
The Influence of Corporate Governance on Environmental Disclosure of Listed Non-Financial Firms in Nigeria

Ndubuisi Odoemelam^{1*}, Regina G. Okafor²

¹University of Nigeria, Department of Accountancy, Enugu State, Nigeria

²University of Nigeria, Department of Accountancy, Enugu State, Nigeria

*Correspondence to: Ndubuisi Odoemelam, University of Nigeria, Department of Accountancy, Enugu Campus, Nigeria.

E-mail: ndubuisi.odoemelam@uniport.edu.ng

Abstract: The study investigates the influence of corporate governance on environmental disclosure of nonfinancial firms listed in Nigeria Stock Exchange (NSE), anchoring on “Trinity theory” (agency, stakeholder and legitimacy theories). 86 firm-year observations across 86 companies listed in Nigeria Stock Exchange (NSE) using content analysis, cross-sectional data, OLS regression techniques were used to analyze the influence of board characteristics on the extent of overall environmental disclosure (OED). The results show that board independence, board meeting, and the environmental committee were statistically significant while audit committee independence and board size were insignificant. Among the three company attributes used to mitigate spurious result only firm size significantly influence the quantity of overall environmental disclosure of the sample companies. Auditor type “big 4” (Ernest Young, Deloitte, KPMG, and PwC) and industry membership show insignificant relation to environmental disclosure. The findings indicate that the level of environmental disclosure of nonfinancial companies in Nigeria is quite insufficient at an average of 10.5 percent. It is not surprising that environmentally sensitive industry and auditor type had no significant influence on the extent of environmental disclosure. This buttress the point that the environment the companies operate is institutionally and legally weak. Hence it calls for improvement on environmental law and implementation as well as harmonized environmental reporting infrastructure and standard to aid comparison.

Keywords: corporate governance, environmental disclosure, trinity theory, non-financial companies, company attributes.

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Introduction

The dynamic nature of the environment and its associated cost to humanity has generated concerns of stakeholders (Jones et al., 2017; Rokhmawati & Gunardi, 2017; Rokhmawati et al., 2017) in search of ways of ameliorating the adverse impact of activities of various companies; emphasizing the need for environmental impact assessment and reporting (Ghani et al., 2018). Some scientific studies have revealed the potentially harmful effect of corporate activities on the environment. For example, the study of Wilson et al. (2011) shows that automated teller machines, computer keyboards, telephones, handsets, hospital beds, rails, doors handle,

currency notes are transmission agents of microorganisms. There are many cases of respiratory infection and chronic obstructive pulmonary diseases as a result of industries environmental pollution and climate change issues (Ostro, 2004; Nriagu et al., 2016). An increase in multinational and domestic food companies and its related potential negative environmental health impact (Akbas, 2016; Igumbor et al., 2012; Khoiruman & Haryanto, 2017). There are other ecological damage and natural resources depletion (Li et al., 2015; Yu et al., 2016).

Shareholders are equally concerned about issues of climate change, pollution and another negative impact on the environment since they affect business performance and should be accountable for (Li et al., 2016; Al-Tuwaijri et al., 2004; de Villiers & van Staden, 2010; Said et al., 2013; Wang, 2016; Baron, 2014; Joshi & Li, 2016). Policy makers, especially corporate management are encouraged to show interest in maintaining a quiet and noiseless environment as it has tremendous benefits to humanity (Votsi et al., 2017; Mulyanto et al., 2018). The questions that are readily demanding answers are: do corporate entities disclose their impact on the environment and to what extent? If yes, does corporate governance influence the level of environmental disclosure by companies? Hence, why corporate environmental disclosure?

Corporate environmental reporting aimed at providing useful and faithful information of entity operations in an environment (Bateman et al., 2017; Shearer, 2002). This information is incorporated in some traditional annual reports and mostly in all in-one-integrated annual report of companies (de Villiers et al., 2017). As it remains voluntary for entities to disclose the environmental impact (Plumlee et al., 2015), the information is severely lacking in various reports (Al-Janadi et al., 2012) and where it exists, entities only disclose positive information (Deegan & Gordon, 1996). The decision of what, how, when and to what extent to disclose these environmental issues rest upon the corporate governance mechanism of the entity (e.g. Agyei-Mensah, 2016; Akbas, 2016; Alhazaimah et al., 2014; Cormier et al., 2015; Dembo & Rasaratnam, 2014; Elsakit & Worthington, 2014; Liao et al., 2015; Mayorga & Trotman, 2016; Trireksani & Djajadikerta, 2016; et al., 2014). Moreover, also influenced by company attributes such as size, industry membership and auditor reputation (Al-Shammari & Al-Sultan, 2010; Ahmad et al., 2015; Eng & Mak, 2003; Iatridis, 2013; Marcia et al., 2015). However, there exist distinct problems with corporate environmental disclosure.

Over the years despite wider acknowledgment of the importance of corporate environmental reporting, there are no standards for comparison (Carvalho et al., 2014; da Rosa et al., 2015; Montecchia et al., 2016). As environmental reporting remains voluntary within and across countries (Horváth et al., 2017), glaring differences regarding the quality and quantity of environmental information abound (Ienciu et al., 2012). When this important information is less readable in the reports presented by managers, is likely that the investors' and regulators valuation judgments are influenced by outside sources of information (Asay et al., 2017). In most developing countries, environmental disclosure practice is weak (Biobele & Mefor, 2012) and there is no reliable and regular information for controlling the environment (Botero et al., 2015). The bottom-line is that stakeholders should be "lawfully" informed about corporate environmental performance and not just voluntary disclosure (Ienciu et al., 2012). The effort of Coalitions for Environmentally Responsible Economies (CERES) by the launching of Global Reporting Initiative in 1997 aimed at bringing environmental reporting at par with financial reporting standard yet to be achieved. On that note, Chen et al. (2014) advocates for specific measures to make environmental disclosure meaningful to stakeholders. Studies in developed and developing countries have provided evidence on corporate governance influence on environmental exposure (Akbas, 2016; Umoren et al., 2015; Trireksani & Djajadikerta, 2016).

