Green Accounting and Material Flow Analysis in Oil Producing Companies in Nigeria

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Abstract

This study investigated the effect of green accounting practice on material flow analysis of oil producing companies in Nigeria from (2018-2020). A research questions and hypotheses was formulated for the study. Ex-post facto research design was employed in the study. The population of the study included all quoted oil and gas firms trading on the Nigerian Exchange Group (NXG) (NSE) as at 31st December 2021 with a sample size of Five (5) Multinational oil and gas firms selected from the population sector. The study relied on secondary sources of data which was obtained from Annual reports of sampled firms as provided by individual firms and Nigerian Exchange Group (NXG) website. Panel Least Square (PLS) regression analysis was employed in validating the hypothesis. The study revealed a significant positive effect of green accounting disclosure on material turnover. Consequent on the findings, the study therefore recommends amongst others that consumers form the focal point of managers in any green and sustainability campaign as they form the bedrock for the company's improved bottom line over time. Further studies can be undertaken on other specific factors that affect green accounting practices in oil producing firms or other related sectors.

Keywords: Green accounting, MFA, Material turnover, Sustainability

1.1 INTRODUCTION

The increase in global environmental awareness and the campaign for sustainable economic development is redirecting the attention of firms towards environmental sensitivity (Okafor, 2018). Sustainable development as is generally known focuses on the creation of wealth and prosperity, whilst considering the true importance of social and environmental aspects, allowing business and public organizations to meet triple bottom line in sustainable management which has today extended to green practices in in other to foster sustainable environment (Okafor, 2018). Green accounting refers to the aspect of accounting which upholds sustainable practices on the probable green life impact of social and environmental costs emanating from production externalities on the environment and society in general (Makori & Jagongo, 2013). Green accounting practice which evolved from "sustainability accounting", has been receiving increasing attention in the academia and business literature from the early 90's (Bhat, 2014). Presently, firms are paying more attention to social and environmental issues; and, dedicate portions of their annual reports and accounts for reporting and disclosing such costs (Ding, Ferreira, & Wongchoti, 2014; Hoje, Kim, & Park, 2014). Stakeholders are mounting pressures on corporate boards on corporate social responsibility issues (Rahim, 2012; Kakabadse, 2007); while, there are also increasing regulations and sanctions (Aggarwal, 2013).

Firms are being pressured to respond to green life, social and environmental matters and report on them (Oluwagbemiga, 2014). Such disclosure is believed to make a firm more responsive (Cortez & Cudia, 2011; Muller, Mendelsohn, & Nordhaus, 2011). Thus, enhances the reputation of a firm (Servaes & Tamayo, 2013; Carroll & Shabana, 2010); reduce idiosyncratic risk (Lee & Faff, 2009; Bassen, Meyer, & Schlange, 2006; McWilliams & Siegel, 2001). It is a signal of all round management efficiency (Renneboog, Ter Horst, & Zhang, 2008); and a signal to the capital market to enhance credit ratings (Jiraporn, Jiraporn, Boeprasert, & Chang, 2014). Green accounting disclosure also seeks to convey a company's green activities, financial, social, and environmental performance which are the main focus of large oil producing company's reporting. The oil manufacturing firms in Nigerian is a key aspect of the economic growth and development of the country, with key players such as 11 Plc, ONDO and Total Nig. Plc. commanding a massive market share in Nigeria and West Africa. However, the sector also carries out large production activities which impacts material utility and green life hence, there could be a high propensity for these firms to engage the use of non-current biological assets. Therefore, the proper analysis of material flow in these firms is expected to plays a key role in determining its response to green accounting. Material flow analysis (MFA) is a technique for converting, moving and storing materials within an identified system (Brunner & Rechberger 2004). This technique had been applied in various industries such as manufacturing, medicine, social systems, and urban metabolism (Allesch & Brunner, 2015), The growing use of material flow analysis can be attributed to sub-soil resources, environmental, economic, and health-related demands. Among others, it serves to fulfill higher recycling rates and reduce losses of potential secondary raw materials as demanded (EC 2014). The ecological consequences of greenhouse gas emission are also minimized with the implementation of national laws or international agreements (Fodio & Oba, 2012).

