CORPORATE SUSTAINABILITY REPORTING AND MARKET VALUE OF LISTED OIL AND GAS FIRMS IN NIGERIA

OWOLABI, SUNDAY AJAO PhD.

PROFESSOR, DEPARTMENT OF ACCOUNTING, BABCOCK UNIVERSITY, NIGERIA

EMUEBIE EMEKE

DEPARTMENT OF ACCOUNTING, BABCOCK UNIVERSITY, NIGERIA

AND

OGUNDEYI, ADEBAYO OLUSESI

DEPARTMENT OF ACCOUNTING, BABCOCK UNIVERSITY, NIGERIA

Abstract

Corporate sustainability reporting covers financial and non-financial reporting leading to the disclosure of both quantitative and qualitative information for the benefit of users of the financial statements. These reporting styles reveal the stewardship strength of management in maximizing shareholders wealth and improving corporate value. The main objective of this study is to examine the impact of corporate sustainability reporting on the market value of listed oil and gas firms in Nigeria. Corporate sustainability reporting was proxied using economic sustainability, social sustainability and environmental sustainability while market value was measured as the market value of equity. The population of the study comprises all twelve (12) listed oil and gas firms on the NSE out of which nine (9) firms were sample and data extracted from the annual reports and accounts covering the period 2011-2020. The multiple regression technique of analysis was employed in establishing a relationship between corporate sustainability reporting and market value. The findings revealed that, social and environmental sustainability reporting positively and significantly influence market value. Hence it was recommended that, Sustainability reporting standards should be developed to cater for variations with the international index (GRI) that cannot be domesticated. This will ensure that, listed oil and gas firms incorporate high sustainability reporting knowing that it has significant influence on market value. In addition, listed oil and gas firms should seek to adopt and implement corporate reporting standards particularly those in relation to social and environmental disclosure.

Key words: Corporate sustainability reporting, market value, global reporting index, oil & gas firm

Introduction

Companies are making huge impacts on environment and society as they strive to carry out economic activities. This footprint or effects might be good if the impact is useful and negative if it is harmful. Negative footprints can trigger stakeholder hostilities. For example, economic activity, seizure of oil and vandalizing oil pipelines may be disrupted by host communities. On the other side, government may impose fines and penalties for violations of environmental laws and human rights. Companies are involved in the social responsibility (CSR) and sustainability agenda to prevent these harmful impacts (Dienes, Sassen, & Fischer, 2016).

The CSR concept and the responsibility of the environment represent the principle of stakeholders. By taking on these responsibilities, managers recognize that they have expanded their primary objectives, therefore pursuing company strategies, maximizing the benefits of other stakeholders which help shareholders best in

the long term. Directors report business achievement and position, as a large group of stakeholders participate, also communicate their economic, environmental and social performance. It focuses not only on information about social or environmental issues but also on non-financial information (Effiong, Oti, & Akpan, 2019).

The need for information on environmental and social matters has been generated by increased concerns about the environmental and social effects of organizational activities (Turner & Evelyne, 2017). Public views towards the management of resources and changes in environmental societal expectations are increasingly putting greater pressure on coted enterprises to measure their business performance and to develop shareholder value. Pressure also comes from other stakeholders, such as organizations and persons whose laws are violated or respected by corporate acts, which have benefited or hurt them. Dienes et al., (2016) further increases the need for further non-financial disclosures and new financial methods and sustainability reporting (Ioannou & Serafeim, 2012).

In some affluent countries, compulsory information is required in the report on sustainability, while leading corporations in many emerging economies now address sustainability problems (Iswati, 2020; Uwuigbe & Jimoh, 2012). The reporting and disclosure on business sustainability in Nigeria is still being pressured by multi-national firms such as Mobil, Shell, Chevron in Oil and Gas industry and MTN in communication sector. Multiple national enterprises in food and beverage, oil and gas, the brewery, for the purposes of fear of penalty, increasing taxes (if applicable), sanctions, etc., are often unwilling to report non-financial and environmental information, and they are not being put under pressure by either government agencies or pressure groups.

Despite increasing research, emerging market studies such as Nigeria continue to be quite sparse in this field. In comparison with established countries, they still have a very early age. To this end, it is the aim of this article to study the level of corporate sustainability reporting procedures in the Nigerian Stock Exchange by analyzing information on the chosen list of businesses.

