the new institutional theory and legitimacy theory. The analyses also showed that there was a statistical significant variation in sustainability reporting from year 2010 to 2014 in the sample companies. Also, stakeholder engagement had a significant positive relationship with sustainability reporting. The study concluded that stakeholder engagement is crucial for sustainability reporting.

Ebieri (2018) investigated the effect of sustainability costs on net-worth of firms' listed on Nigeria stock exchange for the period 2005-2015, a period of substantial deregulation of the Nigeria economy. The study employed *ex-post facto research design* and extracted cross section data from eleven (11) years annual reports of twenty (20) listed companies using non-probability sampling technique. The twenty (20) listed firms were selected using judgmental sampling technique from three (3) sectors namely; Industrial goods, Consumer goods and financial services sectors based on their perceived high activities. The study adopted the ordinary least squares based unbalanced panel data regression technique and engaged longitudinal data set of two hundred and fourteen (214) observations. The results revealed that sustainability costs affect net-worth of listed firms in Nigeria in line with a priori expectation. It was also revealed that 76.4% of the total variation on net-worth of the listed firms in Nigeria is attributable to changes in sustainability cost included in the model. The study then substantiated that the financial sector has more environmental management philosophy than the consumer goods

and industrial goods sectors, while the consumer goods sector has more environmental friendly disposition than the industrial goods sector. It therefore recommended that the industrial and consumers goods sectors should continue to be more receptive to sustainability issues while companies should identify sustainability activities that would impact the society.

Dike-Wozuru and Micah (2018) also carried out an investigation into the relationship between environmental accounting practices and sustainable development in Nigeria. To achieve the objectives of the study, data was collected from thirty four (34) companies having environmentally related issues in Nigeria. The study adopted the descriptive research design to explain the various findings on related studies and recommended that: Stakeholders should increasingly require companies to manufacture goods efficiently and at competitive prices without harming the environment; to enhance sustainable development by reducing the environmental impact while increasing the value of an enterprise, satisfying human needs; contributing to the quality of life, and resource intensity through environmental performance reporting occasioned by the ratio between an environmental variable and financial variable that measures the environment performance of an enterprise with respect to its financial performance.

Balla and Singh (2018) determined the effect of company characteristics on environmental disclosure on the websites of the selected manufacturing companies listed on the Bangladesh Stock Exchange (BSE) for the financial years 2011-12 to 2015-16. The sample consisted of 61 companies of different manufacturing industries. Regression analysis was used to analyze the data and the results of the study showed that characteristics like age of the company, size of the company and leverage are statistically significant and are positively associated with the environmental disclosure on the websites by the manufacturing companies. On the contrary, ISO 14001 certification, profitability and industry type were statistically insignificant and did not influence the web environmental disclosure by the companies.

Odoemelam and Okafor (2018) carried out an investigation into the influence of corporate governance on environmental disclosure of non-financial firms in Nigeria. The study was anchored on the “Trinity theory” (i.e. agency, stakeholder and legitimacy theories) and 86 companies listed in Nigeria Stock Exchange (NSE) were included using content analysis, cross-sectional data, OLS regression techniques. The results show that board independence, board meeting, and the environmental committee were statistically significant while audit committee independence and board size were insignificant. Among the three company attributes used to mitigate spurious result only firm size significantly influence the quantity of overall environmental disclosure of the sample companies. Auditor type “big 4” (Ernest Young, Deloitte, KPMG, and PwC) and industry membership show insignificant relation to environmental disclosure. The study found that the level of environmental disclosure of non-financial companies in Nigeria is quite insufficient at an average of 10.5 percent and had no significant influence on the extent of environmental disclosure. It was deduced or inferred that the environment where the companies operate is institutionally and legally weak. The study recommended that improvement on environmental law and implementation as well as harmonized environmental reporting infrastructure and standard be used to aid comparison.

