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Article

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Corporate board characteristics and environmental disclosure quantity: Evidence from South Africa (integrated reporting) and Nigeria (traditional reporting)

Grace N. Ofoegbu¹, Ndubuisi Odoemelam^{1*} and Regina G. Okafor¹

Abstract: The study examined the influence of corporate board characteristics on environmental disclosure quantity of listed firms in two leading emerging economies: South Africa and Nigeria which practice integrated reporting framework and traditional reporting framework, respectively. Two issues motivate the study: First, calls by researchers for integrated reporting regulation in Nigeria. Second, the challenge facing regulatory bodies and companies boards in Nigeria in ensuring commitment to the protection of the environment and the society. Many studies have examined the influence of corporate governance on environmental disclosure at the cross-country level, documenting evidence that corporate governance mechanisms are essential for corporate ecological reporting. However, these studies examined settings based on the legal framework and mostly focused on companies quoted on common and civil law countries. They neglected the weak and robust reporting framework and difference within either common or civil law countries. Our study provides evidence on

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Reporting on the environmental impact of the company's activities ensures commitment to the protection of the environment and the larger society. Researchers in Nigeria call for regulation of integrated reporting. This research investigated the corporate board characteristics influence on environmental disclosure of quoted companies in two different countries (South Africa and Nigeria). These two countries adopt integrated financial reporting and traditional reporting framework, respectively. Data on annual reports of companies from the two countries were used. Results revealed a more significant positive association between board characteristics and environmental disclosure in South Africa and less relevant association in Nigeria. In a traditional reporting framework, the effect of environmentally sensitiveindustries is insignificant and highly significant in the integrated reporting framework. The results enhance the policymakers and regulators decision on regulation of integrated reporting in Nigeria and other countries not under integrated reporting. Corporate board's responsibility towards successfully integrated reporting also highlights.





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corporate board characteristics influence on environmental disclosure of quoted firms in South Africa and Nigeria. Data obtained from annual reports of 303 environmentally sensitive companies selected from South Africa (213) and Nigeria (90) was investigated using descriptive, multivariate, and regression model. Major findings indicate a significant positive association between board independence and environmental disclosure in Nigeria. In South Africa, 45% of environmentally sensitive industries significantly influence environmental disclosure, while 51% of environmentally polluting industries in Nigeria show insignificant association with environmental disclosure. Our findings are helpful to policymakers and other regulators for an impactful framework on environmental reporting.

Subjects: Accounting; Corporate Governance; Corporate Social Responsibility & Business Ethics

Keywords: corporate board characteristics; environmental disclosure; traditional and integrated frameworks; South Africa and Nigeria

1. Introduction

A call for companies environmental impact assessment and disclosure has assumed enormous dimensions over the decades. This clarion call aimed at providing a sustainable environment that will be conducive to the human and corporate organisations to operate efficiently (Votsi, Kallimanis, & Pantis, 2017). Disclosure is a means through which a company reports its environmental activities to the stakeholders (Hendri & Puteri, 2015). In recent times, corporate governance has been considered essential and relevant in sustainability reporting because research results reveal that it is a factor that influences the level of environmental disclosure (Omer & Andrew, 2014). Through environmental disclosure, firms project their corporate governance effectiveness in promoting sustainability, accountability, and transparency (Ajibodade & Uwuigbe, 2013).

Several studies have examined the influence of corporate governance on environmental disclosure at the firm level (Ienciu, Popa, & Ienciu, 2012), country-specific (e.g. Odoemelam & Okafor, 2018; Baboukardos, 2017; Akbas, 2016; Liao, Luo, & Tang, 2015), and cross-country evidence (Halme & Huse, 1997; Khlif, Guidara, & Souissi, 2015). Collectively, these studies show that corporate governance mechanisms are essential for corporate environmental reporting. However, the reviews on cross-country perspective have mostly examined a setting based on a legal framework (e.g. Khlif et al., 2015) and most importantly, the focus has been on companies quoted on common and civil law countries neglecting the weak and robust reporting framework. The studies have mainly concentrated on differentiating their sample size with regard to crosscountry analysis based on the difference in common law and civil law countries (Khlif et al., 2015). The authors of these prior studies failed to consider the tendency of within laws reporting framework, (i.e. within either common or civil law countries). No empirical research compared all in one fit and traditional reporting on environmental disclosure.

We provided evidence on corporate board characteristics influence on environmental disclosure quantity of quoted firms in South Africa and Nigeria. Furthermore, we chose South Africa and Nigeria (two common law countries), unlike Khlif et al. (2015) that investigated the relationship between corporate performance and social and environmental disclosure of South Africa (common law country) and Morocco (civil law country). Though these two African leading economies have the same legal system, a reasonable gap exists between the two nations in their corporate reporting framework for quoted firms. South African quoted companies are mandated to submit an integrated annual report as approved by the King III report (Rensburg & Botha, 2014; Zhou, Simnett, & Green, 2017). While in Nigeria, the traditional corporate annual reporting is still a vital medium of relating to the stakeholders, which Otu Umoren, John Udo, and Sunday George (2015) found to be lacking

relevant information concerning the natural capital and other non-financial issues. The empirical evidence on the determinants of disclosure decisions is largely inconclusive (Beyer, Cohen, Lys, & Walther, 2010; Gray, Javad, Power, & Sinclair, 2001; Ott, Schiemann, & Günther, 2017).

Our study contributes to accounting literature on the determinants of corporate environmental disclosure (Khlif et al., 2015). For the first time, we provide evidence between two countries of the same legal system but have different reporting mechanisms.

The rest of this paper is organised as follows. Section 2 the theoretical framework, literature review, and hypotheses development. Section 3 discusses the research methodology, and Section 4 explains the results and discussion. Finally, Section 5 conclusions and limitations as well as directions for future studies.

2. Underpinning theory

The theoretical framework adopted for this study to examine the relationship between corporate governance mechanisms and the quantity of corporate environmental disclosure practices of quoted companies in South Africa and Nigeria annual reports are the legitimate and stakeholder theories. These theories are linked to the concept that there exists a social contract between the organisation and society whereby an organisation endeavours to operate within the values and norms of the society and is being held responsible and accountable to its entire stakeholders (Gray et al., 1995).

2.1. Legitimacy theory

Legitimacy theory is derived from the concept of organisational legitimacy. It grants an organisation the right to carry out its operations in an agreement with society's interests. Hence organisations seek to operate within the norms and aspirations of their respective communities. When there is a disparity between two value systems, there is a threat to the company's legitimacy. The argument surrounding legitimacy theory is that companies can only survive if they are operating within the framework of the society's norms and values. Greiling and Grüb (2014) stress that an organisation must be accountable for its actions. Legitimacy theory is perceived as a possible reason for the recent rapid increase in environmental disclosure as corporate entities strive to be greenish in their operations (Braam, Uit de Weerd, Hauck, & Huijbregts, 2016; Lan, Wang, & Zhang, 2013; LYTON CHIYEMBEKEZO, 2013; Prasad, Mishra, & Kalro, 2016). Corporate disclosures represent a response to environmental pressures and the urge to legitimate their existence and actions. Companies disclose social and environmental information voluntarily to maintain their legitimacy. They aim to obtain the impression of the society that they are socially responsible. This reality of this perception lies in the strict adherence to the rule of law, and investors and citizen's right to a healthy environment enshrined in the Constitution.

