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Research Paper

Board Composition And Corporate Environmental Investment:A Study Of Listed Oil And Gas Firms In Nigeria

ONYALI, CHIDIEBELE INNOCENT
EZE, MARIA
OKEREKEOTI, CHINEDU UCHENNA
DEPARTMENT OF ACCOUNTANCY, FACULTY OF MANAGEMENT SCIENCES, NNAMDI AZIKIWE UNIVERSITY AWKA, ANAMBRA STATE, NIGERIA

ABSTRACT
The study investigated the effect of board composition on environmental investment of listed oil and gas firms in Nigeria. Specifically, it examined the nexus between foreign directors' inclusion in the board, board ethnicity and board gender diversity respectively on environmental investment of listed oil and gas firms in Nigeria. Three research hypotheses guided the study. Ex-post facto research design was employed for the study. The population of the study comprised all the ten (10) listed oil and gas firms in the Nigerian Stock Exchange as at June 2022. Six (6) of these firms were sampled for the study based on the criteria of availability of their audited annual report and accounts for the period (2010-2019) of the study.Ordinary Least Squares (OLS) simple regression technique of data analysis with the aid of STATA 14 was used in testing the hypotheses of the study. The result of the study revealed thatthe proportion of foreign directors in the board is positively associated with the level of environmental investment of listed oil and gas firms in Nigeria while board ethnicity and gender diversity respectively has no significant effect on environmental investment of listed oil and gas firms in Nigeria. Based on the results, the study recommended amongst others that Managers of oil and gas firms should include more foreign directors in the boardas they can, in addition to improving upon the efficiency of corporate governance, have a substantial impact on how the firm is directed and controlled towards compliance to environmental regulations and policies.

Keywords: Board; Board composition; Environmental Investment

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I. INTRODUCTION

Engaging in environmental investment is a costly exercise, as the use of natural resources including energy although imperative to firms' motive of profit maximization comes with a given number of environmental consequences.Environmental investment as shown in extant literature is about the business movement of formulating, commercializing and offering environmental solutions for commercial gain (Shanshan, Tommy &Wenchao, 2015). It involves the procurement of environmentally friendly machines and equipment, implementing higher quality control standards, new environmental protection systems, and new health and safety programs.

Corporate environmental investment plays a pivotal role in promoting sustainabledevelopment (Tian et al., 2020). Firms can improve environmental performance andreduce environmental liabilities by investing in environmentally friendly technologies that reduceemissions and improve resource utilization (Bierbaum et al., 2019). This can improve their social reputation and make them gain the trust of stakeholders, hence, enhance their financial performance (Pekovic et al., 2018; Tian et al., 2020).

A number of factors including external and internal factors can influence corporate environmental investment. Externalfactors include environmental regulations (Huang and Lei,2021), government subsidies (Jung and Feng, 2020) andmarket competition (Ducassy and Montandrau, 2015). Internal factorsinclude board structure (Du et al., 2017; Sun et al., 2020), managercharacteristics (Wei and Zhou, 2020), and corporate culture(Fiordelisi et al., 2019). In external factors, in terms of environmental regulations, considering that companiesare the main carbon emitters and energy consumers (Alamet al., 2019), governments of various countrieshave introducedenvironmental laws and regulations to regulate firms'operation and production (Du et al., 2020), forcing firms toimprove their environmental performance. In terms of government subsidies, governments may provide incentives such as green subsidies for firms to adopt environmentallyfriendly strategies (Huang et al., 2020), leading to an increase incorporate environmental investment. In terms of market competition, firms in the same industry can also incentivize peer firms' environmental investment by investing in cleantechnologies to increase core competencies and gain competitiveadvantages in the market (Sengupta, 2015).

Considering internal factorsin terms of board structure, themore diverse the board members' background and educationalattainment, the more feasible the environmental investmentdecisions made by the firm (Du et al., 2017; Sun et al., 2020). Also, in terms of manager characteristics, managers' insightand personality have a substantial impact on firms' decisions oflong-term investment such as environmental investment (Weiand Zhou, 2020). Furthermore, in terms of corporate culture, Fiordelisiet al. (2019) find that corporate culture plays a guiding role in thestrategic decision making of environmental investment.