The literature on green accounting and disclosure reveals mixed findings on the relationship between green accounting practices and corporate performance both globally and locally although, the researcher found no existing study on green accounting and material analysis in Nigeria. Broadly speaking studies in Nigeria can be divided into two: studies which examine

determinants of disclosure practices of Nigerian firms on green initiatives (Onyali, Okafor, & Egolum, 2014). However, the general consensus seems to be that disclosure level is still ad hoc; with little or no quantifiable data. According to Jeroh and Okoro (2016) this is further compounded by the absence of adequate green accounting models or techniques of practical applicability in Nigeria.

The second stream of studies are devoted to studying the link between sustainability practices and corporate performance as in Asuquo, Dada, and Onyeogaziri (2018) on sustainability reporting; Egbunike and Okoro (2018) on green accounting practices. In this category there is an extensive focus on manufacturing firms (either from the consumer or industrial goods). Other studies; such as Onyekwelu and Ekwe (2014) on the banking sector; Ijeoma (2015) used primary data; while, Udeh and Ezejiofor (2018) focused on telecommunication firms.

However, despite the abundance of studies, only few studies have specifically examined this in the oil producing companies in Nigeria. For instance, Ekwe, Odogu, and Mebrim (2017) studied two companies, Conoil and Forte; Ajayi and Ovharhe (2016) undertook an exploratory study on LNG; Nze, Okoh, and Ojeogwu (2016) restricted to two firms in the Oil and Gas sector. An extensive study was however conducted by Ifurueze, Lydon, and Bingilar (2013) on a sample of twelve oil companies. But this study was based on field survey methodology in the Niger Delta region. There is therefore a need to investigate this green accounting and material flow analysis using secondary data from Multinational oil producing companies in Nigeria.

1.2 Objective of the Study

The broad objective of the study investigated the effect of green accounting practices on material flow analysis of quoted oil and gas firms in Nigeria. Specifically, the study investigated the effect of green accounting practices disclosure and material turnover of multinational oil and gas companies in Nigeria.

2.0 REVIEW OF RELATED LITERATURE

2.1 Conceptual Review

2.1.1 The Concept of Green Accounting

The concept of green accounting originated as an off shoot of the sustainability discussion about 20 years ago. Green accounting is a sub-category of financial accounting that focus on activities that have a direct impact on the society, environment and economic performance of an organization and the disclosure of such information to external parties such as capital holders, creditors and other authorities (Alnafea, 2014). Green accounting refers to the process of the collecting; analysing and communicating on sustainability-related information (Schaltegger & Burritt, 2010) to enable organizations become more sustainable (Alnafea, 2014). It is based on a synergetic view; that the financial and competitive success of a firm is intertwined with its social legitimacy (Perrini & Tencati, 2006). Green accounting emerged from developments in accounting, on two lines of thought. The first line is the philosophical debate; on the relevance and contribution of green accounting to sustainable development. The second is the management perspective associated with varied terms and tools towards sustainability (Schaltegger & Burritt, 2010). Broadly, green accounting takes into consideration environmental resources and changes in them, and integrates the result with the system of national account so as provide a valuable

information base for planning and formulating policy for the integrated sustainable development and growth of a nation (Bhat, 2014). The current study measures green accounting by taking a score card of green accounting disclosures which entail the description of corporate activities, more especially as it impacts green life of the society and environment. Green disclosures emerge from a variety of sources, but evidence suggests that it is an important and increasingly prevalent source of information supplementary to the annual reports and accounts (Setyorini & Ishak, 2012).