Okaro, Ofoegbu and Okafor (2018) explored the link between corporate governance and sustainable development in Nigeria. The study adopted a mixed research design. A survey design was used to identify the perceptions of Accountants, Auditors, Accounting Academics and regulators on whether there is a nexus between good corporate governance and sustainable development in Nigeria. Once identified, a Linkert-type research questionnaire was drawn to elicit information from the respondents. Additionally, focused group discussions, comprising accounting academics at a premier Nigerian University was convoked to also throw light on the issues involved. Descriptive statistics of percentages, mean and standard deviation were used to analyze the data generated by the study. T-test statistic was used to determine the homogeneity of the opinion of the various classes of respondents. The findings were that there is a positive relationship between good corporate governance principles and sustainable development in Nigeria.

After reviewing the literatures, the researcher found that none of the studies did a comparative analysis of the oil and gas as well as the industrial goods sectors in Nigeria. The studies did not also take cognizance of the period, 2009-2018. This study is focused on closing this gap and to add knowledge to the subject under discuss

3. Methodology

3.1 Research Design

The research design adopted in this study is the *ex-post facto* research design. The data for analysis are already available in the form of historical or administrative records of the firms’ annual reports (Onyekwelu, 2015, pp. 226).

3.2 Sources of Data

The study made use of secondary data extracted from published annual reports of the sampled firms. This means that the researcher only acquired the data for the purpose of analysis after the firms have used them primarily.

3.3 Population and Sample of the Study

The study is a comparison of two distinct populations, namely, listed oil and gas firms (represented by N_1) and the industrial goods firms (represented by N_2) in Nigeria. There are 12 listed oil companies and 9 listed industrial goods firms in Nigeria (see appendix). The total population then is $N_1 + N_2 = 21$.

The choice of the firms for study was informed by the fact that the firms have been in existence for a long time and have been consistent in publishing their annual accounts. More so, the researcher discovers that more attention has been given to oil and gas firms than industrial goods firms by scholars with no comparative analysis on the two sectors.

The researcher purposively chose to study a sample size of $n = 6$ firms as follows:

$n_1 = 3$ (Oil and Gas firms)

$n_2 = 3$ (Industrial Goods firms)

Hence $n_1 + n_2 = 6$

The Oil and Gas firms that were purposively sampled include Mobil Nig. Plc, MRS and Total Nig. Plc. while the 3 industrial goods firms are Berger Paints Plc, Dangote Cement Plc and First Aluminum Nig. Plc (see appendices).

3.4 Model Specification

The model adopted in this study is the simple regression equation stated as follows:

$$Y_i = \alpha + \beta \text{Log}(\text{EC}) + \mu_i \quad (\text{i})$$

$$Y_i = \alpha + \beta (\text{Log})\text{DC} + \mu_i \quad (\text{ii})$$

$$Y_i = \alpha + \beta (\text{Log})\text{ET} + \mu_i \quad (\text{iii})$$

3.5 Description of the Variables

The variables in the models are explained as follows:

Y_i is the productivity of firms (proxy by revenue or sales)

α is a constant

EC represents economic social responsibility cost (proxy by tax and other statutory payments to the government)

DC represents discretionary social responsibility cost (proxy by gifts and donations, etc, that are not mandatory under the law)

ET represents ethical social responsibility cost (proxy by staff salaries and benefits)

e_i is the error term in estimation of the model.

3.6 Method of Data Analysis

The data was analyzed electronically using SPSS version 20.0 as applicable to the three specific objectives of this study. The basis statistical instruments in the package are the regression analysis, correlation co-efficient (r), coefficient of determination (R^2), t-test and F-test for the tests of hypotheses. All tests are carried out using $\alpha = 0.05$.

