Effect of Environmental Sustainability Cost on the Financial Position of Quoted Manufacturing Firms in Nigeria: Evidence from Healthcare Sector

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Abstract: This study empirically explored the effect of environmental sustainability cost on the financial position of quoted manufacturing firms in Nigeria with evidence from the healthcare sector. In achieving the research target, the study estimated the effect of community development cost, employee benefit cost and raw material cost on the profit after tax of the selected healthcare manufacturing sector. Research design adopted was ex-post facto design while analytical tools employed were descriptive statistics and vector auto regression analysis techniques. Relevant diagnostic tests such as panel unit root (stationarity) test and co-integration test. Findings revealed that environmental sustainability cost operationalized by community development cost, employee benefit cost and raw material cost contributes positively to the long-run sustainable growth and development of healthcare manufacturing firms in Nigeria. On this background, the study suggested that healthcare manufacturing firms in Nigeria should consider investing in their workers through engaging them in various educational training and other beneficial skills for improved performance and organizational productivity. The firms should equally consider investment in community development projects of their host communities since they lead to more patronage which makes the company to thrive.

Keywords: Profit After Tax, Community Development Cost, Employee Benefit Cost, Raw Material Cost

1. Introduction

1.1. Background to the Study

Some business activities generate pollution and waste that can damage natural systems, causing irreversible harms, which reduce environmental resources available to society. Effective and sustainable healthcare system is the key to providing quality healthcare at a low cost, with large population coverage and effective disease management [1]. The pursuit for sustainability and the preservation of existing resources mandates that organizations must develop new ways and attitudes of doing business in terms of environmental sustainability. However, environmental sustainability has become a pressing issue across the globe [2].

Environmental costs are incurred in preventing, reducing or repairing damage to the environment and conserving resources such as cleanup costs, costs of recycling materials or conserving energy, closure costs, capital expenditure and development expenditure. Environmental costs cover all costs incurred concerning environmental protection such as emissions treatment as well as wasted material, capital and labour which are called 'non-product output' as a result of their inefficiency in production activities [3]. They also include fines, penalties, compensation, and disposal losses relating to assets which have to be scrapped or abandoned because they damage the environment [4, 5].

Nowadays, firms generate a lot of environmental problems in struggling for: profit maximization, satisfying the endless needs, to update with the rapidly advancing technological developments, and unconscious consumption of natural resources. Hence, they must take care of preventing and reducing their environmental impact through corporate environmental practices, which also have an impact on firms’ financial performance [6]. Efforts to reduce this environmental pollution are additional cost to the companies
in the short-term. Nevertheless, according to [7], they can have a chance of cost minimization in medium and long-term and even additional income in this process.

Presently, due to intense competition in healthcare sector, they are faced with multiple challenges to cope with the current healthcare needs, including sustainability as one of the essential requirements to obtain strategic fit for the future. In view of this, developing an effective sustainable healthcare system has become a difficult task. This study however set out to investigate the effect of environmental sustainability cost on the financial position of quoted manufacturing firms in Nigeria with evidence from the healthcare sector.

1.2. Statement of the Problem

The Nigerian environment had continued to pose significant challenge to business growth within. Sustaining the environment in the form of ensuring that costs incurred in aspects of employee benefit, raw materials, and community development are matched with the financial position of the firm had remained an issue of controversy. Particularly, failure of the firms to integrate environmental sustainability cost into the business operation had grossly influenced the firm’s financial performance (positively and negatively). In order to bounce back, the firms must take a due consideration of critical examination of both the magnitude and direction of effect of these costs on the business growth, and also work towards adopting environmental and social policies capable of destroying the shareholder’s wealth and values. There is also the need to ensure that the companies do not experience higher cost structure which may result to them being eliminated by their competitors. This study however, set forth to ascertain the effect of employee benefit cost, raw material cost, and community development cost on the financial position of healthcare manufacturing sector in Nigeria.

1.3. Objectives of the Study

The main objective of this study is to ascertain the effect of environmental sustainability cost on the financial position of quoted manufacturing firms in Nigeria, with evidence from healthcare sector. The specific objectives were to:

- Ascertain the effect of community development cost on profit after tax of healthcare manufacturing sector in Nigeria.
- Determine the effect of employee benefit cost on profit after tax of healthcare manufacturing sector in Nigeria.
- Find out the effect of raw material cost on profit after tax of healthcare manufacturing sector in Nigeria.

1.4. Statement of Hypotheses

Community development cost has no significant effect on profit after tax of healthcare manufacturing sector in Nigeria.

Employee benefit cost has no significant effect on profit after tax of healthcare manufacturing sector in Nigeria.

Raw material cost has no significant effect on profit after tax of healthcare manufacturing sector in Nigeria.

2. Review of Related Studies

The study is underpinned by the Stakeholder’s theory. The stakeholder theory was propounded by Edward R. Freeman in 1984. Stakeholder theory views corporations as part of a social system while focusing on the various stakeholder groups within society. They comprise of individuals and constituencies that contribute voluntarily and involuntarily to the firms’ wealth and activities that lead them as the potential beneficiaries [8]. Stakeholders are shareholders, employees, suppliers, consumers, government, media, creditors, interest groups, and general public. Stakeholders are identified by companies to ascertain which groups need to be managed in order to further the interest of the corporation.