2.1.1. Stakeholder theory

Stakeholder theory is also considered as an explainable theory for corporate environmental accounting (Deegan & Blomquist, 2006; Depoers, Jeanjean, & Jérôme, 2016; Liao et al., 2015). It involves the recognition and identification of the relationship existing between the company's behaviours and its impact on its stakeholders. The stakeholder theory perspective takes cognisance of the environment of the firm, including customers, suppliers, employees, and other segments of the society. As a result of this relationship, the company requires support from the stakeholders to survive. The connection must be managed if the company considers the stakeholders important. One of the ways of maintaining that relationship is by providing information through voluntary social and environmental disclosures to gain support and approval of these stakeholders. These stakeholders of the enterprise and lobbying decisions of these individuals are determined by the stakeholders who possess power, urgency, and legitimacy (Ahmad, 2015).

We conclude that legitimacy theory and stakeholder theory are the theories that dominate the explanations of social and environmental impact disclosure practices.

2.1.2. Empirical evidence

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.

2.2. Environmental disclosure quantity

Otu Umoren et al. (2015) from Nigeria provided evidence that the level of environmental information reported by sample companies listed in the Nigeria Stock Exchange (NSE) was 7%. The study used a sample of 40 companies across eight sectors and data from two-year 2013–2014 was analysed using descriptive statistics, correlation, and linear regression. The study desperately calls for integrated reporting in Nigeria. Otu Umoren et al. (2015) sample size based on the firm-level study is limited regarding generalising the result of the survey.

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 a strong legal environment could be factors to this upsurge. Ahmed Haji and Anifowose (2017) confirmed a significant rise in the overall corporate disclosure because of the adoption of integrated reporting in South Africa. This increase may be attributed to public pressure (Darrell & Schwartz, 1997). The current study focused on investigating and providing empirical evidence of the relationship between the extent of environmental disclosure and corporate board characteristics of listed companies in Nigeria and South Africa taking cognisance of both firm attribute in one hand and reporting framework of the individual country.

2.3. Corporate governance

Recent scandals that ravaged some companies have awakened a good number of studies on how entities are governed. Beekes, Brown, Zhan, and Zhang (2016) in a cross-country study involving 23 countries confirmed: "the belief that better-governed firms make more frequent disclosures to the market" also corroborated by Ntim (2016) and Rupley, Brown, and Marshall (2012). 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, Kang, & Salter, 2016) and carbon disclosure (Le & 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 (Kanagaretnam, Lobo, & Whalen, 2007).A good number of measures have been taken to strengthen corporate governance in both Nigeria and South Africa. In South Africa ranging from King report on corporate governance in 1994 (Rossouw, Van der Watt, & Malan, 2002; Vaughn & Ryan, 2006), to King III report (King Committee on Corporate Governance, 2009). In Nigeria, in 2003, the Artedo Peterside committee set up by the Securities and Exchange Commission, developed a code of best practice for public companies in Nigeria. We focused on board independence (BIND), board size, board meetings, audit committee independence, and environmental committee as corporate board characteristics, while the emphasis is on the assumption that BIND arrangement may serve as bonding mechanisms in weak reporting environments, suggesting a substitutive relationship between BIND and the regulatory framework.

2.3.1. Board independence

The stakeholder's theory buttress the importance of having independent directors in board composition aimed at protecting the interest of the investors (Arayssi, Dah, & Jizi, 2016; Gul & Leung, 2004; Jizi, Salama, Dixon, & Stratling, 2013). Liao et al. (2015) showed evidence of a positive association between significant independent directors and extensive disclosure of GHG information from a UK sample of 329 largest companies using both univariate and regression models. García-Meca and 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 BIND and voluntary disclosure only occurs in those countries with high investor protection rights." Jizi et al. (2013) stated that there exists a positive relationship between the upper level of corporate social responsibility (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 independent executive administrators on the board. Post, Rahman, and McQuillen (2014) 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 nonexecutive directors on the board are expected to relate to extensive environmental impact disclosure significantly.

2.3.2. Board size

The large composition of the board is perceived to be capable of influencing the extent to which corporate entities disclose their activities in any environment (Haniffa & Cooke, 2005; Ntim & Osei, 2011). Bhagat and Bolton (2008) supported by agency theory (John & Senbet, 1998) due to the diversity of expertise of members (Allegrini & Greco, 2011; Nan, Salama, Hussainey, & Habbash, 2010; Xie, Davidson, & Dadalt, 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; Khlif et al., 2015) while some showed negative relationship Uwuigbe and Ajayi (2011) and others insignificant result (Cheng & Courtenay, 2006; Halme & Huse, 1997). Recent empirical evidence from an emerging economy by Trireksani and Djajadikerta (2016) examined the relationship between corporate governance variables and the extent of environmental disclosure. The study focused only on mining companies listed in 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, Che-Ahmad, and Che-Adam (2016) utilised a cross-section data of sample size of 116 firms in Niaeria and provided evidence that board size positively relates to the level of environmental disclosure. Concerned about the quality of climate change disclosure, Ben-Amar and McIlkenny (2015) result from Canada showed a positive association 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 CSR in the banking sector of US, Jizi et al. (2013) found a significant positive association between board size and CRS. Jizi et al. (2013) used meta-analysis to a sample of 64 empirical studies to identify possible determinants to 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.

2.3.3. Audit committee independence

Audit committee independence is among the dimensions of measuring audit committee effectiveness (Pincus, Rusbarsky, & Wong, 1989). This committee is part of corporate governance structure (Cohen, Hoitash, Krishnamoorthy, & Wright, 2014; Cohen, Krishnamoorthy, & Wright, 2002; Vera-Muñoz, 2005; Yasin & Nelson, 2013) that helps in overcoming agency-related problems (Aburaya, 2012; Ho & Shun Wong, 2001; Islam, 2010) as well as carrying out oversight function (Beasley, Carcello, Hermanson, & Neal, 2009; Rahim, Johari, & Takril, 2015) must be independent (Vera-Muñoz, 2005). Based on this important role of audit committee in achieving objectives of corporate governance (Ho & Shun Wong, 2001; Khan, Muttakin, & Siddiqui, 2013; Said, Hj Zainuddin, & Haron, 2009), required a good number of independent members for its effectiveness (Akhtaruddin & Haron, 2010; Bouaziz, 2012; Carcello & Neal, 2000; DeZoort, Hermanson, Archambeault, & Reed, 2002; Ghafran & O'Sullivan, 2013; Mohamad & Sulong, 2010). Some empirical evidence has emerged about the degree of number of independent members in positively influencing what, how and when to disclose information that will help stakeholders to make an informed decision. Madi, Ishak, and Manaf (2014) in a study of 146 Malaysian listed firms for the year 2009 provided evidence that audit committee independence is positively related to voluntary corporate disclosure. The study used a content analysis method. Madi et al. (2014) is a confirmation of Iatridis (2013). Also, Samaha, Khlif, and Hussainey (2015) reported a positive relationship between the level of voluntary disclosure and the percentage of independent directors on the audit committee.