4. Data Presentation and Analysis

4.1 Data Presentation

Table 1: Pooled Data on environmental accounting costs of selected Oil & Gas Firms

Year	Economic Cost N'000	Discretionary Cost N'000	Ethical Responsibility Cost N'000	Revenue N'000
2009	4,347,875	5,808	7,109,899	290,309,706
2010	4,287,547	6,040	7,412,210	277,276,612
2011	5,027,198	5,200	8,702,393	289,832,945
2012	3,853,266	8,648	6,228,415	250,873,216
2013	4,400,893	10,568	5,006,050	283,825,105
2014	4,813,594	58,825	9,941,648	412,527,836
2015	5,006,949	56,369	10,248,890	359,347,805
2016	9,743,021	278,116	8,570,824	514,037,462
2017	9,776,803	144,606	11,683,966	520,408,106
2018	9,961,021	4,278,609	11,584,006	562,150,250

Source: Compiled by the researcher, 2019

Table 2: Log of Pooled Data on environmental accounting costsof selected oil and Gas Firms

Year	Log of Economic Cost	log of Discretionary Cost	Log Ethical Responsibility Cost	Log Revenue
2009	6.63827705	3.764026608	6.851863431	8.462861556
2010	6.632208894	3.781036939	5.869947715	8.442913239
2011	6.701325991	3.716003344	6.939638692	8.46214775
2012	6.58582899	3.936915681	6.794377542	8.399454297
2013	6.64354081	4.023992805	6.699495183	8.453050807
2014	6.682469457	4.769561936	6.997458382	8.615453259
2015	6.699573168	4.75104033	7.010676832	8.555514996
2016	6.988693639	5.444225975	6.933022577	8.710994771
2017	6.990196864	5.160186313	7.067590285	8.716344053
2018	6.998303856	6.6313026	7.063858774	8.749852408

Source: Compiled by the researcher, 2019

Table 3: Pooled Data on Environmental Accounting Costs of Selected Industrial Goods Firms

Year	Economic Cost N'000	Discretionary Cost N'000	Ethical Responsibility Cost N'000	Revenue N'000
2009	135,940	1760	693,524	10,120,328
2010	5,407,146	4574	769,222	213,810,917
2011	7,824,287	6,619	902,401	252,530,214
2012	4,792,889	1,273,722	1,567,727	296,788,123
2013	6,072,874	1,486,808	8,342,480	383,510,188
2014	158,913	38,906	10,363,229	383,458,665
2015	138,679	3,405	38,877,256	402,715,497
2016	192,034	934	52,400,720	428,731,824
2017	484,159	1,419	15,627,983	66,334,764
2018	223052	1,063,012	17,059,075	621,678,223

Source: Compilation by the researcher, 2019

Table 4: Log of Pooled Data on Environmental accounting costs of selected Industrial Goods Firms

Year	Log of Economic Cost	Log of Discretionary Cost	Log of Ethical Responsibility Cost	Log of Revenue
2009	5.133347266	3.245512668	5.841061495	7.005194588
2010	6.732968096	3.66029616	5.886051697	8.330029876
2011	6.893444772	3.820792381	5.955399568	8.402313347
2012	6.680597371	6.100507465	6.195270438	8.472446517
2013	6.78339427	6.172254889	6.921295174	8.583776906
2014	5.201159426	4.590016582	7.015495095	8.583718556
2015	5.142010701	3.532117116	7.589695604	8.604998342
2016	5.283378128	2.970346876	7.719337254	8.632185722
2017	5.684988009	3.151982395	7.19390293	7.821741188
2018	5.348406122	6.026538167	7.231955479	8.793565655

Source: Compilation by the researcher, 2019

4.2 Data Analysis

4.2.1 Analysis on Oil & Gas firms

Hypothesis 1

H₀: Economic accounting cost does not have significant effect on productivity of oil and gas firms in Nigeria

Decision rule: Accept H₀ if p-value > 0.05, otherwise reject.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.944 ^a	.891	.877	41243233.439

a. Predictors: (Constant), EC

The model summary of analysis indicates that there is a very strong and positive correlation between economic accounting cost and productivity of oil and gas firms in Nigeria. With $r = 0.944$ and $R^2 = 0.891$ or 89.1 percent, we can deduce that economic cost (taxation) strongly explains or determines the changes in productivity

of the oil and gas firms in Nigeria.

