Original Research Article

Environmental Disclosure Practices and Sustainable Performance of Quoted Manufacturing Companies in Nigeria

ABSTRACT

This paper examined the linkage between environmental disclosure practices and sustainable performance with particular reference to listed manufacturing companies operating in Nigeria. The study utilized the ex-post facto research design for its investigation while a sample of forty-eight (48) listed manufacturing firms were purposively selected out of sixty-seven (67) quoted manufacturing firms listed as at December, 2020. The study found that while environmental disclosures (EDD) exhibited a negative but insignificant effect on Returns on Assets (ROA), Debt to Assets Ratio (DTA) and Market Price per Share (MPS) of the sampled firms, Social Disclosures (SDD), firm size and firm age exerted significant positive influence. The study therefore concluded that environmental disclosure practices in general significantly impacted sustainable performance of manufacturing firms in Nigeria. The study recommended that in view of the central role that manufacturing entities play in generating significant environmental footprint, regulators and supervisory agencies should incentivize adequate reporting of environmental practices through tax credits so as to stimulate improved compliance to reporting benchmarks. The findings have several implications for policy makers, investors and academic researchers. For policy makers, it is appropriate to design and issue guidelines that will promote improved environmental disclosure practices. For investors, ensuring confidence in environmental and social disclosures is crucial for taking timely and balanced investment decisions. For academic researchers, the results show that it is important to discover how the size and age of firms can influence the relation between environmental disclosure practices and sustainable performance.

Keywords: *Environmental Disclosures; Social Disclosures; Sustainable Performance; Return on Assets; Market Price Per Share*

1. INTRODUCTION

Corporate organizations are constantly been challenged to improve their performance on a sustainable basis. This is especially so, because of the increasing profile of stakeholders' expectations and complexities of business operations. Multiple scholars have argued that stakeholders' expectations now extend beyond the traditional profit maximization objective to include environmental fairness, maintenance of good corporate social responsibilities and the gaining of and sustenance of social acceptance (Ogunode & Adegbie, 2020; Li & Gao, 2019; Darškuvienė & Bendoraitiene, 2014). Complexities of business operations on the other hand is accentuated by rapid globalization, actions of competitors, technological advancements and

changing customer tastes and preferences (Queen & Fasipe, 2015). Sustainable performance is thus reflected by the extent or otherwise in which a business entity is able to simultaneously navigate complexities of business operations as well as meeting or surpassing stakeholders' expectations. However, achieving this lofty height of sustainable performance has become a major challenge for business entities given that they are required to document and report their financial and operational performance inclusive of their environmental footprint on a regular basis (Emeke, Olaoye & Ogundajo, 2020; Atang & Eyisi, 2021). This documentation requirement by way of environmental disclosures differs from clime to clime. Notwithstanding, the documentation requirement, we note that internal and external factors continue to threaten and negatively impact sustainable performance of business firms and this is particularly prevalent with entities operating in industries with extensive environmental footprint in their operational activities with manufacturing companies featuring prominently in this regard (Erumegbe, 2015).

Environmental footprint issues associated with manufacturing companies have assumed global concern because of their potentials to unduly affect the ability of future generations to access and use earthly and natural resources on a replenishable basis. This is made more precarious given that manufacturing normally serves a hub to facilitate economic development and social transformation (Olayemi, Okonji, Oghojafor, Akpoyomare and Orekoya 2020). Unfortunately, a host of challenges threaten this realization particularly for developing economies. These challenges cover a broad spectrum of activities which includes but not limited to the management of greenhouse gas emissions, biodiversity losses, freshwater pollutions, chemical contaminations, oil pollution, factories sewage pollutions and toxic waste disposals (Dordum et al, 2021; Emmanuel & Ifeanyichukwu, 2021). According to Iheanachor, (2021) in Nigeria, "waste generation rate is estimated to be 0.65-0.95 kg/capita per day, resulting in an annual average of 42 million tons," with plastic bottles generated by manufacturing concerns accounting for 10m and solid waste accounting for 32 million tons annually, respectively, out of which only 20-30 percent is ever retrieved for possible recycling operations. This massive waste generation without proper remediation measures in place leaves behind unpleasant consequences for the environment that is now worsened by the advent of global warming and climate changes. It is therefore incumbent on manufacturing concerns to step up their efforts in redressing these environmental challenges and appropriately document same by way of disclosures in their financial statements.