2.3.4. Board meetings

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 and 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 and Samaila (2015) reported negative association based on the study of the impact of monitoring characteristics on financial reporting quality of the Nigerian listed oil marketing firms. While in Nigeria, 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.

2.3.5. Environmental committee

The environmental committee is saddled with the responsibility of assessing the natural capital (Council on Social Work Education, 2015; Pryor, Bierbaum, & Melillo, 1998; Rockwell, 1991; Sánchez & McIvor, 2007; Sano & Kawai, 1996; Stewart, 2004). An advisory committee (Vasseur et al., 1997) that has shown a high-level transparency towards the environment (Liao et al., 2015). However, the words of Berrone and Gomez-Mejia (2009) that "...environmental committee do not reward environmental strategies more than those without such structures, suggesting that these mechanisms play a merely symbolic role," call for more evidence on the relationship between the environmental committee and corporate environmental disclosure practices. Dixon-Fowler, Ellstrand, and Johnson (2017) found a positive association between board environmental committee will be proactive and not reactive in handling environmental issues and actions help companies gain environmental legitimacy (Berrone, Fosfuri, & Gelabert, 2015; Hummel & Schlick, 2016) and firm value (Clarkson, Fang, Li, & Richardson, 2013; Plumlee, Brown, Hayes, & Marshall, 2015) as well as beneficial to shareholders (Griffin & Sun, 2013).Peters and Romi (2013b) reported a positive association between the environmental disclosure.

2.4. Corporate attributes (control variable)

Roberts (1992) pointed out the importance of company characteristics in investigating the level of corporate environmental disclosure. In this current study, the firm attribute is used as control variables as previously done by (e.g. Akbas, 2016). Therefore, we consider only three attributes-company size, industry membership, and auditor type.

2.4.1. Industry membership

The industry a company belongs is perceived to be a determinant factor of the quantity of environmental impact disclosure to the stakeholders. In a study by Halkos and 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 a logit regression method. This evidence supported an earlier study by Galani, Gravas, and Stavropoulos (2012). On the contrary, Ong, Tho, Goh, Thai, and Teh (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 the poor and weak legal environment as it relates to the environment (Ong et al., 2016). In Jordan, Ismail and 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 and Pavelin (2008) provided evidence to support that industry class relate to the extent of corporate disclosure of environmental information using a sample of 450 conglomerates selected from different sectors.

2.4.2. Firm size

Large companies exhibit higher disclosure as they have financial "muscle" to bear the cost. Various studies provided the empirical result relating the size of a company and the level of environmental disclosure. In China, Lu and Abeysekera (2014); Zeng, Xu, Dong, and Tam (2010) documented a positive significant relationship. Greek evidence shows that size is a strong determinant of environmental ratings (Galani et al., 2012). Adhikari and Tondkar (1992) examined the relationship between selected environmental factors and stock exchange disclosure requirements of 35 stock exchanges in different countries and found that the size of the equity market significantly explained the variation. Chek, Zam Zuriyati, Nordin Yunus, and Norwani (2013) used content analysis and Pearson correlation methodology and found the size of 154 companies in consumer and plantation industries of Malaysia to correlate with level disclosure. Having the desire to fill the gap in knowledge, Ismail and 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 company size and level of environmental disclosure. Also from Thailand, Suttipun and Stanton (2012) found a positive association. Evidence from developed country US showed a different result when company size and industry type were used as a control variable to determine the relationship between performance and disclosure for the 131 companies (Patten, 1992). Canadian experience as documented by Cormier and Magnan (1999) showed that firm size significantly explain environmental disclosure. Also in UK, Brammer and Pavelin (2008) reported a positive association.

2.4.3. Audit firm size

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, Sewon, and Claiborne (2008) provided evidence from China. The study showed that voluntary disclosure is related to the reputation of the auditor. Braam and Borghans (2014) see the interlock ties between the board and the external auditor as a catalyst for voluntary corporate disclosure. From the point of ethical values, Houqe, van Zijl, Dunstan, and Karim (2015) stated thus entities "from countries where 'high corporate moral 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 strong legal environment, investor protection and disclosure standards (El Ghoul, Guedhami, & Pittman, 2016; Ernstberger & Grüning, 2013).

2.4.4. Research hypotheses

In cognisance of the theoretical and empirical evidence on the relationship between board characteristics and the extent of overall environmental disclosure. We state hypotheses for this study thus:

H1. Corporate Environmental Disclosure Quantity is associated with corporate board characteristics in African emergent markets (South Africa and Nigeria).

H2: Board Independence arrangement serve as bonding mechanism in the traditional reporting framework (Nigeria) and not in integrated reporting framework (South Africa) with the extent of corporate Environmental Disclosure Quantity

3. Research method

This current study used an archive data which call for ex-post facto research design to enable us to investigate the relationship between corporate board characteristics and environmental disclosure practices of listed companies in South Africa and Nigeria. The population of the study is listed companies of NSE and Johannesburg Stock Exchange (JSE). This population comprises of 188 and 360 companies listed on NSE and JSE, respectively. We eliminated companies that are either suspended or unavailability of the annual report for the year 2015. The 303 (Nigeria 90 and South Africa 213) companies formed the sample size for the study. The sample is made up of

large and industrially diverse companies for possible generalisation of the findings (Aburaya, 2012; Brammer & Pavelin, 2006).

The study employed content analysis of annual reports which has been widely used by previous studies to investigate the extent of environmental disclosure by corporate entities (Akbas, 2016; Fallan, 2016; Hackston & Milne, 1996; Hughes, Anderson, & Golden, 2001; Khlif et al., 2015; Niskala & Pretes, 1995; Nor, Bahari, Adnan, Kamal, & Ali, 2016; Ong et al., 2016). In line with prior studies (Aburaya, 2012; Clarkson, Li, Richardson, & Vasvari, 2008; Cormier et al., 2011; Hackston & Milne, 1996), we developed a 35 checklist item (Appendix A) was used to measuring the extent (Aburaya, 2012; Odoemelam & Okafor, 2018). The annual report of the sample companies for the year 2015 was used for the investigation. This data is based on the annual reports which are the secondary source (Hussey & Hussey, 1997) of data collection that is widely accepted as credible (Al-Tuwaijri, Christensen, & Hughes, 2004; Neu, Warsame, & Pedwell, 1998; Tilt, 2001; Tilt & Symes, 1999).

Coding of the items to generate a data set is in line with (e.g. Gray, Kouhy, and Lavers (1995); Aburaya (2012)) based on a measure of disclosure volume by the scoring system. Despite the criticism that un-weighted index (dichotomous scores) of the 1 if the item is disclosed and 0, if not disclosed, negate the possibility that all the elements are not equally important (Barako, Hancock, & Izan, 2006), the un-weighted index is accepted for measuring quantity of entities environmental disclosure (Bozzolan, Trombetta, & Beretta, 2009) and previous studies have used dichotomous score (e.g. Aburaya (2012); Haniffa and Cooke (2005); Chau and Gray (2002). Hence, we adopt the formula by Aburaya (2012) and Odoemelam and Okafor (2018) for calculating the quantity of environmental disclosure by the sample companies.

