GREEN ACCOUNTING AND CORPORATE PROFITABILITY: AN EMPIRICAL ASSESSMENT OF SELECTED DOWNSTREAM OIL AND GAS FIRMS IN NIGERIA

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ABSTRACT

Green accounting is advocated and promoted globally in response to the increasing deterioration of the environment resulting from business activities. Hence this study is focused on investigating whether there is any significant relationship between green accounting and profitability of downstream oil and gas firms in Nigeria. Data for this research study were secondary data generated from the annual reports and accounts of Six (6) randomly selected quoted oil and gas firms operating in the downstream sector that are into marketing and distribution of oil and gas. The annual reports covers a period of five years from 2012 – 2016 and the study was based on ex-post facto research design as the data already existed. The data collected were analyzed using descriptive statistics and correlation matrix. The ordinary least square was used to evaluate the strength of the relationship between green cost accounting (predictor variable) and profitability (criterion variable). Key findings of the study show that waste management cost has a significant effect on profitability while legal cost and penalties as well as pollution control cost have no significant effect on the profitability of downstream oil and gas firms in Nigeria. Based on the findings and the conclusion drawn, the study recommends among others that companies operating in the downstream oil and gas sector should give keen attention to waste management cost when formulating green cost accounting policy as empirical evidence indicate that there is a correlation between these costs and profitability

Keywords: Green accounting; profitability; waste management cost; pollution control cost

1. INTRODUCTION

Environmental performance information is imperative and the emergence of green accounting - corporate environmental reporting in Nigeria has been an important development, both for improved environmental management and overall corporate governance. Traditional reporting appears to be outdated and inadequate due to global awareness of stakeholders on corporate environmental performance. Thus, green accounting also known as environmental accounting helps in accurate assessment of costs and benefits of environmental preservation measures of companies (Schaltegger, 2000). It provides a common framework for entities to identify and account for past, present and future environmental costs to support managerial decision-making, control and public disclosure (KPMG & UNEP, 2006). Hence its essence is to measure, record and disclose the impacts of corporate environmental activities on such entity's financial status through a set of accounting systems. Environmental management accounting also known as green cost accounting is defined as the generation, analysis and use of financial and related non-financial information, to support management within a company or business (Bartolomeo, 2000). It directly places a cost on every environmental aspect, and determines the cost of all types of related action. Environmental actions include pollution prevention, environmental design and environmental management. Past approaches on environmental impacts were based mainly on environmental cleanup costs and past product disposal. The contribution of green cost accounting is to account for a way of doing business which bothers on allocation and reporting of environmental overhead (Grinnell & Hunt, 2000). Green accounting therefore integrates corporate environmental and business policies, and thereby provides guidance on building a sustainable business.

The rapid expansion of green accounting practices is fueled by increasing public concerns over environmental issues. The pollution of the environment is a global problem and has unfavourable impact on public health and the quality of our life. Measures are being taken both at the national and international level to reduce, prevent and mitigate its impact on social, economic and political spheres (GRI, 2002; GR1, 2006). The increased societal attention on environmental friendly activities has created business opportunities for some firms and increased cost for others as they see the demand for sustainability as a threat to their profitability agenda. Hence the relationship between sustainability and firm performance is not expected to be linear. Green accounting offers business entities the opportunity to gain a good reputation as eco-friendly company and this can have a positive effect on the market share and profitability of such a company. However, the extent it affects the financial performance is unknown as various empirical studies have come out with contradicting evidence to that effect. Ifurueze et al. (2013), believe that the extent to

which a firm environmental costs influence corporate performance can be determined by some environmental friendly cost variables, such as community development costs, waste management costs and employee health and safety costs.

Historically, environmental regulation in Nigeria just existed on paper with no concrete implementation prior to1998. However, the narrative changed in 1997 due to an attempt made by a foreign company, acting through an agent, to dump toxic waste in the Niger Delta region. This incidence and many more awakened the nation to the realization of the need to control and regulates waste and environmental pollution in Nigeria leading to the promulgation of Decree No. 42 of 1998 by the federal government of Nigeria. This decree made it a criminal offence for anyone to dump harmful waste within the entire land mass and waters of the Federal Republic of Nigeria (Allen, 2017).

