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Article

Sustainability disclosure: Impact of its extent and quality on value of listed firms in Nigeria

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ACCOUNTING, CORPORATE GOVERNANCE & BUSINESS ETHICS | RESEARCH ARTICLE

Sustainability disclosure: Impact of its extent and quality on value of listed firms in Nigeria

N. G. Nwaigwe^{1*}, G. N. Ofoegbu¹, N. O. Dibia² and C. V. Nwaogwugwu²

Abstract: Aside from scanty research in developing economies' context on the sustainability and firm value nexus and the dearth of studies on disclosure quality globally, available studies seem to have neglected the multidimensional nature of disclosure quality in measuring the construct. This paper was, therefore, designed to examine the effect of the extent and quality of sustainability disclosure on market value of firms. To achieve the study's objectives, 31 relevant sustainability performance indicator aspects were analyzed for the 39 companies drawn from 9 sectors for the period 2010–2019. This results in 390 firm-year observations and 12,090 data points used to calculate unweighted sustainability extent and quality indices. Findings from regression analysis suggest a positive non-significant association between extent of sustainability disclosure and firm market value. Quality of sustainability disclosure was found to be negatively related to market value. Variations were also found in the value effect of the extent and quality of sustainability disclosure across the economic, social and environmental dimensions of

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This research relates to a project aimed at investigating how firm stakeholders in emerging economies react to corporate commitment to sustainable development.

PUBLIC INTEREST STATEMENT

As sustainable development continues to gain policy traction globally, increasing number of firms are adopting sustainability philosophy to show their commitment to sustainable development. We deemed it important to examine how the investing public in a developing clime view this commitment, given that most studies in this area have been conducted in the context of developed economies.

This research, therefore, examined if firm market value is affected by the extent and quality of a firm's sustainability performance disclosure using data from listed firms in Nigeria.

Interestingly, result reveals a non-significant positive link between extent of sustainability disclosure and firm market value. A significant negative association was revealed between quality of sustainability disclosure and firm market value. Variations were revealed in the value relevance of the extent and quality of sustainability disclosure across economic, social and environmental dimensions of sustainability.

This research has implication for implementation of policies that encourage alignment of the perceptions of investors and the business to foster sustainable development.

sustainability. Joining two separate streams of research—extent and quality of sustainability disclosure—the study offers new and insightful evidence on the value relevance of the duo from a developing clime. This result is relevant for firm managers who make decisions about sustainability initiatives knowing that investors react to the reportage of these initiatives. It is also of relevance in the implementation of robust policies that encourage joint efforts by firms and the investing public in fostering even sustainable development.

Subjects: Business, Management and Accounting; Accounting; Corporate Social Responsibility & Business Ethics

Keywords: Firm market value; sustainability disclosure; extent of disclosure; quality of disclosure

1. Introduction

Seeing that threat to the environment and society is threat to the business, corporate firms are increasingly adopting sustainability philosophy as a business strategy contrary to the belief of the classicists that the only social responsibility of business is to increase profit for its shareholders (Friedman, 1970). Corporate organizations, through the instrumentality of sustainability reporting, publicly report their economic, environmental and social impacts and, hence, their contributions—positive or negative—towards sustainable development (Global Sustainability Standards Board, 2016). As sustainable development gains policy traction globally, irresponsible corporate attitude is seen as capable of reducing long-term value (Aifuwa, 2020).

Sustainability issues have attracted the interest of many stakeholder groups, including investors, either for business advantage or for sustainability sake (Gerged et al., 2021). Globally, the investing public is increasingly considering sustainability in their investment decisions (Miralles-Quiros et al., 2017). Corporate entities cannot ignore their responsibility towards sustainability matters or environmental issues (Gnanaweera et al., 2018). Firms now show more interest in sustainability matters to endear themselves to fund providers (Charlo et al., 2015). Yet, sustainability performance reporting remains largely voluntary in most climes.