The assumptions underpinning corporate governance and environmental disclosure are agency theory (Jensen & Meckling, 1976) which provides the framework for the link between the variables (Allegrini & Greco, 2013; Ienciu et al., 2012; Kabir & Thai, 2017). Legitimacy theory which "stresses that an organization must be accountable for its actions" (Greiling & Grüb, 2014). This theory perceived as a possible reason for the recent

upsurge in environmental disclosure as corporate entities strive to be greenish in their operations (Braam et al., 2016; Lan et al., 2013; Prasad et al., 2017). This perception will be correct when the rule of law is strictly adhered to, and investors and citizen's right to healthy environment is enshrined in the Constitution. Stakeholder theory is also seen as an explainable theory for corporate environmental accounting (Deegan & Blomquist, 2006; Depoers et al., 2016; Liao et al., 2015). We followed Gray (1995) stand "that political economy, legitimacy theory, and stakeholder theory need not be competitor theories but may if analyzed appropriately, be seen as alternative and mutually enriching theories from alternative levels of resolution." We conclude that legitimacy theory, stakeholder theory, and agency theory is seen as "trinity theory," a group of theories explaining reasons for corporate governance concerns towards the environment and the extent of corporate environmental impact disclosure. Trinity theory chain of causation in our context is described thus: when companies are environmentally friendly, it will translate to efficient allocation of resources and firms will maximize profit for the shareholders and legitimately gain reputation (Asmeri et al., 2017) from all segments of the society (stakeholders).

A good number of researchers have provided empirical evidence on the relationship between the extent of environmental disclosure and corporate governance. Mostly corporate governance mechanism is used as an independent variable and environmental disclosure as a dependent variable. In this section, we review some of the existing empirical studies as supported by underpinning theories. The level of environmental disclosure to investors and other segments of the society to a greater extent depends on corporate governance structure and influenced by both firm attributes (Agyei-Mensah, 2016; Akbas, 2016; Boesso & Kumar, 2007; Ahmad et al., 2015; Akbas & Canikli, 2014). The regulation also determines it as (Fallan, 2016) reported that firms subjected to certain required disclosure by management usually comply with such law. Environmental information has been categorizing in different ways by previous researchers (AbuRaya, 2012; Roberts, 1991). In line with AbuRaya (2012), our study adopted six categories of corporate environmental disclosure 1) environmental policies, 2) environmental product process-related, 3) compliance with environmental laws and standards, 4) environmental auditing, 5) Sustainability, 6) other environmentally-related information.

Umoren et al. (2015) from Nigeria provided evidence that the level of environmental information reported by sample companies listed on Nigeria Stock Exchange was 7%. The study used a sample of 40 companies across eight sectors and data from two-year 2013-2014 and used descriptive statistics, correlation, and linear regression. The study desperately calls for integrated reporting in Nigeria. While in South Africa, KPMG (2013) reported that companies that prepare environmental report increased from 45% in 2008 to 98% in 2013. Mandatory integrated annual reporting, enhanced governance structure, and stable legal environment could be factors to this upsurge. The current study focused on investigating and providing empirical evidence of the influence of corporate governance on the extent of various categories of environmental disclosure of listed non-financial companies in Nigeria.

Recent scandals that ravaged some companies have awakened a good number of studies on how entities are governed. Beekes et al. (2016) in a cross-country study involving 23 countries confirmed "the belief that better-governed firms make more frequent disclosures to the market." That often happens in common law countries (Beekes et al., 2016) while national culture is said to be capable of explaining variations in firm-level and country-level in corporate governance (Duong et al., 2016) and carbon disclosure (Luo & Tang, 2016). When the institution is weak, it affects the effectiveness of corporate governance (Kumar & Zattoni, 2016). Also, competent corporate governance is capable of reducing information asymmetry (Kabir & Thai, 2017).

The corporate governance mechanisms as they relate to the extent of the environmental disclosure are discussed as follows: The large composition of the board is perceived to be capable of influencing the extent in which corporate entities disclose their activities in any environment (Honggowati et al., 2017; Ntim & Osei, 2011). The large board is supported by agency theory (John & Senbet, 1998) due to the diversity of expertise of