The global consciousness of the impact of environmental pollution on the quality of lives has given spread to green accounting. In spite of the global attention that green cost accounting has attracted, most empirical studies on green reporting and its impact on profitability of firms has been concentrated on a few developed countries. In Nigeria, few studies have attempted to look at the effect of environmental cost accounting on financial performance. Those studies focused on environmental sustainability cost and firm performance and their findings were quite contradictory and a better measure of profitability using return on capital employed was ignored. This may be due partly to the fact that green accounting has become a norm around the globe, even though it is still in the promotion stage in many countries especially in Nigeria. The above issues created gap in literature, which this study seek to fill. Thus the main objective of this study was to evaluate the relationship between green accounting and profitability of selected oil and gas firms operating in the Nigerian downstream sector. The specific objectives include, to:

I. investigate whether there is a significant relationship between waste management costs and return on capital employed of downstream oil and gas firms in Nigeria
II. investigate whether there is a significant relationship between legal and penalty cost and return on capital employed of downstream oil and gas firms in Nigeria.
III. investigate whether there is a significant relationship between pollution control cost and the return on capital employed of downstream oil and gas firms in Nigeria.

Based on the objectives of the study, the following hypotheses were formulated and tested

$H0_{1:}$ There is no significant relationship between waste management cost and the return on capital employed of downstream oil and gas firms in Nigeria.
$H0_{2:}$ There is no significant relationship between legal and penalty cost and the return on capital employed of downstream oil and gas firms in Nigeria.
$H0_3$ There is no significant relationship between pollution control cost and return on capital employed of downstream oil and gas firms in Nigeria. on Nigeria Stock Exchange.

2. LITERATURE REVIEW

2.1 Conceptual Issues

2.1.1 Green Accounting

Green-environmental-accounting is the ability to provide accurate information in the financial statements regarding the estimated social cost occasioned by the production externalities on the environment and how much deliberate intervention cost had been incurred to bridge the gap between the marginal social cost and the marginal private cost by a firm (Daniel & Jagongo, 2013). It measures, records and discloses the impacts of corporate environmental operations on the profitability of firms. It promotes the use of clean production; adopt total cost analysis through effective accounting system to disclose the environmental financial information of the firms. The current green concept is to improve the environment, restore the ecology and maintain sustainable operation. According to the Ministry of Environment Japan (2005), green accounting is the quantitative assessment of the expenditures and benefits in environmental protection activities and specified systematic records and reports, maintenance of a positive relationship between the enterprises and the natural ecology, and promotion of effective and efficient environmental activities, in order to achieve sustainable development. Environmental Protection Administration, Taiwan (2008) believe that by measurement, records, analyses and explanation, enterprises' resources invested in environmental improvement and protection and executive outcomes are completely and consistently reorganized, and the outcomes are provided to stakeholders of enterprises.

Environmental cost accounting means adding environmental cost information to the current cost accounting system, identifying hidden environmental cost and allocating it to proper products or manufacturing (U.S. Environmental Protection Agency, 2015). International Federation of Accountants, 2005 asserts that environmental management accounting manages environmental and economic performance by development and execution of a proper environmental accounting system, including reports and auditing of corporate information.

The different definitions of green accounting points to the fact that it is to use lifecycle assessment to measure the environmental impacts of corporate activities and to promote the use of clean and green production. The essence of green accounting and reporting is to urge enterprises to implement effective and efficient environmental activities, so as to achieve sustainable development. Green accounting makes environmental expenditure a part of operational cost; thus, new thinking should be adopted for product design, in order to maintain the existing profits, enhance environmental performance or meet the green accounting rules (Tu & Huang, 2015).

