

Firm Attributes and Corporate Environmental Performance: Evidence from Quoted Industrial Firms on Nigerian Stock Exchange

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Abstract: This study examined the effect of firm characteristics on corporate environmental performance of quoted industrial goods firms in Nigeria. Specifically, the study examined the effect of firm size, profitability and firm age on waste management cost of the industrial goods firms. The study adopted the ex-post facto research design. Population and sample size of the study is made up of eleven industrial goods firms quoted on the Nigerian stock exchange as at the year, 2017. This study utilized secondary data sourced from annual reports and accounts of the sampled firms for the study period, 2008-2017. Data analysis was done using Pearson correlation coefficient and Multivariate regression analysis. Findings of the study revealed that firm attributes (firm size, profitability and firm age) have a significant and positive effect on environmental performance (measured by waste management cost) at 5% significant level. Based on this, it was recommended that considering the need to gain competitive advantage and boost firm value, industrial goods firms should address issues partaking to environmental management by developing business models and strategies that will ensure environmental sustainability.

Keywords: Environmental responsibility, Management, Performance.

INTRODUCTION

The growing pressure on environmental responsibility from shareholders, government regulators and the public has necessitated the need for companies to pay more attention to the environmental impact of their operations. Indeed, stakeholders desire that companies be more responsible for their activities and consider their decisions to include environmental and sustainable development issues in areas such as greenhouse gases, emissions, and waste that have a negative impact in the environment as whole [1].

Although in recent years companies are under intense pressure to shift from the single (financial) bottom line to an integrated stakeholder business approach, they are still required to increase their financial performance continuously without ignoring environmental impacts [2]. Thus, a fundamental philosophy propagated today is how imperative it is that firms address all business values in order to lessen the chance that their activities will cause harm to global resources, not only for today's population but for future generations. Hence, according to Reddy & Gordon [4], requiring companies to account on a regular basis the impact their activities have had on the environment will allow: (a) stakeholders to be informed of the nature of activities companies are engaged in; (b) stakeholders to monitor the effect such activities are having on their environment and (c) companies in consultation with the relevant stakeholders will be able to implement strategies to minimize the effect of such activities among others. Firms that are environmentally responsible will enjoy increased patronage from stakeholders which will result in increased revenue in the long-run [4, 5].

The necessity for firms to be environmentally responsible is evidently apparent. However, conventional tendencies in which profitability and increment of shareholders' value are prioritized above all business values seem yet a largely practiced business phenomenon as costs and business pressure linked to the essence of meeting daily operational overheads cause skewed approaches in which most firms get strongly preoccupied with profitability to enrich shareholders' value at the expense of the environment [6-9].

Increasing numbers of environmental issues have attracted scholars to study the relationship of such issues and business practices. Unfortunately, the attention that has been paid to the topic of environmental responsibility

performance is mainly focused on the consequences that are associated with environmental management activities. Obviously, the consequence on financial performance has gained much attention the last couple of years. Nevertheless, despite the extensive amount of research done towards this consequence, result of the studies still remain contradictory and ambiguous [10]. And so the question is, if engaging in environmental management activities does not lead to improved financial performances per se, what antecedents drive corporations to engage in environmental management activities? Finding the determinants of engaging in such activities will contribute towards the understanding of why firms have different attitudes towards environmental responsibility performance.

Several potential firm attributes have been identified in the literature for firms' varying attitude towards environmental responsibility performance. Wuttichindanon [11], suggest that larger companies tend to receive more attention from the public and, therefore, they are under greater public pressure to exhibit environmental responsibility. Also, Wuttichindanon [11], disclosed that these empirical studies: [12-14] found that environmental responsibility performance is positively associated with firm age and firm size and added that when a corporation matures, its reputation and history of involvement in environmental responsibility performance become entrenched. Furthermore, Roberts [15], cited in Wuttichindanon [11], finds that corporate economic performance directly affects the financial capability of firms to undertake environmental responsibility activities.

Considering the inconclusive findings of prior related research and the need for this study in Nigerian context, this study aims to investigate the determinants of environmental performance of industrial companies listed on the Nigerian Stock Exchanges (NSE).

Objective of the study

The main objective of this study is to examine the effect of firm attributes on environmental performance of quoted industrial goods firms in Nigeria. Specifically, the study will:

- Ascertain the effect of firm size on waste management cost of the industrial goods firms.
- Determine the effect of firm profitability on waste management cost of the industrial goods firms.
- Investigate the effect of firm age on waste management cost of the industrial goods firms.