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	p-value
1	Regression	111230285370742176.000	1	111230285370742176.000	65.391	.000 ^b
	Residual	13608034436046042.000	8	1701004304505755.200		
	Total	124838319806788224.000	9			

a. Dependent Variable: Y

b. Predictors: (Constant), EC

The test of hypothesis shows that the p-value = 0.000. Since p-value < 0.05, we do not accept the null hypothesis but we conclude that economic cost has significant effect on the productivity of oil and gas firms in Nigeria.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	p-value
		B	Std. Error	Beta		
1	(Constant)	112440184.521	35112100.257		3.202	.013
	EC	43.062	5.325	.944	8.086	.000

a. Dependent Variable: Y

We can state the research model for this relationship as follows:

$$Y_i = 112440184.521 + 43.062(EC) + 5.325$$

This shows that there was a constant annual growth of over ₦112 trillions in productivity value as a result of tackling economic responsibility towards the government or country during the period. There was also a variable annual increase rate of 43.06 percent caused by economic cost handling. These contributions are both significant since the p-values are less than 0.05.

Hypothesis 2

H₀: Discretionary accounting cost does not have significant effect on productivity of oil & gas firms in Nigeria

Decision rule: Accept H₀ if p-value > 0.05, otherwise reject

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.603 ^a	.363	.283	99697494.319

a. Predictors: (Constant), DC

The analysis reveals that at r = 0.603 or 60.3 percent, there is a high and positive correlation between discretionary accounting cost and productivity of oil and gas firms in Nigeria. However, discretionary accounting cost could only explain 36.3 percent of the changes in productivity of oil and gas firms in Nigeria.

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	p-value
1	Regression	45321596818385568.000	1	45321596818385568.000	4.560	.065 ^b
	Residual	79516722988402656.000	8	9939590373550332.000		
	Total	124838319806788224.000	9			

a. Dependent Variable: Y

b. Predictors: (Constant), DC

The test of hypothesis here reveals that p-value = 0.065 and is > 0.05. Therefore, we accept H₀ and conclude that discretionary accounting cost do not have significant effect on productivity of the oil and gas sector of Nigerian economy.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	p-value
		B	Std. Error	Beta		
1	(Constant)	350276964.197	33760004.028		10.376	.000
	DC	53.128	24.880	.603	2.135	.065

a. Dependent Variable: Y

We therefore fit the simple regression model as follows:

$$Y_i = 350276964.197 + 53.128(DC) + 24.880$$

This shows that discretionary accounting cost contributed an estimated annual fixed amount of about

N350.276tr and an estimated marginal contribution of 53.128 over the period.

Hypothesis 3

H₀: Ethical accounting cost does not have significant effect on productivity of Oil & gas firms in Nigeria

Decision rule: Accept H₀ if p-value > 0.05, otherwise reject

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.793 ^a	.629	.583	76037436.783

a. Predictors: (Constant), ET

The model summary shows that at r = 79.3 percent, there is a very high and positive correlation between ethical responsibility cost and productivity of oil and gas firms in Nigeria.

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	p-value
1	Regression	78584785466231440.000	1	78584785466231440.000	13.592	.006 ^b
	Residual	46253534340556792.000	8	5781691792569599.000		
	Total	124838319806788224.000	9			

a. Dependent Variable: Y

b. Predictors: (Constant), ET

The p-value in this ANOVA test is 0.000 which is less than the critical value of 0.05. Therefore, we do not accept H₀ but we conclude that ethical accounting cost has significant effect on the productivity of oil and gas firms in Nigeria.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	p-value
		B	Std. Error	Beta		
1	(Constant)	15007511.546	100841271.822		.149	.885
	ET	41.746	11.323	.793	3.687	.006

a. Dependent Variable: Y

The relationship can be represented in a simple regression model thus:

$$Y = 15007511.546 + 41.746(ET) + 11.323$$

That is ethical accounting responsibility grew productivity at a constant value of over N150tr in the period under study. The marginal increase over this period was 41.746 percent. That was very impressive and significant.