As the board has a central position in any organization and in strategic decision making, the influence of board composition on board's strategic decisions becomes a pertinent point of research.The attributes of corporate board of a business organization contribute to the establishment of organizational objectives and corporate strategies that will involve the immediate environment in which it operates. Given the current unpredictability of the business environment, owners of corporations are worried about howboard composition influences the strategic performance of their corporations. Thus, a number ofscholars intend to find out the board compositional factors that affect board's role in strategicdecision making (Veltrop&Molleman, 2019).The idea is to enable firms to deliberately address the feasible complexities going from social, monetary and environmental issues (Aliyu, 2018; Okere, 2017). This study sets out to investigate boards' structural composition that affects corporate environmental investment in Nigeria.

1.2 Objectives of the Study

The broad objective of this study is to investigate the effect of board composition on environmental investment of listed oil and gas firms in Nigeria. The specific objectives of the study include:

i. To determine the effect of foreign directors' inclusion in the board on environmental investment of listed oil and gas firms in Nigeria.

ii. To ascertain the effect of board ethnicity on environmental investment of listed oil and gas firms in Nigeria.

iii. To examine the effect of board gender diversity on environmental investment of listed oil and gas firms in Nigeria.

II. REVIEW OF RELATED LITERATURE

2.1 Concept of Board Composition

It is the fiduciary duty of a company's Board of Directors to "oversee the actions and decisions of corporate management" (Rupley, Brown, & Marshall, 2012). Hence, the structureof the board would affect how effectively the board fulfills this duty. Board composition has become a pertinent issue among academic researchers and businessregulators(Burke et al., 2019; Hassan et al., 2020). It is simply referred to as the distinct characteristics that make up the structure of members of the board of directors of a firm. They can as well be called corporate board structure, board heterogeneity, board diversity, board characteristics or corporate governance attributes. Board composition act as pointers that indicate how well a corporate entity is governed. It is the soundness of the composition of the board that foster effective corporate governance by ensuring the sustainability of firms through sound business practices that promote accountability and transparency. An effective board composition provides the acceptable framework through which the objectives of a firm are set, implemented and monitored.

According to Elaigwu, Ayoib and Salau (2020), board composition has been considered a crucial phenomenon which exerts some influence on how effective corporate governance is. This is because it promotes the effectiveness of the board with respect to corporate leadership all in a bid to enhance all-round performance of firms in economic, environmental and social aspects.Drawing from prior literature on board composition and CSR performance and reporting, this study focuses on examining the following board characteristics: Foreign directors (Umoh-Daniel &Urhoghide, 2018), Board ethnicity (Nwanyie, 2019), Female directors (Zaid et al., 2020).

2.2 Concept of Corporate Environmental Investment

Environmental investment refers to the expenses related to environmental practices such as pollution control and environment improvement, which belong to a special type of corporate investment (Ehresman and

Okereke, 2015). It promotes the adoption of greentechnologies which lead to efficient resource use and lowerenvironmental compliance cost (Bierbaum et al., 2019).Environmental investment encompasses how the environment, from which corporate entities derive profit, can be sustained for the benefit of generations yet to come (Umoh-Daniel &Urhoghide, 2018). It helps to balance the human-environment connection and promotes sustainable development (Tian et al., 2020).

Firms can fulfill their social responsibility through environmental investment (Bierbaumet al.,2019), which improves firm reputation (Aksak et al.,2016), brand value (Guenther and Guenther, 2019), and overall corporate performance (Pekovic et al., 2018). Although environmental investment as a form of public utility investment (Michelfelder et al., 2019), has lower returns andhigher costs in the short term (Wei and Zhou, 2020), it is a type of investment that aims to solve real or potential environmental problems and to balance the relationship between humans and the environment (Linhard, 2005). Typical environmental investment includes expenditure on research and development, renovation of environmental technologies, renovation of environmental facilities, pollution control and waste management, ecological protection, and cleaner production (Askildsenet al., 2006; Kumari et al., 2021).