In general, stakeholder theory is prioritizing the relationship between an organization and its stakeholders. This is because the central idea of the theory is to attain success which depends on the capability of the company to sustain her relationship with the stakeholder groups, such as employees, customers, and even general public [9]. Stakeholder’s theory explains specific corporate actions and activities using a stakeholder-agency approach, and it is concerned with how relationships with stakeholders are managed by companies in terms of the acknowledgement of the society where they operate.

Empirical Studies

Essentially, several empirical literatures abound on the study of environmental sustainability cost and financial position of manufacturing firms. These literatures differ in terms of time, space, setting and methodology. Etale and Otuya (2018) employed ordinary least square (OLS) regression method to examine the relationship between environmental responsibility reporting and financial performance of quoted oil and gas companies in Nigeria [10]. 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 period of 2012-2017. The result showed a significant positive relationship between financial performance and environmental responsibility reporting in the oil and gas sector of Nigeria. Also, provided by the study was that environmental responsibility reporting in Nigeria was 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.

Karamat et al (2019) used structural equation modeling to examine the role of barriers, enablers and drivers on Knowledge Management (KM) adoption in Pakistan [1]. The finding revealed that organizational and strategic barriers have significant negative association with KM adoption; government related enablers have significant positive association with KM adoption; healthcare related drivers, and performance-based drivers have significant positive association with KM adoption.

Using Correlation coefficient, the coefficient of determination and the simple regression analysis model, Akparhuere (2019) examined the effectiveness of environment reporting in annual reports using a comparative analysis of reporting practices of listed firms in Nigeria [11]. The finding showed 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. Obara, Ohaka and Nangih (2017) used simple regression analysis technique to examine the effect of accounting for waste management expenditure on the profitability of oil and gas companies in Nigeria [12]. The finding showed that waste management has high positive and significant influence on the Return on Assets, Return on Equity and Operating Profit Level of the oil and gas companies in Nigeria.

Nyirenda, Ngwakwe and Ambe (2013) examined the impact of environmental management practices on financial performance in South Africa using a Johannesburg Stock Exchange listed mining company as case study [13]. Return on equity proxy for financial performance was regressed against elements of environmental management practices such as carbon reduction, energy efficiency, and water usage. Multiple regression statistics was used as methods of data analysis. The result showed no significant relationship between environmental management practices and financial performance.

Nnamani, Onyekwelum and Ugwu (2017) investigated the effect of sustainability accounting on financial performance and used the ordinary linear regression tools for the analysis of secondary data collected from 3 listed brewery companies in Nigeria for the period 2010 to 2014 [14]. The study found that sustainability accounting had significant positive effect on financial performance of brewery companies in Nigeria.

Owolabi, Taleatu, Adetula and Uwaigbe (2016) examined the extent of sustainability reporting by Lafarge Africa Plc [15]. Data sourced from the 2014 annual report of the company were examined through content analysis using the Global Reporting Initiative (GRI) guidelines as basis of assessment. The study revealed low sustainability reporting practice by the company (that is, no disclosures on human right issues, 3% environmental disclosures, and 30% disclosure based on 169 indicators). They recommended the need for regulation of sustainability reporting practices among firms in the country.

Ofoegbu, Odoemelam and Okafor (2018) used descriptive statistics, correlation analysis and multiple regression model to examine the influence of corporate board characteristics and environmental disclosure quantity of listed firms in two leading emerging economies in South Africa and Nigeria [16]. The result showed that environmental disclosures are more relevant in the South African sample and less in Nigeria sample. Furthermore, the board characteristics statistically significantly associated with the extent of environmental disclosure of listed firms in South Africa and Nigeria.

Malarvizhi and Ranjani (2016) employed regression model to examine whether there was any significant relationship between Corporate Environmental Disclosure (CED) and firm performance of selected companies listed in Bombay Stock Exchange (BSE), India [17]. The finding revealed that there was no significant relationship between the level of environmental disclosure and firm performance.
manufacturing companies was obtained from the Bloomberg portal and analysed using Ordinary Least Square method. The finding revealed that in relation to ROA, operating expenses and asset turnover had negative and positive significant relationship respectively. Employees’ growth, account receivables, turnover, and inventory turnover was found to be insignificant. In relation to Tobin’s q, both inventory and asset turnover had a positive significant relationship. Operating expense had a negative significant relationship [22].

Dibia and Onwuchekwa (2015) used binary regression technique to examine the determinants of environmental disclosures using oil and gas companies in Nigeria. The finding revealed that there is a significant relationship between company size and corporate social responsibility disclosures. Also, there is no significant relationship between Profit, Leverage, Audit firm type and corporate social responsibility disclosures [23].

Okegbe and Ofurum (2019) empirically examined the effect of environmental management accounting and financial performance of Nigerian consumer goods firms. The study employed ordinary least square regression estimation technique and found that environmental restoration cost, pollution prevention cost and environmental protection cost have effect on return on assets of quoted Nigerian consumer goods firms [24].

Shehu (2014) employed the multiple regression analysis technique to investigate the effect of environmental expenditure on the performance of quoted Nigerian oil companies, for the period of twelve years (1999-2010). Empirical evidence from the study exposed that environmental expenditure has significant effect on the performance of quoted oil companies in Nigeria [25].