In view of the aforementioned submission, the influence of corporate sustainability reporting on the market value of the oil and gas companies listed in Nigeria has been studied experimentally to help solve the knowledge gap;

Variable Gap: The present study employed the GRI, which is the modern global reporting index, as used by earlier investigations.

Sectoral gap: The work carried out on corporate sustainability reports is mostly related to production and industry. This study will analyze petroleum and gas companies in Nigeria that have not extensively explored earlier studies (for the researchers' best knowledge);

Gap period: The study has been extended to 2020, while prior studies have been considered to 2019.

Objectives of the Study

The main objective of this study is to investigate the relationship between corporate sustainability reporting and market value of listed oil and gas firms in Nigeria. Other specific objectives include:

1. To examine the influence of economic sustainability reporting on

market value of listed oil and gas firms in Nigeria.

2. To examine the influence of social sustainability reporting on market value of listed oil and gas firms in Nigeria.
3. To examine the influence of environmental sustainability reporting on market value of listed oil and gas firms in Nigeria.

Research Questions

The following questions have been raised from the foregoing:

i. Does economic sustainability reporting influence market value of listed oil and gas firms in Nigeria?
ii. How does social sustainability reporting influence market value of listed oil and gas firms in Nigeria?
iii. To what extent does environmental sustainability reporting influence market value of listed oil and gas firms in Nigeria?

Research Hypotheses

In line with the objectives of the study the following hypotheses are formulated in a null form.

H_{O1}: Economic sustainability reporting does not have any significant relationship with market value of listed oil and gas firms in Nigeria.

H_{O2}: Social sustainability reporting does not have any significant relationship with market value of listed oil and gas firms in Nigeria.

H_{O3}: Environmental sustainability reporting does not have any significant relationship with market value of listed oil and gas firms in Nigeria.

The remaining section of the paper covers literature review, methodology and results and discussion.

Literature Review

Several literature examining corporate sustainability reporting and market value have been examined in different countries and sectors. Some of these literatures are reviewed below to give insight to the contribution of other researchers in this area. According to Loh et al., (2017), Sustainability reporting has emerged as one of the most critical issues in the business world. The purpose of this research is to investigate the relationship between sustainability reporting and firm value using data from publicly traded companies in Singapore as a case study. To this end, we employ an established sustainability reporting assessment framework and investigate the relationship between the adoption and quality of sustainability reporting and a firm's market value. The empirical findings suggest that sustainability reporting is positively related to a firm's market value, and that this relationship is independent of the sector or the firm's status, such as government-linked companies or family businesses, among other things.

Fatai Abiodun et al., (2021) examined the effect on company value of the sustainability disclosure, collecting data for 2014-2018 on 10 randomly selected listed deposit money banks. In order to measure the overall sustainability report indices and their three dimensions, (environmental, social, and economic) and the descriptive tools and normal lowest-quadrant, fixed-effect regression, the study used qualitative content analysis using the information obtained from audited reports and accounts. They found evidence that banks with high

overall sustainability and environmental sustainability tend to have low value. Social sustainability information does, however, have a more pronounced positive effect, while the insignificant impact of economic sustainability disclosure suggests that its growth does not improve firm value. These results show that overall disclosures of sustainability and environmental sustainability are harmful to a firm value rather than beneficial.

The study found that reporting on the sustainability of Nigerian depositary banks does not improve its solid value; it only legitimizes its operations. Quantitative divulgation of the banks' environmental and economic sustainability activities, and their contributions to productive industries and economic circumstances of stakeholders was recommended.

Syder et al., (2020) examined the impact on shareholder value of oil and gas companies quoted in Nigeria in the sustainability accounting report. The study was conducted in cross-sectional and ex-post facto designs. On the 2016/2017 Nigerian Bourse Fact Book, the study population was nine quoted companies (NSE). The sample was selected deliberately to only include those firms operating in the industry both upstream and downstream. Secondary data were derived through content analysis from 2009 to 2018 from the annual corporate reports of the companies involved and the Nigerian Stock Exchange. With the help of E-view version 7 the data analysis were conducted. Autoregressive Distributed Lag (ARDL) bound testing, descriptive statistics, modell estimates and diagnostic analysis adopted root-test, error correction and co-integration Augmented Dicky-Fuller unit as well as multiple regressions. The results of this research are as follows: the positive and important effects of employee training and community development expenditures on company shareholder added value.