Environmental investment is accounted for using environmental costs and benefits which are apportioned in such a way as to make a clear distinction between the generation of revenue from the environment and the drawing down of capital resources through asset depletion or environmental degradation. Firm's environmental investments can be made to either comply with environmental regulations or made to set-up a strategy for the promotion of the firm's course such as winning stakeholders' goodwill, customers patronage or branding benefits (Okere, 2017). Firms can capitalize on the strategies available in environmental investment by creating a sustainable competitive advantage that will help maximize the values of the shareholders.

Disclosure of environmental investments is the use of accounting models or reports as means of communicating environmental effects of organizations' economic actions to particular interest groups within the society and to the society at large. By this, corporate accountability of firms is extended beyond the traditional role of disclosing only financial reports to the shareholders or owners of capital. Corporate environmental investment therefore is commonly perceived as one of the ways of extending firms' efforts towards the preservation and protection of the environment from the hazardous effects of firms' production activities (Corvino, Doni& Silvio, 2020).

2.3 Board Composition and Corporate Environmental Investment

Recent studies, business reports and official statements of companies show that more diverse board arises not due to moral or ethical pressure (Burke et al., 2019), butdue to the fact that highly heterogeneous board has a competitive edge and a greater ability toovercome environmental uncertainties. Thus, organizational success and survival depend on the efficiency of firms to manage these uncertainties to create competitive advantage (Midavaineet al., 2016).

Environmental investment helps to balance the human-environment connection and promotes sustainable development (Tian et al., 2020). It promotes the adoption of green technologies, which lead to efficient resource use and lower environmental compliance cost,thereby improving corporate environmental performance (Tian et al., 2020).Firms need to be continually held accountable for the impact of their operation in the environment. The Nigerian economy for instance is very dependent on the oil and gas sector which makes this sector the busiest and at the same time the most environmentally unfriendly sector because of the degradations that are brought about by intensive oil exploration and production activities. Although the continued use of Nigerian natural resources especially crude oil is somewhat indispensable to the economic development of the nation, the utilization comes with series of some environmental consequences, environmental degradation and atmospheric pollution.

Board composition has become a top-notch issue among researchers and corporate stakeholders as it is the fiduciary duty of board of directors to oversee the actions and decisions of firms. According to stakeholder theory board of directors are held responsible for a broader group of stakeholders (Rao and Tilt, 2016). Also, resource-based theory, which posits that firms should have unique human and socialcapital to overcome external environment's uncertainties (Taljaard et al., 2015), suggests that to survive and gain an advantage over competition, firms should rely on their external environment to get support (Pugliese et al., 2014). This implies that to improve social reputation and further acquire external resources and support, firms will actively practice social responsibility (Singh and Misra, 2020).

Board composition has been considered a crucial phenomenon which exerts some influence on how effective corporate governance is. This is because it promotes the effectiveness of the board with respect to corporate leadership all in a bid to enhance all-round performance of firms in economic, environmental and social aspectsElaigwu, Ayoib and Salau (2020).Board composition is of two forms, these are: observable also known as social and less observable also known as occupational composition. Observable or social composition includes race or nationality, ethnic background, gender and age. On the other hand, less observable or occupational heterogeneity includes industry experience, education, functional and occupational backgrounds, organizational membership, life experience, and personal attitudes (Akram et al., 2020). Existing literature has focused on the two categories of board composition. However, little emphasis has been made in the study of board ethnicity and foreigners inclusion in the board. Meanwhile, the study of women inclusion in the board has produced mixed results, with some studies reporting positively while others reporting negatively and no effect respectively.

In Nigerian context, empirical researches relating to board composition and environmental investment such asAnis, Hanen and Bassem (2020); Elaigwu, Ayoib and Salau (2020); Gunarathne, Cooray and Senaratne (2020); Corvino, Doni and Silvio (2020); Ogbu (2019); Odoemelam, Ofoegbu and Okafor (2018); Umoh-Daniel and Urhoghide (2018); Aliyu (2018);derived their evidence from sectors other than the Nigerian Oil and Gas sector. Theimpact of the activities of the oil and gas firms on the environment cannot be overemphasized. Thus, this study investigates the nexus between board composition and environmental investment of oil and gas firms in Nigeria.