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

n

CED Quantity = Σ Quantity

i = 1

MAX Quantity i

where:

CED Quantity = Corporate Environmental Disclosure Quantity Index,

Quantity*i* = 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 study tests the hypotheses using a cross-sectional sample of companies (Cho, Roberts, & Patten, 2010) listed across South African and Nigerian stock exchange (www.jse.co.za and www.nse.com.ng)

3.1. Model specification

To achieve the purpose of examining the relationship between board characteristics and the extent of environmental disclosure, we follow Akbas (2016) model using ordinary least square with cross-sectional data and as well as panel data technique to test the association. Therefore, the model for the study is specified thus:

Table 1. Measurement and ex	planation of variables	
Dependent	ABBR.	
Environmental Disclosure	CEDQ	1 = Companies that disclose environmental information in their annual report 0 = Otherwise (see Appendix A)
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 the 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 an environmental committee, 0 = Otherwise
Control variables		
Company Size	FS	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.
Audit Firm Size	AFS	Dummy variable = 1 if the company is audited by one of the "Big 4" and 0 otherwise

$$\begin{split} \mathbf{CEDQ_i} &= \alpha_\mathbf{0} + \beta_\mathbf{1}\mathbf{BSIZE} + \beta_\mathbf{2}\mathbf{BIND} + \beta_\mathbf{3}\mathbf{BOMET} + \\ \beta_\mathbf{4}\mathbf{ACOINDE} + \beta_\mathbf{5}\mathbf{ENVICOM} + \mathbf{B_6SIZE} + \beta_\mathbf{7}\mathbf{INDM} + \beta_\mathbf{8}\mathbf{AFS} + \varepsilon_i \end{split}$$

(1)

where:

CEDQ: the overall of environmental disclosure of company $_{\rm i}$

 $\alpha_{0:}$ 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: an environmental committee of company i

SIZE: size of company i

INDM: industry membership of company i

AFS: auditor type of company i

 \mathcal{E}_i : random error term

The apriori signs are $\theta_1 > 0$, $\theta_2 > 0$, $\theta_3 > 0$, $\theta_4 > 0$, $\theta_5 > 0$, $\theta_6 > 0$, $\theta_7 > 0$, $\theta_8 > 0$

The variables and their measurements are further explained in Table 1.

4. Result and discussion of findings

Results in this study are presented as follows. Firstly, the descriptive statistics table and analysis and followed by multivariate analysis and discussions of findings.

4.1. Descriptive analysis

Table 2, panel A results show that environmental disclosures are more relevant in the South African sample and less in Nigeria sample. For, instance, the mean of overall environmental disclosure score accounts for 40% while in Nigeria the average for overall environmental disclosure amount to 10.7%. These results suggest that integrated reporting framework and regulatory environment stimulates the extent of environmental disclosure more than the opposite (Figure 1).

Panel B of Table 2 shows relevant information in this study. It reveals that 35% of South Africa sample firms have an environmental committee as one of their corporate board mechanisms, while 65% of the same sample size of South Africa have no environmental committee. Also revealed in this study with regard to the panel B of Table 2 result is that in a stakeholder-oriented model such as South Africa (Khlif et al., 2015) environmentally sensitive industries are legitimately concerned towards the natural capital. For instance, 45% of the total sample size of South Africa belongs to environmentally polluting industries scored a mean of 48%, whereas, the less environmentally sensitive industries totalling 117 (55%) have a mean value of 33%. On the contrary, the same result for Nigeria is quite revealing and confirms the relatively weak reporting framework and environment the firms operate. Panel B, also, reveal that for Nigeria, environmentally sensitive industries demonstrate poor concern towards the environment with regard to their environmental reporting in the traditional annual reports. For instance, out of 90 firms, 46 (51%) are in the membership of environmentally sensitive industries but not surprising, their mean score is 9.5% while 44 (49%) number of less environmentally sensitive industries score higher mean of 12%. This outcome buttresses the point that in a weak reporting environment, less environmental polluting industries disclosed more than and higher quantity environmental information.



Figure 1. Environmental disclosure means scores for South Africa and Nigeria (Appendix B).

Table 2.	Descriptive sta	tistics													
			Whole sample					SA Sample					Nigeria sample		
	z	Mini	Maxim	Mean	Std. dev.	z	Mini	Maxim	Mean	Std. dev.	z	Mini	Maxim	Mean	Std. dev.
Panel: A															
OED		00.	91.43	31.4132	25.92819		00	91.43	40.1515	25.16098		00:0	65.71	10.7327	12.56807
BSIZE		3.0	18.0	9.310	2.8429		3.0	18.0	9.330	2.8292		5.0	17.0	9.300	2.8853
BIND		00.	89.00	40.1499	25.20880		0.0	86.0	52.142	16.2340		00.0	89.00	11.8698	19.27230
BOMET		1.0	14.0	5.023	1.6501		1.0	14.0	5.076	1.7441		3.0	11.0	4.911	1.4034
ACOINDE		00.0	100.00	71.1044	40.57545		0.0	100.0	94.382	16.8947		00.0	100.00	15.9949	22.80922
SIZE		3.570	23.410	13.94421	3.553456		7.23	23.41	15.0474	2.42148		3.570	22.150	11.33339	4.367396
Valid N (list wise) (303)	303					213					06				
			Whole sample				SA Sample				Nigeria sample				
		Ŀ	Percent	Valid percent	Cum percent	LL.	Percent	Valid percent	Cum percent	Ŀ	Percent	Valid percent	Cum percent		
Panel: B: Dur	nmy variables														
	No	226	74.6	74.6	74.6	139	65	65.	65	86	96	96	96		
Valid	Envicom	77	25.4	25.4	100.0	74	35	35	100.0	4	4	4	100.0		
	Total	303	100.0	100.0		213	100	100.0		06	100.0	100.0			
	No	95	31.4	31.4	31.4	59	28	28	28	36	40.0	40.0	40.0		
Valid	Audited "Big 4"	208	68.6	68.6	100.0	154	72	72.	100.0	54	60.0	60.0	100.0		
	Total	303	100.0	100.0		213	100.0	100.0		06	100.0	100.0			
	No	161	53.1	53.1	53.1	117	54.9	54.9	54.9	44	48.9	48.9	48.9		
Valid	Environmentally Sensitive Industry	142	46.9	46.9	100.0	96	45.1	45.1	100.0	95	51.1	51.1	100.0		
	Total	303	100.0	100.0		213	100.0	100.0		06	100.0	100.0			
Notes : Bsiz ⁱ AFS: audit † Nigeria env	e: board size; BIND: Tirm size. OED: a ma ironmentally sensit	board inder odel for Over tive industrie	pendence; BC rall environm es = 46 (51%	DMET: board nental disclo); the numb	meetings; AC sure. For Sou er of compar	OINDE: aud th Africa pa nies audited	it committee nel B, enviro 1 bv "bia 4" =	e independer inmentally si = 54 (60%) o	nce; ENVICOI ensitive indu of the total s	M: environmo Istries = 96 (- ubsample	ental commi 45%); Numb	ittee; FS: firm er of firms a	size; INDUM udited by "Bi	: industry me g4" = 154 (7	embership; 2%) While

Audit firm size's reputation theory was confirmed in the analysis in Panel B of Table 2. A total of 72% and 60% of South Africa and Nigeria samples engage the services of "Big4" and audit firm size demonstrated legitimatising their reputation. Audit firm size in Table 4 statistically significantly influences overall environmental disclosure in both study countries. The result implies that in a poor and weak institution, audit firm reputation substitute for strong legal and regulatory framework.