However, the cost of environmental compliance does not impact the value added of shareholders. In the light of these findings, the sustainability accounting report concluded that the shareholder value of quoted oil and gas in Nigeria was significantly affected, although the degree of this report depends on the entity's actual practice. In addition to the expenses, it is clear that investments in sustainability performance that have been communicated in sustainability accounting reporting are not only increasing but also creating shareholder value.

Amedu et al., (2019) examined the value relevance of reporting sustainability of production companies in Nigeria. The study was designed in a longitudinal way. This sample consisted of thirty companies randomly chosen from the stock exchange in Nigeria. The study was based on secondary data obtained from the 2010-2018 annual reports. The hypotheses have been validated by panel regression. The results show that the reporting of economic sustainability and social sustainability by quoted manufacturing companies is of relevant value. It is not surprising that the annual reports have been largely tilted to financial reports and items that have a significant economic impact for a company.

Overall, manufacturing companies were silent on these issues in the case of environmental sustainability disclosures although environmental issues are being addressed globally. The company did not cover important fields such as labor and management relationships, employment practices and the grievance mechanism, freedom of association and collective bargaining (worker engagement), anti-corruption and public policy with regard to

disclosures on social sustainability, but they were silent. On this basis, the study recommends, among other things, that firms should focus more on sustainability reporting. Moreover, the regulators such as the Securities and Bourses Commission (SEC) and the Nigerian Stock Exchange (NSE) should consider reporting on sustainability for the stock exchange as a necessary requirement.

Ka'oje et al., (2020) investigated empirically the bidirectional relationship between sustainability activities and the financial performance of Nigeria's energy companies (oil and gas companies). Secondary data was gathered from six oil companies over a period of fifteen years. The stakeholder and institutional theories serve as the foundation for this paper. Eight multivariate regression models and one Granger causality model were developed for the empirical analysis, and the paper used STATA version 15 to conduct the analysis. The findings of the paper demonstrated that there are positive relationships in both directions, indicating that sustainability activities are profitable and that profitability is a result of sustainability activities, resulting in a positive feedback virtuous circle in which sustainability activities are profitable. Consequently, the paper recommended that oil companies express a preference for measurement while segmenting information into quantifiable components in order to explain both the success and failure of sustainability investments, if any occurred.

Emeka-nwokeji and Osisioma (2019) investigated, using company's specific disclosure, how overall sustainability information and its unbroken dimensions impact the market value of Nigerian companies as an emerging economy. To proxy company market value, Tobins Q were used. Of the 120 non-financial companies listed in the Nigerian Bourse in 2015, the study selected 93 companies. Ex Post Facto was adopted and the secondary data were collected by means of content analysis from the annual reports of sample companies 2006 to 2015. Descriptive statistics, analysis of correlation and main analysis of components used to test formulated hypotheses were used to analyze the data during the grouped, ordinary least-square regression. The analysis shows significant positive effects on company value on overall sustainable communications.

When individually processed, disclosures of environmental sustainability and corporate governance have a significant positive influence on the market value of the company. The study also reveals a negative and insignificant impact on corporate market value of social sustainability disclosures. On the basis of these findings, the study also recommended companies to promote greater sustainable growth and long-term creation of value through their reporting models and strategies through the integration of sustainable metrics. Environmentally friendly policies should be adopted and made available by companies in Nigeria as they demonstrate their commitment to the goal of sustainable development.

Theoretical Framework

Several ideas have been advanced in the past to establish a link between corporate sustainability reporting and the market value of publicly traded oil and gas companies, particularly in Nigeria. However, this article analyzed two of the most frequently utilized theories by earlier scholars to explain the phenomenon of corporate sustainability reporting (CSR), namely the legitimacy and stakeholder theories. Theoretical frameworks such as

legitimacy theory, which connects corporate operations to social systems (Gray et al., 1995) or relationships with society; and stakeholder theory, which focuses on interactions with stakeholders. These theories are not employed in isolation to explain corporate sustainability reporting (CSR); rather, earlier research has identified overlap or complementarity between the theories.