Panel Corrected Standard Error Regression analysis was employed by Mohammed (2018) to examine the mandatory social and environmental disclosure using performance evaluation of listed Nigerian oil and gas companies pre- and post-mandatory disclosure requirements. The result showed 53% increase in volume of social disclosure and 235% increase in volume of environmental disclosure six years post-code over disclosure six years pre-code. Also, the mean of disclosure six years post code was greater than the mean of disclosure six years pre- code and corporate size, has positive and significant relationship with disclosure [26].

Ndubuisi-Okolo, Anekwe and Attah (2016) employed Pearson Product Moment Correlation (PPMC) coefficient and one-sample Kolmogorov-Smirnov (K-S) test to investigate waste management and sustainable development in Nigeria with particular reference to Anambra State Waste Management Agency (ASWAMA). The finding revealed that waste management practice has a significant relationship with environmental sustainability in Anambra State [27].

Using Pearson correlation and multiple linear regression analysis technique, Nwaivu and Oluka (2018) examined the effect of environmental cost disclosure and financial performance measures of quoted oil and gas companies in Nigeria. The finding showed that adequate disclosure on environmental cost, compliance to corporate environmental regulations have positive significant effect on financial performance measures [28].

Nazaripour and Shadi (2015) investigated the impact of financing on evaluating the performance of companies listed on the Stock Exchange in Tehran through debt and the optimal structure of debt during years 2010 to 2013. Multivariate regression analysis, based on the method of combined data was used for testing hypotheses. The result showed that there is a negative and significant relationship between financing through debt and performance. Also, there is a positive and significant relationship between the optimal structure of debt and the performance of the company, and difference of the average of efficiency, between optimal and non-optimal structure of debt is 0.182 and meaningful [29].

Agbo, Ohaegbu and Akubuilo (2017) examined the effect of environmental cost on financial performance of Nigerian brewery using multiple regression analysis. The finding showed that both donation and medical expenses have a negative relationship respectively with return on assets (ROA). Trainings, Recruitment and Canteen Expenses (TRC) and the return on assets (ROA) have a positive relationship on Nigerian brewery Plc [30].

Multiple regression technique was employed by Abubakar (2017) to examine the influence of firm attributes on environmental disclosure of listed breweries companies in Nigeria from 2012 to 2016. The finding showed that board size has negative but significant influence on environmental disclosure; leverage has negative and insignificant influence on environmental disclosure; while firm size has positive and insignificant influence on environmental disclosure of the listed breweries companies in Nigeria [31].

Using Regression Analysis, Ezejiolor, John-Akamelu, and Chigbo (2016) examined the effect of sustainability accounting measure on the performance of corporate organizations in Nigeria using data from annual reports and accounts of the company in Nigeria. The finding showed that environmental cost impacts negatively on revenue, while positively on profit generation of corporate organizations in Nigeria [5].

3. Methodology

The study adopted ex-post facto research design. Data for the study was annual time series secondary data obtained from the annual accounts and financial statements of the selected healthcare manufacturing firms in Nigeria from 2009 - 2018. Panel unit root test was performed on the data series to establish the stationarity state of the dataset. The essence of the stationarity test was also to know if the data were spurious.

Also, before empirical estimation, the secondary data were subjected to descriptive analysis considering the mean, standard deviation, skewness, kurtosis, and Jarque-Bera goodness of fit test. The reason was to ascertain the behaviour of the dataset and provide estimate of the spread out from the central mean, estimate extent of their symmetry
and tail thickness for the period of study which by extension informs whether parametric or non-parametric tools are appropriate for further estimation.

The Jarque and Bera (1987) test of normality was given by:

$$\text{JB} = \frac{S^2(x)}{\nu_T} + \frac{(K(x) - 3)^2}{24}/T$$

Where, 

\(x\) represents the parameter of interest 

\(S(x)\) and \(K(x)\) are estimates of the skewness and kurtosis respectively.

The skewness \(S(x)\sim N(0, \frac{5}{9})\) while the kurtosis \(K(x)\sim N \left(0, \frac{24}{9}\right)\). This implies that the skewness and kurtosis estimates are assumed to be normally distributed with zero mean and variances \(\frac{5}{9}\) and \(\frac{24}{9}\) respectively; \(t\) is the time period.

The J-B statistic is asymptotically distributed as Chi-squared with \(2\) degrees of freedom. In this test, the null hypothesis (Ho) of normality is rejected if the p-value of J-B statistic is less than the specified significance level; otherwise Ho is upheld.