4.1.1. Correlation matrix

The correlation matrix showed no presence of multicollinearity among the variables. The result is depicted on Appendix C.

4.1.2. Multivariate analysis

Table 3 reports the results of multiple regressions

4.1.3. Testing of the overall multiple regression model fit

Testing of the overall multiple regression model fit, Muijs (2004) suggested that for a goodness of fit with an adjusted *R* square: < 0.1: poor fit; 0.11–0.3: modest fit; 0.31–0.5: moderate fit; >0.5: strong fit. However, Table 3 reveals a statistically significant relationship between the independent variables and the dependent variable, which according to Cohen, Manion, and Morrison (2011) it tells us that it is useful to proceed with our regression analysis, as it contains important results. Table 3 reveals a coefficient of multiple determination (*R* square of 0.505 and an Adjusted *R* square of 0.492), which represents the proportion of the variation in CEDQ that is explained by the set of independent variables in this study. This implies that the independent variables jointly explain about 50% of the variation in CEDQ of quoted sample companies *F*-test has the capacity to assess multiple regression model framed in this study to test hypotheses is a good fit for the data. Observe that Table 3 reveals that the independent variables jointly the dependent variables are coefficients (8.392) = 37.299, *p*-value < .05). These results simply indicate that the multiple regression model postulated in this study is a good fit for our data.

Also, Table 3 indicates that South Africa sample has an Adjusted *R* square of 0.336, which represents the percentage of the variation in CEDQ that is explained by the set of independent variables in this study. The implication of this is that the independent variables together account for just about 33% of the change in CEDQ of quoted companies in South Africa. Note that the Adjusted *R* square is used here instead of the traditional *R* square because Adjusted *R* square reflects both the number of independent variables in the model and the sample size. While Nigeria sample result showed that Adjusted *R* square of 0.296, which represents the proportion of the variation in CEDQ that is explained by the set of independent variables in this study. This implies that the independent variables jointly explain 29% of the variation in CEDQ of quoted companies in Nigeria.

From Table 3, the model reveals that board characteristics statistically significantly (p = 0.000) associated with the extent of environmental disclosure of listed firms in South Africa and Nigeria. The results provide supporting evidence for the first conjecture H1; corporate environmental disclosure quantity (CEDQ) is associated with corporate board characteristics in African emergent

Table 3. Model summa	iry and ANOVAa		
Model (1)	Whole sample	South Africa	Nigeria
R ² a	50.5%	36.1%	35.9%
Adjusted R Square	49.20%	33.6%	29.6%
F stat	37.299	14.198	5.679
Prob (F-statistics	.000 ^b	.000 ^b	.000 ^b

Table 4. Coefficients	(overall sample)					
			Coefficients ^a			
Model		Unstandardise	ed coefficients	Standardised coefficients	ţ	Sig.
		B	Std. Error	Beta		
1	(Constant)	-23.397	5.492		-4.260	000.
	BSIZE	1.269	.452	.139	2.810	.005***
	BIND	.135	.078	.132	1.739	.083*
	BOMET	.454	.697	.029	.651	.515
	ACOINDE	.185	.047	.292	3.911	.000
	ENVICOM	14.621	2.589	.261	5.647	.000
	SIZE	.721	.419	660.	1.719	.087*
	AFS	6.496	2.560	.117	2.537	.012**
	INDM	8.214	2.341	.159	3.510	.001***
^a Dependent Variable: OED						

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Note: Bsize: board size; BIND: board independence; BOMET: board meetings; ACOINDE: audit committee independence; ENVICOM: environmental committee; FS: firm size; INDUM: industry membership; AFS: audit firm size. *, **, ***Significant at $\rho < 0.10$; $\rho < 0.05$; $\rho < 0.01$.

markets (South Africa and Nigeria). The finding agrees with (e.g. Akbas, 2016; Beekes et al., 2016) that the model is significant in the model (whole sample, South Africa and Nigeria) considered. We, therefore, accept the H1.

Considering the whole sample of the study, the coefficients of the independent variables are given in Table 4 in the unstandardised coefficients column. The intercept or constant is given as -23.397. It is important to state that the independent variables are calculated relative to each other rather than independent of each other. Hence, we say that, relative to each other, ENVICOM has the strongest positive effect (β = 14.621) on the level of CEDQ, and that this statistically significant (*p*-value = 0.000, which is stronger than 0.01 and 0.05). In the same vein, INDM (β = 8.214, *p*-value = 0.001), ADT (β = 6.496, *p*-value = 0.012), BSIZE (β = 1.269, *p*-value = 0.005), and ACOINDE (β = 0.185, *p*-value = 0.000), equally have significant effect on CEDQ. BIND has the lowest insignificant (*p*-value = 083, which is weaker than 0.05) positive effect (β = 0.135) on CEDQ; Several other independent variables have insignificant positive effect on CEDQ and they include BOMET (β = 0.454, *p*-value = 0.515) and SIZE (β = 0.721, *p*-value = 0.087).

Table 5 presents the coefficients of the independent variables (South Africa) in the unstandardised coefficients column. ENVICOM has the strongest positive effect (β = 17.602) on the extent of CEDQ, (*p*-value = 0.000, which is stronger than 0.01 and 0.05). Followed by INDM (β = 8.938, *p*value = 0.006), BSIZE (β = 1.263, *p*-value = 0.050), equally have significant effect on CEDQ. While, BIND (β = 0.029, *p*-value = .793), BOMET (β = -.021, *p*-value = .980), ACOINDE (β = 0.134, *p*value = 0.195), SIZE (β = 1.338, *p*-value = 0.101), and AFS (β = 6.323, *p*-value = 0.087) have insignificant positive effect on CEDQ.

Table 6 presents the coefficients of the independent variables (Nigeria Sample) in the unstandardised coefficients column. BIND has the most significant positive effect (β = 0.220) on the extent of CEDQ, (*p*-value = 0.00, which is stronger than 0.01 and 0.05). BSIZE (β = 1.186, *p*-value = 0.023), AFS (β = 5.248, *p*-value = 0.036), equally have significant effect on CEDQ. While, BOMET (β = 1.194, *p*-value = .205), ACOINDE (β = .043, *p*-value = .494),ENVICOM (β = 3.215, *p*-value = 0.308),SIZE (β = 0.387, *p*-value = 0.267), and INDM (β = 1.569, *p*-value = 0.551) are statistical.

The results of the relationship between percentage of independent directors of the total number of directors on the board of a company (BIND) and CEDQ (whole sample, *p*-value = 0.08,South Africa, 0.79, and Nigeria, 0.00) in Tables 4, 5 and 6 respectively, provide supporting evidence for the second conjecture H2: BIND arrangement serve as bonding mechanism in the traditional reporting framework (Nigeria) and not in integrated reporting framework (South Africa) with the extent of CEDQ. The finding agrees with the view of (e.g. (Ernstberger & Grüning, 2013; Ntim, 2016) and tends to disagree with Jizi et al. (2013) (whole sample, South Africa and Nigeria) considered. Hence, these results allow validating our H2.