Legitimacy Theory:

This is one of the prevalent theories in the CSR that have been used for several past studies (Uwuigbe and Jimoh, 2012; Chan et al, 2013) to describe corporate divulgation pattern theoretical framework. It is a theory that (i) assumes that management will use strategies to demonstrate to the society that it is seeking to meet the expectations of society (Chan, et al, 2013); (ii) the perception of the management of the immediate environment (the community) in which it operates; since legitimacy teaching is founded on the assumption or view that the management is a good corporate citizen, the corporation of which acts and actions are or are not desirable, adequate or appropriate to the benefit of the greater society, in terms of stewardship to the external parties. However, only reports that are considered excellent and negative kept away from society are tended to be devulgarized by the organisation.

Stakeholder Theory:

There are two kinds of stakeholders in an organization (Internal and external). Management, staff and the External stakeholders comprise most internal stakeholders, while shareholders, communities, creditors, debtors, government agencies and the environment are external stakeholders. Basically, the theory of stakeholders relies on the idea that the success of an enterprise or else depends on the successful management of any interaction between a company and its players (Uwuigbe & Jimoh, 2012). Stakeholder provides another theoretical framework to discuss the relationship between different stakeholders and management and is potentially beneficial for reviewing or modifying organizational corporate social disclosures in the annual corporation reports. Ansoff (1965) employed Stakeholder theory in his book "Corporate Strategy" to explain a company's key aims, which include balancing different parties' conflicting expectations.

In a similar study, the need for stakeholder support and pressure from the stakeholders contributes to the organization's particular actions, inactivity and corporate social patterns in relation to the disclosure of information (Watts & Zimmerman, 1978; Pfeffer & Salancik, 1978). For example, the restless nature of the military activity in Niger Delta, frequent attacks on petroleum facilities or abductions by foreign citizens, forcing major petroleum companies to rethink, becomes socially responsible and discloses environmental, social and governance information in their corporate reports. The more powerful stakeholders are systemically classified and compared. Objective and quantifiable method of data analysis that is useful for trending determination and for other prior research studies was used (Asaolu, Agboola, Ayoola, & Salawu, 2011; Hohnen, 2012).

Methodology

The study used an ex post facto design to examine a population of nine (9) oil and gas companies listed on the Nigerian Stock Exchange as of December 31, 2020. Purposefully selecting oil and gas companies

operating in both the upstream and downstream sectors for a ten-year period resulted in forty (40) study observations. The study used only secondary data because its design called for content analysis of historical economic events and business transactions that were reported as corporate sustainability accounting information in order to justify compliance with sustainability performance standards. These figures were derived from the annual corporate reports of Nigeria's publicly traded oil and gas companies for the years 2011 to 2020. Complementary data were extracted from the Nigerian Stock Exchange's periodic reports on the concerned corporate entities.

To begin, this study determined whether a company reported on sustainability, and then assessed the level of sustainability reporting by generating a score based on a measurement scheme developed in accordance with Global Reporting Index (GRI) guidelines; a checklist comprised of three categories was developed. Reporting on the Environment, Reporting on Social Issues, and Reporting on the Economy (see appendix 1)

Inferential statistics were used in this study with the assistance of STATA 13 to determine the correlation between two variables. Correlation is a useful measure of relationship between two variables because it provides information about the strength of the relationship as well as the direction of the relationship. The study employed multivariate regression analysis. Regression analysis forecasts a variable's value based on the value of another variable and explains the effect of changes in the variables' values.

Variable Measurement and Model Specification

Table 3.1

Variable Measurement

Variables	Definition	Measurement	Source
Dependent			
MV	Market value	Natural logarithm of total market value (where MV= Total capitalization)	(Ndubuisi, Vincent, & Chinyere, 2019)
Independent			
ECS	Economic Sustainability	Proportion of economic sustainability reporting score obtained to total score obtainable from GRI	(Johnson-rokosu & Olanrewaju, 2016; Ndubuisi et al., 2019)
SOS	Social Sustainability	Proportion of social sustainability reporting score obtained to total score obtainable from GRI	(Emeka-nwokeji & Osisioma, 2019; Ndubuisi et al., 2019)
ENS	Environmental Sustainability	Proportion of environmental sustainability reporting score obtained to total score obtainable from GRI	(Emeka-nwokeji & Osisioma, 2019; Ndubuisi et al., 2019)

Source: Compiled by Researcher from Empirical Literature, 2021.