2.4 Hypotheses Development

The issue of board composition has gained much interest of scholars in recent time. However, few researchers shed light on nationality, gender, and ethnicity diversityin developing nations (Akram et al., 2020).Drawing from prior literature on board composition and CSR performance and reporting, this study focuses on examining the following board characteristics: Foreign directors (Umoh-Daniel &Urhoghide, 2018), Board ethnicity (Nwanyie, 2019), Female directors (Zaid et al., 2020).

i. Foreigbers' inclusion in the board

Foreigners' inclusion in the board refers to the extent to which foreign directors are appointed to be in the board structure of a firm. In this study, it is operationally taken as the ratio of number of foreign directors to the total number of board members. In the context of this study, foreigners are considered to be those who are from countries or nations other than Nigeria. Foreigners' inclusion in the board has been reported to influence corporate environmental investment based on the assumption that the culture of foreigners, especially those from developed economies where environmental investment is considerably high, will be transferred to the boards that oversee the corporate affairs of the firm (Umoh-Daniel &Urhoghide, 2018). The proportion of foreign directors, when high, can in addition to improving upon the efficiency of corporate governance have substantial impact on how the firm is directed and controlled towards compliance to environmental regulations and policies. Foreigners' inclusion in the board increases corporate disclosure by creating a link that addresses the gap occasioned by the different culture of directors (Umoh-Daniel &Urhoghide, 2018). Che-Ahmad and Osazuwa (2015) emphasized the need to include foreigners in the board structure with the argument that foreign directors would introduce their exposure and foreign expertise in the running of the firm.

Contrary to the propositions of the upper echelon theory and resource-based perspective which states that foreign directorswith different nationality, bring a variety of cognitive skills and capabilities to board and decisionmakingprocess which contributes to creative strategic decisions(Akram et al., 2020), Masulis et al. (2012) argued thatnational heterogeneity creates communication issues, increase agency costs and in return decrease organizational commitment.

ii. Board ethnicity

According to Enukorah (2019), board ethnic diversity is the extent of combination of board members with different heritage, origin, and race. Ethnicity is based on claims or myths of common history, ancestry, language, race, religion, culture and territory (Edewo, Aluko&Folarin, 2014). In the Nigerian context, ethnicity as a social signifier is linked up with a particular sense of belonging as a result of a single common language, belief and origin, (Odiegwu, Ubabukoh, Baiyewu and Okpi, 2012). Thus, ethnic loyalties in Nigeria have led to conflicts when political allocations apparently do not favour a particular ethnic tribe or region (Odiegwu, Ubabukoh, Baiyewu and Okpi, 2012). The act of ethnic discrimination in Nigeria also termed tribalism, encourages frictions in various levels of institutions from the political scene down to the processes of forming the marital institution. Nwanyie (2019) contended that since ethnicity largely influences decision making at the top level including political level, it also tells its tolls on the corporate governance of firms. That is to say, board ethnicity is one of the major factors that could influence the decision making of the board who are managing the affairs of a corporate firm.

iii. Board gender diversity

Board gender diversity refers to the extent to which women are included in the board structure of a firm. In this study, it is operationalized as the ratio of number of female directors to total number of board members. The inclusion of women on the board has been reportedly argued to favourable contribute to solving the environmental problems that are caused by firm activities. The premise for this argument is that women feel easily concerned more than men. Furthermore, female directors allegedly show greater responsibility and philanthropy even asthey are relatively less concerned about the economic performance of the firm (Hendri&Puteri, 2015). Naturally, women seem to be more committed, more diligent, more prepared and more involved in asking questions and ultimately creating a conducive atmosphere during the meeting hours in the meeting room all as a result of their inherent philanthropic nature (Abubakar, 2016).

