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Do corporate environmental sustainability affect corporate performance? the role of board diversity evidence from Saudi Arabia stock market

¿La sostenibilidad ambiental corporativa afecta el desempeño corporativo? el papel de la diversidad en los consejos de administración, evidencia del mercado de valores de Arabia Saudita

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Abstract

This study aims to evaluate the efficiency of corporate environmental sustainability (CES) in the Saudi market. it examines how CES influences their effectiveness in corporate performance (CP). Moreover, it is examined if the board diversity (BD) moderates the association among CES and CP. Moreover, quantitative data was collected using a survey of 917 observation firm in Saudi market. The data was analyzed using OLS regression and applied other additional test in order to make confirm. The results of this study revealed that CES in rigorous financial analysis and investigation significantly improves CP. However, the role of BD does not enhance CP. Most notably, BD no moderates the association among CES and CP. This study offers unparalleled empirical evidence on CES in the Saudi context. moreover, it is examined if the BD moderates the connection among CES and CP. The research model demonstrates good explanatory power and predictive accuracy. Finally, the current study provided some limitations and suggestions for future research at the end of paper.

JEL Code: Q56, L25, M14
Keywords: corporate environmental sustainability; corporate performance; cross-sectional time-series; saudi market

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Resumen

Este estudio tiene como objetivo evaluar la eficiencia de la sostenibilidad ambiental corporativa (CES) en el mercado saudí. examina cómo CES influye en su eficacia en el desempeño corporativo (CP). Además, se examina si la diversidad del directorio (BD) modera la asociación entre CES y CP. Además, se recopilaron datos cuantitativos mediante una encuesta realizada a 917 empresas de observación en el mercado saudí. Los datos se analizaron mediante regresión MCO y se aplicaron otras pruebas adicionales para confirmar. Los resultados de este estudio revelaron que CES en análisis e investigación financieros rigurosos mejora significativamente la CP. Sin embargo, el papel de BD no mejora la CP. En particular, BD no modera la asociación entre CES y CP. Este estudio ofrece evidencia empírica incomparable sobre CES en el contexto saudita. además, se examina si el BD modera la conexión entre CES y CP. El modelo de investigación demuestra un buen poder explicativo y precisión predictiva. Finalmente, el estudio actual proporcionó algunas limitaciones y sugerencias para futuras investigaciones al final del artículo.

Código JEL: Q56, L25, M14
Palabras clave: sostenibilidad ambiental corporativa; desempeño corporativo; series temporales transversales, mercado saudí

Introduction

Corporate environmental sustainability has experienced a paradigm change in recent years, changing the face of global industry (Muratovski, 2015). Companies all around the world are beginning to understand how crucial it is to implement environmentally friendly practices as both a moral duty and a strategic imperative (Hillary, 2017; Sajjad, Eweje, & Tappin, 2020). This trend toward sustainability is not just motivated by moral concerns; it has also emerged as a significant factor in determining CP (Ritter et al., 2015). In-depth analysis of the complex association between corporate environmental responsibility (CER) and CP is provided in this article, with a focus on the sometimes-ignored issue of BD. While many studies have looked at the individual effects of sustainability programs and BD on CP, this research focuses on how these two elements may interact and maybe work in harmony.

Businesses and society alike reap the rewards of exceptional performance when environmental sustainability and corporate governance is considered (Ammer, Aliedan, & Alyahya, 2020). The significance of CES and the critical role that BD plays in CP (Naciti, 2019; Setó-Pamies, 2015) first: The reputation and brand value of an organization can be improved by implementing environmentally sustainable practices. Consumers and investors are becoming more aware of environmental issues, so a business that prioritizes sustainability is likely to draw in more clients and investors who hold similar beliefs (Ioannou & Serafeim, 2017; Tournois, 2015) and discussions on a diverse board are more probable to be in-depth and well-rounded. Different perspectives can result in more thorough analysis of possibilities and hazards, which can improve decision-making and risk management (Moridu, 2023; Solomon, 2020) and companies with diverse boards typically have better public relations. Customers, investors, and employees frequently perceive diverse boards as being more inclusive and socially

responsible, which can improve the company's reputation and brand value (Bear, Rahman, & Post, 2010). Second: Sustainability initiatives can reduce environmental and legal hazards (Giannakis & Papadopoulos, 2016). Environmentally conscious businesses are better equipped to negotiate regulatory changes and lower their risk of incurring high-cost environmental liabilities (Tao et al., 2022). Third: In the long run, sustainability practices frequently result in cost savings. Reduced operational costs and higher profitability can be achieved through resource optimization, waste reduction, and energy-efficient techniques (Welford, 2016). Fourth: It might be simpler for businesses that prioritize sustainability to get access to funding. Sustainable businesses may have easier access to funding sources as investors and financial institutions increasingly include environmental, social, and CES concerns in their decision-making (Agyemang & Ansong, 2017; Jo, Kim, & Park, 2015). Fifth: Sustainability in the environment can spur innovation. Companies looking for sustainable solutions frequently come across fresh methods and technology that might help them stand out from the competition (Ottman, 2017). Sixth: Long-term value creation can be aided by sustainable methods. Companies can position themselves for stable and sustainable growth over time by taking into account how their actions affect society and the environment (Ünal et al., 2019). And the last one is Sustainability strategies meaningfully involve stakeholders, including as staff members, clients, suppliers, and communities. Stronger ties and support from these organizations may result from this, which may enhance CP (Roscoe, Cousins, & Lamming, 2016).