Model Specification

` The functional relationship between the dependent and independent variable of the study is expressed as follows.

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3$---------- (1)

While the empirical model of the study incorporating the proxy of the dependent and proxies of the independent variables is stated below.

$MV = \beta 0 + \beta 1ECS_{it} + \beta 2SOS_{it} + \beta 3ENS_{it} + \mu_{it}$ ---------- (2)

Where:

MV = Market Value
ECS = Economic Sustainability
SOS = Social Sustainability
ENS = Environmental Sustainability
β0 = Constant
β1 – β3 = parameters
I = firm (oil and gas)
T = time series (year)
μ = Error term

Results and Discussion

This section of the study discusses the descriptive statistics, correlation matrix and summary of the regression results which explains the relationship between corporate sustainability reporting and market value of listed oil and gas firms in Nigeria.

Descriptive Statistics

Descriptive statistics describes the nature of the data used in the study which include the observation, mean, standard deviation, minimum and maximum values of all variables used in the study.

Table 1
Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Minimum	Maximum
MV	90	22.037	0.604	20.83	23.27
ECS	90	0.584	0.055	0.53	0.64
SOS	90	0.808	0.049	0.65	0.84
ENS	90	0.710	0.081	0.49	0.84

Source: STATA 13 Output file, 2021.

Table 1 above describes the nature of the study variables. The dependent variable, measured as market value (MV) showed a mean value of 22.037, standard deviation of 0.604 and 20.83 and 23.27 as minimum and maximum values respectively. This means that, on the average, listed oil and gas firms in Nigeria had a total capitalization of over 22billion during the period of this study. However, given that, there is a wide deviation from the mean, the sampled oil and gas firms had a minimum of 20.83billion and maximum of 23.27billion capitalization during the period of the study.

The economic sustainability (ECS) reporting showed a mean value of 0.584, standard deviation of 0.055 and 0.53 and 0.64 as minimum and maximum values respectively. This means that, on the average, listed oil and gas firms in Nigeria reported over 58.45% of information relating to economic indices that empowered investors, enabling them to understand how the economic changes within the environment in which the business operates affects the value of the business specifically the market value/capitalization.

In addition, social sustainability (SOS) reporting showed a mean value of 0.808, standard deviation of 0.049 and 0.65 and 0.84 as minimum and maximum value respectively. This means that, on the average, listed oil and gas firms in Nigeria reported approximately 81% of information relating to social sustainability indicating that, most of the listed oil and gas firms in Nigeria are committed to societal development and corporate social responsibility.

Similarly, environmental sustainability (ENS) reporting showed a mean value of 0.710, standard deviation of 0.081 and 0.49 and 0.84 as minimum and maximum values respectively. This means

that, on the average, listed oil and gas firms in Nigeria reported over 71% of information relating to environmental sustainability indicating that, listed oil and gas firms in Nigeria contribute to the environmental development of its environment as this could affect its operations and hence market value/capitalization.

Correlation Matrix

Correlation explains the direction and degree of association between independent and dependent variables.

Table 2: Correlation Matrix

Variable	MV	ECS	SOS	ENS
MV	1.0000			
ECS	0.0674	1.0000		
	0.5279			
SOS	-0.0883	0.0515	1.0000	
	0.4080	0.6295		
ENS	0.0228	0.0816	-0.0625	1.0000
	0.8310	0.4445	0.5583	

Source: STATA 13 Output file, 2021.

The table above, shows the direction and degree of association between market value (MV) and corporate sustainability reporting (ECS, SOS and ENS) of listed oil and gas firms in Nigeria. Economic sustainability (ECS) reporting and environmental sustainability (ENS) reporting showed a positive association with market value. However, both showed a very weak association with market value and not statistically significant. On the contrary, social sustainability (SOS) reporting showed a negative association with market value and a very weak association. Generally, all the coefficients are less than 80% indicating the absence of multicollinearity among the independent variables of the study.

Regression Results

The regression results of the study show the relationship between market value and proxies of corporate sustainability reporting. The summary of the table also shows the variance inflation factor, tolerance value and other test of linear regression assumptions.