4.2.2 Analysis on Industrial Goods firms

Hypothesis 1

H₀: Economic accounting cost does not have significant effect on the productivity of Industrial goods firms in Nigeria.

Decision rule: Accept H₀ if p-value > 0.05, otherwise reject.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.105 ^a	.011	-.113	190160378.189

a. Predictors: (Constant), EC

The analysis shows that at r = 0.105 and R² = 0.011 economic accounting cost has very weak and positive correlation with productivity of industrial goods firms in Nigeria. Economic cost could not determine more than 1.1 percent of the changes in productivity during the period.

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	p-value
1	Regression	3216546067852520.500	1	3216546067852520.500	.089	.773 ^b
	Residual	289287755464573820.000	8	36160969433071728.000		
	Total	292504301532426370.000	9			

a. Dependent Variable: Y

b. Predictors: (Constant), EC

The p-value in this ANOVA test is 0.773 and is greater than the critical value (0.05 or 5 percent). Therefore, we accept H₀ and conclude that economic cost has no significant effect on productivity of industrial goods firms in Nigeria.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	p-value
		B	Std. Error	Beta		
1	(Constant)	321517901.302	79589522.407		4.040	.004
	EC	-6.115	20.503	-.105		

a. Dependent Variable: Y

The model for this relationship is expressed below:

$$Y_i = 321517901.302 - 6.115(EC) + 20.503$$

The model shows that productivity increased at a constant annual value of about ₦321.517tr and marginally at a negative growth rate of -6.115.

Hypothesis 2

H₀: accounting cost does not have significant effect on productivity of industrial goods firms in Nigeria

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.433 ^a	.188	.086	172316623.232

a. Predictors: (Constant), DC

The analysis shows that $r = 0.433$ and so there is a weak but positive correlation between discretionary cost of social responsibility and productivity of industrial goods firms in Nigeria. Also there is a very small coefficient of determination being R square of 0.188. This means that discretionary cost is not a strong determinant of the changes in productivity of industrial goods firms in Nigeria.

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	p-value
1	Regression	54960152394638736.000	1	54960152394638736.000	1.851	.211 ^b
	Residual	237544149137787648.000	8	29693018642223456.000		
	Total	292504301532426370.000	9			

a. Dependent Variable: Y

b. Predictors: (Constant), DC

The analysis of variance shows that $p\text{-value} = 0.211$. Since $p\text{-value} > \text{the critical value } (0.05)$, we accept the null hypothesis and conclude that discretionary cost responsibility does not have significant effect on productivity of industrial goods firms in Nigeria.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	p-value
		B	Std. Error	Beta		
1	(Constant)	257988476.207	64907649.395		3.975	.004
	DC	125.349	92.135	.433		

a. Dependent Variable: Y

The simple regression model for this relationship is shown as follows:

$$Y_i = 257988476.207 + 125.349(DC_i) + 92.135$$

The model shows that DC contributed a constant annual value of about ₦257.98tr and a marginal value of 125.349. The constant value is significant but the marginal increase was not.

Hypothesis 3

H₀: Ethical responsibility cost does not have significant effect on productivity of industrial goods firms in Nigeria.

Decision rule: Accept H₀ if $p\text{-value} > 0.05$, otherwise reject.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.450 ^a	.203	.103	170721572.695

a. Predictors: (Constant), ET

The value of $r = 0.450$ showing that the relationship between ethical responsibility cost and productivity of industrial goods firms in Nigeria is weak but positive. This position is affirmed by the coefficient of determination which is $R^2 = 0.203$. This shows that ethical responsibility cost affected the productivity of industrial goods firms up to about 20.3 percent. The greater percentage of 70.7 was not determined or could not be explained concerning the period under study.