To appreciate sustainability disclosure–firm value nexus, one should first recognize that reporting can reflect various motives (Fatemi et al., 2018). Various arguments are advanced as motivations for voluntary disclosure of sustainability initiatives. One is to satisfy the disclosure needs of varied groups of stakeholders (stakeholder theory; see Freeman, 1984; Chiu & Wang, 2015; Patten and Zhao, 2014). The next is to reduce firm risk, promote long-term value creation, maintain market position and create a door for higher investments (value creation theory; Artiach et al., 2010; Khelif et al., 2015; Miralles-Quiros et al., 2017; Yu & Zhao, 2015). Another is to send superior positive performance signals that make a company more appealing to investors in the market (signaling theory; Connelly et al., 2011; Loh et al., 2017; Spence, 1973; Thorne et al., 2014). Others contend that it is used to show corporate transparency and, hence, enhance corporate reputation and image (Batista & Francisco, 2018). Yet to others, it is used to build, maintain or regain legitimacy (legitimacy theory; Banik & Lin, 2019; Deegan, 2002; Suchman, 1995; Wasara & Ganda, 2019). It is used as an investment strategy (McWilliams et al., 2006) and to avert punishment or for fear of legal violation (Banik & Lin, 2019; Kolk, 2016). Conversely, it can be imagined that corporate management may opt for a reduced publication of their social investments for fear that the investing public may perceive them as unduly costly initiatives and, hence, detrimental to their interest (Fatemi et al., 2018).

As companies globally increasingly disclose their performance in sustainability, extensive scholarly interest has been aroused on the sustainability disclosure and firm value or profitability connection, with most studies undertaken in developed regions of the world such as the UK

(Broadstock et al., 2018), the US (Fatemi et al., 2018), Europe (Miralles-Quiros et al., 2017), Central Europe (Fijalkowska et al., 2018), North America (Lourenco et al., 2012) and Canada (Berthelot et al., 2012). However, studies from developing countries remain scanty. Developing climes grapple with more severe sustainability issues relative to developed nations. Yet, research on sustainability disclosure and firm value or performance nexus in developing economies is scanty. Available research in local literature focused on specific sectors studied in isolation (Asuquo et al., 2018; Atanda et al., 2021; Ezeokafor & Amahalu, 2019; Nwobu, 2015; Uwuigbe et al., 2018). Specific sector studies provide valuable insights; however, they may suffer limitations relating to generalization (Alshehhi et al., 2018). These researches were approached in a variety of measurement standpoints with regard to the operationalization of sustainability performance. Some research operationalized sustainability performance by mere inclusion of the firm in a sustainability index (Lopez et al., 2007; Miralles-Quiros et al., 2017); others relied on the number of recognitions on green initiatives (Hou, 2019) or on issuance of standalone sustainability reports as measure of sustainability performance (Aureli et al., 2020).

These prior researches have contributed greatly to the development of the subject area. However, studies relating to sustainability disclosure quality remain meager globally. Few available studies in this area have either measured quality of disclosure in terms of quantity of disclosure (Ching et al., 2017; Loh et al., 2017; Munshi & Dutta, 2016) or classified quality of disclosure into positive and negative disclosures (Hussain et al., 2018) or into descriptive and quantitative disclosures (Carp et al., 2019). These studies seem to have neglected the multidimensional nature of quality in operationalizing construct.

So far, the extant literature linking firm value to sustainability disclosure shows evidence of knowledge gap. First, published research in developing countries' context is scanty. Second, few available researches in local literature are single-sector studies, while multisector studies are rare. Third, researches on quality of sustainability disclosure and value of a firm are few in the extant literature. Fourth, the extant literature has not addressed the many dimensions of disclosure quality in measuring the construct.

This paper, therefore, is concerned with investigating whether a firm's market value is affected by the extent and quality of sustainability disclosure of the firm. The study draws sample from nine sectors of the Nigerian economy and draws novelty in measuring quality of sustainability disclosure by classifying quality attributes into time orientation sub-classified into forward-looking or historical disclosure, type orientation sub-classified into quantitative or non-quantitative disclosure and comparability orientation sub-classified into relative or absolute disclosure—thus reflecting the multidimensional nature of disclosure quality. Joining two separate streams of research extent and quality of sustainability disclosure, this study provides new and insightful evidence on the valuation effect of the duo from the standpoint of a developing clime.

To achieve this objective, the remaining sections of this paper are organized as follows. A review of prior literature is presented in the next section. Methodology adopted is presented in the third section. Results and discussion are presented in the fourth section. The study is concluded in Section 5.

1.1. Review of prior literature

1.1.1. Background of sustainable development and sustainability

Sustainable development philosophy lies within the new order of environmental management where economic progress, social improvement and ecological resources engagement and conservation can occur simultaneously (Barkemeyer et al., 2014). The challenge of sustainable development, therefore, is to achieve human well-being without worsening ecological system (United Nations, 2019). There are concerns about the widening mismatch between the demand on the planet and the supply capacity thereof (Chen & Lee, 2017). The concept seeks to gradually conjoin

the consumption of finite resources and supply thereof (Williams & Millington, 2004). This is in a bid to reach a steady state where both humanity and nature thrive (Garvare & Isaksson, 2001). As climate change becomes more real on the planet system with profound threat to the resource supply capacity of the earth, the business is not spared by the threat. Such development has created a context where firms show their commitment to sustainable development through voluntary sustainability disclosure. This practice is believed to have value relevance.