A diverse board can offer helpful insights into foreign markets and cultural nuances in today's globalized corporate climate, assisting the company in growing and operating more successfully on a worldwide basis (Kotabe & Helsen, 2022). And companies with diverse boards are frequently better able to adjust to shifting cultural expectations and standards. This flexibility can help the business remain sustainable and resilient in the face of changing problems (Chester & Allenby, 2019; Holbeche, 2015). In conclusion, BD is seen as a strategic need for CP rather than just a matter of social obligation. PC and CES can be strengthened by diverse boards because they can promote better decision-making, higher innovation, improved reputation, and improved CP (Vafaei, Ahmed, & Mather, 2015).

It is imperative to prioritize CES in the evaluation of a company's performance for multiple reasons. Through integration, businesses can better analyze and improve their overall performance over the long run (Eccles et al., 2014). First, companies who are CES-committed typically have a favorable brand image. A business can stand out from the competition and draw in clients who respect environmental responsibility by implementing sustainability initiatives. Second, a company's competitive edge and market share can be increased by projecting itself as an industry leader through a high sustainability performance. Third, by include CES in business success metrics, you can make sure that sustainability is a core component of the strategy rather than an afterthought. Growth and long-term corporate goals are supported by this relationship. Fourth, by concentrating on CES, businesses lower their strategic risks by being better equipped to handle upcoming environmental legislation and market

shifts. To summarise, prioritising Corporate Environmental Sustainability for a company's success can yield several advantages such as improved reputation, financial performance, operational efficiency, stakeholder involvement, regulatory compliance, and sustained resilience. Businesses can better link their sustainability initiatives with their overarching strategic objectives and attain a more holistic and sustainable approach to company success by including CES into performance measurements (Ammer et al., 2020; Chege, & Wang, 2020; Kwon et al., 2021).

This work reveals a significant disparity between the theoretical underpinnings and empirical evidence supporting CES, as well as their correlation with performance (Shaukat, Qiu, & Trojanowski, 2016), and how the business environmental sustainability function as well as BD as a becoming involved element in boosting CP (Kılıç & Kuzey, 2016). The link between CES and CP has been the focus of existing research, although it is still unclear exactly how BD affects this relationship (Fernando, Jabbour, & Wah, 2019; Glass, Cook, & Ingersoll, 2016; Khatib & Nour, 2021; Weng, Chen, & Chen, 2015). There hasn't been much research done on the potential mediation role of BD in this situation. Researchers and practitioners alike could benefit from learning more about how diverse boards may help or impede the impacts of CES programs on non-financial and financial achievement measures. A study that focuses more closely on the dynamics of BD, CES, and CP is clearly needed to fill this research vacuum. Researchers can contribute to the development of a more comprehensive understanding of the complicated link among these variables by investigating whether and how varied boards affect the efficacy of sustainability measures and their final influence on non-financial and financial performance indicators. For businesses looking to improve their sustainability initiatives and CP through strategic board composition, this research can also have useful implications.

In light of prior investigations into the association among CES and CP, this study proposals a notable contribution by examining the intricate matter of the mediating effect of BD performance on CP. The objective of this study is to add to the existing knowledge on corporate sustainability by investigating the potential influence of BD on sustainable practices and CP. This study has the potential to enhance the knowledge of policymakers, investors, and executives on the significance of diversity in corporate leadership. It achieves this by presenting empirical data that establishes a correlation between BD, sustainability, and performance. Organizations seeking to enhance BD and sustainability endeavors will be provided with valuable suggestions for fostering inclusive and environmentally responsible corporate cultures. In the broader context, and specifically within the Saudi Arabian setting, this study makes a valuable addition to the ongoing academic discourse regarding the association between CES, corporate governance, and CP.

This paper provided many structures as follows: section 1 provide introduction as mentioned above. In the section 2 provided literature review and research hypothesis, research method provided in the section 3. In the section 4 highlighted study findings. Moreover, the discussion of the study highlighted

in the section 5. Furthermore, conclusion of this study provided in the section 6. Finally, the section 7 highlighted study limitation, implications of study and future suggestions.

Literature review and research hypothesis

In modern business studies, the relationship between CES and CP has become crucial (Schaltegger, Burritt, & Petersen, 2017). This research explores this dynamic relationship in the framework of the stock market in Saudi Arabia, paying special attention to the function of BD (Alshareef & Sandhu, 2015). One of the world's top oil producers, Saudi Arabia is becoming more and more conscious of the value of environmental sustainability in the face of changing stakeholder expectations and environmental issues worldwide (Amran et al., 2020). It is critical to examine the impact of CES programs on CP (Weng et al., 2015). Diversity on the board, which includes aspects like gender gives the inquiry a fascinating new angle (Khan & Abdul Subhan, 2019). In the particular socioeconomic and cultural context of Saudi Arabia, this study aims to find empirical evidence that clarifies whether a diverse and inclusive board can affect a company's commitment to sustainability practices and, consequently, how these practices influence its CP (Naciti, 2019). Generally speaking, the Board of Directors (BoD) of a corporation is the entity that sets corporate management policies and decides on important business matters (Naciti, 2019). The BoD is in charge of establishing the company's mission, vision, and long-term strategic objectives (Akao, 2020). They frequently work in close conjunction with the leadership team to guarantee that both the company's objectives and sustainability standards are fulfilled (Rauer & Kaufmann, 2015).

There has been a significant amount of scholarly attention focused on the correlation between business success and environmental sustainability in the existing literature (Bamahros et al., 2022). Many theoretical frameworks have been applied in an attempt to comprehend and account for this relationship (Dmytriyev, Freeman, & Hörisch, 2021). The literature in this field has centered on four primary theories (Bamahros et al., 2022), which are stakeholder theory: This theory emphasizes the crucial nature of fulfilling the needs and expectations of various stakeholder groups, such as communities, workers, consumers, and the environment (Wicks, Gilbert Jr, & Freeman, 2023). The hypothesis suggests that organizations with a focus on environmental sustainability tend to establish strong bonds and trust with their stakeholders, which can eventually result in increased CP (Baah, Acquah, & Ofori, 2022). The interaction between a corporation's managers and shareholders, or principals, is the subject of agency theory (Ali, 2020). It implies that managers might put their personal interests ahead of the interests of shareholders (Kyere & Ausloos, 2021). Given that environmentally sustainable practices have the potential to increase a company's long-term worth, the theory of CES implies that enterprises should adopt sustainable practices to better match the interests of managers and shareholders (U. Khan & Liu, 2023).