There has been an enormous increase in the considerable participation of women in all the activities around the world. This is one of the reasons that women inclusion in the boardroom is indispensable and cannot be disregarded in this century. Females' inclusion in the board fetches some benefits for the firms such as such as embedding diversity and enhancement of the opportunity to achieving the competitive advantage (Ghabayen, Nor &Norsia, 2016). Female directors who sit on the board have a higher expectation with respect to their responsibility and their role on the board which ought to lead to a better monitoring of the board. Board gender diversity tends towards improving organizational value and performance given that it provides new perspectives and insights to the board.

Existing literature on gender diversity postulate that women on boards enhance boardeffectiveness, increase understanding of market place and produce a most creative solution to board agenda (Julizaerma&Sori, 2012; Zaid et al., 2020). Similarly, when women on board areonly a few, they monitor the board activities more independently and effectively. Researchersargue that women have great potential to work and compete with their counterparts (Joeckset al., 2013). Mahadeo et al. (2012) stated that women on corporate board have a positive effecton firm performance.Contrary to that, Khan and Abdul Subhan (2019) asserted that number of female directors onboard do not have any significant effect on firm performance. On the same vein, other scholars(Adams & Ferreira, 2009; Ahern &Dittmar, 2012; Bøhren&Staubo, 2014) have found negative orno significant relationship between gender diversity and firm performance (Carter et al., 2010).

In line with the above, the following research hypotheses guide the study:

H_{O1}: The proportion of foreign directors in the board is associated with the level of environmental investment of listed oil and gas firms in Nigeria.

H_{O2}: Board ethnicity has significant effect on environmental investment of listed oil and gas firms in Nigeria.

H_{O3}: Board gender diversity has significant effect on environmental investment of listed oil and gas firms in Nigeria.

III. METHODOLOGY

3.1 Research Design

Ex-post facto research design was employed in this study to examine the effect of the selected board attributes on corporate environmental investments. The choice of the design is informed by the need for an effective design that can reveal the empirical association among two or more variables and the effect of one variable on another. Additionally, the study chose the design because the design allows for use of historical data from events that took place in the past. Therefore, the researcher cannot influence the data as they have already taken place.

3.2 Population and Sample of the Study

The population of this study comprised all the ten (10) listed oil and gas firms in the Nigerian Stock Exchange as at June 2022 being the time of writing this research. The choice of the oil and gas sector is informed by the fact that the sector is one of the most environmentally-sensitive sectors in the Nigerian economy. It highly contributes significantly to environmental hazards and is one of the leading sectors in the league for environmental sustainability. According to NSE (2022), the ten (10) listed oil and gas firms are:

S/N	Company	Ticker	Date Incorporated
1.	ArdovaPlc	ARDOVA	November 12, 1964
2.	Capital Oil Plc	CAPOIL	August 29, 1985
3.	ConoilPlc	CONOIL	June 30, 1970
4.	EternaPlc	ETERNA	January 13, 1989
5.	Japaul Gold & Ventures Plc	JAPAULGOLD	June 29, 1994
6.	MRS Oil Nigeria Plc	MRS	August 12, 1969
7.	OandoPlc	OANDO	August 25, 1969
8.	Rak Unity Pet. Comp. Plc	RAKUNITY	December 20, 1982
9.	Seplat Energy Plc	SEPLAT	June 17, 2009
10.	TotalEnergies Marketing Nigeria Plc	TOTAL	January 6, 1956

Source: NSE 2022

Purposive sampling technique was used to select six (6) of these listed oil and gas firms with complete records of all the data required for measuring the variables of the study within the period covered, 2010 to 2019.The firms include Conoil Plc., Eterna Plc., Japaul Gold & Ventures Plc., MRS Oil Nigeria Plc., Oando Plc., and Total Nigeria Plc

3.3 Data and Variables

Data for the study were collected from secondary sources through the use of the NSE fact book of various issues and published annual reports and accounts of the sampled oil and gas firms for the selected periods. In uncovering the effect of the selected board composition on corporate environmental investments, the proxies of board compositionas the independent variable include foreigners' inclusion in the board (FOIB), Board gender diversity (BGD), board ethnicity (BETH). Corporate environmental investment (CEI) as the dependent variable is represented by annual waste management expensesand pollution control (WME).

The equation below represents the relationship between the variables.

