SUSTAINABILITY, CORPORATE GOVERNANCE, AND FIRM PERFORMANCE: EVIDENCE FROM EMERGING MARKETS

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Abstract

The purpose of this paper is to explore and investigate the influence of sustainability especially the environmental pillar and corporate board diversity on the financial performance in emerging markets. This study examines the effect of sustainability and board composition on firm performance. The sample of this study comprises 1382 firms with a total of 19199 firm-year observations covering a period from 2008 to 2021. These firms are listed in the MSCI emerging markets index representing 24 emerging countries. The results show that the main index of sustainability (ESG index) and other sub-indices (environmental score, emission score and CO_2 equivalent emission) of sustainability that are used as measures of climate change have an effect on accounting-based performance (return on assets, ROA) and market-based performance (Tobin's Q and book-to-market value, BTMV). Also, the results show that age, nationality and education as board diversity components affect the firm performance; however, the female directors on the board did not affect the firm performance.

Keywords: Green House, Firm Performance, Board Composition, Gender Diversity

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1. INTRODUCTION

With a fresh perspective of sustainable development, pressure is being placed on big businesses to direct resources toward reducing climate change. greenhouse gas (GHG) emissions, particularly carbon dioxide emissions that cause global warming, have been viewed as a major environmental problem

following events like the Rio Earth Summit in 1992 and the Kyoto Protocol in 1997. Because businesses are responsible for a sizable portion of GHG emissions, particularly those resulting from energy use during their production operations, it is imperative that the quantity of GHGs they produce be decreased in order to combat global warming (Bernstein et al., 2007; Bradford & Fraser, 2008). Moreover, the climate conference in Sharm el-Sheikh in Egypt (COP 27) and the United Nations Conference of the Parties (COP 26) in Glasgow have received pledges from different countries across the globe. Despite all the regulations that policymakers have undertaken, companies are encouraged to reduce GHG emissions voluntarily instead of being required mandatorily by policies, where doing this voluntarily is considered more lenient and less expensive, which is much better than direct and indirect regulations (Arimura et al., 2008; Ikkatai et al., 2008).

Researchers and environmental advocates believed that empirical evidence of a causal relationship between corporate environmental performance and corporate financial performance would persuade commercially astute managers to lessen their organizations' environmental effects. Although there have been several practical studies and a significant amount of academic research on the subject (Etzion, 2007; Ambec & Lanoie, 2008; Molina-Azorín et al., 2009), there is disagreement over whether or not "becoming green" is profitable. Furthermore, in the United States, the United Kingdom, Germany, and Japan, numerous studies were conducted to determine whether environmental and economic outcomes could be achieved simultaneously or not (Hart & Ahuja, 1996; Al-Tuwaijri et al., 2004; Nakao et al., 2007).

Although some studies are being done to determine the association between GHG and corporate financial performance (Busch & Hoffmann, 2011; Delmas & Nairn-Birch, 2011), earlier studies have shown contradictory findings. The results of some research highlight the potential economic advantages of businesses reducing their GHG emissions (Boiral et al., 2012). Others demonstrate that the GHG policies and measures actually put into practice typically have few direct effects (Ernst & Young, 2010; KPMG, 2008). Most of the studies have been conducted in developed countries, while there are few studies that focused on emerging countries, thus data on emerging markets would provide intriguing intuition with respect to the relationship between environmental performance and financial performance.

The lack of consensus in the literature's findings regarding how environmental performance affects financial performance in emerging countries is what makes our study interesting. The study has employed ordinary least squares regression (OLS) to determine whether there is any connection between environmental performance and the financial success of companies in emerging markets as evaluated by return on assets (ROA), Tobin's Q, and book-to-market value. Thus, this study contributes to the literature in several ways. First, conducting our tests adds to the ongoing debate on whether environmental performance impacts financial performance as proxied by both accounting and market-based measures, which would provide imperative insights to policymakers and businesses on the importance of environmental performance, and more specifically in emerging markets. Moreover, the environmental performance has been measured by testing four indices as identified: environmental, social, and governance score (ESG), environmental pillar, emissions score and carbon dioxide emissions. Furthermore, the study has incorporated corporate governance variables: board size, board age, board nationality, board education, board independence, female on board, and CEO duality. The major research question in our paper is:

RQ: How does sustainability especially the environmental pillar and corporate governance mechanisms influence the financial performance in emerging markets?

The findings of the study indicate that the main index of sustainability (ESG index) and other sub-indices (environmental score, emission score and CO_2 equivalent emission) of sustainability that are used as measures of climate change have affected accounting-based performance (ROA) and market-based performance (Tobins'Q and book-to-market value, BTMV). Also, the results show that age, nationality and education affect the firm performance; however, the female directors on the board are not affecting the firm performance.