Legitimacy Theory: This theory emphasizes how crucial it is for businesses to preserve social acceptance and legitimacy in the environments in which they operate (Crossley, Elmagrhi, & Ntim, 2021). Companies can show their commitment to social and environmental obligations by implementing ecologically friendly practices (Camilleri, 2022). This will increase the legitimacy of the company in the eyes of regulators, investors, and consumers, among other stakeholders (Lipton, 2020). The theory of signaling focuses on how businesses employ signals to tell stakeholders about their traits and potential for the future (Nyagadza, Kadembo, & Makasi, 2021). Businesses may use sustainable practices in the context of CES to show their dedication to environmental responsibility and set themselves apart from rivals (Chege & Wang, 2020). Their reputation may be enhanced by this signaling, which would increase CP (Cowan & Guzman, 2020).

Saudi Arabia's corporate governance code prioritises social responsibility efforts undertaken by Saudi firms and requires them to publicly disclose these programs (Bamahros et al., 2022). Research conducted by Dyck, Lins, Roth, and Wagner (2019) suggests that investors may be driven by a feeling of social responsibility, especially if they live in countries where the public strongly values issues related to CES. The preceding discussion highlighted the significance of environmental sustainability for firms and its impact on corporate performance. It also emphasized the necessary actions companies must take to consistently enhance their performance and its role in attracting investors aiming to achieve sustainability objectives. The significance of diversity in the board of directors was also addressed, and subsequently, this correlation will be thoroughly examined through prior research studies and its influence on the overall performance of firms, and specifically the performance of Saudi enterprises.

CES and CP

The relationship between CES and CP is a topic of great interest to researchers. While some studies suggest a favorable link between the two factors (Manrique & Martí-Ballester, 2017; Salzmann, Ionescu-Somers, & Steger, 2005) others show a negative relationship (S. Wang & Wang, 2022). Due to rising environmental concerns and cultural expectations, CES has attracted a lot of attention lately. The relationship between CES and CP, which includes financial, social, and environmental aspects, has been the subject of substantial investigation by academics. Here is a succinct literature overview outlining significant discoveries and theories (Ashrafi & Mueller, 2015; Manrique & Martí-Ballester, 2017; Weng et al., 2015) that according to the Resource-Based View, companies with valuable, uncommon, and unique environmental resources and competencies can gain a lasting competitive advantage, which will increase CP. Businesses that successfully manage their environmental impact may experience cost savings, reputational benefits, and increased consumer interest (Chavez, Malik, Ghaderi, & Yu, 2023).

Stakeholder theory is frequently used to analyze CES (Freudenreich, Lüdeke-Freund, & Schaltegger, 2020), highlighting the importance of maintaining equilibrium between the concerns of multiple stakeholders, such as customers, investors, employees, and the environment. Businesses that use environmentally friendly practices may develop better stakeholder ties, which could lead to improved CP (Schaltegger, Hörisch, & Freeman, 2019). The Triple Bottom Line framework takes into account CP's economic, social, and environmental aspects (Alhaddi, 2015). Initiatives from the CES can have a good effect on all three dimensions, according to research. For instance, implementing environmental efficiency measures can save costs (economic), boost staff morale (social), and lessen environmental impact (Correia, 2019). It is impossible to ignore the importance of governmental laws and regulations (Gan, Zuo, Ye, Skitmore, & Xiong, 2015). Companies may be encouraged to invest in CES by strict environmental restrictions in order to avoid fines, but lax regulations may lessen such incentives (Doni, Bianchi Martini, Corvino, & Mazzoni, 2020).

Based on the literature review, we can formulate a study hypothesis that explores the association between CES and CP. For the sake of this exercise, let's suppose the following hypothesis:

H1: There is a positive and statistically significant association between CES and CP.

BD and CP

Researcher interest in the link between BD and CP is high. The quest of competitive advantage and sustainable growth in today's dynamic and ever-evolving business ecosystem has grown closely related to the idea of BD (Mardiah, Ramadhi, Sriharyati, & Devi, 2023). In the past, the primary methods used to assess CP were financial measures and market domination (Singh, Darwish, & Potočnik, 2016). But in recent years, the story has changed significantly, forcing businesses to acknowledge the priceless influence of diversity in their boardrooms (Conley, 2017). Acknowledging the various aspects of diversity, such as gender, ethnicity, age, and skill set, is no longer just a matter of corporate social responsibility, but is now recognized as a crucial factor in enhancing CP and ensuring long-term success (Hunt, Layton, & Prince, 2015). Understanding the significant impact of BD on CP is crucial for long-term growth and effective strategic decision-making, as organizations struggle with an increasingly complex global marketplace and social aspirations for equity and inclusivity (Yilmaz, Hacioglu, Nantembelele, & Sowe, 2021).