CEI = f (FEIB,BEth, BGD…) ________________________eqn (1)

The econometric model used in the study took the following form:

$CEI_{it} = \alpha_0 + \beta_1 FOIB_{it} + \mu_{it}$ ______________________eqn (2) for H_{O1}

$CEI_{it} = \alpha_0 + \beta_1 BETH_{it} + \mu_{it}$ ______________________eqn (3) for H_{O2}

$CEI_{it} = \alpha_0 + \beta_1 BGD_{it} + \mu_{it}$ ______________________eqn (4) for H_{O3}

Where:

CEI_{it} = Total amount spent on waste management expenses and pollution control by firm "i" in period "t"

α_0 = intercept

β_1 = Coefficient of the independent variable

$FOIB_{it}$ = Foreigners' inclusion on the board of firm "i" in period "t"

$BETH_{it}$ = Board ethnicity of firm "i" in period "t"

BGD_{it} = Board gender diversity of firm "i" in period "t"

μ_{it} = Residual or error term of firm "i" in period "t"

The study used the Ordinary Least Squares (OLS) simple regression technique of data analysis in testing the hypotheses of the study. OLS technique was used because of its efficiency in estimating effects and relationships among variables. All the tests were conducted using a statistical software known as STATA 14 as a tool of analysis to ensure reliability of the study results. The tests were carried out at 5% level of significance.Thus, as a decision rule, reject null hypothesis in favour of the alternate hypothesis if the *p-value* of the test is less than 0.05, and vice versa.

3.4 Variables and Measurement

Presented below is the summary of the variables and their measurements as used in the study

Variables Definition and Measurement

Name of Variable	**Type of Variable**	**Measurement**
Corporate Environmental Investment (CEI)	Dependent	Total amount spent on waste management and pollution control
Foreign directors' inclusion in the board (FOIB)	Independent	$\frac{Number\ of\ Foreign\ Directors}{Total\ Number\ of\ Board\ Members}$
Board Ethnicity (BETH)	Independent	ratio of total number of ethnic group present to the weight of three (3)
Board Gender Diversity (BGD)	Independent	$\frac{Number\ of\ Female\ Directors}{Total\ Number\ of\ Board\ Members}$

Source: Author's Compilation

IV. Data analysis

4.1 Test of Hypothesis I

The hypothesis to be tested in this section is presented thus:

H_{O1}: The proportion of foreign directors in the board is associated with the level of environmental investment of listed oil and gas firms in Nigeria.

The model formulated for the test of the above hypothesis is stated thus:

$CEI_{it} = \alpha_0 + \beta_1 FOIB_{it} + \mu_{it}$

The following is the output of the Ordinary Least Square (OLS) regression analysis:

Regression Result of Test of Hypothesis I

Source	SS	df	MS			
				Number of obs	=	60
				F(1, 58)	=	4.01
Model	2.7134e+11	1	2.7134e+11	Prob > F	=	0.0499
Residual	3.9229e+12	58	6.7636e+10	R-squared	=	0.0647
				Adj R-squared	=	0.0486
Total	4.1943e+12	59	7.1089e+10	Root MSE	=	2.6e+05

WME	Coef.	Std. Err.	t	P>|t|	Beta
FOIB	374300.4	186874.7	2.00	0.050	.2543505
_cons	81548.03	48708.99	1.67	0.099	.

Source: Stata 14 Output, June, 2022

Interpretation of Results

The coefficient of determination, alternatively known as R^2, gives the fraction of the variance in environmental investment explained by the changes in foreign directors' inclusion in the Board. From the above regression result for test of hypothesis I, the regression result has a coefficient of determination of 0.0647 which indicates that about 6.47% variations in environmental investment of the listed Oil and Gas firms can be explained by changes in foreign directors' inclusion in the Board.

The regression coefficient of foreign directors' inclusion in the Board reveals that the marginal contribution of including an additional foreigner in the board to environmental investment is 0.2544. That is to say, an increase in foreign directorship will lead to 0.2544 increase in environmental investment. Furthermore**,** the value of the constant which is 81548.03 shows the waste management expenditure of the firms when other variables are zero is ₦81,548.03.