2.1.2 Material Flow Analysis

The concept of material flow analysis was developed by (Allesch & Brunner, 2015). It is a technique for converting, moving and storing materials within an identified system ((Allesch & Brunner, 2015). The approaches differ in terms of scale of the system evaluated; materials investigated and databases used. Regarding method, the main principle of all material flow analysis approaches is the mass balance: That is, the sum of all inputs into a system has to be equal to all outputs plus changes in inventory. Material flow analysis on the level of inventory is the analysis of flows and inventory which are economic entities with a positive or negative economic value (Allesch & Brunner, 2015). Material flow refers to the movement within the operating and production system. That is, the delivery of raw materials, the transfer of machine and assembly and the loading of the finished products into delivery trucks. This cycle is easily captured under the inventory turnover period of the manufacturing firm. Thus, the study measures material flow as the material turnover which is computed as thus: (Net sales /Bought in material).

2.2 Theoretical Framework

The study is anchored on 'stakeholder theory'. The justification for this theory is that emphasized on the role of the firm in meeting the interests of several stakeholders.

2.2.1 Stakeholder Theory

Stakeholder theory was propounded by Freeman (1984). The theory draws from the strategic management literature, systems theory and corporate social responsibility to challenge the longstanding assumption "that the sole objective of firms is to maximize shareholders' wealth" (Laplume, Sonpar, & Litz, 2008). Stakeholders refer to individuals or groups who are affected by, or whose actions can directly, or sometimes indirectly, affect the firm's operation (Orlitzky, Louche, Gond, & Chapple, 2017; Kassinis & Vafeas, 2006; Buysse & Verbeke, 2003; Hillman & Keim, 2001; Carroll, 1999; Harrison & Freeman, 1999). Stakeholders include employees, consumers, suppliers and related organizations, the local community and the general public.
Stakeholder theory suggests that the company has a binding fiduciary duty to different stakeholders' which ultimately determines the value of the company based on how well the company fulfil the contracts with its stakeholders (Ong & Djajadikerta, 2017; Cornell & Shapiro, 1987). A firm's objective is to optimize stakeholders' well-being in order to create strategic advantage (Laplume, Sonpar, & Litz, 2008). Freeman, Harrison, Wicks, Parmar, and De Colle (2010) posits that (1) the basic objective of a firm is to create value for stakeholders; (2) business is a set of relationships among groups which have a stake in the business activities; (3) business is about how customers, suppliers, employees, financiers (such as stockholders,

bondholders, banks, or investors), communities, and managers interact and create value. The stakeholder theory intends to address three problems: (1) the problem of value creation and trade; (2) the problem of the ethics of capitalism; and (3) the problem of a managerial mindset (Freeman, Harrison, Wicks, Parmar, & De Colle, 2010).

Summarily, the relevance of the theories on which the study is anchored is premised on the fact that they emphasized on the relationship which one or more persons (the principals) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent" and the role of the firm in meeting the interests of several stakeholders respectively.

2.3 Empirical Review

Wang, Khan, Anwar, Shahzad, Adu, and Murad, (2021) in Pakistan investigated the impact of stakeholders' views on the practices of green innovation (GI), consequent effect on environmental and organizational performance (OP), and moderating influence of innovation orientation. They employed a quantitative method for the sample size of 515 responses. Convenient random sampling was used. Data were collected from manufacturing and services firms through a field survey by using a closed-ended questionnaire based in the Punjab province of Pakistan. The analysis was done using the structural equation model of the partial least square analysis method. Their findings revealed a positive and significant link between stakeholders' views on GI practices. A significant association has been found between GI practices and environmental and OP. The moderating effect was found to be negative but statistically significant. This research offers numerous contributions and provides decision-making insinuations.

Ahashan, Yukun, and Aboobucker, (2020) examined the impact of green entrepreneurial orientation (GEO) and market orientation (MO) on the implementation of green supply chain management (GSCM) practices and subsequent sustainable firm performance. Data was collected from 246 Bangladeshi textile manufacturing firms and analysed using the structural equation modelling with partial least square techniques, typifying that exploratory and quantitative research. The results from the study revealed that GEO has a significant positive influence on MO and GSCM practices, which ultimately positively effects on all the three dimensions (economic, environmental, and social) of sustainable firm performance. Further, their study found that GSCM practices partially mediate the relationship between GEO and firm performance while MO also partially mediate the relationship between GEO and GSCM practices.