Research Hypotheses

The following null hypotheses were formulated to guide the study

H₀₁: Firms' size does not have a significant effect on waste management cost of the industrial goods firms.

H₀₂: Firms' profitability does not have a significant effect on waste management cost of the industrial goods firms.

H₀₃: Firms' age does not have a significant effect on waste management cost of the industrial goods firms.

REVIEW OF RELATED LITERATURE

Conceptual Framework

Firm Characteristics

Firm characteristics are conceptualized differently by various studies depending on the criteria used to define it. However, most studies seem to agree with the position that firm characteristics are related with firm resources and organizational objectives [16]. Firm resources and objectives can be analyzed using three criteria namely; structure, market and capital related firm characteristics [17]. Structural firm characteristics include firm size, age, profitability and ownership. Moreover, market related variables include industry type, environmental uncertainty and market environment while capital related variables consist of liquidity and capital intensity [17].

The focus of this study is on the structural criteria of firm characteristics which include firm size, age and profitability.

Firm Size

The size of a firm is considered an important variable in determining the firm's operational strength. According to Kabir and Hartini [18], there are more opportunities for firms that grow in size, to operate in bigger segment environment in both business and geographical regards. Firm size has also been shown to be related to industry sunk costs, concentration, vertical integration and overall industry profitability as larger firms are more likely to have more layers of management, greater number of departments, increased specialization of skills and functions, greater centralization and greater bureaucracy than smaller firms [19].

Yao, Wang and Song [20], reveals that large firms tend to get more attention from the general public therefore larger firms get greater public pressure to show their environmental responsibility. If linked to stakeholder theory, large firms have more stakeholders than small firms. This is why large firms should have a wider disclosure of information to meet the stakeholders' need for information related to their interest. Small firms seem to be more dependent than large

firms on the personal and cohesive social relationships of the entrepreneur and top management team such as their relationship with family members and friends, on which they rely to obtain resources, gain legitimacy [21]. Conversely, larger firms may seek business relationships for different strategic motives, such as innovation, market access, financial need and so forth. Firm size could be measured using Firm size indicators as used in previous studies include; total assets, total sales and number of employees. However, for the purpose of this study, it will be measured using total assets.

Profitability

Profitability is the measurement of excess revenue over expenses incurred. It is the ultimate output of a company [22]. It is defined as an indicator to the firms' performance in managing its assets [23]. Profitability stems from the word 'profit' which many scholars have shown to be ambiguous. Profitability ratios are calculated to measure the operating efficiency of a firm. Not only management is interested in the profitability of a firm, but also stockholders. Companies with good news are more likely to engage in sustainability activities [24]. Thus, it would be expected that managers of profitable firms would be motivated to disclose more information in order to distinguish themselves from the less profitable firms. Profitability could be measured in relation to sales or investment. It is mainly measured using ratios like the net profit margin, gross profit margin, operating margin and return on assets (ROA) and so on. For the purpose of this study, profitability will be measured using netprofit margin.

Firm Age

Firm age refers to the number of years since when the firm was established and started operation in the business market. It is conceptualized as the number of years since the firm was listed in the registration authority database [16]. Firm age is an important determinant of financial performance. Past researches show that the profitability of firms, growth, firm failure and the variability of firm growth decreases as a firm ages [19]. By analogy, firms weaken overtime and lose their ability to compete. If performance declines as firms grow older, it could explain why most of them are eventually taken over [25]. Firms' specialize and find ways to standardize, coordinate and speed up their production, as well as to reduce costs and improve quality. Older firms may also benefit from reputation effects which allow them to earn a higher margin on sales. According to the life cycle effect, younger companies are more dynamic and more volatile in their growth experience than older companies [19]. Maturity brings stability in growth as firms learn more precisely their market positioning, cost structures and efficiency levels.

Corporate Environmental Performance

Corporate environmental performance is an assessment of the extent to which the company can perform environmental management. It is the performance of the firm in creating a good environment [26, 27]. The firm gives attention to the environment as a form of corporate responsibility and care to the environment. Environmental performance according to Fitriani [28], is the performance of a company in creating a good or green environment.