2.1.2 Profitability

Profitability is the firm's ability to generate sufficient profit. It is related to financial performance which is a measure that reveals the firm's ability to generate positive net profit after the payment of all expenses relating to the period (Klapper & Love, 2002). Profitability is usually measured using such accounting based performance measurement such return on capital employed, net profit margin, gross profit margin and asset turn-over. Such measurement uses the net profit as the numerator. This study used return on capital employed to measure profitability as according to Osirim and Wadike (2016), return on capital employed is the most important measure of profitability and efficiency of business organization as it is a product of profit margin and asset turn over.

2.1.3. Waste management cost

Waste is both a by-product and an input of economic activity, by businesses, government and households. The management of waste has economic implications– for productivity, government expenditure, and, of course, the environment. Corporate entity's decisions on how to manage waste can positively or negatively impact their profitability. Waste costs can be reduced by optimizing the management of waste which may arise in the course of business activities. One of the ways of limiting environmental liabilities that may result from business activities is through the improvement of environmental performance of corporation and the production of eco-friendly products.

2.1.4 Legal and penalty cost

Environmental related crime and lack of adherence to environmental laws and regulations could attract huge legal costs and penalties. Legal action against the firm by the stakeholders either for negligence or for other environmental related infraction could increase the operating cost of the firm or reduce its ability to generate more profits.

2.1.5 Pollution control

Pollution control comes with a cost and it can be defined as the activities of a company directed towards ensuring that the impact of its activities are reduced as not to cause environmental pollution The control involved various activities ranging from environmental friendly activities, green production process and restoration of the environment to its original state. The process involved large investment which the firm must make to ensure its and environmental sustainability (Dasgupta, La plante, & Mamingi, 1998).

As pointed out by Young and Tilley (2006), business approach to sustainability has moved from pollution control to eco-efficiency and socio-efficiency. The underlying notions of these concepts are focused in the so called win-win solutions, where economic benefits are aligned with environmental performance (e.g. reducing resource consumption and waste minimization) and social performance (e.g. minimization of negative social impacts or maximization of positive ones)

2.2 Theoretical Review

The study is built on stakeholders' theory. Ansoff (1965) first introduced stakeholders' theory to explain the importance of identifying key stakeholders of an organization. He opined that the company's primary strategic objective is to achieve the capability to balance the different needs of diverse stakeholders in the company. This notion was further developed by Freeman (1983), who integrated stakeholder theory into the corporate social responsibility model and business policy model. Stakeholder theory indicates that groups of stakeholders can develop and approve the company's strategic decisions concerning business policies. Furthermore, stakeholders' behavior can constrain the company's strategy, which is developed by managers to match appropriate resources with its surroundings. Freeman (1994) defined the stakeholders as any group or individual who can affect or is affected by the achievements of the firm's objectives. According to this definition, stakeholders can be owners, customers, suppliers, and public groups. The basic proposition of the stakeholders' theory is that the firm's success is dependent upon the successful management of all the relationships that a firm has with its stakeholders. The above statement was originally introduced by the Stanford Research Institute (SRI) to refer to those groups without whose support, the organization would cease to exist (Freeman 1994).

The long term survival of businesses requires stakeholder's support and approval. The more powerful the stakeholders are, the more the organization must adapt to their interests and demands. Stakeholder theory can also be applied to explain how manager's plan and make strategy (Donaldson & Preston, 1995) and how companies

are actually managed (Clarkson, 1995; Donaldson & Preston, 1995; Kreiner & Bhambri, 1988). As such, stakeholders' theory is often applied when discussing a company's sustainable strategy, since a company's sustainable strategy and related practices are influenced by different kinds of stakeholders, such as customers, suppliers, line leaders, government, regulators, advisory boards, and NGOs (Donaldson & Preston, 1995).