The rest of the paper is structured as follows. In Section 2, an overview of the literature and hypotheses development have been presented. Section 3 provides a description of the data and the research methodology. Then, in Section 4, the empirical results of the study are presented. Section 5 concludes the paper.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

As many countries pledges in the National Climate Change Strategy 2050, this has risen their focus on five main objectives, including cutting emissions in various sectors to maintain sustainable economic growth, promoting the use of renewable energy sources, producing energy from waste, and using alternative energy forms like green hydrogen. Witnessing the research on this topic of climate change has taken various avenues when it comes to firm effects such as value relevance, information asymmetry, financial performance, and cost of capital as well as corporate governance. The need for a cleaner environment has been fostered dramatically, and various studies have been done to investigate the link between a company's environmental performance and its financial performance. While carbon disclosures do not directly influence operating companies' performance, it does impact their financial performance by improving firm transparency and reducing risk and therefore reducing information asymmetry (Lueg et al., 2019). In metanalysis research that has been done by Busch and Lewandowski (2018), which examined 32 studies, it was found a positive significant relationship between environmental and financial performance (Albertini, 2013; Dixon-Fowler et al., 2013; Endrikat et al., 2014; Hang et al., 2019; Horvathova, 2010). However, another study that

combined earlier empirical findings on the effects of both favourable and unfavourable corporate environmental performance-related events on the stock market, has found a significant correlation between positive market responses to positive occurrences and negative market responses to negative ones. Additionally, the results demonstrate that market responses to negative occurrences are stronger than those to favourable events (Endrikat, 2016).

During the last few decades, significant changes in Earth's environment have occurred. Burning of fossil fuels releases harmful pollutants that have a negative impact on the air, water, and soil such as global warming, acid rain, deforestation and ozone depletion. Some wastes have a negative effect on water's purity and validity in addition to several acts that are not for the sake of Earth's health. The main contributor to these effects is firms that do not act in favour of the environment. Firms do not put into consideration plans to control pollution and save the Earth (Bernstein, 2007). Furthermore, each environmental problem has its own features, such as the length of time it has existed, the severity of the problem, the restrictions that have been implemented, and the extent of pollution. As a result, each stakeholder has a unique perspective on each environmental issue. To put it another way, certain stakeholders may regard global warming as one of the most pressing issues, while others believe the waste problem is the most harmful. As a result, there are more arguments about how to rank and deal with environmental issues (Iwata & Okada, 2011).

Shareholder theory sees ESG as an intrinsic intangible powerful asset that can hinder management self-serving behaviour and pushes further for self-discipline (Gao et al., 2014). From the four perspectives demonstrated by Garriga (2004) besides social responsibility, other theories such as ethical theories, political theories, integrative theories, and instrumental theories should be considered. Ethical theories view ESG as an ethical obligation that a firm will pursue to contribute morally to society, which fosters responsibility within the firm that will result in a high level of transparency (Gelb & Strawser, 2001; Hoi et al., 2013; Bereskin et al., 2020). Under the ethical theory, governance is strengthening within the firm by starting with its employees (Kim, 2014), and managing quality disclosures to enhance stakeholder value (Kim, Webster et al., 2012).

Most of the research has focused on overall environmental performance, but only a few have looked at GHG emissions. The literature had documented a positive relationship between social performance measure and financial performance (Albertini, 2013; Busch & Lewandowski, 2018; Dixon-Fowler et al., 2013; Endrikat et al., 2014; Hang et al., 2019; Horvathova, 2010; Margolis & Walsh, 2003; Orlitzky et al., 2003). Companies that disclose carbon emission performance to reduce their risk profile may reflect positive financial performance (Matsumura et al., 2013). Companies that tend to please their customers when it comes to carbon emission footprint verge to impact their revenue line higher and manage to sustain better than those who do not (Lemma et al., 2019). Recently, there has been a lot of discussion about how to reduce harmful emissions in financial disclosure. In addition, companies are attempting to develop new environmental strategies to ensure long-term viability (Guenther & Hoppe, 2014). Various research has highlighted the financial performance connection to climate change performance measures, but the conclusions of the relationship remain unclear and belligerent (Guenther & Hoppe, 2014; Lei & Wang, 2014; Mandina et al., 2014).

As the government's main objective is to promote a firm's long-term growth, while implementing policies and controls that will discourage managers from self-serve, one of the core objectives of corporate governance is to establish a good relationship between the firm's and society's goals (Thomsen & Conyon, 2012). Corporate governance is a notion that businesses use to improve their performance and ensure their long-term viability. Corporate governance establishes the framework for all stakeholders' relationships by establishing laws and rules.

Some studies had reflected on multiple directorship executive characteristics but found limited results regarding age, education and multiple directorships of top executives (Haque, 2017). Based on Echelon's theory, such chief executive officer (CEO) characteristics as education, tenure, and salary can influence how the CEO's governing characteristics would impact carbon performance (Hambrick & Mason, 1984). Moreover, CEO tenure as well as his or her education was seen as positively impacting carbon emission disclosure (Ma et al., 2019; Lewis et al., 2014). Firms that have a CEO that reports on climate emission performance tend to be less likely to engage in corporate manipulation as they self-regulate. Firms that do such disclosure are less likely to engage in tax avoidance (Hoi et al., 2013) and less likely to be involved with insider trading schemes as the agency problem is reduced (Gao et al., 2014).

Sayih et al. (2018) stated that having an independent board that is diverse can have a positive impact on carbon emission disclosure together with Jaggi et al. (2018) and Liao et al. (2015). While Akbas and Canikli (2019) and Kılıç and Kuzey (2019) did not confirm these results. Research that was done on board composition or diversity did indicate a positive effect on carbon performance and disclosure. Moreover, having at least three females on the board tends to increase carbon disclosure performance (Ben-Amar et al., 2017; Haque, 2017; Liao et al., 2015) as well as with foreign diversity on the board (Kılıç & Kuzey, 2019).