members (Allegrini & Greco, 2013; Sun et al., 2010; Welford, 2007; Xie et al., 2003). Some of the studies conducted in both developed and developing countries revealed a positive association between board size and environmental impact disclosures (Andrikopoulos & Kriklani, 2013); Cormier et al., 2011; Samaha et al., 2015). While some showed the negative relationship (Uwuigbe et al., 2011) and others insignificant result (Cheng & Courtenay, 2006; Michelon & Parbonetti, 2012; Halme & Huse, 1997). Recent empirical evidence from emerging economy by Trireksani & Djajadikerta (2016) examined the relationship between corporate governance variables and the extent of environmental disclosure. The study focused only on mining companies listed on Indonesia Stock Exchange and employed content analysis of the annual reports and documents a significant positive association between the board size and the extent of environmental disclosure. Osazuwa et al. (2016) utilized a cross-section data of sample size of 116 firms in Nigeria and provided evidence that board size positively relates to the level of environmental disclosure. Concerned about the quality of climate change disclosure, Ben-Amar & McIlkenny (2015) result from Canada showed a strong relationship between board effectiveness and the firm's decision to answer the CDP questionnaire as well as its carbon disclosure quality. Bridging the gap in knowledge about the relationship between corporate governance and corporate social responsibility (CSR) in the banking sector of US, Jizi et al. (2014) found a significant positive association between board size and CSR. Samaha et al. (2015) used meta-analysis to a sample of 64 empirical studies to identify possible determinants of the relationship between board, audit committee characteristics and voluntary disclosure. The study acknowledged that board size has a significant positive effect on voluntary disclosure. We expect a significant positive relationship between environmental disclosure variables and corporate board size.

The stakeholder theory buttresses the importance of having independent directors in board composition. It aimed at protecting the interest of the investors (Arayssi et al., 2016; Haniffa & Cooke, 2005, Dixon-Fowler et al., 2017; Jizi et al., 2014). Board independence is grounded in the agency theory (AbuRaya, 2012). Liao et al. (2015) showed evidence of a positive association between large independent directors and extensive disclosure of GHG information from UK sample of 329 largest companies using both univariate and regression models. García-Meca & Sánchez-Ballesta (2010) adopted a meta-analysis approach to a sample of 27 empirical studies to explain the association of corporate governance structure with voluntary disclosure. The study document “that positive association between board independence and voluntary disclosure only occurs in those countries with high investor protection rights”. Jizi et al. (2014) stated that there exists a positive relationship between the higher level of CSR disclosure and more independent boards of directors. The study was based on a sample of large US commercial banks. Eberhardt-Toth (2017) also supported having more of independent executive directors on the board. Post et al. (2015) empirically investigated the association between board structure and company environmental performance using sustainability-themed alliances as a moderating variable and the whole public oil and gas companies as a sample. They found among others that the sustainability-themed alliances moderate dependent and independent variables. A higher percentage of independent non- executive directors on the board are expected to relate to extensive environmental impact disclosure significantly.

Audit committee independence is among the dimensions of measuring audit committee effectiveness (Krishnan, 2005; Xie et al., 2003). This committee is part of corporate governance structure (Suprianto et al., 2017; Cohen et al., 2002; Cohen et al., 2014; Vera-Muñoz, 2005; Yasin & Nelson, 2012) that helps in overcoming agency related problems (AbuRaya, 2012; Ho & Wong, 2001; Islam et al., 2010) as well as carrying out oversight function (Beasley et al., 2009; Rahim et al., 2015) must be independent (Vera-Muñoz, 2005). Based on this important role of audit committee in achieving objectives of corporate governance (Ho & Wong, 2001; Khan et al., 2013; Said et al., 2009), required a good number of independent members for its effectiveness (Akhtaruddin & Haron, 2010; Bouaziz, 2012; Carcello & Neal, 2000; DeZoort et al., 2002; Ghafran & O’Sullivan, 2012; Mohamad

& Sulong, 2010). Some empirical evidence have emerged with regard to the degree of number of the independent members in positively influencing what, how and when to disclose information that will help stakeholders to make an informed decision. Madi et al. (2014) in a study of 146 Malaysian listed firms for the year 2009 provided evidence that audit committee independence is positively related to corporate voluntary disclosure. The study used content analysis method. Madi et al., (2014) is a confirmation of Iatridis (2013). Also, Samaha et al. (2015) reported a positive relationship between the level of voluntary disclosure and independent directors on the audit committee.

Vafeas (1999) revealed that “board activity, measured by board meeting frequency, is an important dimension of board operations” which helps to overcome agency conflicts (Xie et al., 2003). Ntim & Osei (2011) study the impact of corporate board meetings on corporate performance of 169 listed companies in South Africa and found a positive relationship. On the other hand, Kantudu & Samaila (2015) reported negative association based on the study of the effect of monitoring characteristics on financial reporting quality of the Nigerian listed oil marketing firms. While Osazuwa et al. (2016) investigated the relationship between board characteristics and the extent of environmental disclosures. The study used cross-sectional data and quantitative design method and documents a negative relationship between board meetings and environmental disclosure.

Environmental committee is saddled with the responsibility of assessing the natural capital (Council on Social Work Education, 2015; Pryor et al., 1998; Rockwell, 1991; Sánchez & Mclvor, 2007; Sano & Kawai, 1996), an advisory committee (Vasseur et al., 1997) that has shown a high level transparency towards the environment (Liao et al., 2015). But Berrone & Gomez-Mejia (2009) noted that having environmental committee does not imply good environmental strategies only serve as the symbolic role, call for more evidence on the relationship between the environmental committee and corporate environmental disclosure. Dixon-Fowler et al. (2017) found a positive association between board environmental committees and corporate environmental performance. In agreement with agency theory, such committee will be proactive and not reactive in handling environmental issues (Peters & Romi, 2012). This was confirmed later by evidence from greenhouse gas emission accounting as Peters & Romi (2014) reported a positive association between the environmental committee and environmental disclosure. We expect a positive relationship between environmental disclosure and environmental committee.