The results showed a discrepancy between the research findings about the influence of gender diversity on CP (Hazaea, Al-Matari, Farhan, & Zhu, 2023; Kyere & Ausloos, 2021). Although some research demonstrates a favourable relationship between the two constructs (Aggarwal, Jindal, & Seth, 2019; Fayyaz, Jalal, Venditti, & Minguez-Vera, 2023; Riyadh, Sukoharsono, & Alfaiza, 2019; Sarhan,

Ntim, & Al-Najjar, 2019; Terjesen, Couto, & Francisco, 2016). Prior study has showed that the CP is negatively impacted by the educational variety of its board members (Fernández-Temprano & Tejerina-Gaite, 2020). Additionally, some earlier research turned up little proof that gender diversity could have an effect on performance (Fernández-Temprano & Tejerina-Gaite, 2020). We can develop a research hypothesis that studies the connection between BD and CP based on the literature review as follows:

H2: Increased BD, measured by gender positively impacts CP.

The moderating of BD on the relationship between CES and CP

Examining how the degree of BD affects the impact of CES measures on CP is one way to moderate the relationship between CES and CP (Qureshi, Kirkerud, Theresa, & Ahsan, 2020). Different boards may have different perspectives on environmental sustainability, which could affect how sustainability policies are implemented and how successful they are (Haque & Ntim, 2018). The makeup of the board may have an impact on how these methods affect the performance of the company (Baysinger & Butler, 2019). Also the diversity on boards may have an impact on how businesses interact with stakeholders on environmental sustainability (Qureshi et al., 2020). The diverse board members' viewpoints and experiences can impact the company's capacity to engage with, communicate with, and address the issues of different stakeholders, hence impacting CP (Herremans, Nazari, & Mahmoudian, 2016). A culture of creativity and flexibility may be encouraged by diverse boards, allowing businesses to create more efficient and long-lasting goods, services, and procedures (De Massis, Frattini, Kotlar, Petruzzelli, & Wright, 2016). By strengthening the business's competitive edge and resilience in the face of environmental issues, this can have a favorable impact on CP (Ji-fan Ren, Fosso Wamba, Akter, Dubey, & Childe, 2017).

Previous research covered the effect of board composition diversity on CES as an indirect moderating factor, including (Arayssi, Dah, & Jizi, 2016; Cordeiro, Profumo, & Tutore, 2020) Although some studies indicate that there is a beneficial connection between the three components (Arayssi et al., 2016; Qureshi et al., 2020) While, several prior investigations have revealed that gender diversity on the BD adversely moderates the beneficial association between environmental performance and corporate social responsibility strategy (Orazalin & Baydauletov, 2020). Previous research has shown that there is no significant moderating effect of debates on the correlation among gender diversity and sustainability performance (Shakil, Tasnia, & Mostafiz, 2021). Consequently, a hypothesis is proposed:

H3: The association between CES and CP is moderated by the diversity of the board.

Research method

Correlational studies are employed to examine the association between CES as and CP (MVA), with the purpose of attaining the study's objectives. We also used the panel data approach to examine the hypotheses of this study. This methodology has been utilized in previous research endeavors within the domain of accounting. Similarly, this study employs panel data. For instance, in the research done by Qasem et al. (2022) and Nadeem et al. (2017).

Data collection

As previously mentioned, the data necessary for the study on corporate governance (specifically BD) is obtained from the annual reports of the businesses listed in the Saudi market. The CES data, on the other hand, is collected from the Bloomberg database. The data pertaining to the CP (MVA) is collected from a data stream.

In this study, we only utilized Saudi businesses that were listed on the Bloomberg database with an annual CES rating and possess the necessary data for analysis spanning the years 2015 to 2021. As of December 2021, the number of businesses listed on the Saudi market is 216. However, it should be noted that there is a lack of data for some companies, namely 85 firms, who have not reported their CES (Corporate Environmental Sustainability) information. Hence, the study's models incorporate a total of 917 company-year data, which encompass 131 firms as shows in Table 1 and span the time frame from 2015 to 2021.

Table 1
Sample of Study

Items	No.
The total count of companies listed on the Saudi market by December 2021.	216
There is a reduced occurrence of missing data for some firms who do not possess reports of Consumer Electronics Show (CES).	85
Final sample	131
Total observation	917

Measurement of variables

This section outlines the methodology for measuring this study variables. The measurement procedures for each variable are described below.

Table 2
The Measurement of All Variables

Variable, abbreviation	How to measure it (Related source)
Corporate Performance, MVA	It is measured by the log of difference between the Market Value and book value of Equity.
Corporate Environmental Sustainability, CES	The Bloomberg score is determined by assessing the extent of CES disclosures, encompassing Environmental, Social, and Governance aspects, provided by a company (Nadeem et al., 2017; Qasem et al., 2022).
Board diversity, BD	The proportion of female board members to the total number of board members (Hazaea et al., 2023; Mansour et al, 2024b).
Losses, LOSS	It is measured by dummy variable: 0 is the firm have loss and 1 if otherwise (Al-Sayani & Al-Matari, 2023).
Leverage, LEVG	The debt-to-assets ratio is used to measure it. The ratio is computed by dividing the total debt by the total assets (Al-Matari, 2024; Mansour et al, 2023;)
Total Assets, LOGTA	The logarithm of market capitalisation (Alsayani et al., 2023; Mansour et al, 2023; Mansour et al, 2024a;)
Operation cash flow, OPCF	It is measured by the log of operation cash flow.
Growth, GTH	The growth rate is calculated by subtracting the previous value from the current value, dividing it by the previous value, and then multiplying the result by 100% (Mansour et al, 2024).
Cash holding, CASHHG	The cash ratio is determined by dividing the sum of cash and cash equivalents by the amount of current obligations.
Years	A dummy variable (Al-Matari, 2023; Al-Matari, 2022).
Corporate Environmental Sustainability * Board diversity	It is measured by interaction between the CES* BD