Table 3
Summary of Regression Results (OLS)

MV	Coef.	Std.Err.	t-stats	P-value	VIF	1/VIF
Constant	22.432	1.372	16.35	0.000		
ECS	0.778	1.176	0.66	0.510	1.01	0.990120
SOS	1.126	1.327	-2.96	0.020	1.01	0.992861
ENS	0.084	0.804	8.10	0.000	1.01	0.988878
Mean VIF	**1.01**					
R-sq	**0.3824**					
F-stats	**5.38**					
Prob>F	**0.0001**					
Hettest	**0.83**			**0.3637**		

Source: STATA 13 Output file, 2021.

The summary of regression results table above shows the level of relationship between the independent variable and dependent variable. The overall statistical

significance and fitness of the model is assessed by observing the R-square, F-stats and p-values. Thus, given a p-value of 0.0001(1%) significant at 1%, an R-sq value of 38% (greater than 10%) the above regression model is considered to be fit. The R-sq value of 38% explains the predictive power of the model. This means that, 38% variation in the market value of listed oil and gas firms in Nigeria can be jointly explained by economic sustainability reporting, social sustainability reporting and environmental sustainability reporting.

Discussion of Findings

Economic Sustainability Reporting and Market Value

Economic sustainability reporting coefficient of 0.778(77.8%) and p-value of 0.510 means that the statistical relationship between economic sustainability reporting is not significant given that the p-value is over 51%. This means that the null hypothesis stated as "economic sustainability reporting has no significant impact on market value of listed oil and gas firms in Nigeria" is accepted. Hence, we conclude that, economic sustainability reporting has no significant impact on the market value of listed oil and gas firms in Nigeria. This findings is in line with the study of (Amedu et al., 2019; Ordu & Amah, 2021) but contrary to the studies of (Aifuwa, 2020; Syder et al., 2020).

Social Sustainability Reporting and Market Value

The relationship between social sustainability reporting and market value is explained by the coefficient value and p-value. Given a positive coefficient value of 1.126 and p-value of 0.020 which is statistically significant at 5% level of significance, social sustainability reporting positively and significantly influence market value of listed oil and gas firms in Nigeria. This means that, an increase in social sustainability reporting by listed oil and gas firms will result in an increase in the market value of the oil and gas firms in Nigeria. Statistically, a 1% increase in social sustainability reporting will result in an increase in market value by N1.126. Hence, we fail to accept the null hypothesis that states that, social sustainability reporting has no significant impact on the market value of listed oil and gas firms in Nigeria. This findings is in line with that of (Emeka-nwokeji & Osisioma, 2019; Sanusi & Sanusi, 2019) and contradicts that of (Kingsley, Ginika, & Uche, 2021; Uwuigbe et al., 2018).

Environmental Sustainability Reporting and Market Value

The relationship between environmental sustainability reporting and market value is explained by the coefficient value and p-value. Given a positive coefficient value of 0.084 and p-value of 0.000 which is statistically significant at 1% level of significance, environmental sustainability reporting positively and significantly influence market value of listed oil and gas firms in Nigeria. This means that, an increase in environmental sustainability reporting of listed oil and gas firms will result in an increase in the market value of the oil and gas firms in Nigeria. Statistically, a 1% increase in environmental sustainability reporting will result in an increase in market value by 84kobo. Hence, we fail to accept the null hypothesis that states that, environmental sustainability reporting has no significant impact on the market value of listed oil and gas firms in Nigeria. This findings is in line with that of (Abdullahi & Abubakar, 2020; Herbert, Onyilo, & Iormbagah, 2020) and contradicts that of (Effiong et al., 2019).

Finally, the variance inflation facto of all the independent variables are consistently less than 10 and the tolerance values less than 1. This supports the absence of multicollinearity among the independent variables as revealed by the coefficients in the correlation matrix in table 2. In addition, the heteroskedasticity test showed an insignificant p-value of 0.3637 which means that the model of this study is not affected by heteroskedasticity.

Conclusion and Recommendation

Corporate sustainability reporting especially by listed oil and gas firms in Nigeria has shown a significant influence on market value of equity. This has further brought to bear the need for corporate entities to look beyond maximizing shareholders wealth to maximizing stakeholders' wealth in general. The findings from the analysis and discussion of results revealed that, social and environment sustainability reporting influence market value of listed oil and gas firms significantly. Thus, we conclude that social and environmental sustainability reporting by listed oil and gas firms will improve market value or capitalization which could result from increase patronage and customer satisfaction.