This study noted the importance of company characteristics in investigating the level of corporate environmental disclosure (Akbas, 2016). In this current study, the corporate attribute is used as control variables as previously done by (e.g. Akbas, 2016; AbuRaya, 2012). Therefore, we consider only three attributes- company size, industry membership and auditor type. The particular industry a company belongs to determines the quantity of environmental impact disclosure to the stakeholders. In a study by Halkos & Skouloudis (2016) using a disclosure index, investigate the level of disclosure practices of the largest 100 firms operating in Greece, document among others that working in environmentally sensitive sectors has a positive association with climate change disclosure. The study used logit regression method. This evidence supported earlier study by Galani et al. (2012). On contrary, Ong et al. (2016) found that less environmentally sensitive industry disclosed more and higher quality of environmental disclosure than ecologically sensitive industries of Malaysia. The finding is not unconnected to poor and weak legal environment as it relates to the environment (Ong et al., 2016). In Jordan, Ismail & Ibrahim (2008) on the overall, found no significant relationship between industry type and the level of social and environmental disclosure. From the United Kingdom, Brammer & Pavelin (2008) provided evidence to support that industry class relates to extent of corporate disclosure of environmental information using a sample of 450 conglomerates selected from different sectors.

Large firms exhibit higher disclosure (Gunardi et al., 2016) as they have financial ‘muscle’ to bear the cost. Various studies provided the empirical result relating size of a corporation and the level of environmental

disclosure. In China, Lu & Abeysekera (2014a); Lu & Abeysekera (2014b); Zeng et al. (2010) documented positive significant relationship. Greek evidence shows that size is a strong determinant of environmental ratings (Galani et al., 2012). Adhikari & Tondkar (1992) examined the relationship between selected environmental factors and stock exchange disclosure requirements of 35 stock exchanges in different countries and found that size of the equity market significantly explained the variation. Chek et al. (2013) used content analysis and Pearson correlation methodology and found the size of 154 companies of consumer and plantation industries of Malaysia correlate with the level of disclosure. Having the desire to fill the gap in knowledge, Ismail & Ibrahim (2008) provided evidence from Jordan a developing country, Using a sample of 60 companies in the manufacturing and service sectors, content analysis was employed. The study equally found a positive association between size and level of environmental disclosure. Also from Thailand, Suttipun & Stanton (2012) found a positive association. Evidence from developed country US showed a different result when company size and industry type were used as the control variable to determine the relationship between performance and disclosure for the 131 companies (Patten, 1992). Canadian experience as documented by Cormier & Magnan (1999) showed that firm size significantly explain environmental exposure. Also in UK, Brammer & Pavelin (2008) reported positive association.

The reputation of an engaged external auditor is perceived to be an influencing factor in corporate environmental disclosure practices. As such complete disclosure enhances the audit firms reputation (Copley, 1991). Anchoring on this perception, Wang et al. (2008) provided evidence from China. The study showed that voluntary disclosure is related to the reputation of the auditor. Braam & Borghans (2014) sees the interlock ties between the board and external auditor as a catalyst for voluntary corporate disclosure. From the point of ethical values, Houqe et al. (2015) stated thus entities "from countries where 'high corporate ethical values' prevail are more likely to hire a Big four auditor". By extension, we expect "Big 4" auditor type to influence extensive corporate environmental disclosure in a secure legal environment, investors protection and disclosure standards (El Ghoul et al., 2016; Ernstberger & Grüning, 2013).

On this background, this study provides robust evidence on the influence of corporate governance on environmental disclosure of listed non-financial firms in Nigeria. The essence of this study is to extend prior research on the influence of corporate governance mechanisms on environmental disclosure of non-financial listed firms in Nigeria. Therefore, the specific objectives of the study are: 1) Examine the influence of corporate governance structure (Board size, board independence, board meeting, audit committee independence, environmental committee) on environmental disclosure made by listed nonfinancial companies operating in Nigeria. 2) Ascertain the influence of firm attributes (size, industry membership and auditor type) on environmental disclosure of listed non-financial companies in Nigeria.

Methods

This current study used an archive data which call for ex-post facto design to enable us to investigate the influence of corporate board characteristics, and the company attributes on environmental disclosure of non-financial listed firms in Nigeria. The population of the study is listed non-financial enterprises in the Nigeria Stock Exchange (NSE). The population comprises of 109 non-financial companies listed on NSE.

The sample size is determined using sampling technique of Taro Yamani formula $n = N / 1 + N(0.05)^2$. A selected sample size of 86 (71%) of 109 non-financial companies listed in Nigeria (Table 1). We excluded nine (9) firms from the sample size due to unavailability of data. In line with some previous researchers (e.g. AbuRaya, 2012; Umoren et al., 2015), we excluded all financial companies.

Table 1 shows the distribution of population and sample size of the companies. The sample is made up of large and industrially diverse companies for possible generalization of the findings (AbuRaya, 2012; Brammer & Pavelin, 2006).