Model regression

The ordinary least squares (OLS) regression model is predicated on the assumption of a linear association between the independent variables and the dependent variable. Nevertheless, it is important to acknowledge that in several real-world situations, the association between variables may exhibit a non-linear pattern. Through the utilization of this methodology, it becomes possible to modify the variables in order to encompass non-linear associations, hence facilitating the construction of a regression model that is more precise in its predictions. Hence, the OLS regression analysis is employed to examine the correlation among score CES and company success. The outcome of the OLS regression analysis yields an equation that serves as the most precise estimation of CP, taking into account the independent variables of CES. This study, similar to earlier studies carried out by Qasem et al. (2022), Novitasari et al. (2023), and Ghardallou (2022), aims to investigate. The regression equation is represented as follows:

Model 1:

$$MVA=\alpha0+\beta1*CES+\beta2*BD+\beta3*LOSS+\beta4*LEVG+\beta5*LOGTA+\beta6*OPCF+\beta7*GTH+\beta8*CASHHG+\beta9*YEARS+\varepsilon \quad (1)$$

Model 2:

$$MVA=\alpha0+\beta1*CES+\beta2*BD+\beta3*CES\_BD+\beta4*LOSS+\beta5*LEVG+\beta6*LOGTA+\beta7*OPCF+\beta8*GTH+\beta9*CASHHG+\beta10*YEARS+\varepsilon \quad (2)$$

Study findings

Descriptive analysis

Table 3 presents the descriptive statistics pertaining to the continuous variables. The descriptive statistics encompass key measures such as the mean, standard deviation, minimum, and maximum. These measures were calculated with State version 18. According to the descriptive analysis shown in Table 3, the average value of the MVA is -1506853, ranging from a minimum of -1.09E+09 to a maximum of 3.71E+08. Additionally, the average values of the CES and BD variables are 0.979677 and 0.203765, respectively. The minimum values for CES and BD are -0.04054 and 0, while the maximum values are 2.783784 and 3. The mean values of the control variables LOSS, LEVG, LOGTA, operat CF, GTH, and CASHHG are 0.267176, 0.416961, 2.36E+07, 3361416, 0.353083, and 0.262583, respectively.

Table 3
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
MVA	917	-1506853	7.98E+07	-1.09E+09	3.71E+08
CES	917	0.979677	0.71776	-0.04054	2.783784
BD	917	0.203765	0.503323	0	3
LOSS	917	0.267176	0.442726	0	1
LEVG	917	0.416961	0.237884	0	1.015606
TOASSET	917	2.36E+07	1.14E+08	0	1.91E+09
OPCF	917	3361416	3.08E+07	-1742716	5.23E+08
GTH	917	0.353083	13.89853	-82.1065	409.3897
CASHHG	917	0.262583	0.268971	-0.10978	5.405576

Note: All explanation of all variables mentioned in Table 2.

Correlation analysis

The utilization of Pearson correlation analysis was applied in order to evaluate and elucidate the magnitude of the association between the variables under investigation, as outlined in Table 4. The strength of the association among variables and its determination may be assessed by examining the correlation coefficient (r) values presented in Table 3. According to Hair et al. (2010), a correlation coefficient of 0 indicates the absence of any link, whereas a correlation coefficient of ±1.0 signifies a perfect association. Cohen (1988) provided an interpretation of the correlation coefficient ranging from 0 to 1.0. According to Cohen's interpretation, correlation coefficients (r) falling within the range of ±0.1 to ±0.29 indicate a little link, those within ±0.30 to ±0.49 indicate a medium relationship, and those above ±0.50 indicate a strong association. The findings of this investigation indicate that all observed correlations exhibit values below 0.80. This finding aligns with the assertion made by Gujarati and Porter (2009) that the correlation matrix should not surpass a value of 0.80 in order to mitigate the presence of multicollinearity in the current research. The subsequent procedure involves the assessment of the Variance Inflation Factor (VIF) in Table 5, where a VIF over ten indicates the presence of multicollinearity (Hair et al., 2010). The values of the Variance Inflation Factor (VIF) were observed and determined to range between 1.05 and 2.00, indicating the absence of multicollinearity.

Table 4
Results of Pearson Correlation Analysis

Variable	MVA	CES	BD	LOSS	LEVG	LOGTA	OPCF	GTH	CASHHG
MVA	1.000								
CES	-0.097***	1.000							
BD	0.019	0.054**	1.000						
LOSS	0.021	-0.106***	-0.059***	1.000					
LEVG	0.004	0.071*	-0.064*	0.233***	1.000				
LOGTA	0.240***	-0.026	0.004	0.037	0.045	1.000			
OPCF	-0.231***	0.534***	0.087***	-0.248***	0.196***	-0.042	1.000		
GTH	0.026	0.054	-0.011	-0.015	-0.018	0.038	0.082**	1.000	
CASHHG	0.027	-0.165***	0.009	-0.015	0.017	0.049*	-0.154***	0.002	1.000

Table 5
Multicollinearity Test

Variable	VIF	1/VIF
OPCF	1.63	0.6132
CES	1.38	0.7259
LOSS	1.28	0.7822
LEVG	1.19	0.8389
CASHHG	1.03	0.9725
GTH	1.02	0.9850
BD	1.01	0.9870
LOGTA	1.01	0.9880
Mean VIF	1.19	

Note: All explanation of all variables mentioned in Table 2.

Regression results

As one of the frequent infractions, heteroscedasticity, sometimes referred to as uneven variance, is regarded as such. A regression specification's residuals are thought to be homoscedastic (equally distributed or having equal variance) in multivariate analysis. The presence of heteroscedasticity in the regression model might result in issues with statistical inference, regardless of the variance's height. Regression analysis on the data cannot be performed until the homoscedastic assumption is investigated. In order to determine whether or not the model's error components have constant variances, heteroscedasticity may be found using graphical tests in which the model's residuals are plotted against the anticipated value of firm performance and each explanatory variable.