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	p-value
1	Regression	59337458464387048.000	1	59337458464387048.000	2.036	.191 ^b
	Residual	233166843068039328.000	8	29145855383504916.000		
	Total	292504301532426370.000	9			

a. Dependent Variable: Y

b. Predictors: (Constant), ET

The test of hypothesis using ANOVA has also shown that the p-value is 0.191. Since p-value > the critical value (i.e. 0.05), we do not reject H₀ but we conclude that the cost of ethical responsibility has no significant effect on the productivity of industrial goods firms in Nigeria.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	p-value
		B	Std. Error	Beta		
1	(Constant)	238773829.204	71640208.353		3.333	.010
	ET	4.583	3.212	.450	1.427	.191

a. Dependent Variable: Y

The model for this relationship is expressed as follows:

$$Y_i = 238773829.204 + 4.583(ET_i) + 3.212$$

The result indicates that the cost of Ethical social responsibility grew at a constant amount of about 238.77r and marginally at 4.583 percent during the period. The constant value is quite significant but the marginal growth is quite little.

5. Summary of Findings, Conclusion and Recommendations

5.1 Summary of Findings

The summary of findings is in two categories, namely, the findings under oil and gas firms and the ones under the industrial goods firms in Nigeria. The comparison is as follows:

i) Economic responsibility cost had significant effect on productivity of oil and gas firms in Nigeria but it had no significant effect on productivity of industrial goods firms in Nigeria.

Proof: The test of hypothesis shows that the p-value = 0.000. Since p-value < 0.05 for oil and gas firms in Nigeria while the p-value in the ANOVA test is 0.773 and is greater than the critical value (0.05) for industrial goods firms in Nigeria.

ii) Discretionary responsibility cost had no significant effect on productivity of oil and gas firms in Nigeria and also had no significant effect on productivity of industrial goods firms in Nigeria.

Proof: The test of hypothesis here reveal that p-value = 0.065 and is > 0.05 for the oil and gas firms in Nigeria. Equally the analysis of variance shows that p-value =0.211 and is > 0.05 under industrial goods firms in Nigeria

iii) Ethical responsibility cost had significant effect on productivity of oil and gas firms in Nigeria but it had no significant effect on productivity of industrial goods firms in Nigeria

Proof: The p-value in this ANOVA test is 0.000 which is less than the critical value of 0.05 for oil and gas firms in Nigeria but under the industrial goods firms the p-value is 0.191 > the critical value of 0.05.

5.2 Conclusion

The study pursued its objectives to a logical conclusion whereby the results from the three specific objectives in each of the two sectors could be compared accordingly. It was realized that there is only discretionary responsibility cost that did not have significant effect on oil and gas firms but the outcome under industrial goods firms was negative all through. The outcome has shown that the oil and gas industry is more sensitive to the issue of social responsibility reporting in Nigeria and suggests that there is neglect of discretionary costs. The results and recommendations when adopted will be helpful to decision makers in the two sectors.

5.3 Recommendations

i) Management of oil and gas firms should concentrate its effort on meeting economic responsibility cost and help government to realize development effort in the economy. On the other hand the Management of industrial goods firms should upgrade and improve on economic responsibility as there is no significant contribution to the productivity of the sector.

ii) There should be conscious effort to intensify discretionary responsibility cost reporting by oil and gas firms as this would help to bring stability to the communities concerned. It is observed that oil and gas firms are not

doing enough to make the communities where they operate not to be restive.

Similarly, the management of Industrial Goods firms should have deliberate policies aimed at developing the communities where they are operating. That measure would increase patronage and curtail youth restiveness in the environment.

iii) Oil and Gas firms should endeavour to consolidate and build on ethical responsibility cost so that workers' welfare and social satisfaction may be improved. On the other hand, Industrial Goods should as a matter of urgency revamp the remuneration and entitlements and impact positively on the welfare and earnings of employees in that sector.