Table 1 Distribution of Population and Sample Size of the Companies

Stratum	Population Size	Sample Size	Sample as Percent of Population
Technology	7	6	85.7
Oil and Gas	13	11	85
Industrials	25	19	76
Basic Materials	12	10	83
Industry Membership-Environmentally Sensitive	57	46	80.7
Healthcare	11	7	63.6
Consumer Services	14	11	78.6
Consumer Goods	27	22	81.5
Industry Membership-Environmentally Non-Sensitive	52	40	76.9
Total	109	86	79

Source: www.nse.com.ng

The study employed content analysis of annual reports, a method that has been widely used by previous studies to investigate the extent of environmental disclosure by corporate entities (Akbas, 2016; Akbas & Canikli, 2014; Fallan, 2016; Hackston & Milne, 1996; Khlif et al., 2015; Niskala & Pretes, 1995; Nor et al., 2016; Ong et al., 2016). Following AbuRaya (2012); Clarkson et al. (2008); Cormier et al. (2011); Hackston & Milne (1996); Asmeri et al. (2017) we developed a checklist categorizing corporate environmental disclosure into six (6) categories (AbuRaya, 2012). These are 1) environmental policies, 2) product and process-related environmental issues, 3) environmental auditing, 4) sustainability, 5) compliance with environmental laws and standards, 6) other environmental related information. Based on the classification, we added one item (rehabilitation) to 34 items used by (AbuRaya, 2012) i.e. 35 checklist items were used to measuring the extent of disclosure by the sample companies (Table 2). The annual report of 2015 of the sample firms which is the most recent data is used.

Coding of the items to generate a data set is in line with, e.g., Gray et al. (1995); AbuRaya (2012) based on a measure of disclosure volume by the scoring system. Despite the criticism that un-weighted index (dichotomous scores) negate the possibility that all items are not equally important (Barako et al., 2006). The unweighted index is acceptable for measuring the quantity of environmental disclosure (Bozzolan et al., 2009) and previous studies have used dichotomous score (e.g. AbuRaya, 2012; Monteiro & Aibar-Guzmán, 2010; Haniffa & Cooke, 2005; Chau & Gray, 2002). Hence, we adopt the formula by AbuRaya (2012) for calculating the quantity of environmental disclosure by the sample companies in 2015 annual report.

Table 2 Environmental Disclosure Index Checklist

Disclosure	Year (2015)
A. Environmental Policies	
1. Actual Statement of Environmental Policies	
2. Departments or Positions for environmental and/or safety Management	
3. Past, current or future estimates of capital and operating expenditure for environmental protection or remediation	
4. Environmental investment & investment appraisal	
5. Financing of pollution control equipment and facilities	
6. Research and development expenditure for pollution abatement	
7. Environmental impact studies	
8. Environmental contingent liabilities and provisions	
9. Conservation of natural resources	
10. Energy saving and conservation	
11. Health and safety policies	
12. Aesthetics policies and landscaping	
B. Product and Process-Related Environmental Issues	
1. Pollution emissions and effluent discharge	
2. Waste	
3. Packaging	
4. Recycling	
5. Products and product development	
6. Efficient use of materials	
7. Energy efficiency of products	
8. Product Safety	
9. Rehabilitation	
C. Compliance with Environmental Laws and Standards	
1. Discussion of environmental regulations and requirements	
2. Compliance with pollution laws and regulations	
3. Compliance with health and safety standards and regulations	
4. Compliance status with environmental and/or health and safety such as ISO, EMS, BS OHSAS and PAS	
D. Environmental Auditing	
1. Internal and /or external verification, review, scoping, audit and assessment of environmental performance and /or environmental disclosure	
E. Sustainability	
1. Any Mention of Sustainability	
2. Any mention of sustainable development	
F. Other Environmentally Related Information	
1. Receiving awards for environmental protection or safety excellence	
2. Environmental Protection e.g. Pest control	
3. Wildlife conservation	
4. Supporting anti-liter campaigns	
5. Environmental education and training	
6. Environmental actions/lawsuits against the company	
7. Any environmental issues other than the above	

Table 3 Description of Variables and Measurement

Variable	Code	Measurement	A Priori expectation
Dependent			
Environmental Policies	EP	1 = Companies that disclose EP information in their annual report, 0 = Otherwise	
Product and process Environmental Issues	PPEI	1 = Companies that disclose EP information in their annual report, 0 = Otherwise	
Environmental Auditing	EA	1 = Companies that disclose EP information in their annual report, 0 = Otherwise	
Sustainability	SUS	1 = Companies that disclose EP information in their annual report, 0 = Otherwise	
Other Environmental Related Information	OERI	1 = Companies that disclose EP information in their annual report, 0 = Otherwise	
Compliance with Environmental Laws and Standards	CELS	1 = Companies that disclose EP information in their annual report, 0 = Otherwise	
Overall Environmental Disclosure	OED	EP + PPEI + EA + SUS + OERI + CELS	
Independent			
Board Size	B SIZE	Total number of directors on the board of a company	+
Board Independence	BIND	The percentage of independent directors of the total number of directors on the board of a company	+
Board Meeting	BOMET	The total number of meeting held by the board of a company	+
Audit Committee Independence	ACOINDE	The percentage of independent directors of the total number of directors on the audit committee of a company	+
Environmental Committee	ENVICOM	Dummy variable 1 = company has environmental committee, 0 = Otherwise	+
Control Variable			
Company Size	Size	The natural logarithm of total assets at the end of the fiscal year 2015	+
Industry Membership	INDM	Dummy variable = 1 if the company operates in an environmentally sensitive industry and 0 otherwise.	+
Auditor Type	ADT	Dummy variable = 1 if the company is audited by one of the “Big 4” and 0 otherwise	+

Corporate Environmental Disclosure Quantity Index for each company is computed according to the following equation:

$$\text{CED Quantity} = \sum_{i=1}^n \frac{\text{Quantity}_i}{\text{Max Quantity}}$$

Where,

CED Quantity = Corporate Environmental Disclosure Quantity Index

Quantity = 1 if item i is disclosed; 0 if item i is not disclosed

MAX Quantity = maximum applicable disclosure quantity score

N = number of items disclosed

The formula is also applicable to each disclosure category in the checklist. For measurement of the independent variables. The study tests the hypotheses using a cross-sectional sample of companies (Cho et al., 2010) listed nonfinancial companies in Nigerian stock exchange. Table 3 shows measurement and explanation of variables.