4.2. Discussion of findings

The regression results showed the influence of selected corporate board mechanisms and firm attributes on the CEDQ. The result indicates that BIND which is statistically significant (p < 0.01) for Nigeria sample only. The superior result of BIND against South African listed firms provide evidence in support of the view of Ernstberger and Grüning (2013) however, strong corporate governance arrangements may serve as bonding mechanisms in weak legal environments (traditional reporting framework), suggesting a substitutive relationship between corporate governance and the regulatory framework. It implies that the independent executive direct board as a dimension of a better-governed company ensures the reduction of information asymmetry (Ernstberger & Grüning, 2013; Ntim, 2016). The revelation implies that South African legal and regulatory framework is strong (Khlif et al., 2015) that compensate the level of South Africa environmental disclosure while the independent executive directors on board of listed firms in Nigeria substituted for the poor regulatory environment (Adegbite, 2015).

Table 5. Coefficients	and significance (South A	Africa Sample)				
			Coefficients ^a			
Model		Unstandardise	d coefficients	Standardised coefficients	ţ	Sig.
		B	Std. error	Beta		
1	(Constant)	-20.215	12.982		-1.557	.121
	BSIZE	1.263	.641	.142	1.971	.050**
	BIND	.029	.111	.019	.263	.793
	BOMET	021	.871	001	025	.980
	ACOINDE	.134	.103	060.	1.301	.195
	ENVICOM	17.602	3.420	.332	5.147	
	SIZE	1.338	.812	.130	1.649	.101
	AFS	6.323	3.671	.113	1.723	.087*
	INDM	8.938	3.228	.177	2.769	***900'
^a Dependent Variable: OED						

Table 6. Coefficients	and significance (Nigeria	Sample)				
			Coefficients ^a			
Model		Unstandardise	ed coefficients	Standardised coefficients	t	Sig.
		В	Std. error	Beta		
1	(Constant)	-9.229	5.571		-1.657	.101
	BSIZE	1.186	.510	.272	2.325	.023
	BIND	.220	.074	.337	2.955	.004
	BOMET	1.194	.935	.133	1.278	.205
	ACOINDE	.043	.062	.077	.687	.494
	ENVICOM	3.215	3.136	.092	1.025	.308
	SIZE	387	.346	135	-1.118	.267
	AFS	5.248	2.455	.206	2.137	.036
	INDM	1.569	2.619	.063	.599	.551
^a Dependent Variable: OED						

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Based on the evidence, board size associated with the extent of environmental disclosure among listed companies in South Africa and Nigeria. The results agree with the findings of (Akbas, 2016; Haniffa & Cooke, 2005; Jizi et al., 2013; Ntim & Osei, 2011; Osazuwa et al., 2016) that board size influences the extent of environmental disclosure. The finding agrees that having a large board comprising a diversity of expertise (Nan et al., 2010) encourages more disclosure. We find that audit firm size influences the extent of corporate environmental disclosure. The result concurs with (Braam & Borghans, 2014).Hence, these results allow corroborating the results attained by Wang et al. (2008), Copley (1991), Braam and Borghans (2014).

Moreso, South Africa's estimated regression result indicates that environmental committee (ENVICOM) and industry membership (INDUM) are statistically significant ($p \le 0.01$) and ($p \le 0.01$), respectively. On the contrary, Nigeria's estimated regression results show that both variables are statistically insignificant at (p > 0.05) for ENVICOM and (p > 0.05) for INDUM. The results of South Africa with regard to environmental committee and industry membership positive association to the extent of overall environmental disclosure were not surprising. South Africa companies are operating in a relatively strong legal environment and have a strong regulatory standard (i.e. Integrated reporting). The ENVICOM result from South Africa confirms the views of Liao et al. (2015) & Council on Social Work Education (2015). The findings agree with Dixon-Fowler et al. (2017); Peters & Romi (2013) and gaining of environmental legitimacy Berrone et al. (2015). Firms operating in a highly regulated and strong reporting environment is also enjoined to be proactive (Peters & Romi, 2012) in agreement with legitimacy theory. The result disagrees with the view of Berrone and Gomez-Mejia (2009).

In the same vein, our findings show that environmentally sensitive industries in a strong reporting framework (South Africa) are legitimising their operations. South Africa's results corroborate well the results reached by Halkos and Skouloudis (2016), Galani et al. (2012), Brammer and Pavelin (2008) confirming that the presence of strong reporting framework institution associated with the occurrence of stakeholder activism (Darrell & Schwartz, 1997), upheld legitimacy theory.

However, on the contrary, disagree with Ong et al. (2016). While environmentally sensitive industries result from Nigeria, agrees with Ismail and Ibrahim (2008) that document insignificant relationship and Ong et al. (2016) of low disclosure of environmentally sensitive industries that portrays poor and weak legal environment (traditional framework).

On the other hand, the coefficients for the variables audit committee independence; board meeting and firm size were not significant in both countries. This finding implies that these variables do not significantly influence the extent of environmental disclosure of listed firms in South Africa and Nigeria. These results negate the stakeholder's theory which expects the presence of independent directors on the board to help to overcome information related problems (Aburaya, 2012; Ho & Shun Wong, 2001; Rahim et al., 2015) and larger firms to extensively disclose environmental information. The result on board meeting contradicts the earlier finding of Osazuwa et al. (2016) in Nigeria and (Ntim & Osei, 2011) from South Africa. The result on company size does not match with the results achieved by Lu and Abeysekera (2014); Zeng et al. (2010); Galani et al. (2012);Ismail and Ibrahim (2008); Suttipun and Stanton (2012); Cormier and Magnan (1999); Brammer and Pavelin (2008) as well as Chek et al. (2013). Usually, companies having a big size are characterised by more transparency, less information asymmetry

5. Conclusions

The differences in respect to the mode of reporting system between the two leading African emerging economies allows us to distinguish between the extent at which corporate board mechanisms influence environmental disclosure quantity between the two countries South Africa and Nigeria. Our results are consistent with the conclusion that corporate board characteristics associate with environmental disclosure quantity in both countries, but emphasises centres on a substitutive relationship between BIND and the regulatory framework. The magnitude of the

association in a relatively weak regulatory framework and that of strong reporting environment. Our results are robust for CEDQ for a country that has a strong institution and has implemented integrated reporting regulations. Moreover, the influence of BIND on environmental reporting suggests a substitutive relationship in a traditional reporting setting. While interestingly, our results reveal a great concern with regard to environmentally polluting industries and less environmentally polluting industries. Firms from the strong regulatory framework and are environmentally sensitive-industries are more inclined to disclose their environmental impact. While their counterpart firms from weak legal environment publish less environmental impact to stakeholders. This result is inconsistent with both the voluntary disclosure perspective and the legitimacy theory. Interestingly, companies that have environmental committee are more likely to publish their environmental responses. Furthermore, our results are based on the unique setting of the medium of disclosure, characterised by mandatory integrated reporting of environmental impact and voluntary disclosure of climate change-related issues. Therefore, we are constrained to crosssectional content analysis and should be careful of generalising our specific results. Our results provide useful insight background information for future research and are also relevant for regulators and policymakers charged with environmental accounting. Our contribution to the literature is twofold. First, we shed further light on the substitutive relationship between BIND and the regulatory framework. Second, we contribute specifically to the environmental disclosure literature by showing-in the setting of different reporting framework-industry membership influences on environmental disclosure decisions vary. In Polluting-intensive industries, the mandatory disclosure perspective (integrated reporting) and the legitimacy perspective advanced in prior research appear to complement each other in a highly regulated country while our result extends prior study arguing that environmentally sensitive industries in the poorly regulatory country, voluntary disclosure perspective substitute legitimacy perspective.