2.3 Empirical Review

Al-Tuwaijri et al. (2004) employed simultaneous equations approach to investigate the relations among environmental disclosure, environmental performance and economic performance. The percentage of total waste generated recycled as identified using the TRI database was adopted as a proxy for environmental performance while environmental disclosure was measured using a content analysis in four categories: potential responsible parties' designation, toxic waste, oil and chemical spills, and environmental fines and penalties disclosures which are largely non-discretionary. Based on these proxies, they documented a positive association between environmental performance and environmental disclosure.

The results of different studies measuring the relationship between green accounting –corporate social and environmental disclosure) and corporate financial performance show mixed results. Waddock and Gravess (1997) found a positive association between corporate social and environmental disclosure and profitability whereas Cowen et al. (1987) found no association between the variables. Roberts (1992) has found a positive relationship between profitability level of a company and corporate social and environmental disclosure. However, Patten (1992) fails to find any significant positive relationship between profitability and corporate social and environmental disclosure.

Hameed et al. (2015) empirically investigated the influence of sustainable environmental manufacturing practice on firm performance. The study was based on survey and used questionnaire to extract data from 103 manufacturing companies in Malaysia. The result found a significant relationship between sustainable environmental manufacturing pr**actice** and environmental performance, but could not find an evidence of a significant relationship between sustainable environmental manufacturing practice**,** and financial and operational performance. This implies that sustainable environmental manufacturing pr**actice**s is yet to be considered as a strategic resource in achieving competitive advantage and better firm performance among manufacturing companies.

Ifurueze et al. (2013) examined the impact of environmental cost on corporate performance using sample of twelve oil companies operating in Niger Delta States of Nigeria. The study used field survey method and multiple regression analysis was explored to test the hypothesis. Community Development Cost (CDC), Waste Management Cost (WMC) and Employee Health and Safety Cost (EHSC) were used as selected indicators of sustainable business practices. The study revealed that sustainable business practices and corporate performance is significantly related.

Sjoerd et al. (2011) examined the impact of environmental sustainability and finance performance of SMEs using a unique data set of 337 Dutch and Chinese firms the results showed a significant positive association between environmental sustainability and firm performance. It appears, however, that different indicators of environmental sustainability display a distinct relationship with the two performance measures. Furthermore, the study finds that firms that communicate to their employees about their sustainability efforts perform better in terms of profit development. Finally, the study finds a weak support is found for a moderating effect of communication to employees on the positive relationship between sustainability and profit development. The study was carried out to examine the impact of environmental sustainability and financial performance of SMEs using a unique dataset of 337 Dutch and Chinese firms.

Kennedy (2015) evaluates the impact of environmental practices on financial performance using a content analysis approach. The study reviewed a total of 130 using, financial variables and environmental variables. The study found that 52% of studies of selected sample show positive and the rest 48% still remaining with negative, mix or no relationship. The inconsistency is due to the absence of clear framework that explains what actually constitutes environmental practices and how to determine their outcome, measures of financial performance, sample composition, time period and control variable.

Samsul and Nurul (2013) examine the relationship between economic growth and environmental sustainability using firms in South-East Asia in 2010. The study used data from environmental performance index in 2010. Both pollution and eco-efficiency measures, of components of environmental sustainability, are considered as independent variables while gross domestic product per capita is used as dependent variable. By using ordinary least square method, the study reveals that while the increase of the gross domestic product per capita appears to have positive impact on the pollution measures, it found mix results on eco-efficiency measures. These findings prove the hypothesis of environmental Kuznets curve partially but not entirely.

Daniel and Jagongo (2013) examine the relationship between environmental accounting and firm profitability: an empirical analysis of selected firms listed in Bombay stock exchange, 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. The data were analyzed using multiple regression models. The study finds that there is significant negative relationship between environmental accounting and return on capital employed and earnings per share and a significant positive relationship between environmental accounting and net profit margin and dividend per Share.

Ngwakwe (2008) examine the nexus between environmental responsibility and firm performance using a field survey methodology. The study used a sample of sixty manufacturing companies in Nigeria. The firms were categorised into two groups, environmentally 'responsible' and 'irresponsible' firms. Employee's health and safety, waste management and community development, were used as explanatory variables. Findings reveal that sustainable practices of firm's are significantly related with firm performance. In addition, sustainable practices are inversely related with fines and penalties.