Sanjay, Manlio, Roberto, and Domenico (2020) examined how green human resource management interplays on to the linkages amongst green transformational leadership, green innovation and environmental performance. Using a survey questionnaire, they collected triadic data from 309 manufacturing sector small and medium-sized enterprises (SMEs). They employed covariancebased structural equation modelling (SEM) to examine hypotheses in the study. Findings of the study suggest that green HRM practices mediates the influence of green transformational leadership on green innovation. They also found that green HRM indirectly through green innovation influences firm's environmental performance.

Gustavo, and Javier, (2019) examined the integration of green practice into operational performance using empirical results from 117 respondents on Green Supply Chain Management (GSCM) practices among Brazilian manufacturers. They examined the impact of the adoption of

green practices on operational performance. To do so, a questionnaire was developed to collect the variables on environmental practices and operational performance in manufacturing firms in Brazil, an emerging economy in which this sector accounts for 25% of its Gross Domestic Product (GDP). Their results show that the adoption of GSCM between suppliers and/or customers has a positive effect on operational performance.

Okafor, (2018) investigated the effect of environmental costs on firm performance. She carried out this study making use of financial reports of Oil and Gas Companies quoted in the Nigerian Stock Exchange Market from years 2006-2015. Regression analysis was employed with the aid of Statistical Package for Social Sciences (SPSS). The results of the statistical analysis indicate that better environmental performance positively impact business value of an organization. Moreover, environmental accounting provides the organization an opportunity to reduce environmental and social costs and improve their performance.

Udeh and Ezejiofor (2018) investigated the effect of sustainability cost accounting on financial performance Nigeria. The sample comprised telecommunication firms in Nigeria. They used regression to test the formulated hypotheses. The study found that sustainability cost accounting has a significant effect on return on assets; and, return on equity of Nigerian telecommunication firms.

Asuquo, Dada, and Onyeogaziri (2018) investigated the effect of sustainability reporting on corporate performance in Nigeria. The sample comprised three brewery firms listed on the Nigerian Stock Exchange from 2012 to 2016. The data were obtained from the annual reports and accounts of the selected non-consumer goods firms. The results showed that economic performance disclosure, environmental performance disclosure and social performance disclosure have no significant effect on return on asset.

Ganda and Milondzo (2018) examined the impact of carbon emissions on corporate financial performance in South Africa. The sample comprised 63 South African CDP companies for the 2015 fiscal year. The measures of financial performance were the ROE, ROI, and ROS; while, the scope of carbon emissions comprised Scope 1, Scope 2, and Scope 1 & 2. The study used multiple regression technique to analyse the data. The results showed a negative significant relationship between ROE and ROI with carbon emission intensity (scope 1), ROS was positive for clean industries [ROI and ROS was negative but non-significant; while ROE was positive for dirty industries]; positive non-significant relationship for ROE and ROI but negative for ROS with carbon emission intensity (scope 2) [ROE, ROI and ROS was negative but non-significant for dirty industries]; negative non-significant relationship for ROE, ROI and ROS with carbon emission intensity (scope 1&2) [ROE, ROI and ROS was negative but non-significant for dirty industries]. Mildawati, Agustia, and Soewarno (2018) examined the effect of climate change strategy on company's performance, and the mediating role of climate change disclosure in Indonesia. The sample comprised 266 firm years from the Indonesia Stock Exchange over the period 2010 to 2016. The study relied on secondary data obtained from annual reports, sustainability reports, and corporate website. The results showed that both a proactive and reactive climate change strategy have a positive influence on company's performance (ROA, ROE, and Tobin's Q), secondly, climate change strategy has a positive influence on climate change disclosure, and, thirdly, climate change disclosure has a positive influence on company's performance. Lastly, climate change disclosure mediated the influence of climate change strategy on company's performance. Egbunike and Okoro (2018) investigated the effect of green

accounting practices on profitability in Nigeria. The sample comprised ten non-consumer goods firms listed on the Nigerian Stock Exchange from 2012 to 2016. The data were sourced from the annual reports and accounts of the selected non-consumer goods firms. They used canonical correlations to analyze the data. The study finds no significant relationship between green accounting and profitability.