The *F*-ratio is used for testing the overall significance of a model to determine whether the explanatory variable, foreign directors' inclusion in the Board, is significant in explaining the outcome variable, environmental investment. The statistical significance of the model is revealed by *p-value.* From the table above, the *p-value* of the test, 0.04990,is less than the significance level of 0.05. Therefore, there is an evidence to reject the null hypothesis and accept the alternate hypothesis which states thatthe proportion of foreign directors in the board is associated with the level of environmental investment of listed oil and gas firms in Nigeria.

4.2 Test of Hypothesis II

The hypothesis to be tested in this section is presented thus:

H_{O2}: Board ethnicity has significant effect on environmental investment of listed oil and gas firms in Nigeria.

The model formulated for the test of the above hypothesis is stated thus:

$CEI_{it} = \alpha_0 + \beta_1 BETH_{it} + \mu_{it}$

The following is the output of the Ordinary Least Square (OLS) regression analysis:

Regression Result of Test of Hypothesis II

Source	SS	df	MS			
				Number of obs	=	60
				F(1, 58)	=	2.34
Model	1.6279e+11	1	1.6279e+11	Prob > F	=	0.1314
Residual	4.0315e+12	58	6.9508e+10	R-squared	=	0.0388
				Adj R-squared	=	0.0222
Total	4.1943e+12	59	7.1089e+10	Root MSE	=	2.6e+05

WME	Coef.	Std. Err.	t	P>|t|	Beta
BETH	427374.5	279262	1.53	0.131	.1970093
_cons	-255662.4	268695.8	-0.95	0.345	.

Source: Stata 14 Output, June, 2022

Interpretation of Results

The coefficient of determination, alternatively known as R^2, gives the fraction of the variance in environmental investment explained by the changes in Board Ethnicity. Fromthe above result for test of hypothesis II, the regression result has a coefficient of determination of 0.0388 which indicates that about 3.88% variations in environmental investment of the listed Oil and Gas firms can be explained by changes in Board Ethnicity.

The regression coefficient of BoardEthnicity reveals that the marginal contribution of Board Ethnicity to environmental investment is 0.1970. That is to say, an increase in board ethnicity by 3 directors from the three major ethnic groups in Nigeria will lead to 0.1970 increase in environmental investment. Also**,** the value of the constant which is -255662 shows that the waste management expenditure of the firms when other variables are zero is – ₦255,662.

The *F*-ratio is used for testing the overall significance of a model to determine whether the explanatory variable, Board Ethnicity, is significant in explaining the outcome variable, environmental investment. The statistical significance of the model is revealed by *p-value.* From the table above, the *p-value* of the test, 0.1314,is greater than the significance level of 0.05. Therefore, there is an evidence to reject the alternate hypothesis and accept the null hypothesis which states that Board ethnicity has no significant effect on environmental investment of listed oil and gas firms in Nigeria.

4.3 Test of Hypothesis III

The hypothesis to be tested in this section is presented thus:

H_{O3}: Board gender diversity has significant effect on environmental investment of listed oil and gas firms in Nigeria.

The model formulated for the test of the above hypothesis is stated thus:

$CEI_{it} = \alpha_0 + \beta_1 BGD_{it} + \mu_{it}$

The following is the output of the Ordinary Least Square (OLS) regression analysis

Regression Result of Test of Hypothesis III

Source	SS	df	MS			
				Number of obs	=	60
				F(1, 58)	=	1.54
Model	1.0879e+11	1	1.0879e+11	Prob > F	=	0.2190
Residual	4.0855e+12	58	7.0439e+10	R-squared	=	0.0259
				Adj R-squared	=	0.0091
Total	4.1943e+12	59	7.1089e+10	Root MSE	=	2.7e+05

WME	Coef.	Std. Err.	t	P>|t|	Beta
FEIB	491436.4	395442.8	1.24	0.219	.1610509
_cons	100353.2	54004.4	1.86	0.068	.