Ben-Amar et al. (2017) found that more managerial ownership and having an environment committee on its board can have a positive impact on carbon emission disclosure (Haque, 2017; Liao, 2015; Ben-Amar & Mcllkenny, 2017). Kılıç and Kuzey (2019) stated that board independence, sustainability committee and foreign board diversity had a positive impact on carbon disclosure. Having a strong external corporate governance structure can have a strengthening effect that can reduce the incidence of corporate fraudulent meaning that it will implement anti-corruption measures in place (Zhang, 2018). Hence, the following hypotheses were derived as follows.

H1: Corporate sustainability has a significant association with accounting and market-based-performance.

H2: There is a significant association between the female on board and the firm financial performance.

H3: There is a significant association between the board's age and firm financial performance.

H4: There is a significant association between the board's education and firm financial performance.

H5: There is a significant association between the nationality of the board and the firm financial performance.

3. RESEARCH METHODOLOGY

3.1. Sample and data collection

The sample of this study comprises 1382 firms with a total of 19199 firm-year observations covering a period from 2008 to 2021. These firms are listed in the MSCI emerging markets index representing 24 emerging countries. The data was collected from different databases. The corporate governance data was gathered from the BoardEx database. Moreover, the sustainability, firm-specific characteristics and firm performance are collected from the Datastream database.

3.2. Measurement of variables

Table 1 shows the dependent variables, which consist of accounting-based performance (ROA) and market-based performance (Tobin's Q and BTMV), whereas the independent variables consist of sustainability indices (ESG, environmental, emission, and CO_2 equivalent emission); corporate governance as represented by the board age, board education of executive and non-executive, board executive and non-executive nationality, board size, female executive directors, female non-executive directors, board independence and CEO duality. Besides, including firm characteristics variables such as firm size and leverage

Table 1. Variables of the study

Variables	*Definition*	*Source*
Dependent variables		
ROA	Return on asset	Datastream
Tobins'Q	Market-based performance	Datastream
BTMV	Book-to-market value	Datastream
Independent variables		
CO_2	CO_2 emission	Datastream
Emiss	Emission score	Datastream
Env	Environmental pillar score	Datastream
ESG	ESG score	Datastream
BS	Board size	BoardEX
F-EX	Executive females on board	BoardEX
F-NEX	Non-executive females on board	BoardEX
AgeEX	Average age of executive directors	BoardEX
AgeNEX	Average age of non-executive directors	BoardEX
EdEx	Average number of education for executive directors	BoardEX
EdNEX	Average number of education for non-executive directors	BoardEX
NatEX	Nationality mix for executive directors	BoardEX
NatNEX	Nationality mix for non-executive directors	BoardEX
Brdlnd	Board independence	BoardEX
CEOD	CEO duality	BoardEX
FS	Firm size	Datastream
Lev	Leverage	Datastream

3.3. Model specification

The estimated equations are:

$$Y = \beta_0 + \beta_1 CO2 + \beta_2 BS + \beta_3 FEX + \beta_4 FNEX + \beta_5 AgeEx + \beta_6 AgeNEx + \beta_7 EdEX + \beta_8 EdNEX + \beta_9 NatEX + \beta_{10} NatNEX + \beta_{11} Brdlnd + \beta_{12} CEOD + \beta_{13} FS + \beta_{14} Lev + \varepsilon \quad (1)$$

$$Y = \beta_0 + \beta_1 Emiss + \beta_2 BS + \beta_3 FEX + \beta_4 FNEX + \beta_5 AgeEx + \beta_5 FEX + \beta_6 FNEX + \beta_7 EdEX + \beta_8 EdNEX + \beta_9 NatEX + \beta_{10} NatNEX + \beta_{11} FS + \beta_{12} CEOD + \beta_{13} Brdlnd + \varepsilon \quad (2)$$

$$Y = \beta_0 + \beta_1 Env + \beta_2 BS + \beta_3 FEX + \beta_4 FNEX + \beta_5 AgeEx + \beta_6 AgeNEx + \beta_7 EdEX + \beta_8 EdNEX + \beta_9 NatEX + \beta_{10} NatNEX + \beta_{11} Brdlnd + \beta_{12} CEOD + \beta_{13} FS + \beta_{14} Lev + \varepsilon \quad (3)$$

$$Y = \beta_0 + \beta_1 ESG + \beta_2 BS + \beta_3 FEX + \beta_4 FNEX + \beta_5 AgeEx + \beta_6 AgeNEx + \beta_7 EdEX + \beta_8 EdNEX + \beta_9 NatEX + \beta_{10} NatNEX + \beta_{11} Brdlnd + \beta_{12} CEOD + \beta_{13} FS + \beta_{14} Lev + \varepsilon \quad (4)$$

where, Y is the ROA, Tobins' Q and BTMV for all the previous equations.

4. DATA ANALYSIS

4.1. Descriptive statistics

Table 2 shows the descriptive statistics of mean, median, maximum and minimum and standard deviation for sustainability as dependent variables (CO_2 emission score, environmental score, and ESG score) and for the corporate governance and firm characteristics as independent variables.