Inferentially, the study employed the vector autoregression

\[
\Delta \ln(PAT_t) = \alpha + \sum_{i=1}^{n} \beta_i \Delta \ln(PAT)_{t-i} + \sum_{i=1}^{b} \beta_i \Delta \ln(EBC)_{t-i} + \sum_{i=1}^{c} \beta_i \Delta \ln(RMC)_{t-i} + \sum_{i=1}^{d} \beta_i \Delta \ln(CDC)_{t-i} + \mu_{t} \tag{3}
\]

\[
\Delta \ln(EBC_t) = \alpha + \sum_{i=1}^{b} \beta_i \Delta \ln(EBC)_{t-i} + \sum_{i=1}^{c} \beta_i \Delta \ln(PAT)_{t-i} + \sum_{i=1}^{d} \beta_i \Delta \ln(RMC)_{t-i} + \mu_{t} \tag{4}
\]

\[
\Delta \ln(RMC_t) = \alpha + \sum_{i=1}^{c} \beta_i \Delta \ln(RMC)_{t-i} + \sum_{i=1}^{d} \beta_i \Delta \ln(PAT)_{t-i} + \sum_{i=1}^{b} \beta_i \Delta \ln(EBC)_{t-i} + \mu_{t} \tag{5}
\]

\[
\Delta \ln(CDC_t) = \alpha + \sum_{i=1}^{d} \beta_i \Delta \ln(CDC)_{t-i} + \sum_{i=1}^{a} \beta_i \Delta \ln(PAT)_{t-i} + \sum_{i=1}^{b} \beta_i \Delta \ln(EBC)_{t-i} + \mu_{t} \tag{6}
\]

Where, 

\(\Delta\) stands for difference operator, 

\(\ln\) is the log-transformational operator 

The lag length (t-1) are determined automatically by the modified AIC and are represented by \(a\), \(b\), \(c\), and \(d\). 

The estimates were subjected to diagnostic tests to confirm the Schwartz Information Criterion with the optimal lag length being the lag with the least information criterion.

Cointegrating relationship amongst the variables was tested following the panel data cointegration test procedure. Decision was taken at 0.05 level of significance. Should a cointegration exist, error correction analysis is performed. The estimates were subjected to diagnostic tests to confirm their validity and as well reliability.

Durbin-Watson (DW) Statistic: This statistic was used to
test for first order serial correlation in the errors of a regression model under the classical linear model assumptions (Wooldridge, 2009). It assists in specifying the right combination of the explanatory variables.

Description of Model Variables

Profit after-Tax: Profit after-tax is the earnings of a business after all income taxes have been deducted. It is the net amount earned by a business after all taxation related expenses have been deducted. It is used as an indicator to determine how much a business really earns and to measure a company’s profitability after when all its expenses have been deducted.

Community Development Cost: These include capital costs in form of donation or gift by the organization to the community for their economic, social, environmental and cultural wellbeing.

Employee Benefit Cost: Employee benefits are any kind of compensation provided in a form other than direct wages and paid for in whole or in part by an employer, even those provided by a third party (e.g., government). Employees receive these benefits above and beyond their wages. The range of employee benefits includes educational, employee incentive, family, government, health, lifestyle, recreational, retirement, savings, and transportation benefits. While some benefits such as government sanctioned ones are mandatory, others are supplementary or optional at the discretion of employers. Unlike wages alone, benefits foster economic security and stability by insuring beneficiaries against uncertain events such as unemployment, illness, and injury. In doing so, organizations improve their worker retention.

Raw Material Cost: Raw materials are the inputs or resources that a company uses to manufacture its finished products to sell to consumers. They include goods that require further processing as well as finished goods used in their received form. However, the raw material costs refer to the cost of the drugs components that go into a final manufactured product.

4. Data Analysis and Interpretation of Results

Analysis of the research data were presented in two segments: descriptive and inferential statistics. The descriptive statistics result is as presented in table 1 below:

| Parameters | PAT | EBC | RMC | CDC |
|------------|-----|-----|-----|-----|
| Mean       | 453939.1 | 187677.4 | 479424.0 | 6378737. |
| Median     | 169507.5 | 96467.00 | 198056.9 | 926085.0 |
| Maximum    | 2919170. | 900138.0 | 32945.00 | 39810.00 |
| Minimum    | -108940.0 | 198046.3 | 5.78372  | 4.704264 |
| Std. Dev.  | 15077087 | 1.570087 | 1.875375 | 1.542795 |
| Kurtosis   | 4.704264 | 5.783272 | 5.06085  | 4.816009 |
| Skewness   | 4.704264 | 28.21925 | 35.51867 |
| Probability| 26.59418 | 42.71249 | 3.19E+08 |
| Sum        | 22696955 | 50     | 3.19E+08 |
| Sum Sq. Dev.| 9383869. | 50     | 3.19E+08 |
| Observations| 50   | 50     | 3.19E+08 |

Source: Author’s E-views 10 result

The descriptive statistics shows estimates of the mean, standard deviations, skewness, kurtosis, and Jarque-Bera statistics of the study variables. The result shows that all the variables are skewed to the right and are platykurtic. The standard deviations of the variables are volatile and therefore of low predictive power. The Jarque-Bera statistics and associated probability values less than 0.05 (i.e., $p < 0.05$) indicates that the distribution of the variables are not normal. However, the Levin, Lin & Chu t* panel unit root test was performed to ascertain the stationarity state of the series.

| Variable  | Levin, Lin, & Chu t* statistic | p-value | Order of integration | Inference |
|-----------|--------------------------------|---------|----------------------|-----------|
| LnPAT     | -7.13                          | 0.0000  | (1)                  | Stationary|
| LnCDC     | -5.08                          | 0.0000  | (1)                  | Stationary|
| LnEBC     | -10.16                         | 0.0000  | (1)                  | Stationary|
| LnRMC     | -4.99                          | 0.0000  | (1)                  | Stationary|

Pedroni Residual Cointegration
Panel rho-Statistic (Prob.)=$-0.902 (0.8165)$

Source: Author’s computation using Eviews 10

The panel unit root test (Levin, Lin & Chu t* method) with p-values<0.05 shows that the variables are stationary at first differencing; hence, the null hypothesis of panel unit root in the variables were rejected at first differencing, indicating the variables are integrated of order one.