The concept of sustainability comprises three major dimensions—economic, social and environmental. The economic dimension relates to the positive or negative impacts the firm may exert on the economic state of its stakeholders and on the economic systems at local, national and global level and the social dimension refers to the impact the organization may have on society in which it conducts its business, while the environmental dimension relates to the impact the company's operations have on living and non-living natural systems (Global Sustainability Standards Board, 2016).

1.1.2. *Measurement of sustainability*

Measuring sustainability is complex and difficult (Fijalkowska et al., 2018). The complexity is because the construct is multidimensional in nature (Alshehhi et al., 2018). Two approaches have been extensively adopted in measuring narrative disclosures—the subjective analysts' disclosure ranking and the researcher-constructed disclosure indices (Beattie et al., 2004). Analysts' disclosure ranking or indexes include the Dow Jones Sustainability Index (DJSI), FTSE4GOOD, Corporate Sustainability Index (ISE) in Brazil and STOXX Global ESG leaders index in Germany. Some indexes cover all sustainability aspects, while others focus on specific indicators (White, 2012). These indexes do not follow a uniform standard. This brings the challenge of comparability and consistency among these indexes (White, 2012) because each of them adopts different criteria for inclusion or exclusion of firms into the index, requiring the firms to develop and disclose information which reflects the index's adopted criteria. Non-universality of these indexes is another challenge (Beattie et al., 2004). Many studies conducted in countries where these indexes are available have adopted them (e.g., Artiach et al., 2010; Lopez et al., 2007; Lourenco et al., 2012; Miralles-Quiros et al., 2017).

Self-constructed indexes have mostly been adopted by researchers in contexts where indexes are absent (e.g., Atanda et al., 2021; Carp et al., 2019). Having a single approach that covers all aspects of a complex and multifaceted construct such as sustainability may be unlikely (Hahn & Figge, 2011). In summary, researches where market indices are available tend to use analyst rankings, while countries where they do not exist, as in most cases, use researcher-constructed indices.

1.1.3. *Sustainability reporting quality as a multidimensional construct*

Quality of sustainability disclosures is scarcely addressed by regulations (Beretta & Bozzolan, 2008); hence, the measurement has varied in literature (Beattie et al., 2004). Three-type attributes of quality classified on a dichotomous basis of historical/forward-looking, financial/non-financial and quantitative/non-quantitative disclosure attributes were proposed by Beattie et al. (2004). Credibility is another measure of disclosure quality in use by researchers (e.g., Adai, 2020; Helfaya et al., 2018; Mion & Adai, 2019). Credibility could be achieved by adopting an external sustainability reporting standards and by using independent third-party assurance (Helfaya et al., 2018). However, Michelon et al. (2015) argue that external assurance may be perceived as a symbolic practice by firms to influence stakeholders' perception about a firm's commitment to CSR. Mion and Adai (2019) measured quality on the basis of availability, credibility and strategic anchorage. Disclosure quality has also been measured with regard to disclosure content, communication tools of disclosure (Adai, 2020). Michelon et al. (2015) measured disclosure quality using content of disclosure, information type and managerial orientation. Beretta and Bozzolan (2008) propose a quality measurement framework that considers both disclosure quantity and richness of content. Helfaya et al. (2018) contend that disclosure contents regarding attributes such as disclosure type,

adoption of guidelines and inclusion of quantitative or financial values are the most important quality determinants.

Global Initiative for Sustainability Rating (GISR, 2015) outlines a number of dimensions in measuring disclosure performance which are more likely to achieve strong market uptake. They include lagging vs. leading indicators, quantitative vs. qualitative indicators, process vs. outcome indicators and absolute vs. relative indicators.

This study contends that sustainability disclosure quality should reflect attributes that make a disclosure informative and capable of stirring stakeholders to appreciate an entity's commitment to sustainability.

1.1.4. Sustainability reporting and firm value

There are opposing sides in literature on the valuation effect of sustainability disclosure. One side argues that for disclosure to occur, value must exist (Broadstock et al., 2018). Hence, investors value sustainability reporting positively (Berthelot et al., 2012; Miralles-Quiros et al., 2017). Entities that publish high-quality reports face fewer difficulties accessing equity financing (Barth et al., 2017).

Another argument that tends to align with the former, midway, is that sustainability is a long-term strategy (White, 2012); hence, seeking short-term results therefrom yields negative outcomes for firms (Perrini et al., 2011). This implies that short-term perspective to sustainability may likely be counter-productive. Desired goals from such initiatives may only be attained in the medium-long-term horizon (Longoni & Cagliano, 2016).