Dezhu et al. (2013) studied the impact of energy-saving efforts on firm value, using the carbon emission rights trading scheme of China as an exogenous shock. The results showed that the carbon emission rights trading scheme increase the market value of energy-related firms; Moreover, the energy-saving efforts of firms further influence their market value and investor reaction. Energy -related firms improve their market value and gain benefits by strengthening their energy-saving activities. The study offered important policy implication that the government should enact appropriate policies to improve the energy-saving activities of firms, especially those in the energy industry.

In the study of Konar and Cohen (2001) environmental performance was found to be correlated with the intangible asset value of firms, and reductions in toxic chemical releases to be associated with greater firm market value. The study evaluates the relationship between corporate environmental performance and the 'intangible assets' of manufacturing firms. Changes in intangible asset values were estimated by observing changes in firm market value (Tobin's q), and controlling for a range of variables that could potentially distort market value, such as 'sales growth. The study finds that environment-related litigation has positive effect on firm performance.

Stanwick and Stanwick (1998) determined that a significant correlation existed between low emissions levels and high profitability for firms with excellent reputations for social responsibility. The study examines companies listed on *Fortune* magazine's corporate reputation index that also had a complete set of toxic release

inventory data for five-year period (1987-92) Sample sets thus varied in size from 102 to 125 companies depending on the availability of complete TRI data for each observed year. The study finds a significant positive relationship existed for all three variables in 2 of the 6 years tested; moreover, a significant positive correlation between high annual profits and low pollution emissions existed for 5 of the 6 years tested.

In line with the above, the study of Hart and Ahuja (1994) found that pollution prevention and emissions reduction initiatives have positive impacts on a firm's return on assets, return on sales and return on equity within two years, and that firms with the highest initial emissions levels show the largess 'bottom-line' gains. The observation of 127 firms was used for the study. Results of this analysis showed that operating performance was significantly enhanced one year after large emissions reductions occurred, and that those performance gains were even more pronounced the following year, before dwindling in year-three.

Miles and Covin (2000) explores the relationship between environmental performance, reputation, and financial performance and concludes that "good environmental stewardship helps create a reputational advantage that leads to enhanced marketing and financial performance. The study of Shehu (2014) finds environmental cost has positive significant effect on the performance of oil firm in Nigeria. The study evaluates the impact of environmental cost on firm performance using data collected from listed oil firms in Nigeria. The study was based on correlation design and used multiple regression for data analysis.

Bima et al. (2015) carried out the assessment of cost impact in health and safety on construction projects. The study was based on field survey, sample of 50 contractors within Bornu state Nigeria and use simple average and percentage to analyze the data. The finding reveals that health and safety cost has impact on construction firm project in Bornu state Nigeria.

Kasum and Osemene (2010), sustainable development and financial performance of Nigerian quoted companies. The study was against the background that sustainable development practices usually involve financial outflows and hence, may be an unattractive investment to managers. They evaluated the impact of corporate compliance to accounting standards that are deemed to enforce sustainable development practices and can, therefore, imply sustainable development practices by companies, on the result of operations of companies. The study discovered that sustainable development practice of companies is rarely associated with financial performance over the years studied.

Research Gap

Different studies have been conducted to find the relationship between green accounting, and firm financial performance. But study conducted to ascertain the impact of green cost accounting on profitability of the downstream oil and gas firms in Nigeria are very scanty. The few studies which mostly relate to the upstream oil and gas sector used gas flaring, community development cost, waste management cost, employees, health and safety, etc. as variables. It is quite difficult to draw rational policy implications from the conclusion reached by the authors as their findings from those studies were contradictory, as they were based on different scope, methodology and the use of a better measure of profitability which return on capital employed reflects.