Table 2. Descriptive statistics

Variable	*Mean*	*Median*	*Maximum*	*Minimum*	*Std. Dev.*
CO_2	5889437	401252	240000000	0.00	22726745
Emiss	64.35	67.61	99.89	0.68	23.45
Env	56.90	58.28	98.39	2.08	20.58
ESG	59.14	59.32	92.75	13.15	15.90
Lev	0.23	0.21	0.89	0.00	0.17
BS	16.26	16.11	21.09	12.15	1.38
AgeEx	55.83	55.30	84.00	40.00	6.27
AgeNEX	61.15	60.60	83.00	40.00	5.43
F-EX	5.74	0.00	66.70	0.00	12.95
F-NEX	14.45	12.50	66.70	0.00	13.17
EdEX	2.24	2.00	6.20	0.00	0.95
EdNEX	2.57	2.60	5.30	0.30	0.70
NatEX	0.06	0.00	0.70	0.00	0.16
NatNEX	0.24	0.20	0.80	0.00	0.24
BS	11.59	11.00	24.00	5.00	3.24
CEOD	0.01	0.00	1.00	0.00	0.10
BrdInd	0.28	0.25	0.77	0.05	0.14

4.2. Analysis and discussion

The results of the CO_2 emission as the first independent variable are shown in Table 3, in which it has been demonstrated that the carbon dioxide has a positive significant association with the financial performance at a significance level of 1%, which is consistent with previous literature (Albertini, 2013; Busch & Lewandowski, 2018; Dixon-Fowler et al., 2013; Endrikat et al., 2014; Hang et al., 2019; Horvathova, 2010; Margolis & Walsh, 2003; Orlitzky et al., 2003). Moreover, the average age of executive directors of the board has an insignificant negative relationship with ROA, whereas it has a significant negative association with Tobin's Q at a significance level of 1%; while it has a significant positive effect on BTMV. Furthermore, with regard to the association between the average age of non-executive directors of the board, it has been illustrated that there is a significant positive relationship between ROA and Tobin's Q at a significance level of 1%; however, there is a significant negative association with BTMV at a significance level of 1%. As for the gender diversity relationships, the executive females on board have an insignificant relationship with financial performance. The same for the non-executive females on board in relationship with ROA and BTMV, whereas, it is a significant positive association with Tobin's Q at a 10% confidence level. With regards to the education of executives and non-executives on the board, the analysis has shown that the average education for executive directors has an insignificant impact on both ROA and BTMV, but it has a significant negative association with Tobin's Q. The average education of non-executive directors has a significant positive association with ROA at 1% significance level and significant negative relationship with BTMV at 5% significance level; however, such relationship is insignificant with Tobin's Q. The results of studies by Fernánaez-Temprano and Tejerina-Gaite (2020), and Boadi and Osarfo (2019) suggest a negative effect of education on firm performance. As for the nationality mix of executives and non-executives on board in relationship with the financial performance, the nationality mix of executive directors on board has a significant positive relationship with ROA at a significance level of 1%, and Tobin's Q at a significance level 10%, but it has a significant negative association with BTMV at a significance level of 1%. As for the nationality mix of the non-executives on the board, the relationship is insignificant with ROA and Tobin's Q, whereas the relationship is positively significant with BTMV at a significance level of 10%.

Table 3. Carbon dioxide, corporate governance and financial performance

Variable	*ROA*	*Tobin's Q*	*BTMV*
Constant	35.5833***	0.0111***	-1.4641**
CO_2	0.0133***	1.78E-6***	0.0018***
Lev	-9.2682***	-0.0026***	0.1751*
FS	-2.0997***	-0.0006***	0.1498***
AgeEX	-0.0228	-3.46E-05***	0.0072***
AgeNEX	0.1169***	4.73E-05***	-0.0094***
F-EX	0.0041	4.40E-07	-0.0002
F-NEX	-0.0044	7.50E-06*	-0.0001
EdEX	-0.231	-0.0001***	0.0016
EdNEX	0.7792***	0.0001	-0.0728**
NatEX	3.0753***	0.0004*	-0.1791***
NatNEX	0.5291	0.0001	0.177*
BS	-0.0287	0.00000174	-0.0111*
CEOD	-7.6865	0.0003	-0.135
BrdInd	1.9983***	0.0003	0.3656***

*Note: ***, **, * mean statistically significant at 1%, 5% and 10% level respectively.*

Table 4 displays the findings of emission score as the second independent variable. It has been established that, at a significance level of 1%, there is a positive significant correlation between emission score and financial performance. Additionally, the average age of the board's executive directors has an insignificant impact on ROA, but a significant negative link with Tobin's Q at a significance level of 1%, and a significant positive impact on BTMV at a significance level of 1%. Furthermore, it has been demonstrated that there is a significant positive relationship between ROA and Tobin's Q and the average age of non-executive directors of the board at a significance level of 1%, but that there is a significant negative relationship with BTMV at a significance level of 1%. In terms of gender diversity relationships, the number of female executives has an insignificant bearing on financial success. The same is true for the non-executive female board members in relation to ROA, Tobin's Q and BTMV. Average non-executive director education has an insignificant link with ROA, but a significant negative association with Tobin's Q at a 1% significance level and a significant negative

relationship with BTMV at a 5% significance level. The nationality mix of executive directors on the board has a significant negative relationship with ROA, Tobin's Q and BTMV at a significance level of 1%. The nationality mix of the non-executives on the board has an insignificant association with ROA or Tobin's Q, but it does have a significant positive relationship with BTMV at a significance level of 5%.