An opposing view argues that the firms that make investments in sustainability initiatives or receive recognition for green initiatives may experience negative abnormal returns (Kim & Lyon, 2015), suggesting that investors penalize such firms for what they perceive as costly investments. ESG disclosure is capable of impairing value of a firm if they are perceived to be cheap (Fatemi et al., 2018). Some other views contend that such disclosures do not appear to matter to the investing community (Cho et al., 2015); hence, establishment of a direct linkage with value of the firm may be impossible (Lourenco et al., 2012).

1.2. Empirical literature and hypothesis development

Prior research further shed light on the firm value and sustainability disclosure link. A review of published research reveals variations in the approach adopted by prior studies to operationalize a company's performance in sustainability issues. For example, Artiach et al. (2010), Lassala et al. (2017), Lopez et al. (2007), Lourenco et al. (2012) and Miralles-Quiros et al. (2017) measured sustainability performance of the sampled firms by their inclusion in Dow Jones sustainability index.

Other researchers (Atanda et al., 2021; Carp et al., 2019; Chen & Lee, 2017; Fijalkowska et al., 2018; Hussain et al., 2018; Khlif et al., 2015; Wasara & Ganda, 2019) used self-constructed index in measuring sustainability. Hou (2019) relied on number of excellence awards received by the sampled firms in proxying sustainability. Event study by Aureli et al. (2020) and Berthelot et al. (2012) used publication of standalone sustainability report as proxy for sustainability. Another research used adherence level to GRI guidelines as proxy measure for sustainability (Nguyen, 2020). Findings of these researches are mixed, ranging from negative impact (Lopez et al., 2007; Nguyen, 2020), to a positive relationship (Artiach et al., 2010; Emeka-Nwokeji & Osisioma, 2019; Fatemi et al., 2018; Hou, 2019; Khlif et al., 2015; Lourenco et al., 2012; Miralles-Quiros et al., 2017), to non-linear relationship (Broadstock et al., 2018; Chen & Lee, 2017) and to no relationship at all (Fijalkowska et al., 2018). This study hypothesizes that

H1. Extent of sustainability disclosure significantly affects a firm's market value.

H2. The valuation effect of the extent of sustainability disclosure differs across the economic, social and environmental sustainability dimensions.

Newer streams of research are those that sought to link quality of sustainability disclosure and firm performance. There are a few and scanty studies in this stream globally. This strand of research is faced with a more difficult challenge with regard to proxies for operationalizing disclosure quality. However, prior studies on the subject have made extensive contributions in the development of the topic. For example, some studies (Ching et al., 2017; Loh et al., 2017; Munshi & Dutta, 2016) resorted to the use of quantity of disclosure as proxy for disclosure quality. The use of parlance such as full disclosure, all information disclosure, almost all information disclosure, partial disclosure, brief disclosure and no disclosure seems to revolve around disclosure quantity rather than quality. However, Hussain et al. (2018) used a better measure in operationalizing disclosure quality by classifying disclosure quality into positive or negative disclosure. A positive disclosure is where a company discloses a positive or negative performance when a negative impact is disclosed. A more recent study by Carp et al. (2019) included the type dimension by classifying disclosure quality on a dichotomous basis of quantitative or descriptive disclosure. This study hypothesizes that

H3. Quality of sustainability disclosure significantly affects a firm's market value.

Findings of these researches range from positive relationship (Carp et al., 2019; Loh et al., 2017) to no relationship (Ching et al., 2017; Munshi & Dutta, 2016). These studies show limitations by ignoring the multidimensional nature of disclosure quality. Available studies in Nigeria are mostly single-sector studies. For example, the banking sector was the focus of Atanda et al. (2021), Nwobu (2015) and Uwuigbe et al. (2018); brewery sub-sector was studied by Asuquo et al. (2018); and Oil and Gas sector was studied by Ezeokafor and Amahalu (2019). The multisector study available in local context (Emeka-Nwokeji & Osisioma, 2019) was not concerned with disclosure quality. These studies also reported mixed findings. This study hypothesizes that

H4. The valuation effect of the quality of sustainability disclosure differs across the economic, social and environmental dimensions of sustainability.