To achieve the purpose of examining the relationship between corporate governance mechanisms and the extent of environmental disclosure, the model used to test the association is ordinary least square (OLS) with cross-sectional data. Therefore, the model for the study is specified thus:

$$OED_i = \alpha_0 + \beta_1 BSIZE + \beta_2 BIND + \beta_3 BOMET + \beta_4 ACOINDE + \beta_5 ENVICOM + \beta_6 SIZE + \beta_7 INDM + \beta_8 ADT + \varepsilon_i$$

Where,

OED : The overall of environmental disclosure of company i in 2015 (total scores of environmental policies index, product and process environmental issues index, environmental auditing index, sustainability index, other environmental related information index and compliance with environmental laws and standards index in the annual report of the company)

α_0 : Intercept

BSIZE : Board size of company i

BIND : Board independence of company i

BOMET : Board meeting of company i

ACOINDE : Audit committee independence of company i

ENVICOM : Environmental committee of company i

SIZE : Size of company i

INDM : Industry membership of company i

ADT : Auditor type of company i

ε_i : Random error term

The a priori signs are $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 > 0$, $\beta_5 > 0$, $\beta_6 > 0$, $\beta_7 > 0$, $\beta_8 > 0$

Results and Discussion

The Adjusted R-squared (R^2) of 0.403 in the model summary (Table 6) indicates how well corporate governance mechanism, predict environmental disclosure when company attributes are controlled. Based on Table 5, the F-statistic is 11.248 ($p = 0.000$) it provides empirical evidence that the estimated model is statistically significant, while the Adjusted R^2 of 0.403 indicates that the independent variables explain 40.3% of the variability of the quantity overall of environmental disclosure (OED).

Also, Table 6 indicates that in the second model Adjusted R^2 of 0.401 (40.2%) explains how well BSIZE, BIND, BOMET, ACOINDE, ENVICOM, SIZE, INDM, and ADT linear combination, predict OED in the sample. The Adjusted R^2 of 40.2% explained the variability of OED account for by the independent and control variables. According to Table 7, BSIZE, BIND, BOMET, ACOINDE, ENVICOM, SIZE, INDM, and ADT in linear combination significantly predict at the 0.05 level OED, F-statistic = 5.864, $p = 0.000$.

For the first hypothesis, because BSIZE, BIND, BOMET, ACOINDE, and ENVICOM, in a linear combination, significantly predict at the .05 level OED, F (71) = 10.128, $p = 0.000$. We accept the hypothesis that states that there is a significant relationship between corporate governance (board size, board independence, board meeting, audit committee independence, environmental committee) and corporate environmental disclosure made by non-financial listed companies operating in Nigeria.

Table 4 Descriptive Statistics on Dependent and Independent Variables (Panel A)

	N	Min.	Max.	Mean	Std. Deviation	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
EP	77	.00	53.33	10.2157	10.52505	1.665	.274	3.729	.541
PPEI	77	.00	57.14	7.0906	14.02351	2.258	.274	4.656	.541
CELS	77	.00	75.00	10.7143	19.20653	1.766	.274	2.329	.541
EA	76	.00	100.00	6.5789	23.58263	3.555	.276	11.443	.545
SUS	76	.00	100.00	36.1842	39.66416	.541	.276	-1.200	.545
OERI	77	.00	42.35	8.7157	9.29271	.872	.274	.974	.541
BSIZE	77	5.00	15.00	8.7532	2.44495	.549	.274	-.132	.541
BIND	77	.00	66.67	11.0426	18.51794	1.852	.274	2.363	.541
BOMET	77	3.00	8.00	4.6883	1.07923	.657	.274	.403	.541
ACOINDE	77	.00	100.00	15.6174	23.37479	1.358	.274	1.035	.541
ENVICOM	77	.00	1.00	.0649	.37479	6.902	.274	51.539	.541
SIZE	77	68.48	5.55E7	1.4662E6	8.17931E6	6.117	.274	36.859	.541
Valid N (listwise)	76								

Table 5 Descriptive Statistics on Dependent and Independent Variables–Dummy Variable (Panel B)

	Frequency	Valid Percentage
Industry Membership		
Sensitive (1)	46	59.7
Non-Sensitive (0)	31	40.3
Total	77	100
Auditor Type		
Big 4 (1)	44	57
NBig 4 (0)	33	43
Total	77	100

Table 6 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
a	.665 ^a	.442	.403	9.58492
b	.696 ^a	.484	.402	10.25138

a. Predictors: (Constant), ENVICOM, BOMET, ACOINDE, BSIZE, BIND

b. Predictors: (Constant), ENVICOM, ACOINDE, BOMET, BSIZE, BIND, ADT, INDM, SIZE

Table 7 ANOVA

	Model	Sum of Squares	df	Mean Square	F	Sig.
a	Regression	5166.920	5	1033.384	11.248	.000 ^a
	Residual	6522.819	71	91.871		
	Total	11689.739	76			
b	Regression	4930.338	8	616.292	5.864	.000 ^a
	Residual	5254.544	50	105.091		
	Total	10184.882	58			

a. Predictors: (Constant), ENVICOM, BOMET, ACOINDE, BSIZE, BIND

b. Predictors: (Constant), INDM, ENVICOM, BOMET, SIZE, BIND, ADT, ACOINDE BSIZE

c. Dependent Variable: OED

In the same vain, BSIZE, BIND, BOMET, ACOINDE, ENVICOM, SIZE, INDM, and ADT, in a linear combination, significantly predict at the 0.05 level OED, $F(68) = 6.532$, $p = 0.000$. We accept the hypothesis that states that corporate attributes do significantly influence corporate environmental disclosure made by non-financial listed companies operating in Nigeria.