3.0 METHODOLOGY

3.1 Research Design

The research design is methodological connection between the philosophies and subsequent selection of data collection methods (Denzin & Lincoln, 2011). The research work will adopt the *ex-post facto* research design. *Ex-post facto* means after the event, meaning that the events under investigation had already taken place and data already exist. The choice of *ex-post facto* research design is based on the fact that the study relies on historical accounting data obtained from annual reports and accounts.

3.2 Population of the Study

The population of the study comprises of quoted manufacturing firms on the Nigerian Stock Exchange (NSE) as at end of 2021 financial year. The number of firms included in the various sectors that constitute the population of the study is shown in the table below: Table 3.1: Number of firms by sector

S/No	Sector	Number of firms
1.	Oil & Gas	12
	Total	**164**

Source: The Nigerian Stock Exchange Website (2022)

3.3 Sample Size of the Study

The study was limited to Multinational oil and gas firms incorporated in Nigeria with consistent information within the study period of (2018-2020). Other companies where removed based on the classification of such firms outside the nature and description of Multinational oil producing company. The final sample selected are shown in the table below guided by in formation in the Nigerian Exchange Group, 2022.

Table 3.1: Sample selection

Company	YOI
11 Plc	1970
Conoil	1988
Mrs (Texaco Chevron)	1977
Oando	1991
Total Nigeria	1978

Source: The Nigerian Exchange Group (2022)

The exclusion of some companies was consistent with prior studies (Abid, Shaique, & Anwar-ulHaq, 2018; Tsipouridou & Spathis, 2012). The final sample percentage with respect to the

population is approximately 41.66% of the entire quoted oil and gas companies on the Nigerian Stock Exchange.

3.4 Sources of Data

Data collection is a crucial stage of dissertation that entails gathering all the necessary and required information from essential sources to be used for the analysis (Kumar, 2011). The data for this study was obtained from secondary sources. Secondary data is information or data that has previously been collected and recorded for other purposes (Blumberg, Cooper, & Schindler, 2008).

3.5 Reliability of Data

Annual reports and accounts are widely used document in secondary data analysis. The reliability of the data is ensured because annual reports are standardized and produced regularly (Buhr, 1998). They are also widely available to a larger audience (Deegan & Rankin, 1996), have a high degree of credibility and reliability due to audit verification (Tilt, 1994).

3.6 Methods of Data Analysis

The study employs both *descriptive* and *inferential* statistical techniques to analyse the data. The following descriptive statistics was computed such as the mean, median, standard deviation, minimum, maximum values, and Skewness-Kurtosis statistics, etc. The correlation matrix was constructed to identify the correlation between the dependent and independent variables. Lastly, Panel least square regression was used to validate the hypothesis. The strength of 'multiple regression models' is its ability to analyze several variables simultaneously (Mussalo, 2015). The goodness of fit of the model was tested using the Coefficient of Determination (R-squared). The analysis was done via E-Views statistical software.

3.6.1 Model Specification:

$$MAT(i, t) = \alpha + GAD(i, t) + FS(i, t) + Leverage(i, t) + Age(i, t) + \mu \ldots\ldots\ldots (1)$$

Dependent Variables

MAT	=	Material Turnover (Measured as **Net Sales/Bought in materials**)

Control Variables

Firm size	=	Natural logarithm of total assets
Firm leverage	=	Total debt / Total equity
Firm age	=	No of years from date of incorporation

3.6.2 Measurement of Green accounting disclosure (Independent variable)

Content analysis was used to measure green management disclosures; this is similar to the procedure used in prior studies (Abeysekera & Guthrie, 2005). Content analysis is "a research technique for making replicable and valid inferences from data to their context" (Abeysekera & Guthrie, 2005). Content analysis is a method of codifying text or content of a piece of writing into various groups or categories depending on selected criteria (Abeysekera & Guthrie, 2005). The study measures disclosure quantity, by assigning "1" if an item is present in the annual report, otherwise zero.

$$GAD_j = \frac{\sum_{i=1}^{n} \text{disclosure quantity}_i \times \text{disclosure type}_i}{\text{Max score}_i}$$

Where GAD*j* = green accounting practice disclosure index of firm *j*; *Disclosure quantity*$_i$= the disclosure or non-disclosure of an item *i* with regard to this item's disclosure type in firm *j*; *Disclosure quality*$_i$= the weight for an item *i* with regard to this item's disclosure type in firm *j* (i.e., narrative, monetary/numerical quantification, or both narrative and monetary/numerical); *n* = the number of items within the checklist; Max score$_i$ = the highest score of three disclosed dimensions for a specified firm.