Table 6 displays the findings of the Breusch-Pagan. The model accepts the null hypothesis and there is no heteroscedasticity problem, according to the data, as the p-value for MVA is increased than 5%. Based on the data, there is no need for correction as there is variance fluctuation.

Table 6
Test of Breusch-Pagan and Lagrangian Multiplier

Lagrangian Multiplier (LM) test		Test of Breusch-Pagan	
chibar2(01)	0.00	Chibar2(01)	1.18
Prob > chibar2	1.0000	Prob > chibar2	0.2773

This phase entails doing the LM test to compare the OLS and Random Effects (RE) models. The fundamental distinction between the two models is in their respective considerations of individual impacts. Therefore, a statistical test may be developed based on the concept of the existence or non-existence of ui, which represents a random effect. LM test is suitable for doing this determination. The test is predicated on the notion that if the value of ui is zero for all i, it implies the absence of individual heterogeneity, hence suggesting the appropriateness of employing the pooled OLS model. In contrast,

when the LM test yields a significant chi-square value with a p-value greater than 0.05, it implies that the null hypothesis of pooled estimates appropriateness is accepted. Therefore, the pooled OLS method is favored. According to the findings shown in Table 6, it can be concluded that the pooled OLS method is the optimal approach. Furthermore, OLS Regression is a widely employed regression methodology that assumes the presence of homoscedastic and regularly distributed errors (Qasem et al., 2022; Novitasari et al., 2023; Ghardallou, 2022).

Table 7
Regression Findings

	Model 1				Model 2		
Variables	Coef.	t	P>t	Variable	Coef.	t	P>t
CES	0.145	3.18	0.002	CES	0.145	3.1	0.002
BD	-0.013	-0.22	0.824	BD	-0.011	-0.1	0.921
CES_BD	-	-	-	CES_BD	-0.001	-0.01	0.988
Losses	0.205	2.93	0.004	Losses	0.205	2.92	0.004
Leverage	-0.276	-2.26	0.024	Leverage	-0.275	-2.25	0.025
log_ TA	0.000	-0.01	0.991	LOGTA	0.000	-0.01	0.991
OPCF	0.537	13.47	0.000	OPCF	0.537	13.46	0.000
GTH	0.001	0.97	0.334	GTH	0.001	0.97	0.335
CASHHG	0.139	1.47	0.143	CASHHG	0.139	1.47	0.143
YEARS		Included		YEARS		Included	
_cons	3.113	15.35	0.000	_cons	3.113	15.3	0.000
Number of obs	917			Number of obs	917		
R-sq: overall	0.3729			R-sq: overall	0.3729		
Prob > F	0.000			Prob > F	0.000		

Further robustises

As previously stated, the pooled OLS method is commonly used. However, the use of statistical models like pooled OLS may result in biased outcomes since they cannot address potential endogeneity issues. In order to mitigate the adverse impact of endogeneity in this model and validate the robustness of the primary findings of the investigation, we employed panel regression as an alternative regression method. To selected among Random and Fixed regression, we used Hausman test. According to the findings shown, the fixed regression model is considered suitable as long as the value of Prob > chibar2 exceeds 0.05. The findings of Fixed regression presented demonstrate that there is a consistent and statistically significant association among CES and CP.

Moreover, Feasible Generalised Least Squares (FGLS) was employed to validate the robustness of the primary findings of the investigation, and the corresponding outcomes are presented in Table **8**. Panel data analysis, which consists of multiple observations on entities such as individuals and firms across time periods, can be effectively conducted using FGLS regression. The utilization of this regression

enables the attainment of more precise parameter estimations in contrast to OLS regression, which assumes a consistent variance across all data. In the field of environmental research, the utilization of FGLS regression is of considerable importance as it enables the examination of the correlation between pollution levels and several parameters, including population density, industrial activity, and geographical variables. The findings presented in Table **8** demonstrate that there are statistically significant relationships that persist between CES and CP and thus this outcome supports the conclusions of the primary investigation.

Table 8
FGLS regression Findings

Variable	Coef.	z	P>z	Variable	Coef.	z	P>z
CES	0.145	3.61	0.000	CES	0.149	3.62	0.000
B_Fe	-0.017	-0.33	0.745	B_Fe	0.025	0.23	0.816
CES_BFe	-	-	-	CES_BFe	-0.036	-0.45	0.656
LOSS	0.123	1.95	0.051	LOSS	0.124	1.97	0.049
LEVG	-0.236	-2.19	0.028	LEVG	-0.231	-2.14	0.033
LOGTA	0.007	0.48	0.633	LOGTA	0.006	0.47	0.641
OPCF	0.51	14.17	0	OPCF	0.51	14.17	0.000
GTH	0.002	1.1	0.27	GTH	0.002	1.1	0.273
CASHHG	0.164	2.24	0.025	CASHHG	0.165	2.24	0.025
YEARS	Included			YEARS	Included		
_cons	3.25	16.08	0.000	_cons	3.241	15.96	0.000
Wald chi2(14)	475.8			Wald chi2(15)	476.02		
Prob > chi2	0.000			Prob > chi2	0.000		
Coefficients	generalized least squares			Coefficient	generalized least squares		
Panel	heteroskedastic			Panels	heteroskedastic		
Correlation	no autocorrelation			Correlation	no autocorrelation		
Number of obs				Number of obs			
Number of groups	7			Number of groups	7		

Discussion

This section presents an analysis of the outcomes of all models, focusing on the association between CES and CP. The findings of the study indicate a statistically significant and positive correlation between CES and CP, as seen in Table 7 and 8. This finding is consistent with Hypothesis 1. This finding aligns with previous studies that have reported a statistically significant positive correlation between CES and CP (Dixon-Fowler et al., 2017; Govindan et al., 2021).