Source: Stata 14 Output, June, 2022

Interpretation of Results

The coefficient of determination, alternatively known as R^2, gives the fraction of the variance in environmental investment explained by the changes in board gender diversity. Fromthe above result for test of hypothesis III, the regression result has a coefficient of determination of 0.0259which indicates that about 2.59% variations in environmental investment of the listed Oil and Gas firms can be explained by changes in Female directors' inclusion in the Board.

The regression coefficient of Female directors' inclusion in the Board reveals that the marginal contribution of board gender diversity to environmental investment is 0.1611. That is to say, adding 1 more female director to the board will lead to 0.1611 increase in environmental investment. Also**,** the value of the constant which is 100353 shows that the annual waste management expenditure of the firms when other variables are zero is ₦100,353.

The *F*-ratio is used for testing the overall significance of a model to determine whether the explanatory variable, board gender diversity, is significant in explaining the outcome variable, environmental investment. The statistical significance of the model is revealed by *p-value.* From the table above, the *p-value* of the test, 0.2190,is greater than the significance level of 0.05. Therefore, there is an evidence to reject the alternate hypothesis and accept the null hypothesis which states that Board gender diversity has no significant effect on environmental investment of listed oil and gas firms in Nigeria.

4.4 Discussion of Findings

This study examined the effect of board compositionon environmental investment of listed Oil and Gas firms in Nigeria. The period covered by the study was 2010-2019. Results from the study revealed that foreign directors' inclusion in the board positively influences environmental investment of oil and gas firms in Nigeria. That is to say, the proportion of foreign directors, when high, can in addition to improving upon the efficiency of corporate governance have substantial positive impact on how the firm is directed and controlled towards compliance to environmental regulations and policies. This finding is in line with the studies of (Zaid et al., 2020), which opined that a nationally diverse board is rich in the knowledge of various markets as well as that foreign directors onboard bring an abundance of resources required in firms (Zaid et al., 2020).

Furthermore, the result of the study also revealed that board gender diversity and ethnicity respectively has no significant effect on environmental investment of listed oil and gas firms in Nigeria.Ahern and Dittmar (2012) claimed that the presence of female directors on board leadsto lower firm performance. According to their study, the reasons behind this negative relationship is attributable to female directors on board having close ties with the owners of firms which restrict theirability to perform independently. More so, the study of Carter et al., (2010) also argued that thenumber of female directors on board is usually limited, thus, constituting minority voice in the board.

V. Conclusion and Recommendations

Corporate environmental investment plays a pivotal role in promoting sustainabledevelopment. Firms can improve environmental performance andreduce environmental liabilities by investing in environmentally friendly technologies that reduceemissions and improve resource utilization. By engaging in environmentally friendly activities, firmscan improve their social reputation,gain the trust of stakeholders, andenhance their overall firm performance.The board of directors of firms are appointed for and charged with the duty of setting the standard of operating objectives, strategies, control mechanism and effective service delivery of firms. Accordingly, this study recommends that Managers of oil and gas firms should include more foreign directors in the boardas they can, in addition to improving upon the efficiency of corporate governance, have a substantial impact on how the firm is directed and controlled towards compliance to environmental regulations and policies.Also, the study suggests that firms that have effective board composition of foreign directorship, board gender diversity and board ethnicity are positively presumed to be better corporate citizens and therefore more environmentally responsible than firms with poor board characteristics. This implies that the expertise ofdirectors on board including foreign directors, female directors and directors of various ethnicity contribute to enhancedenvironmental investment of firms.

This study has important practical implications. First, itbroadens the research in the area of corporate sustainabilityby providing empirical evidence that corporate board composition contributes to corporate sustainability by promotingenvironmental investment. Second, internal control qualityserves as an important channel for the positive impact ofboard composition on environmental investment. The findings of this study is in line with the postulation of the resource dependency theorywhich suggests that to survive and gain an advantage over competition,firms shall rely on their external environment such asthe social environment to get support (Pugliese et al., 2014). Therefore,to improve social reputation and further acquire externalresources and support, firms will actively practice socialresponsibility (Singh and Misra, 2020) and so invest more inpro-environmental activities, which enhances corporate imageand increases their social value (Singh and Misra, 2020).

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