3. METHODOLOGY

3.1 Research design and variable description

Data for this research study were secondary data generated from the annual reports and accounts of Six (6) randomly selected quoted oil and gas firms operating in the downstream sector that are into marketing and distribution of oil and gas (Conoil Nig. Plc, Japaul Oil and Marine Plc, Mobil Nig. Plc, Oando Nig, Plc, Forte Oil Plc andTotal Nig. Plc). The annual reports covers a period of five years from 2012 – 2016 and the study was based on ex-post facto research design as the data already existed. The secondary data collected were analyzed using descriptive statistics and correlation matrix. The ordinary least square was used to evaluate the strength of relationship between green cost accounting (predictor variable) and profitability (criterion variable).

Table 1 Variables and descriptions

Variable(s)	***Measures***	***Authors who used the same proxies***
Criterion		
Profitability	*Return on capital employed (ROCE) = Profit after tax / Capital employed*	Daniel and Jagongo (2013)
Predictor (Green Cost Accounting)		
Waste management cost (WMC)	*Waste management cost / Total expenditure*	*Ifurueze et al (2013), Sjoerd, Nasser and Jolanda (2011)*
Legal cost and penalties (LCP)	*Court penalty for Environmental degradation / total expenditure*	*Konar and Cohen (2001),*
Pollution control cost (PCC)	*Pollution control cost / Total expenditure*	*Sjoerd, Nasser and Jolanda (2011)*

Source: Authors' compilation (2021)

3.2 Model Specification

The model for the study is premised on the main objective and anchored on the specific objective. The model used was adopted from the work of Ifurueze et al (2013) as ROE = (CDC, WMC, EHC) but modified to suite the objective of this study.

ROCE = *f* (WMC, LCP, PCC,)

This can be econometrically expressed as

$ROCE_{it} = a_0 + a_1WMC_{it} + a_2LCC_{it} + a_3PCC_{it} + \mu$ .. ……..ii

Where: ROCE = Return on Capital Employed; WMC = Waste management cost, LCP = Legal cost and penalties; PCC= Pollution control cost; a_0 = Constant; a_1… a3 = the coefficient of the regression equation. μ = Error term; *i*= is the cross section of downstream oil and gas firms used; t = is year (time series); log = Logarithm.

4. DATA ANALYSIS

4.1 Univariate analysis

The descriptive statistics result shows the mean (average) for each of the variables, their maximum values, minimum values, standard deviation and the jarque-bera normality test.

Table 2 Summary of the descriptive statistics.

	WMC	LCP	PCC	ROCE
Mean	0.211800	0.187400	0.198714	0.230143
Maximum	0.374000	0.636000	0.290000	1.230000
Minimum	0.041000	0.068000	0.004000	0.040000
Std. Dev.	0.343592	0.122911	0.170025	0.204508
Jarque-Bera	71.43039	79.17774	6.549079	328.4671
Probability	0.000000	0.000000	0.037834	0.000000

Source: Researcher's Summary of Descriptive Statistics, (2021)

The descriptive statistics results showed the nature of the data collected from the selected downstream oil and gas firms. Firstly, it was observed that within the period under review, the sampled firms' waste management cost as a ratio of total expenses have a mean value of 0.211800, maximum and minimum value of 0.374000 and 0.0410000 respectively. The large difference between the maximum value and the mean value and between the minimum value and the mean value shows that the sampled firms used for the study were dominated by downstream oil and gas firms with high cost of waste management.

Lastly, the Jarque –bera (JB) which test for normality of the data shows that all the variables are normally distributed at 1% level of significance except pollution control cost. This means that there is no variable with auto-regression(abnormality) that may likely distort our conclusion, hence our result is reliable for drawing generalization. This also means that ordinary least square estimation techniques can be used to estimate the panel regression model.