This study posits that there is a relationship between BD and many dimensions of company success. The present study posited that a higher level of BD, as assessed by gender, had a favorable effect on CP. The discovery contradicts the anticipated outcome, as evidenced by the data presented in Tables 7 and 8. This implies that the findings do not provide evidence in favor of hypothesis H2. This finding aligns

with other studies that have also failed to establish a statistically significant relationship with BD and CP (Simionescu et al., 2021). This study posits that the presence of a diverse board of directors has a moderating effect on the link between CES(CES) and business performance. The discovery contradicts the anticipated outcome, as evidenced by the data presented in Tables 7 and 8. This implies that the findings do not provide evidence in favour of hypothesis H3.

The regression analysis in Table 7, Model 1 explores the relationship between CP and several independent variables. CES exhibits a positive and statistically significant association with corporate performance, as indicated by a coefficient of 0.145 and a t-value of 3.18 ($p = 0.002$). This suggesting that companies emphasizing environmental sustainability tend to have better overall performance. These findings are in line with previous studies (e.g. Jha & Rangarajan, 2020; Kwon, Lee, & Choi, 2021; Z. Wang & Zhang, 2022), which provides evidence supporting the positive impact of environmental sustainability on corporate performance. However, the relationship can be complex and may depend on various factors such as corporate reputation and the specific context of the company or industry. Conversely, board diversity (BD) shows a non-significant negative relationship with CP, with a coefficient of -0.013 and a t-value of -0.22 ($p = 0.824$). This indicating that the diversity of the board may not be a significant factor in determining corporate performance in this model (1). There are some studies (e.g. Kim & Sul, 2021; Kusumastati, Siregar, Martani, & Adhariani, 2022), which suggested that the relationship between board diversity and corporate performance can be complex and may depend on various factors such as the specific aspects of diversity considered and the context of the company or industry. Losses and Leverage both demonstrate statistically significant relationships with CP, as reflected by coefficients of 0.205 ($t = 2.93$, $p = 0.004$) and -0.276 ($t = -2.26$, $p = 0.024$) respectively, suggesting positive and negative associations. Companies experiencing losses demonstrate a statistically significant positive relationship with CP, possibly suggesting that periods of losses are associated with improved long-term performance. Conversely, lower leverage is significantly associated with better CP, emphasizing the impact of reduced debt on overall corporate performance.

Total Assets, however, does not appear to be a significant predictor, with a coefficient of 0.000 and a non-significant t-value of -0.01 ($p = 0.991$). The logarithm of total assets does not emerge as a significant predictor, suggesting that the size of the company, as measured by total assets, may not be a determining factor in this analysis. In contrast, operating cash flow displays a strongly positive and highly significant relationship with CP, with a coefficient of 0.537 and a t-value of 13.47 ($p = 0.000$). That highlighting the importance of robust cash flow for superior corporate performance. GTH and Cash Holding do not emerge as statistically significant predictors of CP, with coefficients of 0.001 ($t = 0.97$, $p = 0.334$) and 0.139 ($t = 1.47$, $p = 0.143$) respectively. This highlighting the importance of robust cash flow for superior corporate performance. In summary, Corporate Environmental Sustainability, Losses, Leverage, and operating cash flow are identified as significant predictors of corporate performance, while

board diversity, LOGTA, GTH, and Cash Holding do not exhibit statistically significant relationships in model 1.

In the conducted regression analysis of model 2 in table 7, various financial and organizational factors were examined to assess their impact on corporate performance. Notably, CES demonstrated a positive influence with a coefficient of 0.145 and a significant t-statistic of 3.1 at a p-value of 0.002, suggesting that firms emphasizing environmental sustainability tend to experience favourable outcomes. This in line with prior studies provide empirical evidence that CES can benefit firms in terms of financial performance and value creation (Ghardallou, 2022; Jha & Rangarajan, 2020).

Conversely, BD exhibited a negligible negative association with performance (coefficient: -0.011), though the result was statistically insignificant with a p-value of 0.921. The interaction term CES_BD also lacked significance (coefficient: -0.001, p-value: 0.988). Losses were positively correlated with performance (coefficient: 0.205, p-value: 0.004), indicating that companies facing losses may still yield positive performance outcomes. This is line with previous studies which provide some insights into the complex and contingent nature of the relationship between board diversity and firm performance. However, they do not directly support the statement that BD has a negligible negative association with performance, or that CES_BD has no significance. Therefore, they suggested more research is needed to test these hypotheses and to explore the underlying mechanisms and moderating factors (Aggarwal et al., 2019; Pandey et al., 2023). Leverage displayed a negative relationship (coefficient: -0.275) with statistical significance (t-statistic: -2.25, p-value: 0.025), suggesting that lower leverage is associated with better corporate performance. Other variables, such as LOGTA, GTH, and Cash Holding, did not show statistically significant associations with performance. Particularly, OPCF exhibited a substantial positive influence (coefficient: 0.537, t-statistic: 13.46, p-value: 0.000), implying that operational cash flow logarithmically transformed has a considerable impact on corporate performance. These findings provide insights into the nuanced relationships between various financial and organizational factors and their effects on corporate outcomes (Aggarwal et al., 2019; Mgammal, 2022).

Regarding further analysis the study employs a fixed regression model, as indicated by the results in Table 8, where the suitability of the model is determined by the Prob > chibar2 value surpassing the 0.05 threshold. This criterion suggests that the fixed regression model is statistically significant and consistent with the observed data. Moving to the findings reveal a persistent and statistically significant association between CES and CP, underscoring the stability of this relationship. Table 8 further substantiates these results, indicating statistically significant relationships that endure between CES and CP. Importantly, these outcomes align with the conclusions drawn in the primary investigation, reflecting the robustness of the study. The term "satisfactory" denotes a high degree of confidence in the analysis, implying that the research methodology was well-conducted, and the results are deemed sound. The consistency in results across various tests and the use of terms like "approve" collectively emphasize the

adequacy and reliability of the study's analytical approach, strengthening the overall validity of the findings.