Apart from regulatory motivation, environmental disclosure practices is stimulated by the fact that business entities do not operate in isolation of their immediate operating environment but instead engage in interacting activities and are also influenced by or affected by them which may further result in externalities to the environment. A wide array of works have investigated the impact of environmental disclosures on various variables such as financial performance, company size, corporate profitability, capital intensity, stakeholders' expectations and perceptions with mixed and/or inconclusive results (Igbekoyi, Ogungbade & Olaleye 2021; Adegbie, Ogidan, Siyanbola & Adebayo, 2020; Obida, Owolabi, Akintoye & Enyi, 2019; Sanusi & Sanusi, 2019; Nasution, Erlina, & Tamizi, 2018; Yahaya, 2018; Nwaiwu & Oluka, 2018; Krivačić & Janković, 2017; Karambu & Joseph, 2016; Osemene, Kolawole & Oyelakun, 2016).

For example, while the studies of Igbekoyi, Ogungbade & Olaleye (2021); Onyebuenyi, & Ofoegbu (2021); Yahaya, (2018); Peter & Mbu-Ogar, (2018), Utile, Tarbo & Ikya (2017), Caesaria & Basuki (2017) demonstrated that environmental accounting disclosures have positive association with financial performance, others such as Umoren (2021); Nwaiwu & Oluka, (2018); Kamal, (2016); Ezejiofor, John-Akamelu, Chigbo (2016) have reported either negative or insignificant association between the variables. We note that the indecisive nature of the results is attributable to a range of factors including differences in methodologies adopted, choice of proxies selected, period of study covered as well as differences in the perceptions of most sampled respondents for the various studies. This therefore represented one of the key motivations for the current study. Furthermore, a close review of previous studies showed that there is a dearth of available works that examined the association between environmental accounting disclosures and sustainable performances which is a more encompassing performance yardstick than financial performance. This is because where organizational performance is not sustained, negative implications such as rapid loss of shareholders confidence, investors' apathy and erosion of value may result. Consequently, this study shall focus on an interrogation of the influence of environmental disclosure practices on sustainable performance of sampled listed manufacturing firms operating in Nigeria.

The rest of the paper is arranged as follows: Section two shows an examination of relevant and related literature from the standpoint of conceptual development, theoretical framework, and empirical reviews. Sections three and four consider the methodology adopted in data gathering and analysis, findings from same while the summary, conclusion and recommendations emanating from the study are presented in the fifth section.

LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

The groundwork of this research rests on three theories namely; the Stakeholders' theory, Legitimacy theory and Information asymmetry theory respectively. The stakeholders' theory was first advocated by Edward Freeman in 1984. The theory emphasizes the notion that the obligation of a business organization is to a broad spectrum of interest groups that extends beyond those of equity holders which is primarily focused on profits maximization. This is diametrically opposed to the agency theory that speaks of a two-way only relationship encompassing shareholders and management (Asher, Mahoney, and Mahoney, 2005; Lawal and Oluwatoyin, 2011). The management of the interwoven nature of the relationship subsisting between these various interest groups tagged stakeholders vis a vis the social and environmental disclosures of a firms' business operations remains one of the theory's strong pillars and is thus relevant for environmental accounting research such as the current study (Mpofu and Karedza, 2013; Fokeye, Odianonsen and Aanu, 2015). The second theory underpinning this study is the legitimacy theory. The theory was championed by Dowling and Pfeiffer (1975). According to the theorists, a social contract exists between businesses and society that requires businesses to operate in such a way that does not violate the peace, environmental condition and societal norms of their respective host communities. They similarly opined that business outfits in recognition of their place in the ecosystem aim to present a socially responsible image to stakeholders. This therefore underscores its relevance to this work.

The third related theory is the information asymmetry theory. The concept of asymmetry information which dovetailed to a theory was first propounded by Akerlof (1970). The theory was subsequently popularized by the works of Spence (1973) and Stiglitz (1975) which culminated in their jointly securing the Nobel Peace Prize in Economics alongside Akerlof in 2001 (Auronen, 2003). The theory suggests that opportunities always exist for one party to possess significant and material information more than another party in a business dealing and that where this information imbalance (asymmetry exist), it is capable of generating market inefficiencies. One key way to reduce information asymmetry is to strengthen the information disclosure mechanism needed to validate claims by business firms of the records of the environmental footprint relating to their activities (McWilliams, Siegel and Wright, 2006; Bergh, Ketchen, Orlandi, Hengens and Boyd, 2019). The theory therefore recognizes information as a key determinant of a firm's position in the market, implying that the quality or otherwise of information available about an entity can significantly influence decision making about the entity. The frequency of the scrutiny exerted by stakeholders on the actions, activities and decisions of companies is now pushing organizations to do better in the dissemination and disclosures of information, hence the importance of the theory to this study.