4.2 Bivariate Analysis

In examining the relationship among the variables, the study employed the Pearson correlation analysis; the results are presented in Table 3

Table 3 Pearson correlation matrix

	ROCE	LITC	WMC	PCC
ROCE	1.000			
WMC	0.118	0.0303	1.000	
LITC	0.541	1.000		
PCC	0.198	0.327	0.153	1.000

The findings from the correlation analysis table, shows that return on capital employed have a positive relationship with waste management, legal cost and penalties and pollution control cost. Waste management cost has positive relationship with pollution control cost. Generally, the correlation matrix indicates that the variables are positively correlated. In checking for multi-colinearity the study noticed that no two explanatory-predictor-variables had high correlation. This indicates the absence of multi-colinearity problem in the model used for the analysis and also justifies the use of the ordinary least square.

4.3 Hypotheses Testing

4.3.1 Fixed and Random Effect Test

The summary result of multiple regression analysis of the relationship between green cost accounting and profitability of oil and gas firms is presented below. However, the study takes into cognizance the homogeneity nature of the data, hence the need for testing its effect on the data. The study therefore used Hausman effect test to select between fixed and random effect that is best to be adopted in the study. Below is the summary of the Hausman test result, details of the result are presented in Table 4 under the appendix.

Table 4 Regression Analysis

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	9.127202	6	0.11066

Cross-section random effects test comparisons:

Variable	**Fixed**	**Random**	**Var(Diff.)**	**Prob.**
PCC	0.150914	0.141147	0.000969	0.7537
LCP	-0.021635	-0.040358	0.000117	0.0831
WMC	0.163969	0.049276	0.000123	0.0838

Source: researcher summary of regression analysis result using E-view 8

The Hausman test result shows a chi-square value of 9.127202 and probability value 0.11066, the chi-square value is greater than 10. Based on the result, the study accepts the random effect and rejects the fixed effect; hence we use the random effect to correct the problem of homogeneity in the pool data used for the study. Table 5 below is the summary of the regression result adjusted for fixed effect (details of the result are presented in Table 5 under the appendix).

Table 5 Regression Analysis
Cross-section random effects test equation:
Dependent Variable:ROCE
Sample: 2012 2016

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.789898	0.132954	6.549003	0.0000
PCC	0.150914	0.201580	0.748654	0.4554
LCP	0.021635	0.085719	0.252390	0.8011
WMC	0.563969	0.178640	3.365432	0.0074
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.633286	Mean dependent var		0.285567
Adjusted R-squared	0.561174	S.D. dependent var		0.163856
S.E. of regression	0.102607	Akaike info criterion		-1.627142
Sum squared resid	1.431825	Schwarz criterion		-1.346149
Log likelihood	123.0356	Hannan-Quinn criter.		-1.512983
F-statistic	28.76773	Durbin-Watson stat		2.008095
Prob(F-statistic)	0.000000			

Source: Researchers summary of OLS regression Analysis from E-view 8

In table above, the study observed from the result the R^2 value of 0.6333286 (63%) and R^2(adjusted) 0.561174 (56%) showing that all the predictor variables jointly explain about 56% of the changes in the criterion variables. Hence about 56% of the return on capital employed of the sampled firms can be attributable to the green accounting. The F-statistics value of 28.76773 and its probability value of 0.0000 show that green cost accounting has positive relationship with profitability of oil and gas firms operating in the downstream sector and this result is statistically significant at 1% alpha level of significance. The Durbin Watson statistics result of approximately 2 shows the non-existence of autocorrelation in the model which make our formulated model a proper fit for the study.

Hypotheses 1 (H_{0i}): There is no significant relationship between waste management cost and return on capital employed of downstream oil and gas firms in Nigeria.

To test for the above hypotheses, the researcher had to consider the test of significance using the t-statistic (F-statistic) and the p-values. The tool of F-statistic helps in determining the overall joint significant of the explanatory (predictor) variables on the criterion or explained variable. The analysis result in table 5 above showed a coefficient value of 0.563969, t-value of 3.3654 and a p-value of 0.0074. The t-value shows that waste management cost is positively related with return on capital employed and the relationship is statistically significant at 1% level. Based on the result of this analysis, the null hypothesis is rejected. It is therefore concluded that there is a significant relationship between waste management cost and return on capital employed of the selected downstream oil and gas firms in Nigeria.