The Pedroni Residual cointegration with panel rho statistic value of $-0.902$ and associated probability value of $0.8165>0.05$ shows that the variables are free from
As shown in the result above, the Vector Autoregression (VAR) estimates of the dynamic effect of environmental sustainability cost on the financial position of quoted healthcare manufacturing firms in Nigeria showed that employee benefit cost (LnEBC) and community development cost (LnCDC) have short-run negative and long-run positive but insignificant effects on profit after tax (LnPAT) of the selected quoted healthcare firms; while raw material cost (LnRMC) has short-run positive and long-run negative but insignificant effect on LnPAT of the selected firms in Nigeria.

The R-squared estimate which measures overall effect of the explanatory variables on the response variable is 0.957. This indicates that the model is a good one as about 95.7% of the total variations in LnPAT of the healthcare firms in Nigeria can be explained by the selected environmental sustainability costs. The F-statistic value of 14.043 is high indicating a joint significant effect of the independent variables on the dependent variable.

Irrespective of the variations in analytical methods and scope, the finding of this study affirms with some earlier related works in Nigeria and developed countries. Specifically, our finding identifies with the finding of Shehu (2014), Nnamani, et al (2017), Etale and Otuya (2018), Akparhuere (2019), Okegbe and Ofurum (2019), among others [10, 11, 14, 24, 25]. On the other hand, the finding contradicts the findings of Nyirenda, et al (2013), and Malarvizhi and Ranjanni (2016) [13, 17].

As shown in the result above, the Vector Autoregression (VAR) estimates of the dynamic effect of environmental sustainability cost on the financial position of quoted healthcare manufacturing firms in Nigeria showed that employee benefit cost (LnEBC) and community development cost (LnCDC) have short-run negative and long-run positive but insignificant effects on profit after tax (LnPAT) of the selected quoted healthcare firms; while raw material cost (LnRMC) has short-run positive and long-run negative but insignificant effect on LnPAT of the selected firms in Nigeria.
5. Summary, Conclusion and Recommendations

5.1. Summary of Findings

Having empirically investigated the effect of environmental sustainability cost (proxy by employee benefit cost, raw material cost, and community development cost) on the financial position (measured by profit after tax) of quoted healthcare manufacturing firms in Nigeria, the findings emerged that:

Employee benefit cost has short-run negative and long-run positive but insignificant effect on profit after tax of healthcare manufacturing firms in Nigeria.

Raw material cost has short-run positive and long-run negative but insignificant effect on profit after tax of healthcare manufacturing firms in Nigeria.

Community development cost has short-run negative and long-run positive but insignificant effect on profit after tax of healthcare manufacturing firms in Nigeria.

5.2. Conclusion and Recommendations

This study empirically investigated the effect of environmental sustainability cost on the financial position of quoted healthcare manufacturing firms in Nigeria. The period covered was ten (10) years: 2009-2018. Using the Vector Autoregression (VAR) mechanism, the study established that environmental sustainability cost affects the financial depth of healthcare manufacturing firms in Nigeria. With respect to the findings, the study made the following recommendations:

Healthcare manufacturing firms in Nigeria should not be discouraged by the environmental costs associated with their business operations; instead, they should invest more on them especially those beneficial to their employees and host community since they contribute to sustainable growth and development firm.

Cost of raw materials should be monitored and various strategies for avoiding high costs of these products should be adopted.

There is also the need for regulation of sustainability reporting practices among Healthcare manufacturing sector in Nigeria.