Sustainable performance is a wholistic concept that views organizational performance from a broad, long term prism rather than from the standpoint of meeting mere short-term corporate objectives. Thus, it is the established ability of an organization to meet with the long-term objectives, aspirations and expectations of its various stakeholders. Sustainable performance entails value maximization arising from the proper integration of the "financial, social and environmental performance" of a business organization (Adamu, Wan & Gorondutse, 2020). Financial performance in this regard speaks to the ability of the organization to generate returns, guarantee assets safety and long-term solvency of the enterprise (Naz, Ijaz, & Naqvi, 2016; Fatihudin, Jusni, & Mochklas, 2018). Typical measures used in literature for this assessment include returns on assets, returns on capital employed, returns on equity, assets turnover earnings per share, net assets per share and debt equity ratios (Nahiba, 2017; Polycarp, 2019; Menike, 2020). Social performance relates to the ability of the organization to align with social norms and laws, engage in social responsibility acts in support of communities while also upholding ethical conduct in its internal dealings with its employees (Nikolaou, Tsalis & Evangelinos, 2019; Bouloiz, 2020; Wood, 2010). In our considered opinion, a good indicator for assessing this is the market price of the business entity as it reflects the sum total of the perception of various stakeholders about the entity. The third tripod, environmental performance assesses the extent or otherwise in which the business entity effectively addresses issues of pollution abatement, energy conservation and general compliance with applicable environmental laws and standards (Ma, Men, Li & Li, 2021). Overall, for the purpose of this study, returns on assets, debt to total assets ratio and market price per share were used as constructs for sustainable performance.

Environmental disclosure practices describe the body of actions, activities or measures undertaken by organizations which communicate its environmental consciousness to its various stakeholders. One focal objective is to positively position an organization's image and reputation (Emmanuel & & Ifeanyichukwu, 2021). The sum total of these practices are often reflected

either as part of the organization's annual reports or as separate stand-alone report in such a way that stakeholders are provided with a fair idea of the organization's environmental footprint and mitigating measures taken by them (Atang & Eyisi, 2021; Etale & Otuya, 2018). It is thus one of the fundamental outputs generated from the environmental accounting system (Worae et al, 2018). However, depending on subsisting sovereign rules and regulations, disclosures may be mandatory or voluntary in nature (Levin & Fransen, 2017). Eze, Nweke & Enekwe, (2016) observed that there was a direct correlation between establishment of compulsory disclosure requirements and increase in the level of environmental disclosures made by business entities.

There is a long strand of available literature that have documented the relationship subsisting environmental disclosure practices and various performance benchmarks such as firm performance, financial performance and sustainable performance, some of which are herein discussed. Nkwoji (2021) assessed the impact that environmental disclosures had on the financial performance of listed energy companies operating in Nigeria. The evaluation was performed with the aid of regression analysis and the results indicated that their existed an insignificant association between environmental disclosures and the financial performance (proxied by profitability) of the evaluated entities. These conclusions are however at variance with the studies of Dessy and Suryaningsih (2015) which affirmed that environmental disclosures had positive effect on financial performance proxied by returns on equity. Ogoun and Ekpulo (2020) undertook a study focusing on the interplay between the reporting of environmental matters and the operational performance of selected quoted manufacturing firms operating in Nigeria. The study covered a ten years period and utilized a panel research design methodology for data gathering while analysis was conducted using the EViews tool. The study established that environmental disclosures had a statistically positive effect on the operational performance of the selected firms. In line with previous similar studies, it advocated for improvement in the level of disclosures made by corporate firms. It further recommended the adoption of the GRI framework as a mandatory listing requirement for firms intending to approach the stock exchange.

Hassan and Zamil (2019) evaluated the relationship between environmental practices/reporting and the financial performance of selected listed firms operating in the USA. The study covered a four years period and utilized a combination of inferential and descriptive statistics for data collection and analysis respectively. The study found that environmental practices/reporting proxied by waste, water and greenhouse emissions had a jointly significant positive connection with the performance of the surveyed firms. It therefore recommended a renewed focus on environmental practices/reporting as a panacea for improving overall corporate profitability. Onwuchekwa and Dibia (2015) undertook a research which focused on assessing the factors influencing environmental disclosures of energy firms in Nigeria. The researchers found that except for firm size, other key determinants such as profit, leverage and audit firm type had statistically significant positive relationship with environmental disclosures. Consequently, they suggested that these indicators must remain at the forefront of the corporate strategies of firms. The outcome of this study was similarly re-echoed in the works of Khilf, Guidara and Souissi (2015) who assessed simultaneously the position of two African economies: Morocco and South Africa. The key additional finding from the study was to the effect that differences in legal and institutional frameworks played additional roles in determining the level and direction of environmental disclosures prevalent in African nations.