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Appendix A.

Environmental Disclosure Index Checklist Company: x	Year (2015)
A. Environmental policies	
1. Actual statement of environmental policies	
2. Departments or positions for environmental and/or so	afety management
3. Past, current, or future estimates of capital and operative remediation	ating expenditure for environmental protection or
4. Environmental investment & investment appraisal	
5. Financing of pollution control equipment and facilities	5
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 requiren	nents
2. Compliance with pollution laws and regulations	
3. Compliance with health and safety standards and rea	gulations
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, and/or environmental disclosure	audit, and assessment of environmental performance
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 safe	ety 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	

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victorialdevkode <t< th=""><th></th><th></th><th></th><th></th><th>South Africa</th><th></th><th></th><th></th><th></th><th></th><th></th><th>Nigeria</th><th></th><th></th><th></th></t<>					South Africa							Nigeria				
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(j)(j	Б	213	33.7653	33.38	24.067	0	10	0	06	10.4067	8	33	11.2637	0	53.33	
(1)(1	PPEI	213	45.5993	55.55	34.198	0	10	0	06	7.5477	0		14.5626	0	57.14	
(i) (i) <td>CELS</td> <td>213</td> <td>58.5868</td> <td>75</td> <td>41.466</td> <td>0</td> <td>10</td> <td>0</td> <td>06</td> <td>10.2777</td> <td>0</td> <td></td> <td>18.6986</td> <td>0</td> <td>75</td>	CELS	213	58.5868	75	41.466	0	10	0	06	10.2777	0		18.6986	0	75	
312136x638,10032321013 <t< td=""><td>EA</td><td>213</td><td>53.5258</td><td>100</td><td>50.923</td><td>0</td><td>10</td><td>0</td><td>06</td><td>6.7415</td><td>0</td><td></td><td>24.0631</td><td>0</td><td>100</td></t<>	EA	213	53.5258	100	50.923	0	10	0	06	6.7415	0		24.0631	0	100	
00131004015.4350057.1300	sus	213	84.6384	100	32.921	0	10	0	06	38.2022	12	0	41.3016	0	100	
(0) (1) (1) (2) <td>OERI</td> <td>213</td> <td>19.0848</td> <td>14.29</td> <td>15.4825</td> <td>0</td> <td>57.</td> <td>29</td> <td>06</td> <td>8.0918</td> <td>7.1</td> <td>45</td> <td>9.0788</td> <td>0</td> <td>42.35</td>	OERI	213	19.0848	14.29	15.4825	0	57.	29	06	8.0918	7.1	45	9.0788	0	42.35	
613033036103	OED	213	40.1515	45.71	25.1609	0	91.	43	06	10.7326	5.7	71	12.568	0	65.71	
(b) (1) (2) <td>BSIZE</td> <td>213</td> <td>9.3619</td> <td>б</td> <td>2.8237</td> <td>5</td> <td>1</td> <td>8</td> <td>06</td> <td>9.3</td> <td>0</td> <td></td> <td>2.8852</td> <td>ъ</td> <td>17</td>	BSIZE	213	9.3619	б	2.8237	5	1	8	06	9.3	0		2.8852	ъ	17	
BOMET2135076551,752,41,763,431,173,431,403,41,403,4 <td>BIND</td> <td>213</td> <td>52.0952</td> <td>52</td> <td>16.2901</td> <td>30</td> <td>2</td> <td>~</td> <td>06</td> <td>11.8697</td> <td></td> <td></td> <td>19.2723</td> <td>0</td> <td>68</td>	BIND	213	52.0952	52	16.2901	30	2	~	06	11.8697			19.2723	0	68	
Activity21394,47310016,811671001012,894,6012,894,6012,894,60010Fort1313,452,93390103,827219513,911,89539113,457,962,739,27768,4841,661;3FortInter13,45593390103,827219512195190017,4572,56762,739,27768,4841,661;3FortInterInterInterInterInterInter11,455968,4841,661;341,661;3FortInterInterInterInterInterInter11,4569286691,9126691,6121,752863286FortInterInterInterInterInterInterInterInterInter11,669286286FortInterInterInterInterInterInterInterInter11,669286286FortInterInterInterInterInterInterInterInterInterInterFortInterInterInterInterInterInterInterInterInterInterFortInterInterInterInterInterInterInterInterInterFortInterInterInterInterInterInterInterInterInterFortInterInterInterInter	BOMET	213	5.0765	5	1.7524	m	1	0	06	4.9111			1.4034	m	11	
521313,4533,390103,82721,98521,9869017,532,5721,7366,4841,661,59Pert R: Immy writely.American R: Immy writely.Final R: Immy writely.Final R: Immy writely.Final R: Immy writely.Sign R: Immy writely. <th colspa<="" td=""><td>ACOINDE</td><td>213</td><td>94.4739</td><td>100</td><td>16.8817</td><td>67</td><td>10</td><td>0</td><td>06</td><td>15.9948</td><td></td><td></td><td>22.8092</td><td>0</td><td>100</td></th>	<td>ACOINDE</td> <td>213</td> <td>94.4739</td> <td>100</td> <td>16.8817</td> <td>67</td> <td>10</td> <td>0</td> <td>06</td> <td>15.9948</td> <td></td> <td></td> <td>22.8092</td> <td>0</td> <td>100</td>	ACOINDE	213	94.4739	100	16.8817	67	10	0	06	15.9948			22.8092	0	100
Provide the probability of the provided of the pro	FS	213	124,529	3,390	103,827	21,985	19,81	0,859	06	174,532,267	21,2	278	622,739,277	68.48	41,661,590	
MightMightMealineSuth AfricaMinMinMightMinM	Panel: B: Durr	ımy variables								-						
FValid %MedianRedianStat devMinMoxValid %MedianRed devMinM					South Africa							Nigeria				
WE 74 35 56 6.2.8 2.0.081 2.86 9.1.43 4 4 2.9.2.85 3.7.15 18.2.802 2.85 4.2.85 N 139 65 29.6695 32.405 2.0.417 0 68.57 86 96 9.9683 5.7.1 11.6895 0 65.7 NOU 131 100 7 2.4.65 2.4.617 0 68.57 86 96 9.9638 5.7.1 11.6895 0 65.71 NOU 117 55 3.3.1697 3.7.14 2.3.878 0 88.57 44 91 12.016 5.71 14.7928 0 65.71 No 117 55 3.3.1897 3.7.14 2.3.878 0 88.57 14.7928 0 65.71 No 117 55 3.3.169 3.7.16 10.00 10.01 10.01 14.7928 0 65.71 14.7928 0 65.71 14.7928 0 65.7	ENVICOM	L.	Valid %	Mean	Median	Std dev	Min	Μαχ	ч	Valid %	Mean	Median	Std dev	Min	Max	
N 139 65 29.6695 32.430 22.4317 0 68.57 86 96 9.938 5.71 11.6895 0 65.71 Totol 213 100 + <	YES	74	35	56	62.8	22.0981	2.86	91.43	4	4	29.285	35.715	18.2802	2.85	42.86	
Total213100 $=$ <th< td=""><td>z</td><td>139</td><td>65</td><td>29.6695</td><td>32.405</td><td>22.4817</td><td>0</td><td>68.57</td><td>86</td><td>96</td><td>9.9858</td><td>5.71</td><td>11.6895</td><td>0</td><td>65.71</td></th<>	z	139	65	29.6695	32.405	22.4817	0	68.57	86	96	9.9858	5.71	11.6895	0	65.71	
INDUM INDUM <t< td=""><td>Total</td><td>213</td><td>100</td><td></td><td></td><td></td><td></td><td></td><td>06</td><td>100</td><td></td><td></td><td></td><td></td><td></td></t<>	Total	213	100						06	100						
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Total 213 100 m <td>z</td> <td>117</td> <td>55</td> <td>33.1897</td> <td>37.14</td> <td>23.878</td> <td>0</td> <td>88.57</td> <td>77</td> <td>49</td> <td>12.016</td> <td>5.7</td> <td>14.7928</td> <td>0</td> <td>65.71</td>	z	117	55	33.1897	37.14	23.878	0	88.57	77	49	12.016	5.7	14.7928	0	65.71	
\overline{AFS} AFS	Total	213	100						06	100						
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Total 213 100 100 100 100 100 100 100 100 100 1	No	59	28	26.9246	22.86	21.9686	0	68.57	36	40	5.3202	5.7	4.9771	0	20	
Notes: Bsize: board size; BIND: board independence; BOMET: board meetings; ACOINDE: audit committee independence; ENVICOM: environmental committee; FS: firm size; INDUM: industry membership; AFS: auc firm size. EP: environmental policies disclosure; PPEI: product and process environmental issues disclosure; CELS: compliance with environmental laws and standards disclosure; EA: environmental auditi disclosure (EA); SUS: sustainability; OERI: other environmental related information disclosure; OED: a model for Overall environmental disclosure. For South Africa panel B, environmental sensitive industries = "	Total	213	100						06	100						
disclosure (EA); SUS: sustainability; OERI: other environmental related information disclosure; OED: a model for Overall environmental disclosure. For South Africa panel B, environmentally sensitive industries =	Notes: Bsize firm size. EP	board size; BI	ND: board inde al policies disc	spendence; BOI	MET: board me product and p	etings; ACOINI rocess environ)E: audit comn mental issues	nittee indepen disclosure: Cl	idence; ENVIG ELS: complian	COM: environme nce with enviro	intal committe nmental laws	e; FS: firm size and standard	;; INDUM: indust ts disclosure: E	try membersh A: environme	iip; AFS: audit ntal auditina	
	disclosure (E	A); SUS: sustai	nability; OERI:	other environn	nental related	information di	sclosure; OED:	a model for O	verall enviror	imental disclosi	ure. For South	Africa panel B	, environmental	Illy sensitive ir	dustries = 96	