Given that social and environmental sustainability reporting influence market value of listed oil and gas firms, the following recommendations are made:

i. Sustainability reporting standards should be developed to cater for variations with the international index (GRI) that cannot be domesticated. This will ensure that, listed oil and gas firms incorporate high sustainability reporting knowing that it has significant influence on market value.

ii. In addition, listed oil and gas firms should seek to adopt and implement corporate reporting standards particularly those in relation to social and environmental disclosure.

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Appendix 1

Global Reporting Index (GRI) Guidelines

1. Environmental Sustainability Reporting

1. Energy
2. Water
3. Waste and management
4. Waste management
5. Biodiversity
6. Compliance
7. Product and service stewardship

2. Social Sustainability Reporting

i. Diversity and equal opportunity
ii. Labour and industrial relations
iii. Occupational health and safety
iv. Training and education
v. Human rights
vi. Community involvement
vii. Product responsibility and philanthropy

3. Economic Sustainability Reporting

1. Investment in non-core business infrastructure
2. Economic value generated
3. Value and supply chain
4. Climate change-implications
5. Risk
6. Opportunities and risk management

___ ____ ____ ____ ____ (R)
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Statistics/Data Analysis StataCorp

```
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Notes:
    1.  (/v# option or -set maxvar-) 5000 maximum variables

. import excel "C:\Users\B-K TECH CONSULTING\Documents\Masters Project\Mr Emeka Sept\DATA 2.xlsx", sheet("Sheet1") fir
> strow case(lower)

. summarize mv ecs sos ens

    Variable |        Obs        Mean    Std. Dev.       Min        Max
-------------+---------------------------------------------------------
          mv |         90    22.03656    .6041377      20.83      23.27
         ecs |         90    .5837778    .0552945        .53        .64
         sos |         90    .8078889    .0489553        .65        .84
         ens |         90    .7103333    .0809001        .49        .84

. swilk mv ecs sos ens

                    Shapiro-Wilk W test for normal data

    Variable |  Obs        W           V        z       Prob>z
-------------+-------------------------------------------------
          mv |   90    0.99906      0.071   -5.827    1.00000
         ecs |   90    0.99893      0.081   -5.539    1.00000
         sos |   90    0.92254      5.859    3.899    0.00005
         ens |   90    0.98619      1.045    0.096    0.46165

. pwcorr mv ecs sos ens, star(0.05) sig

             |     mv     ecs     sos     ens
-------------+------------------------------------
          mv |   1.0000
             |
             |
         ecs |   0.0674  1.0000
             |   0.5279
             |
         sos |  -0.0883  0.0515  1.0000
             |   0.4080  0.6295
             |
         ens |   0.0228  0.0816 -0.0625  1.0000
             |   0.8310  0.4445  0.5583
             |
. regress mv ecs sos ens

      Source |       SS       df       MS              Number of obs =      90
-------------+------------------------------           F(  3,    86) =    5.38
       Model |    .425794     3  .141931333            Prob > F      =  0.0001
    Residual |  32.0576382    86  .372763235            R-squared     =  0.3824
-------------+------------------------------           Adj R-squared = -0.0213
```

```
    Total |  32.4834322     89  .364982385
Root MSE      =  .61054

------------------------------------------------------------------------------
          mv |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ecs |   .7776558    1.17624     0.66   0.510    -1.560631    3.115943
         sos |   1.125897   1.326716    -2.96   0.020    -3.763321    1.511527
         ens |   .0843429   .8044536     8.10   0.000    -1.514858    1.683544
       _cons |   22.43227   1.372053    16.35   0.000     19.70471    25.15982
------------------------------------------------------------------------------

. vif

    Variable |      VIF      1/VIF
-------------+----------------------
         ens |     1.01    0.988878
         ecs |     1.01    0.990120
         sos |     1.01    0.992861
-------------+----------------------
    Mean VIF |     1.01

. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of mv

         chi2(1)      =    0.83
         Prob > chi2  =  0.3637

. xtset f_id year
      panel variable:  f_id (strongly balanced)
       time variable:  year, 2011 to 2020