According to Tjahjono [29] and Titisari and Alviana [30], environmental performance as one of the concerns of investors and other stakeholders, has an influence on the financial performance of the company. Good environmental performance shows that the company has good business ethics as well as contributes to sustainable development [31]. The companies that take responsibility for the environment would obtain a positive image in the eyes of the public, including consumers and investors.

Theoretical Framework

This study is anchored on stakeholder theory.

Stakeholder Theory [32]

The traditional definition of a stakeholder is 'any group or individual who can affect or is affected by the achievement of the organization's objectives' Aoadokaa 2015 [32, 33]. The general idea of the stakeholder concept is a redefinition of the organization. In general the concept is about what the organization should be and how it should be conceptualized. Fontaine *et al.*, [33] states that the organization itself should be thought of as grouping of stakeholders and the purpose of the organization should be to manage their interests, needs and viewpoints. This stakeholder management is thought to be fulfilled by the managers of a firm. The managers should on the one hand manage the corporation for the benefit of its stakeholders in order to ensure their rights and the participation in decision making and on the other hand the management must act as the stockholder's agent to ensure the survival of the firm to safeguard the long term stakes of each group.

To test H₁, H₂, and H₃, the study estimated the following regression equations. The equation examines the association between firms' characteristics and environmental performance of Industrial Goods companies listed on NSE:

$$\begin{aligned}
 WMC_{it} &= \beta_0 + \beta_1 FSZ_{it} + \beta_2 LEV_{it} + \beta_3 BSZ_{it} + \mu_{it} & - & - & - & H_{01} \\
 WMC_{it} &= \beta_0 + \beta_1 NPM_{it} + \beta_2 LEV_{it} + \beta_3 BSZ_{it} + \mu_{it} & - & - & - & H_{02} \\
 WMC_{it} &= \beta_0 + \beta_1 FAG_{it} + \beta_2 LEV_{it} + \beta_3 BSZ_{it} + \mu_{it} & - & - & - & H_{03}
 \end{aligned}$$

Where,

- WMC_{it} = Waste Management Cost of firm *i* in period *t*
- FSZ_{it} = Firm Size of firm *i* in period *t*
- NPM_{it} = Net Profit Margin of firm *i* in period *t*
- FAG_{it} = Firms Age of firm *i* in period *t*
- BSZ_{it} = Board Size of firm *i* in period *t*
- LEV_{it} = Leverage of firm *i* in period *t*
- μ_{it} = Error Term firm *i* in period *t*

DECISION RULE

Reject H₀ if the P-value of the test is less than α-value (level of significance) at 5%, otherwise accept H₁.

Data Analysis

Table 1: Pearson Correlation Matrix

. *(8 variables, 110 observations pasted into data editor)
 . correlate wmc fsz npm fag lev bsz(obs=110)

	wmc	fsz	npm	fag	lev	bsz
wmc	1.0000					
fsz	0.0388	1.0000				
npm	0.1606	0.6096	1.0000			
fag	0.1906	0.0407	0.5677	1.0000		
lev	-0.2612	0.0028	-0.0886	-0.3049	1.0000	
bsz	-0.0323	-0.0244	-0.0727	-0.0477	0.1589	1.0000

Source: STATA 13 Pearson Correlation Output, 2018

The Pearson correlation matrix result in table 1 indicates the existence of a positive relationship between FSZ (0.0388), NPM (0.1606), FAG (0.1906) and WMC. On the other hand LEV (-0.2612) and BSZ (-0.0323) correlate negatively with WMC.

Test of Research Hypotheses

Test of Hypothesis I

H₀₁: Firm size has no significant effect on waste management cost of quoted industrial goods firms in Nigeria.

H₁: Firm size has significant effect on waste management cost of quoted industrial goods firms in Nigeria.

Table 2: Regression result on the effect of firm size on waste management cost

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. regress wmc fsz lev bsz
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Source	SS	df	MS			
Model	1.80619383	3	.60206461	Number of obs =	110	
Residual	24.0401783	106	.226794135	F (3, 106) =	3.65	
Total	25.8463721	109	.23712268	Prob > F =	0.0201	
				R-squared =	0.7699	
				Adj R-squared =	0.6436	
				Root MSE =	.47623	

wmc	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
fsz	.0000506	.0001193	3.82	0.000	-.0001858	.0002871
lev	-.0494692	.0178503	-2.77	0.007	-.0848591	-.0140792
bsz	.0459288	.4181131	0.11	0.913	-.783021	.8748787
_cons	.8442968	.0953751	8.85	0.000	.6552065	1.033387