4.0 DATA PRESENTATION AND ANALYSIS

4.1 Descriptive statistics

Below shows the descriptive statistics which covers the mean, median, standard deviation, observations, minimum and maximum values of each selected variable. The description helps in showing the nature of the data in terms of dispersion and central tendencies.

Table 4.1a: Descriptive statistics of dependent variables

	MAT	LEVERAGE	GAD	FIRM_SIZE	FIRM_AGE
Mean	4.734810	2.325977	0.032654	8.267703	38.20000
Median	2.168068	2.327500	0.017780	8.115536	41.00000
Maximum	15.36403	3.873168	0.093600	9.768470	50.00000
Minimum	0.868137	1.092200	0.017780	7.645500	27.00000
Std. Dev.	4.626818	0.951568	0.030312	0.637501	7.992854
Skewness	0.890530	0.187922	1.502153	1.286274	-0.042534
Kurtosis	2.638646	1.648939	3.261441	3.428372	1.607110
Jarque-Bera	2.064219	1.229140	5.683876	4.250940	1.217112
Probability	0.356255	0.540873	0.058313	0.119377	0.544136
Sum	71.02215	34.88966	0.489805	124.0155	573.0000

Sum Sq. Dev.	299.7042	12.67675	0.012864	5.689704	894.4000
Observations	15	15	15	15	15

Source: E-views, 9.0

The observations row in table 4.1 shows the number of cases included in each analysis of the variables of the study as fifteen for all variables. The Mean of each variable shows the measure of central tendency which calculates as the average of a set of observations; while, the Standard Deviation (SD) is the measure of the average distance between the values of the data in the set and the mean. A low SD indicates that the data points tend to be very close to the mean; while a high
SD indicates that the data points are spread out over a large range of values.

Table 4.1b: Covariance Analysis of independent

	GAD	LEVERAGE	FIRM_SIZE	FIRM_AGE
GAD	1.000000	-0.585168	-0.187665	0.700945
LEVERAGE	-0.585168	1.000000	0.524734	-0.503526
FIRM_SIZE	-0.187665	0.524734	1.000000	-0.535802
FIRM_AGE	0.700945	-0.503526	-0.535802	1.000000

Source: E-views, 9.0

Table 4.1b reveals the nature of relationship between the independent and control variables employed in the study. From the table, green accounting practice disclosure (GAD) has a strong positive relationship with firm age (0.700945) and strong negative relationship with leverage (-0.585168) and firm size (-0.187665). The implication of this is that older firms have better value for green accounting and environmentally healthy practice amongst oil producing firms in Nigeria. The result also implied that 1% increase in green accounting practice will lead to a proportionate decrease in leverage and firms assets.

4.2 Test of Hypotheses and Discussion of findings

Table 4.2: Panel LS regression output
Dependent Variable: MAT
Method: Panel Least
Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	77.81270	14.08286	5.525349	0.0003
GAD	179.9347	36.53947	4.924393	0.0006
FIRM_SIZE	-6.709667	1.450865	-4.624599	0.0009

LEVERAGE	0.578649	0.974323	0.593898	0.5658
FIRM_AGE	-0.649890	0.137844	-4.714674	0.0008

		Mean dependent var	
R-squared	0.815280		4.734810
Adjusted R-squared	0.741392	S.D. dependent var	4.626818
S.E. of regression	2.352899	Akaike info criterion	4.810375
Sum squared resid	55.36136	Schwarz criterion	5.046392
Log likelihood	-31.07782	Hannan-Quinn criter.	4.807861
F-statistic	11.03400	Durbin-Watson stat	1.512041
Prob(F-statistic)	0.001092		

Source: E-views output, 2022

H_{01}: There is no significant effect of green accounting practices disclosure on material turnover of multinational oil and gas companies in Nigeria.