Appendix

| COMPANY                      | YEARS | PAT  | EBC   | RMC   | CDC   |
|------------------------------|-------|------|-------|-------|-------|
| FIDSON                       | 2009  | 429,073 | 450,906 | 259,960 | 18,124,500 |
| FIDSON                       | 2010  | 465,893 | 612,365 | 258,853 | 20,098,920 |
| FIDSON                       | 2011  | 312,257 | 900,138 | 301,507 | 30,884,922 |
| FIDSON                       | 2012  | 206,889 | 622,343 | 192,704 | 11,064,900 |
| FIDSON                       | 2013  | 154,980 | 682,389 | 192,002 | 39,420,180 |
| FIDSON                       | 2014  | 631,825 | -108,940 | 377,531 | 32,877,400 |
| FIDSON                       | 2015  | 744,378 | 57,322  | 284,837 | 26,384,483 |
| FIDSON                       | 2016  | 120,698 | 35,850  | 420,461 | 31,630,651 |
| FIDSON                       | 2017  | 1,060,789 | 46,669 | 873,149 | 35,630,175 |
| FIDSON                       | 2018  | -97,447 | 42,458  | 1,049,970 | 40,486,309 |
| PHARMA-DEKO                  | 2009  | -461,497 | 254,970 | 51,467  | 786,560 |
| PHARMA-DEKO                  | 2010  | -464,094 | 145,036 | 88,664  | 822,350 |
| PHARMA-DEKO                  | 2011  | 76,483  | 123,258 | 92,035  | 995,474 |
| PHARMA-DEKO                  | 2012  | 740,945 | 96,467  | 67,982  | 852,749 |
| PHARMA-DEKO                  | 2013  | -221,789 | 68,132  | 69,852  | 936,440 |
| PHARMA-DEKO                  | 2014  | 101,007 | 53,396  | 244,018 | 1,032,385 |
| PHARMA-DEKO                  | 2015  | 659,264 | 72,340  | 311,608 | 1,205,512 |
| PHARMA-DEKO                  | 2016  | -218,704 | 100,349 | 454,522 | 1,730,265 |
| PHARMA-DEKO                  | 2017  | 12,607  | 95,752  | 340,394 | 1,305,615 |
| PHARMA-DEKO                  | 2018  | 14,326  | 92,712  | 209,590 | 1,310,513 |
| Neimeth Nig. Plc             | 2009  | -455,206 | 96,467  | 601,201 | 693,722 |
| Neimeth Nig. Plc             | 2010  | -126,133 | 96,467  | 655,123 | 855,112 |
| Neimeth Nig. Plc             | 2011  | 113,077 | 96,467  | 653,618 | 733,615 |
| Neimeth Nig. Plc             | 2012  | -599,366 | 96,467  | 436,246 | 536,274 |
| Neimeth Nig. Plc             | 2013  | 130,578 | 96,467  | 890,062 | 915,730 |
| Neimeth Nig. Plc             | 2014  | -228,535 | 96,467  | 581,910 | 638,295 |
| Neimeth Nig. Plc             | 2015  | -335,684 | 96,467  | 521,215 | 601,291 |
| Neimeth Nig. Plc             | 2016  | 650,935  | 96,467  | 85,818  | 95,809 |
| Neimeth Nig. Plc             | 2017  | -411,484 | 96,467  | 594,710 | 634,017 |
| Neimeth Nig. Plc             | 2018  | 184,035  | 96,467  | 614,172 | 704,728 |
| GlaxoSmithKline (GSK) Nigeria Plc | 2009  | 1701829  | 347,017 | 867,294 | 995,726 |
| GlaxoSmithKline (GSK) Nigeria Plc | 2010  | 1977394  | 354,980 | 1,348,463 | 1,481,380 |
| GlaxoSmithKline (GSK) Nigeria Plc | 2011  | 2294988  | 495,036 | 1,941,935 | 1,935,091 |
| GlaxoSmithKline (GSK) Nigeria Plc | 2012  | 2823526  | 223,256 | 1,599,570 | 2,059,940 |
### Table 5. Unit Root Test Results.

| Method                                      | Statistic | Prob.** | Cross-sections | Obs |
|---------------------------------------------|-----------|---------|----------------|-----|
| Null: Unit root (assumes common unit root process) |           |         |                |     |
| Levin, Lin & Chu t*                         | -7.12776  | 0.0000  | 2              | 13  |
| Breitung t-stat                             | -0.41153  | 0.3403  | 2              | 11  |
| Null: Unit root (assumes individual unit root process) |           |         |                |     |
| Im, Pesaran and Shin W-stat                 | -0.81670  | 0.2070  | 2              | 13  |
| ADF - Fisher Chi-square                     | 9.96278   | 0.0411  | 2              | 13  |
| PP - Fisher Chi-square                      | 24.1316   | 0.0001  | 2              | 15  |

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D (LNPAT)
Date: 12/12/19 Time: 11:12
Sample: 2009 2018
Exogenous variables: Individual effects, individual linear trends
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel

| Method                                      | Statistic | Prob.** | Cross-sections | Obs |
|---------------------------------------------|-----------|---------|----------------|-----|
| Null: Unit root (assumes common unit root process) |           |         |                |     |
| Levin, Lin & Chu t*                         | -5.08481  | 0.0000  | 3              | 21  |
| Breitung t-stat                             | 0.12002   | 0.5478  | 3              | 18  |
| Null: Unit root (assumes individual unit root process) |           |         |                |     |
| Im, Pesaran and Shin W-stat                 | -0.69967  | 0.2421  | 3              | 21  |
| ADF - Fisher Chi-square                     | 12.6338   | 0.0492  | 3              | 21  |
| PP - Fisher Chi-square                      | 24.1582   | 0.0005  | 3              | 24  |

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary
Series: D (LNEBC)
Date: 12/12/19 Time: 11:14
Sample: 2009 2018
Exogenous variables: Individual effects, individual linear trends
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

| Method                                      | Statistic | Prob.** | Cross-sections | Obs |
|---------------------------------------------|-----------|---------|----------------|-----|
| Null: Unit root (assumes common unit root process) |           |         |                |     |
| Levin, Lin & Chu t*                         | -10.1576  | 0.0000  | 5              | 35  |
### Panel unit root test: Summary

**Series: D (LNRMC)**
- Date: 12/12/19 Time: 11:16
- Sample: 2009-2018
- Exogenous variables: Individual effects, individual linear trends
- User-specified lags: 1
- Newey-West automatic bandwidth selection and Bartlett kernel
- Balanced observations for each test

| Method                      | Statistic  | Prob.** | Cross-sections | Obs |
|-----------------------------|------------|---------|----------------|-----|
| Breitung t-stat             | 0.07300    | 0.5291  | 5              | 30  |
| Im, Pesaran and Shin W-stat | -1.14502   | 0.1261  | 5              | 35  |
| ADF - Fisher Chi-square     | 23.0384    | 0.0106  | 5              | 35  |
| PP - Fisher Chi-square      | 47.2031    | 0.0000  | 5              | 40  |