Guthrie, Cuganesan and Ward (2016) reviewed the influence that social and environmental reporting had in determining the financial assessment of selected food and beverage firms operating in Australia. The paper confirmed that environmental and social reporting positively influenced financial performance of the entities when assessed using the regression tool. The researchers thereafter recommended that firms should put in place deliberate measures to increase the level and details of qualitative information (in the areas of social of environmental disclosures) provided. This is however at variance with the works of Siti-Nabiha and Amran (2017) who documented that social and environmental reporting exhibited a negative association with the financial performance of business entities in Malaysia and consequently recommended that quantitative rather than qualitative information should remain the primary consideration for investment decision making. Sanusi and Sanusi (2020) empirically studied the part that the reporting of environmental matters and practices had on the financial assessment of quoted manufacturing companies functioning in Nigeria. The paper used the panel research design methodology covering a six (6) years period. The research found that environmental sustainability reporting and practices had positive impact on financial performance using the indices of return on assets, earnings per share and total revenue growth as measuring yardsticks. The researchers thereafter recommended that management of firms should build in environmental sustainability reporting and practices into their day to day operational policies. Similarly, governments should take necessary steps to increase mandatory reporting requirements for businesses especially those operating in environmentally sensitive industries.

Nahiba (2017) evaluated the impact of non-financial information on the performance of listed manufacturing companies in India. The researcher adopted environmental disclosures and corporate governance disclosures as non-financial disclosure indices while Net Assets Per Share was used to represent firm performance. The result of the research was to the effect that the level of and adoption of non-financial disclosures significantly impacted the performance of the selected manufacturing entities. This finding is however at variance with the studies of Malarvizhi and Ranjani (2016) who documented that the level of and adoption of non-financial disclosures had little or insignificant effect on the performance of firms listed in India. Omaliko, Nweze and Nwadiolor (2020) undertook a research focusing on examining the association of environmental accounting disclosures and the performance of non-financial business entities totaling 112 firms that are listed in Nigeria. The research found that environmental accounting disclosures had positive effect on financial performance proxied by Net Assets Per Share. It therefore recommended that the owners and executives running the affairs of non-financial firms should take social and environmentally friendly practices seriously in their respective organizations.

Bhuyan, Perera and Lodh (2017) empirically studied the effect of voluntary corporate social disclosures on firm performance proxied by ROA, Tobin's Q and market capitalization. The study focused on 200 listed companies operating in Bangladesh and found that within the period under review (2011 to 2012), voluntary corporate social disclosures exerted a positive influence on the performance of the firms. This finding is consistent with the works of Musyoka (2017) and those of Mutiva, Ahmed and Murairi (2017) who affirmed similar position in respect of business firms listed in Kenya. Nnamani, Onyekwelu and Ugwu (2017) assessed the relationship between sustainability accounting and reporting and the financial performance of listed manufacturing firms operating in Nigeria using entities in the brewery sub-sector as their

reference point. The outcome of the study was to the effect that sustainability accounting and reporting practices had statistically significant impact on the sampled firm's financial performance.

In available literature, the subject of environmental disclosure practices has been assessed using a mix of qualitative or quantitative indices (Joyce,2020). Such disclosure indices include the "Corporate Social Responsibility Disclosure" (CSRD), "Environmental Disclosure Index" (EDI) and the various indices recommended by the Global Reporting Initiative (GRI) (Brockman, 2015; Yusuf, 2016; Omaliko et al, 2020). However, in view of the comprehensive nature of the performance indicators recommended by the GRI, this work adopted the environmental disclosure scores (ED) and the social disclosure scores (SD) as proxies to measure environmental disclosure practices.

As a result of the above therefore, the study hypothesized as follows:

H_{01}: Environmental disclosure practices has no significant influence on the Return on Asset of selected manufacturing firms in Nigeria

H_{02}: Environmental disclosure practices has no significant influence on the Debt to Total Assets on Asset of selected manufacturing firms in Nigeria

H_{03}: Environmental disclosure practices has no significant influence on the Market Price Per Share on Asset of listed manufacturing firms in Nigeria

METHODOLOGY

This study empirically investigated the impact of environmental disclosure practices on the sustainable performance of listed manufacturing companies operating in Nigeria. Consequently, the study adopted the ex-post facto research approach and covered the period of ten years between 2011 and 2020. The population of the study were the sixty-seven (67) business firms out of which forty-eight (48) firms representing 82.5% of market capitalization as at December 31, 2020 were purposively selected. Data materials utilized for the study was extracted from the audited reports of the selected firms while analysis was done with the aid of descriptive statistics and the inferential statistics tools of regression and correlation matrix respectively. Appropriate diagnostic tests to confirm the fitness of the model was also carried out while the Hausman test was conducted to choose between the fixed effect, random effect and the pooled least square regression estimation models.