In Table 9, shows Pearson correlation reliability coefficients of the relationship between corporate governance mechanisms (board size, board independence, board meeting, audit committee independence, environmental committee) and corporate environmental disclosure.

The result of inadequate environmental disclosure by Nigerian companies persists. The study document on average of 10.54% overall environmental disclosure among non-financial listed firms in Nigeria, this finding agrees with Umoren et al. (2015) that found 7%. This low level of environmental disclosure could be as a result of the voluntary disclosure requirement, lack of standard, weak legal and institutional factors (Biobele & Mefor, 2012; Horváth et al., 2017; Plumlee et al., 2015). The results provided evidence as firstly hypothesized that corporate governance has a statistically significant relation ($F = 10.128$, $P = 0.000$) with the overall environmental disclosure made by non-financial listed companies operating in Nigeria. This finding is consistent with other studies (e.g. Akbas, 2016; Cormier et al., 2015; Osazuwa et al., 2016; Umoren et al., 2015; Trireksani & Djajadikerta, 2016; Yekini et al., 2015).

The study also found that company attributes exact influence on the extent of corporate environmental disclosure. The statistical significance relation ($F = 6.532$, $p = 0.000$) indicates support to the second hypothesis. This finding is in line with previous studies Ahmad et al. (2015); Eng & Mak (2003); Marcia et al. (2015). A bit shift from a cursory glance on the overall statistical significance of the model to a deeper knowledge of how the individual proxy variables of corporate governance influence the extent of environmental disclosure in the Nigerian context shows a mixed result. The board size (BSIZE), does not significantly contribute to the degree

of environmental disclosure because the probability of the coefficient is $0.104 > 0.05$ significance levels. The result contradicts the findings of Akbas (2016); Samaha et al. (2015); Trireksani & Djajadikerta (2016) and agrees with the studies of Cheng & Courtenay (2006); Halme & Huse (1997). The result highlights existence of information asymmetry (Kanagaretnam et al., 2007) and institutional weakness (Kumar & Zattoni, 2016). Agency theory holds the managers of the entities to extensively disclose information relating to their managing of the business for the shareholders. While the legitimacy theory expectation, demanding for the environmental impact of organizations is weakened in a weak legal environment.

Table 8 Coefficient

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1/a	(Constant)	-13.407	5.562		-2.410	.019
	BSIZE	.865	.526	.171	1.645	.104
	BIND	.307	.074	.458	4.121	.000
	BOMET	2.629	1.094	.229	2.404	.019
	ACOINDE	.019	.056	.035	.334	.739
	ENVICOM	14.125	6.932	.182	2.038	.045
2/b	(Constant)	-14.788	8.973		-1.648	.106
	BSIZE	1.562	.739	.296	2.112	.040
	BIND	.255	.087	.381	2.931	.005
	BOMET	1.170	1.506	.096	.777	.441
	ACOINDE	.000	.070	.000	-.004	.997
	ENVICOM	13.996	7.663	.193	1.826	.074
	SIZE	.245	.714	.045	.343	.033
	ADT	1.446	3.240	.054	.446	.657
	INDM	-1.177	3.073	-.044	-.383	.703

Board Independence (BIND) does significantly contribute to the variance of OED with a probability of coefficient of $.000 < .05$ significance level. The result justifies stakeholder theory emphasizing the need for more independent non-executive directors in the board also supported by agency theory. In an environment where both legal and institution are weak, more of independent directors will ensure the protection of the interest of

stakeholders. Therefore, the trinity theory is upheld based on this result. Our finding is in line with Arayssi et al. (2016); Eberhardt-Toth (2017); Jizi et al. (2014); Liao et al. (2015). The partial regression coefficient of 2.676 indicates the positive influence of board meeting on the extent of environmental disclosure. BOMET significantly contributes to the variance of OED, because the probability of the coefficient is $0.019 < 0.05$ sig. level. The result agrees that board meeting frequency enhances the quantity of environmental disclosure and will help overcome agency conflicts (Ntim & Osei, 2011; Xie et al., 2003). On the other hand, the finding contradicts earlier result by Osazuwa et al. (2016). The contradiction suggests there was not much board activity in Osazuwa et al. (2016) year of study.

Table 9 Pearson Correlations Matrix

Variables	OED	BSIZE	BIND	BOMET	ACOINDE	ENVICOM
OED	1					
BSIZE	.429**	1				
BIND	.559**	.402**	1			
BOMET	.327**	.354**	.094	1		
ACOINDE	.331**	.238*	.529**	.005	1	
ENVICOM	-.028	-.198	-.081	-.177	-.029	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

The result also indicates that audit committee independence (ACOINDE) does not significantly contribute to the variance of OED because the probability of the coefficient is $0.739 > 0.05$ significance level. The finding is similar to the result of Akbas (2016). In Nigeria context, non-independent directors and shareholders representatives dominate audit committee. ENVICOM does significantly contribute to the variance in QED judging by its coefficient probability of $0.045 < 0.05$. Our result agrees with Dixon-Fowler et al. (2017); Peters & Romi (2014) as against Berrone & Gomez-Mejia (2009) that the presence of the committee made no difference.