2. Methodology

2.1. Sample

The study is delimited to the listed firms on the NSE that met the three sample selection criteria outlined as follows. First, the company must be listed on NSE before 31 December 2009; this ensures that its first set of post-listing annual or sustainability report had been published as at 31 December 2010 which is the earliest year in the study period. Second, a complete set of annual or sustainability reports of the company spanning the period 2010–2019 must be publicly available and obtainable from NSE or the company's website. Third, the company must have made disclosures relating to their sustainability performance in their annual or sustainability reports. Thirty-nine firms from 9 different sectors met the criteria and, hence, the sample. The sample structure is presented in Table 1.

Table 1. Sample structure

Sector	Number of listed firms	(%)
Agriculture	3	7.69
Conglomerates	2	5.13
Construction/real estate	3	7.69
Consumer goods	6	15.38
Financial sector	12	30.77
Industrial goods	2	5.13
Health care	3	7.69
Services	2	5.13
Oil and gas	6	15.38
Total	3	100

The sector types in Table 1 are based on Nigeria Stock Exchange, NSE sector classification.

2.2. Variables and data

2.2.1. Measurement of sustainability disclosure extent

To measure disclosure extent, we conducted content analysis on the annual and sustainability reports of the companies using GRI 3 guidelines as a guiding framework with minor modification. The modification was that 6 core and specific sustainability indicator aspects were analyzed from the economic dimension, 9 from the environmental and 16 from the social dimension. These aspects were chosen to ensure a robust and comprehensive index that included aspects that are relevant to all companies operating in Nigeria. A total of 31 sustainability indicator aspects were analyzed for the 39 companies for 10 years, resulting in 390 firm-year observations and 12,090 data points measured. A binary coding system was adopted where a dummy score of “1” is assigned if an indicator aspect is disclosed and “0” if otherwise. This approach allows the calculation of an un-weighted sustainability disclosure extent index (Sde) for the overall sample as well as for the three dimensions of sustainability—economic, environmental and social. This method was used in Gnanaweera et al. (2018) and Hussain et al. (2018). The index is derived as the ratio of the summation of disclosure scores (D) obtained from aspects disclosed by firm *i* in year *t* to the maximum disclosure scores (M) obtainable, based on the number of relevant indicator aspects included in the GRI framework. The index structure is as follows:

$$\text{Sustainability disclosure extent (Sde) index} = \sum D_{it} / M_{it}.$$

In the same manner, we also calculated sub-indices for the economic sustainability disclosure extent (Ecsde), environmental sustainability disclosure extent (Ensde), and social sustainability disclosure extent (Sosde).

2.2.2. Measurement of sustainability disclosure quality

In this study, calculation of disclosure quality index is based on a three-dimensional quality classification that captures the complexity of the concept of quality as a multidimensional construct and reflects attributes that stir stakeholder investment decision. The quality classification includes time orientation sub-classified into forward-looking (leading) or historical (lagging) disclosure, type orientation sub-classified into quantitative or non-quantitative disclosure and comparability orientation sub-classified into relative or absolute disclosure. This classification technique relies on a mix of measurement dimensions outlined in the principles for sustainability ratings developed by GISR (2015). The classification also aligns with some disclosure quality attributes proposed by Beattie et al. (2004). A disclosure is said to be a leading or forward-looking if it presents anticipated future performance, hence useful for medium- and long-term business decisions (GISR, 2015).

Table 2. Disclosure quality classification

Time orientation	Type orientation	Comparability orientation	Quality score
Forward-looking	Quantitative	Relative	4
Forward-looking	Quantitative	Absolute	3.5
Forward-looking	Non-quantitative	Relative	3
Forward-looking	Non-quantitative	Absolute	2.5
Historical	Quantitative	Relative	2
Historical	Quantitative	Absolute	1.5
Historical	Non-quantitative	Relative	1
Historical	Non-quantitative	Absolute	0.5

Source: Adapted with modification from GISR (2015).

Forward-looking disclosures have predictive value and are capable of making a difference in stakeholder decisions. The more a disclosure looks ahead, the greater its relevance for investment decisions (see Beretta & Bozzolan, 2008). Hence, forward-looking disclosure is a mark of higher quality (Helfaya et al., 2018). Lagging or historical disclosure represents past performance disclosure at certain points in time or a trend (GISR, 2015). A disclosure is quantitative if it is expressed in numeric form or percentages or charts. Quantitative disclosures are ranked higher in quality relative to non-quantitative disclosures because they express easily verifiable and specific information. Quantitative disclosures are verifiable by different knowledgeable and independent persons which is a mark of faithful representation of disclosed information. Non-quantitative disclosures convey performance aspects expressed without figures or numbers (GISR, 2015). Relative disclosures convey an entity’s performance relative to its prior or future period performance or relative to performance of its peers or relative to an externally established benchmark or threshold. On the other hand, absolute disclosures communicate performance information without reference to set targets or established benchmarks internally or externally (GISR, 2015). Relative disclosures are rated higher than absolute disclosures because they enable stakeholders to understand similarities and differences in disclosed performances and keep them informed of improvements or deterioration in sustainability performance. Table 2 presents the quality classification and the quality scores assigned to reflect the perceived importance of these quality dimensions to investors and other stakeholders in influencing investment decision.