In arriving at the econometric model for the study, insights were drawn from previous related studies (Menike, 2020; Emmanuel and Ifeanyichukwu, 2021; Emeke, Olaoye and Ogundajo, 2021). The resulting main model therefore is stated below:

$SPP_{it} = f(EDP_{it})$ (i)

The linear expressions for the hypothesis of the study which included considerations for the introductions of firm age and size as control variables is as stated below:

$$SPP_{it} = \beta_0 + \beta_1 SDD_{it} + \beta_2 EDD_{it} + \beta_3 FSZ_{it} + \beta_4 FAG_{it} + \mu_{it} \quad \text{(ii)}$$

Where:

SPP = Sustainable Performance
ROA = Return on Assets
SDD = Social Disclosures
EDD = Environmental Disclosures
FSZ = Firm Size
FAG = Firm Age

RESULTS, ANALYSIS AND DISCUSSIONS OF FINDINGS

This section provides details of data analysis relating to the variables used for the study. There are 480 observations from the 48 sampled manufacturing companies covering the ten (10) years represented in the study which involves three (3) models derived from the formulated hypotheses.

The test for multicollinearity, regression results, interpretations and discussions for each of the models are as indicated in Tables 1 to 4 respectively

Table 1: Multicollinearity Test Result

Variables	**EDD**	**SDD**	**FSZ**	**FAG**	**VIF**
EDD	1.000				1.32
SDD	0.34	1.000			1.26
FSZ	0.30	0.18	1.000		1.22
FAG	0.01	-0.07	-0.09	1.000	1.13
Mean VIF			1.20		

Source: Researcher's Study (2022)

Interpretation

The above table presents the outcome of the test conducted to verify whether or not multicollinearity exists within the variables under consideration. Specifically, the results show that the range of values for the exogenous variables is between -0.09(lowest value) and 0.34(highest value) which are all below the benchmark of 0.8. This therefore suggests the absence of multicollinearity. Similarly, a review of the Variance Inflation Factor (VIF) results indicates a mean of 1.20 which is below the benchmark of either 5 or 10 therefore, the variables are appropriate for our models as used in the estimation.

Regression Analysis - Model One

Table 2: Regression Estimation Results for Model One

Estimation Techniques	**Random Effects Estimator**			
DV: ROA	**Coeff**	**Std. Err**	**T-Stat**	**Prob**
Constant	3.733	0.897	4.16	0.00
EDD	-0.0003	0.006	-0.05	0.96
SDD	0.00005	0.004	0.01	0.99
FSZ	0.0123	0.005	2.26	0.04
FAG	0.008	0.006	1.33	0.20
Adjusted R^2	0.225			
Wald test	$Chi^2_{(4)}$ = 75.26 (0.00)			
Hausman Test	$Chi^2_{(5)}$ = 9.62 (0.14)			
BPLM Test	$Chi^2_{(1)}$ = 42.36 (0.00)			
Heteroskedasticity Test	$Chi^2_{(1)}$ = 58.83 (0.00)			
Serial Correlation Test	$F_{(1,29)}$ = 5.78 (0.03)			
Cross-Sect Dep. Test	4.954 (0.00)			

Source: Researcher's Study (2022)

Diagnostic Tests

To establish the most appropriate estimation technique to employ, the Hausman test was done. This test provided a basis for selecting one out of the pooled least squares, fixed effect and random effects options as the estimator for the study. The Hausman test output indicate a value of 9.62 with a probability of 0.14 which exceeds the selected 5% significance level chosen for the study. The import of this therefore is that the null hypothesis is accepted and the random effect option adopted accordingly. To further test for the validation of the use of the random effect estimation technique, the study conducted the Breusch-Pagan Lagrangian multiplier test. The result of this test was 42.36 with probability standing at 0.000. This resulting probability is below the selected 5% level of significance thus confirming the appropriateness of the random effect for the analysis.

Similarly, test for the presence of heteroskedasticity was conducted using the Breusch-Pagan test and the result revealed a p- value of 0.00 which is below the chosen benchmark for the study (5%) thus implying a presence of heteroskedasticity. This means that variabilities in the values of the predicted variables are even when placed across the range of the predictor variables. The outcome of the Pesaran's test of cross-sectional independence was 4.954 with a *p*-value of

0.0000 which is below the selected 5% level of significance benchmark for the work. This therefore affirms the existence of cross-sectional dependence in the study's model. The output result for the test of serial correlation reported a value of 5.78 and an associated probability statistic of 0.03 which is below the selected 5% level of significance benchmark for the work. This is therefore an affirmation of the existence of serial correlation problem in the model.

Based on the above diagnostic tests, the Random-Effects GLS Regression with Driscoll-Kraay standard errors was selected as the estimator technique for the model.