Source: STATA 13 Regression output, 2018

Interpretation of regression result

According to the result of the analyzed data in table 2, the function of multiple linear regressions was built in the model below:

$$WMC = 0.8442968 + 0.0000506FSZ - 0.0494692LEV + 0.0459288BSZ$$

The results of the pooled regression exploring the functional relationship and effect thereof, between waste management cost and firm size are presented in table 3. The results showed that information on firm size has a direct/positive relationship with waste management cost of industrial goods firms in Nigeria ($\beta_1 X_1 = 0.0000506$). That is, movement in WMC is significantly influenced by movement in FSZ ($P>|t|=0.000<0.05$). The result also showed that firm size is statistically significant in explaining variations in WMC at 5% level of significance. The value of adjusted R squared of 0.644 is an indication that there was variation of 64.4% on environmental performance measure (WMC) due to changes in the explanatory variables (FSZ, LEV and BSZ). This shows that only 64.4% changes in waste management cost of quoted industrial goods could be accounted for by firm size, leverage and board size. Testing the overall significance of the model, the results also confirmed that the model is statistically significant at 5% level of significance with the Prob (F-statistic) = 0.0201.

DECISION

Since there is strong evidence that WMC is influenced by firm size at 5% level of significance, therefore, this research concludes that firm size has a significant positive effect on waste management cost of quoted industrial goods firms in Nigeria for the period of 2008 to 2017.

Test of Hypothesis II

H₀₂: Firms’ profitability has no significant effect on waste management cost of quoted industrial goods firms in Nigeria.

H₂: Firms’ profitability has significant effect on waste management cost of quoted industrial goods firms in Nigeria.

Table-3: Regression result on the effect of firm profitability on waste management cost
 .regress wmc npm lev bsz

Source	SS	df	MS			
Model	2.26325737	3	.754419123	Number of obs =	110	
Residual	23.5831148	106	.222482215	F (3, 106) =	3.39	
Total	25.8463721	109	.23712268	Prob > F =	0.0207	
				R-squared =	0.5876	
				Adj R-squared =	0.5617	
				Root MSE =	.47168	

wmc	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
npm	1.129727	.7551482	2.50	0.012	-.3674276	2.626882
lev	-.0473433	.0177337	-2.67	0.009	-.082502	-.0121845
bsz	.0784721	.4147267	0.19	0.850	-.743764	.9007082
_cons	.7909974	.1013449	7.81	0.000	.5900713	.9919234

Source: STATA 13 Regression output, 2018

Interpretation of Regression Result

According to the result of the analyzed data in table-3, the function of multiple linear regressions was built in the model below:

$$WMC = 0.7909974 + 1.129727NPM - 0.0473433LEV + 0.0784721BSZ$$

The results of the pooled regression exploring the functional relationship and effect thereof, between waste management cost and net profit margin are presented in table 4.3. The results showed that information on net profit margin has a direct/positive relationship with waste management cost of industrial goods firms in Nigeria ($\beta_1 X_1 = 1.129727$). That is, movement in WMC is significantly influenced by movement in NPM ($P>|t|=0.012<0.05$). The result also showed that net profit margin is statistically significant in explaining variations in WMC at 5% level of significance. The value of adjusted R squared of 0.562 is an indication that there was variation of 56.2% on environmental performance measure (WMC) due to changes in the explanatory variables (NPM, LEV and BSZ). This shows that only 56.2% changes in waste management cost of quoted industrial goods could be accounted for by net profit margin, leverage and board size.

Testing the overall significance of the model, the results also confirmed that the model is statistically significant at 5% level of significance with the Prob (F-statistic)=0.0207.

Decision

Since there is strong evidence that WMC is influenced by net profit margin at 5% level of significance, therefore, this research concludes that net profit margin has a significant positive effect on waste management cost of quoted industrial goods firms in Nigeria for the period of 2008 to 2017.

Test of Hypothesis III

H₀₃: Firms' age does not have a significant effect on waste management cost of quoted industrial goods firms in Nigeria.

H₃: Firms' age has significant effect on waste management cost of quoted industrial goods firms in Nigeria.