This classification allows us to calculate sustainability disclosure quality (Sdq) determined as the ratio of total quality score (sum of all quality scores earned across the three sustainability dimensions obtained by firm *i* in year *t*) to the maximum quality score (maximum potential score if all aspects disclosed were forward-looking, quantitative and relative).

$$\text{Sustainability disclosure quality index}_{it}(\text{Sdq}) = \frac{\text{Total quality score}_{it}}{\text{Maximum quality score}_{it}}$$

In like manner, we calculated disclosure quality sub-index for each dimension—economic sustainability disclosure quality (Ecsdq) index, environmental sustainability disclosure quality (Ensdq) index and social sustainability disclosure quality (Sosdq) index.

2.3. Model specification

This study adopts Ohlson (1995) valuation model which proposes that market value (MV) of equity is a function of the firm’s book value (BV) and the accounting earnings (E) as well as other relevant non-financial information. The content of the non-financial information was not specified. In this paper, we include sustainability disclosure extent and quality as non-financial components of the model. The earning per share (eps) represents accounting earnings in our model. The proposed model is specified as follows:

$$\ln mv_{it} = \alpha_0 + \alpha_1 \ln bv_{it} + \alpha_2 \ln eps_{it} + \alpha_3 \ln sde_{it} + \alpha_4 \ln sdq_{it} + \varepsilon_{it} \quad \text{model 1}$$

In order to test the value relevance of the extent and quality of sustainability disclosure across the economic, environmental and social dimensions, we include the extent and quality of each sustainability dimension in the model as follows:

$$\ln mv_{it} = \alpha_0 + \alpha_1 \ln bv_{it} + \alpha_2 \ln eps_{it} + \alpha_3 \ln ecsde_{it} + \alpha_4 \ln ecsdq_{it} + \alpha_5 \ln ensde_{it} + \alpha_6 \ln ensdq_{it} + \alpha_7 \ln sosde_{it} + \alpha_8 \ln sosdq_{it} + \varepsilon_{it} \quad \text{model 2}$$

3. Empirical results

Table 3 presents the descriptive statistics of the variables for the 390 firm-year observations and the variance inflation factor VIF of the regressors in the two models.

The variables *mv*, *bv* and *eps* with the subscript *w* were winsorized at the 5th and 95th percentiles to remove the influence of outliers and approximate to normal distribution. Winsorized variables are robust to outliers (Artiach et al., 2010). Taking the log functional forms of some of the variables further improved the normality of the distribution. Normality of data for sustainability disclosure index and other variables was tested using skewness and kurtosis analysis. For a normal distribution, the range of standard skewness and kurtosis is ± 2 and ± 3 , respectively. Given the skewness and kurtosis statistics in Table 3, the variables acceptably conform to the assumptions of a normal distribution.

The models were tested for homoscedasticity through scatterplot. The pattern of distribution from the scatterplots shows even spread of the variances, indicating that the models do not have heteroscedasticity concerns.

For the purposes of regression, the independent variables were tested for potential multicollinearity. The variance inflation factors of the regressors range between 1.3 and 2.85 (see Table 3). The values of the VIFs are far below 5, as the rule of thumb, showing that the variables are independent from each other and do not have multicollinearity problem.

3.1. Regression analysis

Tables 4 and 5 present the fixed effect result of the value relevance of the extent and quality of sustainability disclosure for the overall study sample and across the three sustainability dimensions, respectively. The fixed effect regression was based on Hausman specification test. The *F*-statistic and adjusted R^2 show the overall significances of the regression models as well as the extent to which the explanatory variables jointly explain the variation in firm value. We can see in Tables 4 and 5 that the regression coefficients for book value (*lnbv*) and earning per share (*lneps*) in the two models are consistently significant ($p = 0.00 < 0.05$; $p = 0.00 < 0.05$) and positively associated with market value at 1% level of significance.

3.2. Hypothesis testing

Analyzing the main variables of interest, in Table 4, we see that the coefficient of sustainability disclosure extent (*lnsde*) index is positive and not significantly ($p = 0.295 > 0.05$) associated with firm market value. H_1 is rejected on this basis. This implies that increase in the extent of sustainability disclosure of a firm is not significantly associated with improvement in the firm's market value. The result suggests that the level of a firm's commitment to sustainable development through transparent and elaborate reportage of their sustainability impact and performance has no significant value effect on the firm's market value. It shows that expansive disclosure of a firm's sustainability may not be value relevant.