Table 4. Emission score, corporate governance, and financial performance

Variable	*ROA*	*Tobin's Q*	*BTMV*
Constant	39.9200***	0.0131***	-1.5173***
Emiss	11801.7200**	2.5722**	1682.0420***
Lev	-9.1269***	-0.0030***	0.2291***
FS	-2.3915***	-0.0008***	0.1532***
AgeEX	0.0009	-3.14E-5***	0.0063***
AgeNEX	0.0843***	4.39E-5***	-0.0102***
F-EX	0.0099	1.96E-06	0.0005
F-NEX	-0.0073	4.14E-06	-0.0007
EdEX	-0.2255	-7.04E-5***	-0.0192***
EdNEX	0.7390***	0.0002***	-0.0519**
NatEX	1.7029*	0.0006**	-0.1002
NatNEX	-0.5831	-0.0003	0.1283**
BS	0.0445	-1.55E-5**	-0.0117***
CEOD	-5.9981	0.0002	-0.1212
BrdInd	2.7506***	0.0003*	0.3097***

*Note: ***, **, * mean statistically significant at 1%, 5% and 10% level respectively.*

The results supporting the environmental score as the third independent variable are shown in Table 5. It has been determined that there is a positive significant relationship between environmental pillar score and financial performance at a significance level of 1%. The average age of the executive directors of the board has an insignificant effect on ROA, but a significant negative relationship with Tobin's Q at a significance level of 1%, and a significant positive relationship with BTMV at a significance level of 1%. Additionally, it has been shown that there is a significant negative association with BTMV at a significance level of 1%, but a significant positive relationship with ROA, Tobin's Q, and the average age of non-executive directors of the board. In terms of the associations between gender diversity and financial performance, the proportion of female executives and non-executives is insignificant to both the accounting and market-based financial performance measures. Average executive director education level shows an insignificant relationship with ROA, but it does have a significant inverse relationship with Tobin's Q and BTMV at the 1% level of significance. As for the average non-executives education level, a significant positive relationship is revealed with ROA and Tobin's Q at a 1% significance level, whereas a significant negative impact on BTMV at a 5% significance level. At a significance level of 10%, the nationality composition of the executive directors on the board significantly positively affects ROA; however, shows insignificant impact on both market-based financial measures. The non-executive board members' mix of nationalities has no significant correlation with ROA or Tobin's Q, but at a significant positive correlation with BTMV at a 5% significance level.

Table 5. The environmental pillar score, corporate governance, and the financial performance

Variable	*ROA*	*Tobin's Q*	*BTMV*
Constant	40.0047***	0.0133***	-1.5031***
Env	14017.87*	6.1610***	2046.6180***
Lev	-9.0897***	-0.0030***	0.2340***
FS	-2.4144***	-0.0008***	0.1499***
AgeEX	0.0043	-3.12E-5***	0.0068***
AgeNEX	0.0836***	4.22E-6***	-0.0103***
F-EX	0.0095	1.94E-06	0.0005
F-NEX	-0.0076	3.45E-06	-0.0007
EdEX	-0.2369	-7.22E-05***	-0.0205***
EdNEX	0.7676***	0.0002***	-0.0483**
NatEX	1.6362*	0.0006	-0.1105
NatNEX	-0.5801	-0.0003	0.1266**
BS	0.0468	-1.63E-05**	-0.0114***
CEOD	-5.9092	0.0002	-0.1074
BrdInd	2.7659***	0.0003*	0.3115***

*Note: ***, **, * mean statistically significant at 1%, 5% and 10% level respectively.*

Table 6 displays the findings of the ESG as the fourth independent variable. It has been found that there is a significant positive association between the ESG score and both financial performance measures; as ESG is positively significant with ROA and Tobin's Q at a 1% significance level and with BTMV at a significance level of 10%. Although it has an insignificant impact on ROA, the average age of the board's executive directors has a significant negative association with Tobin's Q at a significance threshold of 1% and a significant positive association with BTMV at the same level. Additionally, it has been demonstrated that, at a significance level of 1%, there is a significant negative link with BTMV, but a significant positive relationship with ROA, and Tobin's Q at 5% and 1% significance levels respectively. The number of female executives and non-executives has insignificant relationships on both the accounting- and market-based financial performance indicators, which confirms previous studies according to Amrani et al. (2022), El-Chaarani et al. (2022), and Fernánaez-Temprano and Tejerina-Gaite (2020), there is an insignificant influence of board gender on firm performance. The average executive director's education level has an insignificant relationship with ROA, but it does, at the 1% level of significance, have a significant inverse relationship with Tobin's Q and BTMV. Regarding the average non-executive education level, at a 1% level of significance, a significant positive association between ROA and Tobin's Q is found, whereas, at a 5% level of significance, a significant negative relationship is found between BTMV and ROA. The nationality mix of executive directors on the board has a significant positive relationship with ROA at a significance level of 1% and Tobin's Q at a significance level of 5%, but it has an insignificant association with BTMV. The nationality mix of the board's non-executives has a significant negative association with ROA and Tobin's Q at 10% and 5% significance level, respectively, but it does have a positive relationship with BTMV at a significance level of 5%.