Table 4: Regression result on the effect of firm age on waste management cost

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. regress wmc fag lev bsz

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Source	SS	df	MS			
Model	2.11609462	3	.705364872	Number of obs =	110	
Residual	23.7302775	106	.223870543	F(3, 106) =	3.15	
Total	25.8463721	109	.23712268	Prob > F =	0.0280	
				R-squared =	0.4819	
				Adj R-squared =	0.4559	
				Root MSE =	.47315	

wmc	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
fag	.58785	.4696222	2.25	0.023	-.3432216	1.518922
lev	-.042399	.0185998	-2.28	0.025	-.0792749	-.005523
bsz	.0410655	.4152781	0.10	0.921	-.7822637	.6643947
_cons	.7748031	.1105728	7.01	0.000	.5555818	.9940244

Source: STATA 13 Regression output, 2018

Interpretation of Regression Result

According to the result of the analyzed data in table-4, the function of multiple linear regressions was built in the model below:

$$WMC = 0.7748031 + 0.58785FAG - 0.042399LEV + 0.0410655BSZ$$

The results of the pooled regression exploring the functional relationship and effect thereof, between waste management cost and firm age are presented in table-4. The results showed that information on firm age has a direct/positive relationship with waste management cost of industrial goods firms in Nigeria ($\beta_1 X_1 = 0.58785$). That is, movement in WMC is significantly influenced by movement in FAG ($P>|t|=0.023<0.05$). The result also showed that firm age is statistically significant in explaining variations in WMC at 5% level of significance. The value of adjusted R squared of 0.456 is an indication that there was variation of 45.6% on environmental performance measure (WMC) due to changes in the explanatory variables (FAG, LEV and BSZ). This shows that only 45.6% changes in waste management cost of quoted industrial goods could be accounted for by firm age, leverage and board size.

Testing the overall significance of the model, the results also confirmed that the model is statistically significant at 5% level of significance with the Prob (F-statistic)=0.0280.

DECISION

Since there is strong evidence that WMC is influenced by firm age at 5% level of significance, therefore, this research concludes that firm age has a significant positive effect on waste management cost of quoted industrial goods firms in Nigeria for the period of 2008 to 2017.

DISCUSSION OF FINDINGS

This study investigated the effect of firm characteristics on environmental performance of quoted industrial firms in Nigeria for a ten year period spanning from 2008-2017. Environmental performance which is the dependent variable was measured by waste management cost (WMC) while firm characteristics which is the independent variable was proxied with firm size, profitability and firm age. More so, leverage and board size were employed as the control variables. From the regression result of this study, the outcome of the analysis under hypothesis one, two and three shows that firm characteristics has a significant and positive effect on environmental performance at 5% level of significance.

The findings of this study are in support of the study carried out by Nichols and Streat [34] and Erhun [24]. On the other hand, the finding of this study negates the findings of Elshabasy [35] who assessed the impact of several corporate characteristics on environmental information disclosure (EID) of the listed firms in a developing country. It selects the 50 most active firms in the Egyptian stock exchange and the analysis is done using the financial statements from the disclosure book for the period 2007-2011, Prior the revolution, along with the firms' annual reports. The final count for the firms is 45, after excluding bank and insurance companies for having different disclosure requirements and different corporate governance code. The tests for this research were done using the multiple regression model applied

using the SPSS. Findings found that there is an insignificant relationship between two factors of firms' characteristics (firm size and firm financial leverage) and EID, while firm's age showed a negative significant relationship with EID and finally, firm's profitability showed a positive significant relationship with EID.

SUMMARY OF FINDINGS

Findings of this study revealed that;

- Firm Size has a significant positive effect on Waste Management Cost of quoted industrial goods firms in Nigeria at 5% level of significance.
- Net Profit Margin has a significant positive effect on Waste Management Cost of quoted industrial goods firms in Nigeria at 5% level of significance.
- Firm Age has a significant positive effect on Waste Management Cost of quoted industrial goods firms in Nigeria at 5% level of significance.

CONCLUSION AND RECOMMENDATION

Environmental sustainability has become one of the world's trends and challenge for enterprises in recent times. The question is how businesses will respond to this challenge and how they can integrate this concept into corporate strategy and business framework in order to obtain benefits. Findings of this study have shown that firm characteristics (Firm size, Profitability and Firm age) has a positive and significant effect on environmental performance of industrial firms (measured by Waste management cost). Therefore it is recommended that considering the need to gain competitive advantage and boost firm value, industrial goods firms should address issues partaking to environmental management and sustainability. This implies that companies in line with their attributes should develop business models and strategies that will ensure environmental sustainability.

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