The Panel least square regression output shown above with one IV and two CVs, as follows: Green accounting practice disclosure (GAD), Firm size, Leverage and Firm age. The overall R-squared is 0.815280. The *p*-value of the F-statistic is less than .05 (i.e., margin of error), which confirms the statistical significance of the model. The *coefficient* of the variable of interest: Green accounting practice disclosure (GAD), was (0.0006) and *z-statistic* (4.924393) positive and statistically significant (*p*-value<.05). Therefore, the null hypothesis is rejected and alternate, accepted. Hence, there is no significant effect of green accounting practices disclosure on material turnover of multinational oil and gas companies in Nigeria.

This finding is consistent with Wang, Khan, Anwar, Shahzad, Adu, and Murad, (2021) in Pakistan who investigated the impact of stakeholders' views on the practices of green innovation (GI), consequent effect on environmental and organizational performance (OP), and found a significant effect of green innovation on operational performance. Another study supporting the findings of this study is Gustavo, and Javier, (2019) who examined the integration of green practice into operational performance using empirical results from 117 respondents on Green Supply Chain Management (GSCM) practices among Brazilian manufacturers and found that the adoption of GSCM between suppliers and/or customers has a positive effect on operational performance.

Although, some contrary findings are Ganda and Milondzo (2018) who examined the impact of carbon emissions on corporate financial performance in South Africa. using multiple regression technique and found a negative non-significant relationship for ROE, ROI and ROS with carbon emission intensity. Also, Asuquo, Dada, and Onyeogaziri (2018) who investigated the effect of sustainability reporting on corporate performance in Nigeria and found that environmental performance disclosure and social performance disclosure have no significant effect on return on asset. The difference between these results and the current study result can be linked to variables

employed in the study. While the current study employed material flow analysis as dependent variable, most prior study made use of pure performance proxies such as returns on assets (ROA) returns on equity (ROE) etc.

5.0 CONCLUSION AND RECOMMENDATION

This paper focuses on green accounting and material flow analysis from a Panel Least Square approach. The study saw green accounting from various empirical point of view and concludes that green accounting disclosure which is the proxy for green accounting practice has a significant effect on material flow analysis of multinational oil producing firms in Nigeria. The study thus makes the following recommendations:

i. Multinational oil producing firms should make green accounting practice disclosure a crucial aspect of the annual financial statements. In this regard, a qualitative or quantitative disclosure of green accounting and related information metrics is encouraged as a vital component of the sustainability report because of its long-term effect on the value of a firm;
ii. There is a growing belief that this rather neglected area is gaining awareness in developing countries and soon consumers and shareholders may even boycott products or shares of non-green companies and ultimately lead to a decline in net income. It is therefore recommended that consumers form the focal point of managers in any green and sustainability campaign as they form the bedrock for the company's improved bottom line over time.
iii. Material flow analysis on inventory level is a valuable means of physical inventory check. It is therefore pertinent to implement policy mechanisms to enforce the use of material flow analysis while carrying out green and environmentally healthy practices such as water cleansing, waste recycling landfill and carbon management.

5.2 Contribution to knowledge

The study provides empirical evidence from a developing country perspective in sub-Saharan Africa such as Nigeria. The study also has several academic contributions to the literature and more broadly to green accounting practice by establishing a links between green accounting disclosure and material flow analysis with the various control variables employed in the study which can be beneficial to managers in understanding actual effect of green accounting on material flow analysis.

5.3 Suggestions for Further Studies

This study identifies a number of potential new areas for investigation in future studies. First, studies may test the individual effect of internal or external corporate governance mechanisms or both. The variables may also be employed as moderators or mediators in future research. Although, few studies found conflicting result with the current study. This development may be attributed to the evolving market and the institutional structures of developing countries like Nigeria. The reasons for this contradiction should therefore constitute an area of future research.

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