Table 6. ESG score, corporate governance, and financial performance

Variable	*ROA*	*Tobin's Q*	*BTMV*
Constant	39.9688***	0.0134***	-1.6171***
ESG	36431.87***	15.6473***	737.9321*
Lev	-9.0151***	-0.0029***	0.2309***
FS	-2.437***	-0.0008***	0.1561***
AgeEX	0.0094	-3.23E-05***	0.0067***
AgeNEX	0.0717**	3.96E-05***	-0.0094***
F-EX	0.0081	1.32E-06	0.0004
F-NEX	-0.0112	1.23E-06	-0.0005
EdEX	-0.2906	-8.31E-05***	-0.0189***
EdNEX	0.6654***	0.0001***	-0.0434**
NatEX	1.5244*	0.0006**	-0.101
NatNEX	-0.8235*	-0.0004**	0.1368**
BS	0.054	-1.30E-05*	-0.0108***
CEOD	-6.055	8.59E-05	-0.1078
Brdlnd	2.9471***	0.0004**	0.2948***

*Note: ***, **, * mean statistically significant at 1%, 5% and 10% level respectively.*

5. CONCLUSION

It has been shown that all measures of sustainability with its main ESG score, together with other sub-measures such as carbon dioxide, emission score and environmental score pillar are significantly positively associated with market-based and accounting-based measures. Moreover, the female executives and non-executives on board have revealed insignificant relationships with both financial performance measures. Furthermore, the average age of executives on board has an insignificant relationship with ROA. While, the average non-executives on board are significant to both the market-based and accounting-based measures. The average executive education level has an insignificant association with all financial performance measures; however, the average non-executive education level is significant with all financial performance measures. Board size has an insignificant effect on ROA; whereas CEO duality carries an insignificant relationship with ROA, Tobin's Q and BTMV. Additionally, board independence has a significant association with ROA and BTMV financial performance measures.

This paper has some limitations where the sample of the study includes only emerging companies rather than developed ones. Furthermore, this study focuses on the environmental pillars and their sub-indices ignoring the social and governance pillars. Future studies could be done by doing comparative studies between the developed and developing countries where the results can add to the knowledge in the area of sustainability.

REFERENCES

1. Akbas, H. E., & Canikli, S. (2019). Determinants of voluntary greenhouse gas emission disclosure: An empirical investigation on Turkish firms. *Sustainability, 11*(1), Article 107. https://doi.org/10.3390/su11010107
2. Albertini, E. (2013). Does environmental management improve financial performance? A meta-analytical review. *Organization & Environment, 26*(4), 431–457. https://doi.org/10.1177/1086026613510301
3. Al-Tuwaijri, S. A., Christensen, T. E., & Hughes, K. E. (2004). The relations among environmental disclosure, environmental performance and economic performance: A simultaneous equation approach. *Accounting, Organizations and Society, 29*(5–6), 447–471. https://doi.org/10.1016/S0361-3682(03)00032-1
4. Ambec, S., & Lanoie, P. (2008). Does it pay to be green? A systematic overview. *Academy of Management Perspectives, 22*(4), 45–62. https://www.jstor.org/stable/27747478
5. Amrani, O., Najab, A., & Azmi, M. (2022). The impact of governance structure on bank performance: A cross-country panel analysis using statistical learning algorithms. *Procedia Computer Science, 203*, 520–524. https://doi.org/10.1016/j.procs.2022.07.073
6. Arimura, T. H., Hibiki, A., & Katayama, H. (2008). Is a voluntary approach an effective environmental policy instrument?: A case for environmental management systems. *Journal of Environmental Economics and Management, 55*(3), 281–295. https://doi.org/10.1016/j.jeem.2007.09.002
7. Ben-Amar, W., Chang, M., & McIlkenny, P. (2017). Board gender diversity and corporate response to sustainability initiatives: Evidence from the carbon disclosure project. *Journal of Business Ethics, 142*(2), 369–383. https://doi.org/10.1007/s10551-015-2759-1
8. Bereskin, F., Campbell, T., & Kedia, S. (2020). Whistle blowing, forced CEO turnover, and misconduct: The role of socially minded employees and directors. *Management Science, 66*(1), 24–42. https://doi.org/10.1287/mnsc.2018.3229
9. Bernstein, L., Roy, J., Delhotal, K. C., Harnisch, J., Matsuhashi, R., Price, L., Tanaka, K., Worrell, E., Yamb, F., & Fengqi, Z. (2007). In B. Metz, O. R. Davidson, P. R. Bosch, R. Dave, & L. A. Meyer (Eds.), *Climate change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 448–496). Cambridge University Press. https://archive.ipcc.ch/publications_and_data/ar4/wg3/en/ch7.html
10. Boadi, I., & Osarfo, D. (2019). Diversity and return: The impact of diversity of board members' education on performance. *Corporate Governance, 19*(4), 824–842. https://doi.org/10.1108/CG-01-2019-0017
11. Boiral, O., Henri, J.-F., & Talbot, D. (2012). Modeling the impacts of corporate commitment on climate change. *Business Strategy and the Environment, 21*(8), 495–516. https://doi.org/10.1002/bse.723
12. Bradford, J., & Fraser, E. D. G. (2008). Local authorities, climate change and small and medium enterprises: Identifying effective policy instruments to reduce energy use and carbon emissions. *Corporate Social Responsibility and Environmental Management, 15*(3), 156–172. https://doi.org/10.1002/csr.151
13. Busch, T., & Hoffmann, V. H. (2011). How hot is your bottom line? Linking carbon and financial performance. *Business & Society, 50*(2), 233–265. https://doi.org/10.1177/0007650311398780
14. Busch, T., & Lewandowski, S. (2018). Corporate carbon and financial performance. A meta-analysis. *Journal of Industrial Ecology, 22*(4), 745–759. https://doi.org/10.1111/jiec.12591
15. Delmas, M. A., & Nairn-Birch, N. S. (2011). *Is the tail wagging the dog? An empirical analysis of corporate carbon footprints and financial performance* (Working Paper No. 6). UCLA Institute of the Environment and Sustainability. https://escholarship.org/uc/item/3k89n5b7