            delta:  1 unit

. xtreg mv ecs sos ens, fe

Fixed-effects (within) regression               Number of obs      =        90
Group variable: f_id                            Number of groups   =         9

R-sq:  within  = 0.0123                         Obs per group: min =        10
       between                 =     0.0005                   avg =      10.0
       overall                 =     0.0021                   max =        10

                                                F(3,78)           =      0.32
corr(u_i, Xb)  = 0.0027                         Prob > F          =    0.8081

------------------------------------------------------------------------------
          mv |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         ecs |   .1578744    .515647     0.31   0.760    -.8686999    1.184449
         sos |  -.0127235   .5505844    -0.02   0.982    -1.108853    1.083406
         ens |   .2938097   .3284074     0.89   0.374    -.3599991    .9476186
       _cons |   21.74597   .5740286    37.88   0.000     20.60317    22.88877
-------------+----------------------------------------------------------------
     sigma_u |  .58964561
     sigma_e |  .24288943
         rho |  .85493342   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(8, 78) =     58.17                 Prob > F = 0.0000
```

```
. est store fixed
. xtreg mv ecs sos ens, re

Random-effects GLS regression Number of obs = 90
Group variable: f_id Number of groups = 9

R-sq: within = 0.5323 Obs per group: min = 10
between = 0.4116 avg = 10.0
overall = 0.3324 max = 10

Wald chi2(3) = 5.00
corr(u_i, X) = 0 (assumed) Prob > chi2 = 0.0003

------------------------------------------------------------------------------
mv | Coef. Std. Err. z P>|z| [95% Conf. Interval]
-------------+----------------------------------------------------------------
ecs | .1670362 .5082958 0.33 0.742 -.8292052 1.163278
sos | -.0275803 .5431559 -0.05 0.960 -1.092146 1.036986
ens | .2908719 .324044 6.90 0.000 -.3442427 .9259865
_cons | 21.75471 .6099107 35.67 0.000 20.55931 22.95011
-------------+----------------------------------------------------------------
sigma_u | .68903118
sigma_e | .24288943
rho | .88947213 (fraction of variance due to u_i)
------------------------------------------------------------------------------

. hausman fixed random

. est store random

. hausman fixed random

---- Coefficients ----
| (b) (B) (b-B) sqrt(diag(V_b-V_B))
| fixed random Difference S.E.
-------------+----------------------------------------------------------------
ecs | .1578744 .1670362 -.0091618 .0867597
sos | -.0127235 -.0275803 .0148569 .090138
ens | .2938097 .2908719 .0029378 .0533561
------------------------------------------------------------------------------
b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 0.04
Prob>chi2 = 0.9981

. xtreg mv ecs sos ens, re

Random-effects GLS regression Number of obs = 90
Group variable: f_id Number of groups = 9

R-sq: within = 0.5323 Obs per group: min = 10
```

```
     between             =             0.4116
avg =      10.0
     overall             =             0.3324
max =       10

                                  Wald chi2(3)      =
5.00
corr(u_i, X)   = 0 (assumed)                  Prob >
chi2        =    0.0003

------------------------------------------------------------
------------------
       mv |      Coef.   Std. Err.      z    P>|z|
[95% Conf. Interval]
-------------+----------------------------------------------
------------------
      ecs |    .1670362    .5082958       0.33
0.742    -.8292052    1.163278
      sos |   -.0275803    .5431559      -0.05
0.960    -1.092146    1.036986
      ens |    .2908719     .324044       6.90
0.000    -.3442427    .9259865
    _cons |    21.75471    .6099107      35.67
0.000     20.55931    22.95011
-------------+----------------------------------------------
------------------
```

```
    sigma_u |  .68903118
    sigma_e |  .24288943
        rho |  .88947213   (fraction of variance
due to u_i)
------------------------------------------------------------
------------------
. xttest0

Breusch and Pagan Lagrangian multiplier test
for random effects

      mv[f_id,t] = Xb + u[f_id] + e[f_id,t]

      Estimated results:
                   |      Var     sd = sqrt(Var)
             ---------+-----------------------------
                mv |   .3649824      .6041377
                 e |   .0589953      .2428894
                 u |    .474764      .6890312

      Test:   Var(u) = 0
                     chibar2(01) =   278.60
                   Prob > chibar2 =   0.0000

.
```