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

### Panel unit root test: Summary

**Series: D (LNCDC)**
- Date: 12/12/19 Time: 11:18
- Sample: 2009-2018
- Exogenous variables: None
- User-specified lags: 1
- Newey-West automatic bandwidth selection and Bartlett kernel
- Balanced observations for each test

| Method                      | Statistic  | Prob.** | Cross-sections | Obs |
|-----------------------------|------------|---------|----------------|-----|
| Null: Unit root (assumes common unit root process) | -4.98539 | 0.0000  | 5              | 35  |
| Levin, Lin & Chu t*         |            |         |                |     |
| Null: Unit root (assumes individual unit root process) | 28.9961   | 0.0012  | 5              | 35  |
| ADF - Fisher Chi-square     | 73.6702    | 0.0000  | 5              | 40  |

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

### Table 6. Cointegration Test Result.

#### Alternative hypothesis: common AR coefs. (within-dimension)

| Statistic | Prob. | Statistic | Prob. |
|-----------|-------|-----------|-------|
| Panel v-Statistic | -0.902237 | 0.8165 | -1.050511 | 0.8533 |
| Panel rho-Statistic | 0.314059 | 0.6233 | 0.626877 | 0.7346 |
| Panel PP-Statistic | -5.949378 | 0.0000 | -5.778653 | 0.0000 |
| Panel ADF-Statistic | -5.771686 | 0.0000 | -4.380623 | 0.0000 |

#### Alternative hypothesis: individual AR coefs. (between-dimension)

| Statistic | Prob. |
|-----------|-------|
| Group rho-Statistic | 1.435739 | 0.9245 |
| Group PP-Statistic | -6.887059 | 0.0000 |
| Group ADF-Statistic | -5.259990 | 0.0000 |

#### Cross section specific results

| Cross ID | AR(1) | Variance | HAC | Bandwidth | Obs |
|----------|-------|----------|-----|-----------|-----|
| FIDSON   | -0.483 | 0.167234 | 0.167234 | 0.00 | 6   |
| PHARMA-DEKO | Dropped from Test | Dropped from Test | |
| Neimeth  | 0.003 | 0.010582 | 0.005173 | 8.00 | 9   |
| GlaxoSmithKline | 0.009741 | 0.005063 | 3.00 | 5   |
| May & Baker | -0.436 | 0.167234 | 0.167234 | 0.00 | 6   |
Null Hypothesis: No cointegration

Newey-West automatic bandwidth selection and Bartlett kernel

Automatic lag length selection based on SIC with a max lag of 0

Cross-sections included: 3 (2 dropped)

Included observations: 50

Sample: 2009 2018

Date: 12/12/19 Time: 11:19

References

[1] Karamat, J., Shurong, T., Ahmad, N., Afridi, S., Khan, S., & Khan, N. (2019). Developing sustainable healthcare systems in developing countries: Examining the role of barriers, enablers and drivers on knowledge management adoption. MDPI, 11 (954), 1-31. Available online at: www.mdpi.com/journal/sustainability.

[2] Kai, C. (2015). The effect of environmental performance and preference disclosure on financial performance: Empirical evidence from unbalanced panel data of heavy-pollution industries in China. Journal of Industrial Engineering and Management, 8 (1).

[3] Makori, D. M. & Jagongo, A. (2013). Environmental accounting and firm profitability: An empirical analysis of selected firms listed in Bombay Stock Exchange, India. International Journal of Humanities and Social Science, 3 (18), 248-256.

[4] Wright, C. J. & Noc, B. F. (2006). Theory of Environment and Planning. India: Prentice Hall.

[5] Ezejiofor, R. A., John-Akamelu, R. & Ben-Eucharia, C. C. (2016). Effect of sustainability environmental cost accounting on financial performance of Nigerian corporate organizations. International Journal of Scientific Research and Management (IJSRM), 4 (08), 4536-4549.

[6] Manrique S. & M. Carmen (2017). Analyzing the effect of Corporate Environmental Performance on Corporate Financial Performance in Developed and Developing Countries. Sustainability. 9. 1957.

[7] Hasan, Ş. & Hakan, Ö. (2012). The Importance of Environmental Accounting in the Context of Sustainable Development and Within IFRS Evaluation. International Symposium on Sustainable Development, Sarajevo.

[8] Khudhair, A. A., Norwani, N. M., Ahmed, A. A. H. K. &Aljajawy, T. M. (2019). The relationship between corporate social responsibility and financial performance of Iraqi corporations: A literature review. Journal of Modern Accounting and Auditing, 15 (1), 28-33.

[9] Niresh, J. A., & Silva, W. H. E. (2018). The nexus between corporate social responsibility disclosure and financial performance: Evidence from the listed banks, finance and insurance companies in Sri Lanka. Accounting and Finance Research, 7 (2), 65.

[10] Etale, L. M. &Otuya, S. (2018). Environmental responsibility reporting and financial performance of quoted oil and gas companies in Nigeria. European Journal of Business and Innovation Research, 6 (6), 23-34.