We also see in Table 4 that the regression coefficient of quality of sustainability disclosure (*lnsdq*) index is negative and significant ($p = 0.002 < 0.05$), implying an inverse relationship with

Table 3. Descriptive statistics

Variables	Obs.	Mean	SD	Min	Max	Skewness	Kurtosis	VIF
Panel A: Main variables (sustainability index and firm value)								
Inmv _w	390	2.23	1.59	-0.62	4.47	-0.27	1.9	
Sde	390	0.52	0.19	0.10	0.99	0.53	2.4	
Sdq	390	0.14	0.06	0.04	0.39	1.21	4.4	
Panel B: Sustainability index in log functions								
Insde	390	-0.73	0.38	-2.34	-0.03	-0.31	3.2	1.9
Insdq	390	-2.08	0.42	-3.21	-0.94	0.21	2.5	1.52
Panel C: Sustainability dimensions								
Ecsde	390	0.70	0.26	0.16	1.00	-0.51	2.1	1.69
Ecsdq	390	0.23	0.09	0.06	0.63	0.36	3.0	1.84
Ensde	390	0.33	0.33	0.00	1.00	0.67	2.1	2.85
Ensdq	390	0.08	0.11	0.00	0.69	1.90	7.0	2.69
Sosde	390	0.55	0.15	0.13	1.00	0.46	3.0	2.58
Sosdq	390	0.13	0.04	0.04	0.27	0.69	3.1	2.40
Panel D: Control variables								
Inbv _w	390	23.9	2.12	18.1	26.8	-0.89	3.7	1.7
Ineps _w	390	0.04	1.57	-3.2	2.49	-0.51	2.5	1.3

Table 4. Value effect of the extent and quality of sustainability disclosure for the overall sample

Variable	Coefficient	p-Value
lnbv	0.144	(0.000)***
lneps	0.197	(0.000)***
lnsde	0.166	(0.295)
lnsdq	-0.448	(0.002)***
Adjusted R^2	0.898	
F-statistic	82.9	(0.000)***
Constant	-2.01	(0.006)***
Hausman	100	(0.000)***
Fixed or random effect		fixed
No. of Obs.		390

p Values are in parenthesis.
 *** $p < 0.01$.

Table 5. Results of value effect of disclosure extent and quality across dimensions of sustainability

Variable	Coefficient	p Value
lnbv	0.145	(0.000)***
lneps	0.199	(0.000)***
ecsde	0.049	(0.823)
ecsdq	0.029	(0.964)
ensde	0.113	(0.511)
ensdq	-1.31	(0.009)***
sosde	-0.27	(0.469)
sosdq	0.56	(0.693)
Adjusted R^2		0.89
F-statistic	75.2	(0.000)***
Constant	-1.13	(0.099)*
Hausman test	100.3	(0.000)***
No. of Obs.		390
Fixed or random effect		Fixed

p Values are in parenthesis.
 *** $p < 0.01$. * $p < 0.1$.

firm market value. On this basis, H_2 is not rejected. This result suggests that investors in the Nigerian Capital market may not react favourably to higher sustainability disclosure quality.

Results in Table 5 also show varying links between firm value and various dimensions of sustainability. The coefficient of economic sustainability disclosure extent is positive and insignificant ($p = 0.823 > 0.05$), showing that increased level of disclosure on a firm's economic sustainability initiatives has no significant value relevance to investors in the capital market.

From Table 5, we see that the coefficients of environmental and social sustainability disclosure extent are not significant ($p = 0.511 > 0.05$; $p = 0.469 > 0.05$), respectively. Hence, there is no evidence to support significant association between environmental and social sustainability disclosure extent and firm market value. On the basis of these results, H_3 is not rejected.

Table 5 also shows that the coefficient of the quality of economic sustainability disclosure is positive and insignificant ($p = 0.964 > 0.05$), implying a non-significant relationship with firm market value. Furthermore, the coefficient of quality of environmental sustainability disclosure is negative and significant ($p = 0.009 < 0.05$). Hence, a significant negative association with firm value is implied. Results in Table 5 further show that the coefficient of quality of social sustainability disclosure is insignificant ($p = 0.693 > 0.05$), although positive. This also implies a non-significant association with firm market value.

These results show varying and contrasting links between firm market value and sustainability disclosure quality across the three dimensions of sustainability. Hence, there is no empirical evidence to reject H_4 .