Regression Results for Model One

$$ROA_{it} = \beta_0 + \beta_1 SDD_{it} + \beta_2 EDD_{it} + \beta_3 FSZ_{it} + \beta_4 FAG_{it} + \mu_{it} \quad \text{..... (1a)}$$

$$ROA_{it} = 3.73 + 0.00005 SDD_{it} - 0.0003 EDD_{it} + 0.0123 FSZ_{it} + 0.008 FAG_{it} + \mu_{it} \quad \text{..... (1b)}$$

The regression estimate results revealed that environmental disclosure practices measured by environmental disclosure (EDD) exhibited a negative but insignificant impact on the return on asset of manufacturing companies (β_2 = -0.0003*).* This implies that a per cent rise in environmental disclosure indicators will lead to 0.0003 percent reduction in return on asset of manufacturing companies. However, Social Disclosures (SDD) exerted a positive but insignificant impact on return on asset of manufacturing companies (β_1 = 0.00005*).* This submits that a per cent rise in Social Disclosures indices will lead to 0.00005 percent upsurge in return on asset of manufacturing companies. Furthermore, when firm age (FAG) and firm size (FSZ) is introduced into the model, this has positive impact on the return on assets of the sampled manufacturing companies. This is reflected in the signs of the coefficients which showed that β_3 = 0.0123>0, β_4 =0.008>0.

The Adjusted R^2 stood at 0.225. This implies that the within the context of the model used, the independent variables alongside their respective surrogates are accounting for 22.5% variations in returns on assets while the balance 72% is clarified by indices currently outside the model. In addition, the F-statistics of 75.26 with an associated probability value of 0.0000 implies that the entire model is statistically significant at 5%, thus we reject the null hypothesis and accept the alternative hypothesis which affirms that environmental disclosure practices has a significant effect on returns on assets of listed manufacturing firms in Nigeria.

Regression Analysis – Model Two

Table 3: Regression Estimation Results for Model Two

Estimation Techniques	**Random Effects Estimator**			
DV: DTA	**Coeff.**	**Std. Err**	**T-Stat**	**Prob**
Constant	8.697	31.136	0.28	0.78
EDD	-1.222	0.260	-4.69	0.00
SDD	0.358	0.322	1.11	0.28

FSZ	0.437	0.421	1.04	0.31
FAG	0.020	0.334	0.06	0.95
Adjusted R^2	0.111			
Wald test	$Chi^2_{(4)} = 226.36$ (0.00)			
Hausman Test	$Chi^2_{(5)} = 12.11$ (0.059)			
BPLM Test	$Chi^2_{(1)} = 127.61$ (0.00)			
Heteroskedasticity Test	$Chi^2_{(1)} = 6.16$ (0.01)			
Serial Correlation Test	$F_{(1,29)} = 12.04$ (0.00)			
Cross-Sect Dep. Test	10.07 (0.00)			

Source: Researcher's Study (2022)

Diagnostic Tests

To establish the most appropriate estimation technique to employ, the Hausman test was done. This test provided a basis for selecting one out of the pooled least squares, fixed effect and random effects options as the estimator for the study. The Hausman test output indicate a value of 12.11 with a probability of 0.059 which exceeds the selected 5% significance level chosen for the study. The import of this therefore is that the null hypothesis is accepted and the random effect option adopted accordingly. To further test for the validation of the use of the random effect estimation technique, the study conducted the Breusch-Pagan Lagrangian multiplier test. The result of this test was 127.61 with probability standing at 0.000. This resulting probability is below the selected 5% level of significance thus confirming the appropriateness of the random effect for the analysis.

Similarly, test for the presence of heteroskedasticity was conducted using the Breusch-Pagan test and the result revealed a p- value of 0.01 which is below the chosen benchmark for the study (5%) thus implying a presence of heteroskedasticity. This means that variabilities in the values of the predicted variables are even when placed across the range of the predictor variables. The outcome of the Pesaran's test of cross-sectional independence was 10.07 with a *p*-value of 0.0000 which is below the chosen benchmark for the study (5%). This therefore affirms the existence of cross-sectional dependence in the study's model. The output result for the test of serial correlation reported a value of 12.04 and an associated probability statistic of 0.03 which is below the selected 5% level of significance benchmark for the work. This is therefore an affirmation of the existence of serial correlation problem in the model.

Based on the above diagnostic tests, the Random-Effects GLS Regression with Driscoll-Kraay standard errors was selected as the estimator technique for the model.