[11] Akparhuere, G. O. (2019). Environment reporting in annual reports: A comparative analysis of reporting practices of listed firms in Nigeria. Archives of Business Research, 7 (2), 183-206.

[12] Obara, Ohaka and Nangij (2017). The effect of accounting for waste management expenditure on the profitability of oil and gas companies in Nigeria. International Journal of Economics, Commerce and Management, V (3), 68-81.

[13] Nyirenda, G., Ngwakwe, C. C. &Ambe, C. M. (2013). Environmental management practices and firm performance in a South African mining firm. Managing Global Transitions, 11 (3), 243-260.

[14] Naamani, J. N. & Onyekwelu, U. L. (2017). Effect of sustainability accounting and reporting on financial performance of firms in Nigeria brewery sector. European Journal of Business and Innovation Research, 5 (1), 1-15.

[15] Owalobi, F., Adetula, D., Taleantu, A. &Uwuigbe, U. (2016). Assessment of sustainability reporting in Nigerian industrial goods sector, 3RD International Conference on Africa Development Issues (CU – ICADI), 383-386.

[16] Ofoegbu, G. N., Odoemelam, N. &okafo, R. G. (2018). Corporate board characteristics and environmental disclosure quantity: Evidence from South Africa (integrated reporting) and Nigeria (traditional reporting). Cogent Business and Management, 15, 1-27.

[17] Malarvizhi, P. & Ranjani, M. (2016). Link between corporate environmental disclosure and firm performance. Perception or reality? Review of Integrated Business & Economic Research, 5 (3).

[18] Menhat, M. & Yusuf, Y. (2018). Factors influencing the choice of performance measures for the oil and gas supply chain. iCITES, 1-9.

[19] Alawiyi-Adams, A. A. & Akumolafe, A. (2017). Environmental disclosure practices in annual reports of listed manufacturing firms in Nigeria, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2951272.
[20] Zhang, K. Q. & Chen, H. H. (2017). Environmental performance and financing decisions impact on sustainable financial development of Chinese environmental protection enterprises. *Sustainability*, 9, 1-14.

[21] Odera, O., Scott, A. & Gow, J. (2016). An examination of the quality of social and environmental disclosures by Nigerian oil companies. *Corporate Governance*, 16 (2), 400-419.

[22] Osazefua, I. J. (2019). Operational efficiency and financial sustainability of listed manufacturing companies in Nigeria. *Journal of Accounting and Taxation*, 11 (1), 17-31.

[23] Dibia, N. O. & Onwuchekwa, J. C. (2015). Determinants of environmental disclosures in Nigeria: A case study of oil and gas companies. *International Journal of Finance and Accounting*, 4 (3), 145-152.

[24] Okegbe, T. O. & Ofurum, D. I. (2019). The effect of environmental management accounting and financial performance of Nigerian consumer goods firms. *International Journal of Advanced Academic Research | Social and Management Sciences*, 5 (1), 1-17.

[25] Shehu, U. H. (2014). Environmental costs and firm performance: evidence from quoted oil and gas companies in Nigeria.

[26] Mohammed, S. D. (2018). Mandatory social and environmental disclosure: A performance evaluation of listed Nigerian oil and gas companies pre- and post-mandatory disclosure requirements. *Finance and Accounting*, 6 (2), 56-68.

[27] Ndubuisi-Okolo, P. U., Anekwe, R. I. & Attah, E. Y. (2016). Waste management and sustainable development in Nigeria: A study of Anambra State Waste Management Agency. *European Journal of Business and Management*, 8 (17), 132-144.

[28] Nwaiwu, N. J. & Oluka, N. O. (2018). Environmental cost disclosure and financial performance of oil and gas in Nigeria. *International Journal of Advanced Academic Research | Financial Management*, 4 (2), 1-23.

[29] Nazarpour, M. & Shadi, H. (2015). Impact of debt financing and effective debt management on performance assessment in Tehran stock exchange. *Mediterranean Journal of Social Sciences MCSER Publishing, Rome-Italy*, 6 (6), 101-108.

[30] Agbo, B. O., Ohaegbu, O. K. & Akubuiro, F. (2017). Effect of environmental cost on financial performance of Nigerian brewery. *European Journal of Business and Management*, 9 (7), 59-64.

[31] Abubakar, A. A. & Akomolafe, A. (2017). Influence of firms attributes on environmental disclosure in listed brewery companies in Nigeria. *Research Journal of Finance and Accounting*, 8 (21), 31-35.

[32] Bolton, A. (2018). *Climate Change and Environmental Health*. Christchurch: ESR publisher.

[33] Pruss-Ustün A, Wolf J, Corvalan C, et al. 2016. *Preventing Disease through Healthy Environments: A global assessment of the burden of disease from environmental risks*. Geneva: World Health Organization.

[34] Royal Society of New Zealand (2017). *Human Health Impacts of Climate Change for New Zealand*. Wellington: Royal Society of New Zealand.

[35] World Health Organization and Healthcare Without Harm (2009). *Healthy Hospitals, Healthy Planet, Healthy People: Addressing climate change in healthcare settings*. URL: www.who.int/globalchange/publications/healthcare_settings/eb.