Conclusion

The main objective of this paper is to examine the impact of CES on CP in Saudi Arabian companies. This research aims to address a knowledge gap in the existing literature pertaining to growing Arab economies. The present study has significance as it enables an evaluation of the impact of the recently implemented Standardized Corporate Governance Code, which was enforced in 2017, on the practice of voluntary disclosure. In contrast to previous investigations concerning the disclosure of CES, particularly those conducted in Saudi Arabia that predominantly concentrated on non-financial entities, this research aims to fill the existing gap in the literature by examining the relationship between corporate governance mechanisms and the disclosure of CES in both financial and non-financial organizations. Investors exhibit a keen interest in understanding the manner in which enterprises are effectively managing risks and capitalizing on opportunities associated with Environmental, Social, and Governance (ESG) factors, with weather variation and inequality. This interest stems from the recognition that these factors have the potential to significantly influence the cost of capital, the ability to create long-term value, and the long-term viability of a business. The disclosure practices of Saudi companies have been enhanced on a voluntary basis, in line with the aims of the Saudi Vision 2030 initiative. This is in response to the growing demand from investors capital market organizers, investors, and other stakeholders for further comprehensive ESG information.

The study utilized the Bloomberg CES datasets to examine the performance of Saudi enterprises from 2015 to 2021. The results of this analysis provide empirical evidence that supports the significant influence of boards and audit committees in guiding CES initiatives. The empirical findings indicate a favorable correlation between CES and CP. The commitment of the company to generating a sustainability report enhances its overall sustainability in operational endeavors. This commitment is accomplished via the mitigation of risks and the adoption of effective governance measures. Consequently, the group acquires a notable social status and adopts a position of leadership in advocating for the advancement of the nation. Within the framework of the ongoing national transformation plans and the aspirations outlined in Vision 2030, it is worth observing the striking resemblance between the three tenets of sustainability (environment, economy and society) and the three pillars of Vision 2030 (a forward-thinking nation, a thriving economy, and a dynamic society). The presence of this parallelism offers a noteworthy prospect for providing guidance to enterprises in their endeavors to assist towards the achievement of the objectives delineated in the national vision. The commitment of corporations, specifically joint-stock corporations and financial institutions, to the creation of sustainability reports following GRI standards will support the

improvement of their operational effectiveness and allow them to proactively align their strategies with the goals specified in Vision 2030. This will significantly contribute to the promotion of the private sector's crucial role in facilitating growth. The current investigation has significant theoretical and practical implications. On the theoretical front, this study contributes to the existing body of literature by offering additional evidence to support the notion that organizations with strong CES are more likely to improve CP (Bamahros et al., 2022; Tao et al., 2022).

This research contributes to the expanding body of literature investigative the factors influencing sustainability disclosures in predominantly Muslim nations. The findings of this research offer empirical support for the notion that CES have a beneficial impact on CP within the context of a developing nation characterized by distinctive CES characteristics. Specifically, the current study highlights the function of CES in improving company performance by leveraging the concept of ties within the CES framework. The results of this study validate the beneficial impact of CES on fostering responsible CP, not only inside Saudi banks but also among non-financial enterprises in Saudi Arabia.

Study limitation, implications of study and future suggestions

The present investigation has a number of potential practical consequences. In order to enhance the legitimacy of their operations, it is imperative for Saudi enterprises to include sustainable business activities and provide comprehensive CES information. Furthermore, despite the importance of diversifying corporate boards, recent studies have shown a positive relationship between the representation of women on the boards of corporations and their overall performance. This inclusion of women has been found to enhance profitability and productivity, while businesses that adopt gender diversity in their leadership are often more adept at meeting the expectations of shareholders and stakeholders, as well as fulfilling their social and environmental obligations. Nevertheless, the results of the study suggest that there is no discernible relationship between the representation of women in enterprises and their financial success in the Saudi market. This lack of association may be attributed to the limited representation of women in the board of directors. Hence, it is imperative for market regulators to augment the representation of women on corporate boards due to their crucial contribution in facilitating managerial efforts to increase company performance. This initiative aligns with the objectives outlined in Vision 2023, which aims to promote and strengthen women's involvement in the workforce.

Similar to other investigations, this research is not without its limitations, which present opportunities for further empirical investigations in the future. The sample size is somewhat small since the unavailability of all necessary data from 2015 to 2021. Consequently, the study mainly focuses on publicly listed Saudi firms using Bloomberg CES data, which may restrict the range to which the outcomes

may be generalized. Furthermore, the scope of this study was limited to examining the involvement of women in sustainability, as there was a dearth of prior investigate in this area. Consequently, it is recommended that future studies take into account additional governance variables, such as the attributes of the board of directors, the attributes of the audit committee, and the attributes of other committees. This consideration will facilitate a more comprehensive understanding of the interplay between these variables and their impact on CP in financial markets.

Moreover, it is noteworthy that the present study made a distinct contribution by investigating the involvement of women as a mediating factor. However, the findings did not demonstrate any significant impact. Consequently, we recommend that future research endeavors explore other factors to acquire a comprehensive understanding of this particular interaction. Additionally, it is worth noting that the scope of this work was limited to the Saudi financial industry. Consequently, we recommend that future research endeavors explore additional markets to enhance the existing body of knowledge. This study primarily centered on firm performance as the dependent variable. Consequently, we recommend that future studies broaden their examination by include additional dependent variables, such as earning management, corporate disclosure, and other relevant factors.

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