The control variables also, on the other hand, shows a considerable influence on the extent of environmental disclosure when it was included in the model. The results indicate about the control variables, firstly, that there is a positive relationship between the company size and the overall environmental disclosure ($p = 0.033$) of nonfinancial firms in Nigeria. This finding agrees with studies conducted previously, for example, Akbas (2016); Akbas & Canikli (2014); Lu & Abeysekera (2014a); Brammer & Pavelin (2006); Cormier & Magnan (1999). On the contrary to the result of the significant relation between industry membership and environmental disclosure reported by Akbas (2016); Galani et al. (2012); Halkos & Skouloudis (2016). The result of regression model 2 indicates that operating in the environmentally sensitive industry does not significantly influence the extent of environmental disclosure. The result is in-tandem with the findings of Ismail & Ibrahim (2008); Ong et al. (2016). The outcome negates trinity theory, which buttresses the fact that poor and weak legal environment, environmentally sensitive industry intend not to account for their impact on the environment legitimately. Furthermore, our perception that the reputation of external auditor type will significantly relate to the extent of environmental disclosure by Nigerian companies was not supported by the regression result. The finding agrees with the views El Ghouli et al. (2016); Ernstberger & Grüning (2013). This

study contributes to extending the existing literature on environmental disclosure in Nigeria by providing insights on the influence of corporate governance on the degree of environmental disclosure of non-financial firms listed on Nigeria Stock Exchange.

This study quest for investigation of the influence of corporate governance on the extent of environmental disclosure of nonfinancial firms listed on the Nigeria Stock Exchange (NSE-NFF). Overall environmental disclosure as study variable is total scores of environmental policies index, product and process Environmental Issues index, environmental auditing index, and sustainability index, other environmental related information index and compliance with environmental laws and standards index in the annual report of Nigerian sample companies. Based on the reviewed literature, board size, board independence, board meeting, audit committee independence and the environmental committee were five corporate mechanisms considered as independent variables. In other to mitigate possible spurious relationship, firm size, industry membership and audit type were used as control variables.

On that note, the study document as follows: the extent of environmental disclosure by non-financial listed companies in Nigeria is inferior. The study revealed that independence of the board of directors, Board meetings and ecological committee statistically significantly and positively influence the extent of environmental disclosure. The finding is in-tandem with trinity theory (agency theory, stakeholder theory, and legitimacy theory). It supports the argument that a reasonable number of independent directors on the board, frequency activities of board and having a committee saddled with environmental responsibility will have positive influence on the level of environmental disclosure (Arayssi et al., 2016; Beekes et al., 2016; Depoers et al., 2016; Greiling & Grüb, 2014; Kanagaretnam et al., 2007; Liao et al., 2015; Prasad et al., 2017; Xie et al., 2003). This finding provides empirical evidence that corporate governance influences the degree of environmental disclosure by nonfinancial listed companies in Nigeria; hence the first hypothesis is accepted.

On the other hand, among control variables, only firm size contributed significantly to show that company attributes influence the extent of environmental disclosure. The second OLS regression analysis revealed a change in the statistical significance of some of the independent variables when control variables were included in the model. Thus, the second hypothesis is accepted that company attributes significantly influence the level of environmental disclosure.

Conclusion

The major objective of the study is to ascertain the influence of corporate governance on environmental disclosure of non-financial listed companies in Nigeria. The study was carried out by examining the relationship between the extent of overall environmental disclosure and some selected corporate governance mechanisms. The study avoided possible spurious relationship between the dependent and independent variables by controlling some of the company attributes. In line with previous studies, content analysis approach was used, and the source of secondary data was 2015 annual report of the sampled companies. The OLS multiple regression analysis indicates that corporate governance and firm attributes significantly influence the extent of environmental disclosure. The study provides evidence that the level of corporate environmental disclosure in Nigeria is shallow. This study perceived that unstable institutions, weak legal environment and lack of environmental disclosure standard are a contributor to unconcerned approach exhibited by corporate entities towards the natural capital.

Based on the findings, the study recommends as follow: The professional accounting bodies should make environmental disclosure mandatory for corporate entities. There should be in place harmonized environmental disclosure standards The Nigeria Stock Exchange should include enhancement of corporate board structure to include more of non-executive independent directors managing the companies for the

owners. Furthermore, a better-enhanced medium of communicating corporate activities within the environment should be devised by regulators businesses in Nigeria. For example, the implementation of integrated reporting should be made compulsory. An effective environmental law by legislative arm of government and efficient judiciary system to make corporate entities answerable for their actions towards the environment is required. Finally, there is the need for every company having an environmental/ecological committee to be proactive with regards to environmental issues.

Despite the contributions of the study, it has some limitations like other empirical studies. Firstly, the study analyzed only one-year annual report data. Secondly, the research only considered annual reports of companies whereas there are other possible media of communicating environmental impact of their activities. Therefore, future research could use longitudinal data to examine the influence of corporate governance on the quantity and quality of environmental disclosures of Nigerian firms. Also, other communication channels disclosing environmental impact could be explored for future studies. Furthermore, a cross-country comparative analysis study could investigate for instance between Nigeria that has not implemented integrated reporting and South Africa that has mandatorily adopted integrated annual reporting.

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