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**APPENDIX A
 LISTED MANUFACTURING COMPANIES IN NIGERIA**

S/N	LISTED MANUFACTURING COMPANY NAME	GOODS PRODUCED
1.	ALUMINIUM EXTRUSION INDUSTRY PLC	NATURAL RESOURCES
2.	B.O.C. GASES PLC	NATURAL RESOURCES
3.	BERGER PAINTS PLC.	INDUSTRIAL GOODS
4.	BETA GLASS (INDUSRIAL GOODS)	INDUSTRIAL GOODS
5.	CEMENT COMPANY OF NIGERIA	INDUSTRIAL GOODS
6.	CHAMPION BREWERY PLC.	CONSUMER GOODS
7.	CUTIX PLC	INDUSTRIAL GOODS
8.	DANGOTE CEMENT PLC	INDUSTRIAL GOODS
9.	DANGOTE FLOUR MILLS PLC.	CONSUMER GOODS
10.	DANGOTE SUGAR REFINERY PLC	CONSUMER GOODS
11.	DN TYRE & RUBBER PLC (DUNLOP)	CONSUMER GOODS
12.	FIRST ALLUMINIUM NIGERIA PLC	INDUSTRIAL GOODS
13.	FLOUR MILLS NIG PLC	CONSUMER GOODS
14.	GOLDEN GUINEA BREWERY PLC	CONSUMER GOODS
15.	GUINNESS NIG PLC	CONSUMER GOODS
16.	HONEYWELL FLOUR MILL PLC	CONSUMER GOODS
17.	INTERNATIONAL BREWERIES PLC	CONSUMER GOODS
18.	MC NICHOLAS PLC	CONSUMER GOODS
19.	MEYER PLC	INDUSTRIAL GOODS
20.	MULTI-TREX INTEGRATED FOODS PLC	CONSUMER GOODS
21.	N. NIGERIA FLOUR MILLS PLC	CONSUMER GOODS
22.	NASCON ALLIED INDUSTRIES PLC	CONSUMER GOODS
23.	NESTLE NIG PLC	CONSUMER GOODS
24.	NIGERIAN BREWERIES PLC	CONSUMER GOODS
25.	NIGERIAN ENAMELWARE PLC	CONSUMER GOODS
26.	PZ CUSSONS NIG PLC	CONSUMER GOODS
27.	PORTLAND PAINTS & PRODUCTS NIG PLC	INDUSTRIAL GOODS
28.	PREMIER PAINTS PLC	INDUSTRIAL GOODS
29.	UNILEVER NIG PLC	CONSUMER GOODS
30.	UNION DICON SALT PLC	CONSUMER GOODS
31.	VITAFOAM NIG PLC	CONSUMER GOODS

Source:<http://www.nse.com.ng/issuers/listed-securities/company-details?isin=NGMOBIL00007> accessed on October 28, 2019

**APPENDIX B
 LISTED OIL COMPANIES IN NIGERIA**

S/N	NAME OF COMPANY
1.	MOBIL OIL & GAS
2.	ANINO INTERNATIONAL PLC (MRS) OIL & GAS
3.	CAPITAL OIL PLC CAPOIL
4.	CONOIL PLC
5.	STERNA OIL & GAS
6.	FORTE OIL PLC
7.	JAPPAUL OIL & MARITIME SERVICES
8.	MRS OIL NIGERIA PLC
9.	OANDO PLC
10.	RAK UNITY PETROLEUM COMPANY PLC
11.	SEPLAT PETROLEUM DEVELOPMENT COMPANY PLC
12.	TOTAL NIGERIA PLC.

APENDIX C

MOBIL NIG. PLC

Year	Economic Cost N'000	Discretionary Cost N'000	Ethical Responsibility Cost N'000	Revenue N'000
2009	2,195,000	0	1,929,354	37,136,433
2010	2,476,000	0	2,176,347	41,890,583
2011	1,525,004	0	2,334,309	44,931,055
2012	1,198,250	0	2,530,145	61,306,944
2013	1,642,217	0	1,253,087	78,744,100
2014	2,053,347	8,100	2,379,460	79,583,738
2015	2,033,393	0	2,597,898	64,220,901
2016	3,865,599	145,224	715,881	113,449,888
2017	3,619,153	2,625	2,730,268	125,257,109
2018	4,366,524	19,146	2,082,823	164,609,535