3.3. Discussion of results

The results reveal that sustainability disclosure extent has no significant association with firm market value. This implies that investors may not value extensive disclosure of firms' sustainability initiatives. This result disagrees with Yu et al. (2018) who provided evidence that greater ESG disclosure boosts firm value. It also disagrees with findings by Loh et al. (2017) and Berthelot et al. (2012) who reported a positive correlation between sustainability reports and market value.

Our result showed a significant negative effect of sustainability disclosure quality on firm market value. This result implies that high-quality sustainability disclosures result in lower valuation of a firm's stock. Sustainability has a long-term strategic focus, and investors with short-term investment perspectives may face value conflicts when they seem to compete with business goals. Todaro et al. (2020) noted that when investors perceive competing risks, they may choose to favour short-term business goals over long-term goals. It is also argued that markets may perceive stepped-up disclosure as a firm's attempt to justify an overinvestment in ESG initiatives (Fatemi et al., 2018). This result is consistent with Nguyen (2020) who found a significant negative association between higher adherence to GRI guidelines (a mark of quality) and firm value and with findings by Fatemi et al. (2018) whose results reveal that for a firm with high ESG strength, higher (quality) ESG disclosure decreases firm value. The result, however, disagrees with findings by Loh et al. (2017) who report that better quality sustainability disclosure is associated with higher market value and with Ching et al. (2017) and Munshi and Dutta (2016) who found no association.

Extending the analysis across three dimensions of sustainability brings more insights into the dimensions most relevant to investors in their investment decision. Consistent with findings by Hussain et al. (2018), our results reveal variations in the valuation effect of the extent of sustainability disclosure across the three dimensions of sustainability. No significant relationship was found between the extent of economic sustainability disclosure and market value. This finding implies that higher-level disclosures on a firm's economic sustainability initiatives have no significant value relevance in the capital market. No significant result found on the value effect of the extent of disclosure in the social and environmental dimensions provides no evidence that investors in the Nigerian Capital market consider the level of disclosure in social and environmental issues in their investment decision. The findings disagree with results by Khlif et al. (2015) who reported that social and environmental reporting has positive effect on firm value.

Non-significant correlation was found between economic sustainability disclosure quality and firm value. Social sustainability disclosure quality was also found to have no significant association with market value of reporting firms. A significant negative association was found between quality of environmental sustainability disclosure and firm market value. This very interesting result may imply that investors' perception and business's perception are not yet aligned in the pursuit of environmental sustainability. While corporate businesses may show their commitment to the much needed sustainable development through quality environmental initiatives, investors may

perceive such commitments as value destroying and hence the negative reward for reporting firms. Argument in Kim and Lyon (2015) attests to this.

These results depict variations in the value relevance of quality of sustainability disclosure across the three dimensions.

4. Conclusion

The main objective of this study has been to investigate whether the extent and quality of sustainability disclosure affect market value of listed firms in Nigeria. The research is a multisector study based on 39 listed firms in the Nigerian Stock Exchange from 2010 to 2019.

Based on empirical analysis, the study concludes that, overall, the extent of sustainability disclosure is not related to firm market value. This result lends support to legitimacy theory, which has been used to explain the motivation for voluntary sustainability performance disclosure as a tool for gaining, maintaining or repairing legitimacy.

On the empirical linkage between quality of sustainability disclosure and firm value, a significant negative association was established. This result has implication for corporate managers who make decisions on sustainability initiatives. Firm managers should realize that sustainability initiatives materialize in the medium and long term, seeking only short-term gains therefrom, may provide negative result for corporate firms. Findings indicate significant variation in the value relevance of the extent and quality of sustainability disclosure across the economic, social and environmental dimensions of sustainability.

This study expands the existing literature by bringing new evidence on the value effect of the extent and quality of sustainability disclosure from a multisector study in a developing country context. The study draws novelty in measuring sustainability disclosure quality based on a multi-dimensional quality classification that captures the complexity of the concept of quality and reflects attributes that stir stakeholder investment decision. The introduction of forward-looking/historical and the relative/absolute disclosure quality classifications in the measurement of sustainability disclosure quality is novel in this area of research. Forward-looking and relative disclosure attributes have predictive and comparative value, respectively, and, hence, their relevance in investment decision-making.

This research has implication for firm managers who make decisions about sustainability, knowing that such initiatives may not yield immediate- and short-term market returns but pay in the long term. The study is relevant to regulatory authorities in the implementation of robust policies that will encourage the alignment of the perceptions of corporations and the investing community towards fostering even sustainable development.

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