16. Dixon-Fowler, H. R., Slater, D. J., Johnson, J. I., Ellstrand, A. E., & Romi, A. M. (2013). Beyond "Does it pay to be green?" A meta-analysis of moderators of the CEP-CFP relationship. *Journal of Business Ethics, 112*(2), 353–366. https://doi.org/10.1007/s10551-012-1268-8
17. El-Chaarani, H., Abraham, R., & Skaf, Y. (2022). The impact of corporate governance on the financial performance of the banking sector in the MENA (Middle Eastern and North African) region: An immunity test of banks for COVID-19. *Journal of Risk and Financial Management, 15*(2), Article 82. https://doi.org/10.3390/jrfm15020082
18. Elsayih, J., Tang, Q., & Lan, Y.-C. (2018). Corporate governance and carbon transparency: Australian evidence. *Accounting Research Journal, 31*(3), 405–422. https://doi.org/10.1108/ARJ-12-2015-0153
19. Endrikat, J. (2016). Market reactions to corporate environmental performance related events: A meta-analytic consolidation of the empirical evidence. *Journal of Business Ethics, 138*(3), 535–548. https://doi.org/10.1007/s10551-015-2598-0
20. Endrikat, J., Guenther, E., & Hoppe, H. (2014). Making sense of conflicting empirical findings: A meta-analytic review of the relationship between corporate environment and financial performance. *European Management Journal, 32*(5), 735–751. https://doi.org/10.1016/j.emj.2013.12.004
21. Ernst & Young. (2010). *Action amid uncertainty: Business response to climate change.* EYGM Limited. https://www.climate-expert.org/fileadmin/user_upload/PDF/EY_Action_amid_uncertainty_-_The_business_response_to_climate_change.pdf
22. Etzion, D. (2007). Research on organizations and the natural environment, 1992–present: A review. *Journal of Management, 33*(4), 637–664. https://doi.org/10.1177/0149206307302553
23. Fernánaez-Temprano, M. A., & Tejerina-Gaite, F. (2020). Types of director, board diversity and firm performance. *Corporate Governance, 20*(2), 324–342. https://doi.org/10.1108/CG-03-2019-0096
24. Fonseca, L. M., & Domingues, J. P. (2018). Exploratory research of ISO 14001:2015 transition among Portuguese organizations. *Sustainability, 10*(3), Article 781. https://doi.org/10.3390/su10030781
25. Gao, F., Lisic, L. L., & Zhang, I. X. (2014). Commitment to social good and insider trading. *Journal of Accounting and Economics, 57*(2–3), 149–175. https://doi.org/10.1016/j.jacceco.2014.03.001
26. Garriga, E., & Melé, D. (2004). Corporate social responsibility theories: Mapping the territory. *Journal of Business Ethics, 53*(1–2), 51–71. https://doi.org/10.1023/B:BUSI.0000039399.90587.34
27. Gelb, D. S., & Strawser, J. A. (2001). Corporate social responsibility and financial disclosures: An alternative explanation for increased disclosure. *Journal of Business Ethics, 33*(1), 1–13. https://doi.org/10.1023/A:1011941212444
28. Guenther, E. M., & Hoppe, H. (2014). Merging limited perspectives: A synopsis of measurement approaches and theories of the relationship between corporate environmental and financial performance. *Journal of Industrial Ecology, 18*(5), 689–707. https://doi.org/10.1111/jiec.12125
29. Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *The Academy of Management Review, 9*(2), 193–206. https://doi.org/10.2307/258434
30. Hang, M., Geyer-Klingenberg, J., & Rathgeber, A. W. (2019). It is merely a matter of time: A meta-analysis of the causality between environmental performance and financial performance. *Business Strategic Environment, 28*(2), 257–273. https://doi.org/10.1002/bse.2215
31. Haque, F. (2017). The effects of board characteristics and sustainable compensation policy on carbon performance of UK firms. *The British Accounting Review, 49*(3), 347–364. https://doi.org/10.1016/j.bar.2017.01.001
32. Hart, S. L., & Ahuja, G. (1996). Does it pay to be green? An empirical examination of the relationship between emission reduction and firm performance. *Business Strategy and the Environment, 5*(1), 30–37. https://doi.org/10.1002/(SICI)1099-0836(199603)5:1%3C30::AID-BSE38%3E3.0.CO;2-Q
33. Hoi, C. K., Wu, Q., & Zhang, H. (2013). Is corporate social responsibility (CSR) associated with tax avoidance? Evidence from irresponsible CSR activities. *The Accounting Review, 88*(6), 2025–2059. https://doi.org/10.2308/accr-50544
34. Horvathova, E. (2010). Does environmental performance affect financial performance? A meta-analysis. *Ecological Economics, 70*(1), 52–59. https://doi.org/10.1016/j.ecolecon.2010.04.004
35. Ikkatai, S., Ishikawa, D., Ohori, S., & Sasaki, S. (2008). Motivation of Japanese companies to take environmental action to reduce their greenhouse gas emissions: An econometric analysis. *Sustainability Science, 3*(1), 145–154. https://doi.org/10.1007/s11625-008-0048-y
36. Iwata, H., & Okada, K. (2011). How does environmental performance affect financial performance? Evidence from Japanese manufacturing firms. *Ecological Economics, 70*(9), 1691–1700. https://doi.org/10.1016/j.ecolecon.2011.05.010
37. Jaggi, B., Allini, A., Macchioni, R., & Zampella, A. (2018). Do investors find carbon information useful? Evidence from Italian firms. *Review of Quantitative Finance and Accounting, 50*(5), 1031–1056. https://doi.org/10.1007/s11156-017-0653-x
38. Kılıç, M., & Kuzey, C. (2019). The effect of corporate governance on carbon emission disclosures: Evidence from Turkey. *International Journal of Climate Change Strategies and Management, 11*(1), 35–53. https://doi.org/10.1108/IJCCSM-07-2017-0144
39. Kim, H. M., Webster, P. J., & Curry, J. A. (2012). Evaluation of short-term climate change prediction in multi-model CMIP5 decadal hindcasts. *Geophysical Research Letters, 39*(10), 1–7. https://doi.org/10.1029/2012GL051644
40. Kim, Y. (2014). Strategic communication of corporate social responsibility (CSR): Effects of stated motives and corporate reputation on stakeholder responses. *Public Relations Review, 40*(5), 838–840. https://doi.org/10.1016/j.pubrev.2014.07.005
41. Kim, Y., Park, M. S., & Wier, B. (2012). Is earnings quality associated with corporate social responsibility? *The Accounting Review, 87*(3), 761–796. https://doi.org/10.2308/accr-10209
42. KPMG. (2008). *Climate changes your business.* KPMG International. https://www.greenbiz.com/sites/default/files/document/Climatechang_riskreport.pdf
43. Lei, Y., & Wang, J. A. (2014). A preliminary discussion on the opportunities and challenges of linking climate change adaptation with disaster risk reduction. *Natural Hazards, 71*(3), 1587–1597. https://doi.org/10.1007/s11069-013-0966-6