Hypothesis 2 ($H0_{ii}$): There is no significant relationship between legal cost and penalties and return on capital employed of downstream oil and gas firms in Nigeria.

The result in table 5, showed a coefficient value of 0.0216, t-value of 0.2523 and a p-value of 0.8011. The results show that there is a positive correlation between legal cost and penalties and return on capital employed of downstream oil and gas firms in Nigeria but the relationship is not statistically significant. Based on the result, the study accepts the null hypothesis and concludes that there is no significant relationship between legal cost and penalties and return on capital employed of downstream oil and gas firms in Nigeria.

Hypothesis 3 ($H0_{iii}$): There is no significant relation between pollution control cost and return on capital of downstream oil and gas firms in Nigeria.

The result in table 5 showed a coefficient value of 0.1509, t-value of 07486 and a p-value of 0.4554. The positive coefficient value indicates that there is a positive correlation between pollution control cost and return on capital employed. However, the p-value indicates that the relationship is not statistically significant. Based on the result, the null hypothesis is accepted. It is concluded therefore that there is no significant relationship between pollution control cost and return on capital employed of downstream oil and gas firms in Nigeria.

4. Discussion of Finding

The findings revealed that green cost accounting increases the overall operating cost and affect the profitability of the firm. The positive coefficient value of 0.5639 in table 4.3 shows that waste management cost has a positive relationship with return on capital employed of the sampled oil and gas firms. This implies that a N1.00 variation

in waste management cost (increase) will lead to about N0.56 decline in return on capital employed and a reduction will lead increase in capital employed of these firms.

Besides, waste management cost and pollution cost has positive significant influence on the profit generating capacity of the sampled downstream oil and gas firms. Overall, results suggest that the lesser the firm incurred cost on waste management and pollution control cost, the higher its financial performance in terms of more profit. This finding corroborates the position of Ifurueze et al. (2013) and Ngwakwe (2008).

The analysis further shows that legal cost and penalties have no statistical significant relationship with return on capital employed. This finding agrees with that of Konar and Cohen (2001), Iheanacho (2016). Overall, the study found that selected variables have about 56 percent impact on the profitability of downstream quoted oil and gas firms in Nigeria.

5. CONCLUSION AND RECOMMENDATIONS

The following conclusions were drawn based on the findings:

I. Waste management cost has a positive significant effect on the profitability of downstream oil and gas firms Nigeria..
II. Legal cost and penalties has no statistical significant effect on the profitability of downstream oil and gas firms in Nigeria
III. Pollution control cost has no statistical significant effect on the profitability of downstream oil and gas firms in Nigeria.

Based on the findings and the conclusion drawn, the study recommends the following

i. Companies operating in the downstream oil gas sector should give rapt attention to waste management cost when formulating green cost accounting policy as there is a correlation between these costs and their potential to generate profit.
ii. Managers of firms operating in the downstream oil and gas sector should increase their attention towards green cost accounting and promote programmes that will promote environmental sustainability in order to reduce the legal costs and manners of environmental penalties..
iii. Environmental pollution has negative impact on the eco-system; therefore, the cost incurred in controlling pollution should be seen as social investment. The study therefore, recommends that firms should adopt environmental friendly operations like the use of improved green technology that will reduce pollution so as to minimize cost associated with environmental pollution.

Research on corporate environmental disclosure or green accounting is available largely for developed nations and very few is available for African countries. This research is probably one of the very few initial research works with respect to green accounting in respect of oil and gas companies operating in the downstream sector of the Nigerian economy. Hence, the extent of prior research literature available on green accounting and reporting by Nigerian companies especially those operating in the downstream sector is limited. The sample size considered for this research is too small to generalize and conclude for diverse sectors of Nigerian companies. Therefore the result should be interpreted with caution as there is scope for carrying out further research in this developing field.

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