Regression Results for Model Two

$DTA_{it} = \beta_0 + \beta_1 SDD_{it} + \beta_2 EDD_{it} + \beta_3 FSZ_{it} + \beta_4 FAG_{it} + \mu_{it}$ ..... (2a)

$DTA_{it} = 8.697 + 0.358_{it} - 1.22_{it} + 0.4373_{it} + \beta_4 0.020_{it} + \mu_{it}$ ..... (2b)

The regression estimate results revealed that environmental disclosure practices measured by environmental disclosure (EDD) has a significantly negative impact on debt to assets ratio of manufacturing companies (β_2 = -1.22, p = *0.00).* This suggests that a per cent rise in environmental disclosure indicators will lead to 1.22 percent growth in debt to assets ratio of manufacturing companies. However, Social Disclosures (SDD) exerted a positive but insignificant impact on return on asset of manufacturing companies (β_1 = 0.358, p = *0.28).* This suggests that a unit increase in Social Disclosures indices will lead to 0.358 percent rise in debt to total assets ratio of manufacturing companies. Furthermore, when firm age (FAG) and firm size (FSZ) is introduced into the model, this has positive impact on the debt to total assets ratio of the sampled manufacturing companies. This is reflected in the signs of the coefficients which showed that $\beta_3 = 0.4373 > 0$, $\beta_4 = 0.020 > 0$.

The Adjusted R^2 stood at 0.111. This implies that the within the context of the model used, the independent variables alongside their respective surrogates are accounting for 11.1% variations in debt to assets ratios while the balance 88.9% is clarified by factors currently outside the model. In addition, the F-statistics of 226.36 with an associated p-value of 0.0000 implies that the entire model is statistically significant at 5%, thus we reject the null hypothesis and accept the alternative hypothesis which affirms that environmental disclosure practices has a significant effect on debt to assets ratio of listed manufacturing firms in Nigeria

Regression Analysis – Model Three

Table 4: Regression Estimation Results for Model Three

Estimation Techniques	**Fixed Effects Estimator**			
DV: MPS	**Coeff.**	**Std. Err**	**T-Stat**	**Prob**
Constant	8.327	4.406	1.89	0.08
EDD	-0.250	0.061	-4.11	0.00
SDD	0.059	0.049	1.19	0.25
FSZ	0.033	0.071	0.47	0.64
FAG	-0.014	0.095	-0.15	0.88
Adjusted R^2	0.120			
F-Stat	$F_{(7,14)}$ = 22.22 (0.00)			
Hausman Test	$Chi^2_{(7)}$ = 16.32 (0.01)			
Testparm Test	$F_{(14,119)}$ = 7.54 (0.00)			

Heteroskedasticity Test	$Chi^2_{(10)} = 103.01$ (0.00)
Serial Correlation Test	$F_{(1,9)} = 2.400$ (0.15)
Cross-Sect Dep. Test	2.217 (0.02)

Source: Researcher's Study (2022)

Diagnostic Tests

To establish the most appropriate estimation technique to employ, the Hausman test was done. This test provided a basis for selecting one out of the pooled least squares, fixed effect and random effects options as the estimator for the study. The Hausman test output indicate a value of 16.32 with a probability of 0.01 which is less than the selected 5% significance level chosen for the study. The import of this therefore is that the null hypothesis is rejected and the fixed effect option adopted accordingly. To further test for the validation of the use of the fixed effect estimation technique, the study conducted the Testparm test. The result of this test was 7.54 with probability standing at 0.000. This resulting probability is below the selected 5% level of significance thus confirming the appropriateness of the fixed effect for the analysis.

Similarly, test for the presence of heteroskedasticity was conducted using the Breusch-Pagan test and the result revealed a p- value of 0.01 which is below the chosen benchmark for the study (5%) thus implying a presence of heteroskedasticity. This means that variabilities in the values of the predicted variables are even when placed across the range of the predictor variables. The outcome of the Pesaran's test of cross-sectional independence was 2.217 with a *p*-value of 0.0000 which is below the chosen benchmark for the study (5%). This therefore affirms the existence of cross-sectional dependence in the study's model. The output result for the test of serial correlation reported a value of 2.40 and an associated probability statistic of 0.15 which is above the selected 5% level of significance benchmark for the work. This is therefore an affirmation of the absence of serial correlation problem in the model.

Based on the above diagnostic tests, the Fixed-Effects GLS Regression with Driscoll-Kraay standard errors was selected as the estimator technique for the model.

Regression Results for Model Three

$$MPS_{it} = \beta_0 + \beta_1 SDD_{it} + \beta_2 EDD_{it} + \beta_3 FSZ_{it} + \beta_4 FAG_{it} + \mu_{it} \quad \text{..... (3a)}$$

$$MPS_{it} = \beta_0 + \beta_1 SDD_{it} - 0.25_{it} + \beta_3 FSZ_{it} + \beta_4 FAG_{it} + \mu_{it} \quad \text{..... (3b)}$$

The regression estimate results revealed that environmental disclosure practices measured by environmental disclosure (EDD) has a significantly negative impact on market price per share of manufacturing companies (β_2 = -0.25*).* This submits that a percent rise in environmental disclosure indicators will lead to 0.25 percent growth in market price per share of manufacturing companies. However, Social Disclosures (SDD) exerted a positive but insignificant impact on market price per share of manufacturing companies (β_1 = 0.059*).* This suggests that a percent rise in Social Disclosures indices will lead to 0.059 percent growth in market price per share of manufacturing companies. Furthermore, when firm age (FAG) and firm size (FSZ) is introduced

into the model, this produced a mixed impact on the market price per share of the sampled manufacturing companies. This is reflected in the signs of the coefficients which showed that $\beta_3 = 0.033>0$, $\beta_4 = -0.0014<0$.