Source: Annual reports & Accounts of Mobile Oil Nig. plc (2019)

MRS

Year	Economic Cost N'000	Discretionary Cost N'000	Ethical Responsibility Cost N'000	Revenue N'000
2009	NA	1,808	1,157,777	74,603,000
2010	NA	2,040	1,305,994	74,781,925
2011	1,456,783	1,200	1,650,108	70,952,936
2012	1,112,472	2,200	1,084,751	79,727,349
2013	1,265,140	2,190	588,927	87,786,323
2014	1,217,783	2,290	785,082	92,325,405
2015	525,218	5,394	548,710	87,099,216
2016	321,442	769	671,315	109,635,054
2017	2,381,665	9,689	713,023	107,088,347
2018	162,507	4,178,542	685,373	89,552,819

Source: Annual reports of MRS plc

TOTAL NIGERIA PLC

Year	Economic Cost N'000	Discretionary Cost N'000	Ethical Responsibility Cost N'000	Revenue N'000
2009	2,152,875	4,000	4,022,768	178,570,273
2010	1,811,547	4,000	3,929,869	160,604,104
2011	2,045,411	4,000	4,717,976	173,948,954
2012	1,542,544	6,448	2,613,519	109,838,923
2013	1,493,536	8,378	2,897,036	117,294,682
2014	1,542,464	48,435	6,777,106	240,618,693
2015	2,448,338	50,975	7,102,282	208,027,688
2016	5,555,980	132,123	7,183,628	290,952,520
2017	3,775,985	132,292	8,240,675	288,062,650
2018	5,431,990	80,921	8,815,810	307,987,896

Source: Annual accounts and financial Statements of Total Nig plc

APPENDIX D

BERGER PAINTS

Year	Economic Cost N'000	Discretionary Cost N'000	Ethical Responsibility Cost N'000	Revenue N'000
2009	129,591	1,760	NA	2,379,847
2010	79,612	NA	346,557	2,756,608
2011	141,509	NA	330,026	2,574,359
2012	92,456	NA	NA	2,513,664
2013	NA	NA	NA	3,568,158
2014	57,674	NA	486,874	3,082,930
2015	35,151	NA	626,259	3,022,264
2016	47,763	934	566,695	2,602,824
2017	93,180	1,419	588,755	3,092,445
2018	133,819	923,012	466,075	3,377,223

Source: Annual reports and Accounts of Berger Paints Nigeria plc

DANGOTE CEMENT PLC

Year	Economic Cost N'000	Discretionary Cost N'000	Ethical Responsibility Cost N'000	Revenue N'000
2009	NA	NA	NA	NA
2010	5,270,941	NA	NA	202,565,699
2011	7,635,957	NA	NA	241,405,977
2012	4,651,586	1,273,722	9,984,068	285,635,278
2013	6,003,465	1,486,808	7,705,879	371,551,567
2014	26,596	NA	9,876,355	371,534,117
2015	34,136	NA	38,243,000	389,215,000
2016	38,071	NA	51,245,000	426,129,000
2017	87,342	NA	14,565,000	552,364,000
2018	89,233	1,400,000	16,593,000	618,301,000

Source: Annual reports and presentations of Dangote Cement plc

FIRST ALUMINUM NIGERIA PLC

Year	Economic Cost N'000	Discretionary Cost N'000	Ethical Responsibility Cost N'000	Revenue N'000
2009	6,349	NA	693,524	7,740,481
2010	56,593	NA	734,565	8,488,610
2011	46,821	NA	572,375	8,549,878
2012	48,847	NA	583,659	8,639,181
2013	69,409	NA	636,601	8,390,463
2014	74,643	NA	606,844	8,901,618
2015	69,392	NA	567,997	10,478,233
2016	106,200	NA	589,025	9,154,586
2017	303,637	NA	474,228	7,878,319
2018	NA	NA	NA	NA

Source: Annual reports and Accounts of First Aluminum Nigeria plc