44. Lemma, T. T., Feedman, M., Mlilo, M., & Park, J. D. (2019). Corporate carbon risk, voluntary disclosure, and cost of capital: South African evidence. *Business Strategy and the Environment, 28*(1), 111–126. https://doi.org/10.1002/bse.2242
45. Lewis, B. W., Walls, J. L., & Dowell, G. W. S. (2014). Difference in degrees: CEO characteristics and firm environmental disclosure. *Strategic Management Journal, 35*(5), 712–722. https://doi.org/10.1002/smj.2127
46. Liao, L., Luo, L., & Tang, Q. (2015). Gender diversity, board independence, environmental committee, and greenhouse gas disclosure. *The British Accounting Review, 47*(4), 409–424. https://doi.org/10.1016/j.bar.2014.01.002
47. Lueg, K., Krastev, B., & Lueg, R. (2019). Bidirectional effects between sustainability disclosure and risk. *Journal of Cleaner Production, 229*, 268–277. https://doi.org/10.1016/j.jclepro.2019.04.379
48. Ma, Y., Zhang, Q., Yin, Q., & Wang, B. (2019). The influence of top managers on environmental information disclosure: the moderating effect of company's environmental performance. *International Journal of Environmental Research and Public Health, 16*(7), Article 1167. https://doi.org/10.3390/ijerph16071167
49. Mandina, S. P., Maravire, C. V., & Masere, V. S. (2014). Effectiveness of corporate social responsibility in enhancing company image. *European Journal of Business and Management, 6*(5), 46–61. https://iiste.org/Journals/index.php/EJBM/article/view/10913
50. Margolis, J. D., & Walsh, J. P. (2003). Misery loves companies: Rethinking social initiatives by business. *Administrative Science Quarterly, 48*(2), 268–305. https://doi.org/10.2307/3556659
51. Matsumura, E. M., Prakash, R., & Vera-Muñoz, S. C. (2013). Firm-value effects of carbon emissions and carbon disclosures. *The Accounting Review, 89*(2), 695–724. https://doi.org/10.2308/accr-50629
52. Molina-Azorín, J. F., Claver-Cortés, E., López-Gamero, M. D., & Tarí, J. J. (2009). Green management and financial performance: A literature review. *Management Decision, 47*(7), 1080–1100. https://doi.org/10.1108/00251740910978313
53. Nakao, Y., Amano, A., Matsumura, K., Genba, K., & Nakano, M. (2007). Relationship between environmental performance and financial performance: An empirical analysis of Japanese corporations. *Business Strategy and the Environment, 16*(2), 106–118. https://doi.org/10.1002/bse.476
54. Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate social and financial performance: A meta-analysis. *Organization Studies, 24*(3), 403–441. https://doi.org/10.1177/0170840603024003910
55. Thomsen, S., & Conyon, M. (2012). *Corporate governance: Mechanisms and systems.* McGraw Hill Education.
56. Velte, P., Stawinoga, M., & Lueg, R. (2020). Carbon performance and disclosure: A systematic review of governance-related determinants and financial consequences. *Journal of Cleaner Production, 254*, Article 120063. https://doi.org/10.1016/j.jclepro.2020.120063
57. Zhang, J. (2018). Public governance and corporate fraud: Evidence from the recent anti-corruption campaign in China. *Journal of Business Ethics, 148*(2), 375–396. https://doi.org/10.1007/s10551-016-3025-x