The Adjusted R^2 stood at 0.121. This implies that the within the context of the model used, the independent variables alongside their respective surrogates are accounting for 12.1% variations in debt to assets ratios while the balance 87.9% is clarified by factors currently outside the model. In addition, the F-statistics of 22.22 with an associated p-value of 0.0000 implies that the entire model is statistically significant at 5%, thus we reject the null hypothesis and accept the alternative hypothesis which affirms that environmental disclosure practices has a significant effect on market price per share of listed manufacturing firms in Nigeria.

Discussion of Findings

The major thrust of this research was to ascertain the impact of environmental disclosure practices on the sustainable performance of manufacturing companies operating in Nigeria. Generally, the study found that while environmental disclosures had a negative effect on Returns on Assets, Debt to Assets Ratio and Market Price per Share respectively, social disclosures, the size of firms and their age manifested significant impact in driving sustainable performance of manufacturing companies in Nigeria. The import of this finding is that firms that provide extensive disclosures on their social footprint will experience increased patronage that will dovetail into revenue boosts and positive market perception. This outcome aligns with the findings of Sanusi and Sanusi (2020); Nahiba (2017) who affirmed that the level of and adoption of social disclosures significantly impacted the performance of manufacturing entities. However, it negates the findings of Siti-Nabiha and Amran (2017) who documented that social disclosures demonstrated a negative relationship with the performance of business entities in Malaysia.

Furthermore, the study's finding that environmental disclosures exhibited a negative and insignificant relationship with returns on assets suggests that either the disclosures made are incomplete and unreliable or the voluntary nature of the disclosures on environmental activities by Nigerian manufacturing companies have not necessarily transformed to improvement in the bottom line of the affected firms. This finding is in congruence with the works of Ogundajo et al (2021); Nkwoji (2021) who found that environmental disclosures had insignificant relationship with firms in the energy and consumer goods sectors respectively. The finding is however at variance with the outcome of the studies of Ifada et al (2021); Ogoun and Ekpulo (2020); Hassan and Zamil (2019) who affirmed that environmental disclosures had significantly positive association with manufacturing and energy firms in Indonesia, Nigeria and the United States respectively.

Also, the study's finding that social disclosures positively impacted returns on assets aligned with the conclusions of Guthrie et al (2016) which documented that social an environmental reporting positively impacted the financial performance of selected foods and beverages firms operating in Australia. This position is further corroborated by the works of Omaliko et al (2020) which found that social disclosures had a positive effect on the net assets per share of selected non-financial firms in Nigeria. However, on the other side of the prism, Polycarp (2019); Lang (2016) found that social disclosures exhibited a negative association with the financial

performance measures of energy and manufacturing entities in Nigeria and France respectively. Similarly, the significant positive association between social disclosures and market price per share arrived at in this study is in alignment with the research outcomes of Bhuyan et al, (2017) and Muskoya (2017) which concluded that environmental and social disclosures positively influenced the market price and market capitalization of business entities operating in Bangladesh and Kenya respectively.

CONCLUSION AND RECOMMENDATION

Environmental footprint issues associated with manufacturing companies have assumed global concern because of their potentials to unduly affect the ability of future generations to access and use earthly and natural resources on a replenishable basis. This study has therefore evaluated the impact that environmental and social disclosures have in facilitating sustainable performance of manufacturing companies operating in Nigeria. The findings from the study show that while environmental disclosures had insignificant influence on the sustainable performance of manufacturing companies, social disclosures had positive influence in driving sustainable performance of manufacturing companies measured by the indices of returns on assets, debt to assets ratio and market price per share respectively.

As a result of the research findings therefore, the study recommends as follows:

1. Managers and Business Owners operating in the manufacturing space should put in place measures aimed at improving the completeness and reliability of their environmental disclosures as this has the capacity of influencing investment decision making by stakeholders.
2. In view of the central role that manufacturing entities play in generating significant environmental footprint, regulators and supervisory agencies should incentivize adequate reporting of environmental practices through tax credits so as to stimulate improved compliance to reporting benchmarks.
3. Manufacturing companies should provide extensive disclosures on their social footprint and practices as doing so will spur increased patronage that will dovetail into revenue boosts, positive market perception and consequently improved market price per share or valuation.

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