				Correl	ations				
	OED	BSIZE	BIND	BOMET	ACOINDE	ENVICOM	SIZE	ADT	INDM
OED	1								*
BSIZE	.275	1							
BIND	.547	.182	1						
BOMET	.152	.253	.062	1					
ACOINDE	.541	.082	.820	.030	1				
ENVICOM	.487	.097	.291	.036	.289	1			
SIZE	.439	.463	.521	.315	.468	.191	1		
ADT	.331	.355	.230	.214	.177	.182	.384	1	
INDM	.165	194	035	.035	084	.287	145	035	1

Appendix C. South African and Nigerian data correlation analysis

South African data correlation analysis

	Correlations								
	OED	BSIZE	BIND	BOMET	ACOINDE	ENVICOM	SIZE	ADT	INDM
OED	1								
BSIZE	.315	1							
BIND	.259	.263	1						
BOMET	.133	.189	.032	1					
ACOINDE	.193	.172	.514	021	1				
ENVICOM	.485	.165	.222	.055	.159	1			
SIZE	.324	.534	.297	.326	029	.135	1		
ADT	.328	.384	.207	.211	.134	.219	.445	1	
INDM	.306	105	.088	.087	.031	.405	.095	.030	1

Nigerian data correlation analysis

Correlations									
	OED	BSIZE	BIND	BOMET	ACOINDE	ENVICOM	SIZE	ADT	INDM
OED	1								
BSIZE	.393	1							
BIND	.463	.290	1						
BOMET	.255	.437	.081	1					
ACOINDE	.310	.184	.579	014	1				
ENVICOM	.024	106	074	099	005	1			
SIZE	.226	.562	.298	.408	.236	027	1		
ADT	.354	.291	.240	.224	.186	038	.317	1	
INDM	407	386	170	094	267	.058	451	163	1

Appendix D

Analysis of South African and Nigerian data

Table D1. Model summary								
Model	R	R Square	Adjusted R square	Std. error of the estimate				
1	.711ª	.505	.492	18.41454				

^aPredictors: (Constant), INDM, BOMET, BIND, ADT, ENVICOM, BSIZE, SIZE, ACOINDE.

Table D2. ANOVAa									
Model		Sum of squares	df	Mean square	F	Sig.			
1	Regression	101,184.416	8	12,648.052	37.299	.000 ^b			
	Residual	99,015.809	292	339.095					
	Total	200,200.225	300						

^aDependent Variable: OED.

^bPredictors: (Constant), INDM, BOMET, BIND, ADT, ENVICOM, BSIZE, SIZE, ACOINDE.

Analysis of South African data

Table D3. Model summary							
Model	R	R Square	Adjusted <i>R</i> Square	Std. error of the estimate			
1	.601ª	.361	.336	20.46292			

^aPredictors: (Constant), INDM, ACOINDE, BOMET, ADT, BSIZE, ENVICOM, BIND, SIZE.

Table D4. ANOVAa									
Model		Sum of squares	df	Mean square	F	Sig.			
1	Regression	47,560.507	8	5,945.063	14.198	.000 ^b			
	Residual	84,164.936	201	418.731					
	Total	131,725.443	209						

^aDependent Variable: OED.

^bPredictors: (Constant), INDM, ACOINDE, BOMET, ADT, BSIZE, ENVICOM, BIND, SIZE.

Analysis of Nigerian data

Table D5. Model summary						
Model	R	R Square	Adjusted <i>R</i> square	Std. error of the estimate		
1	.599ª	.359	.296	10.54488		

^aPredictors: (Constant), INDM, ENVICOM, BOMET, BIND, ADT, BSIZE, ACOINDE, SIZE.

Table D6. ANOVAa									
Model		Sum of squares	Df	Mean square	F	Sig.			
1	Regression	5051.382	8	631.423	5.679	.000 ^b			
	Residual	9006.746	81	111.194					
	Total	14,058.128	89						

^aDependent variable: OED

^bPredictors: (Constant), INDM, ENVICOM, BOMET, BIND, ADT, BSIZE, ACOINDE, SIZE



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