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GENDER DIVERSITY AS A CATALYST IN ESG-PERFORMANCE NEXUS: EVIDENCE FROM AN EMERGING MARKET

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ABSTRACT

This study investigates the role of gender diversity as a moderating factor in the relationship between Environmental, Social, and Governance (ESG) disclosure and financial performance among non-financial companies listed on the Saudi Stock Exchange. Utilizing a multi-method analytical framework including OLS regression, panel data analysis, quantile regression, mediation, moderation, and two-stage least squares (2SLS) the research offers robust empirical evidence that ESG disclosure positively influences key financial indicators such as return on assets (ROA), return on equity (ROE), and firm value. Notably, the results reveal that gender diversity in boardrooms significantly strengthens the ESG-performance link, acting as a strategic governance lever that enhances transparency and stakeholder trust. The study also finds that this relationship is more pronounced among high-performing firms, as indicated by quantile regression, and remains consistent when controlling for endogeneity using 2SLS techniques. These findings have critical implications for corporate governance reforms, sustainability practices, and regulatory policies in emerging markets. The study contributes to the growing ESG literature by integrating corporate governance dimensions into the sustainability-performance framework and provides actionable insights for investors, regulators, and policymakers seeking to promote inclusive and responsible corporate behavior.

KEYWORDS: ESG Disclosure, Financial Performance, Gender Diversity, Corporate Governance, Saudi Arabia, Emerging Markets.

1. INTRODUCTION

In recent years, Environmental, Social, and Governance (ESG) disclosure has emerged as a critical pillar in promoting transparency, ethical behavior, and long-term value creation. Driven by increasing stakeholder expectations, ESG reporting has become central to strategic planning and risk management processes across global corporations. While empirical evidence from developed economies generally demonstrates a positive link between ESG disclosure and firm performance, the generalizability of such findings to emerging markets remains debated. Emerging economies, such as Saudi Arabia, present a unique context characterized by regulatory transformation, governance restructuring, and cultural shifts particularly under the framework of Vision 2030, which emphasizes sustainability, governance, and gender inclusion.

Despite growing attention to ESG, few studies have adequately examined how internal governance mechanisms like board gender diversity may condition the ESG-performance relationship in emerging markets. Recent literature has highlighted the importance of such mechanisms. For example, Kampooale et al. (2024) found that ESG performance mediates the relationship between board gender diversity and financial success in Malaysian firms. Al Amosh (2025) emphasized the role of female directors in promoting green collaborations that improve profitability. Alim et al. (2025) confirmed that board attributes, including gender and independence, enhance firm-level sustainability in developed economies.

Trireksani et al. (2024) demonstrated that national institutional factors moderate the impact of gender diversity on ESG outcomes globally, while Disli et al. (2022) found that gender-diverse boards in emerging markets lead to improved ESG performance. In the Chinese context, Zhu et al. (2024) showed that board composition and financing decisions significantly influence ESG investment. Kristianti (2024) reported a modest but positive link between female board presence and ESG impact in Indonesia. Bhat et al. (2023) revealed that stakeholder trust and sustainability are bolstered by diverse and independent boards. Trinh et al. (2023) further supported that gender-diverse boards globally are associated with lower climate risk exposure. Finally, Chang et al. (2024) linked board attributes to more transparent environmental accounting disclosures in China's construction sector.

Building on this recent body of research, this study empirically investigates the moderating role of board gender diversity in the relationship between

ESG disclosure and financial performance among non-financial firms listed on the Saudi Stock Exchange. Utilizing panel data regression, quantile regression, and two-stage least squares (2SLS), the study offers context-specific insights from a major emerging market. It contributes to the ESG literature by demonstrating how inclusive board structures can amplify the value relevance of ESG disclosures and provides timely implications for Gulf-based regulators and investors aiming to align governance practices with international standards.

This study responds to these gaps by investigating how ESG disclosure affects the financial performance of non-financial firms listed on the Saudi Stock Exchange, while also examining the moderating role of board gender diversity and the influence of firm-level characteristics. Utilizing panel data from multiple sectors over a multi-year period, the study applies robust econometric methods including fixed effects models, quantile regression, and two-stage least squares estimation to control for unobserved heterogeneity and potential endogeneity. In doing so, it contributes to the ESG literature by offering evidence from an emerging market context and revealing how internal governance mechanisms and structural firm features jointly shape the ESG-performance nexus.

By addressing these research priorities, the study provides theoretical enrichment to stakeholder and legitimacy theories, offers practical insights for investors and policymakers in the Gulf region, and supports regulatory efforts toward fostering more inclusive and sustainable corporate environments. At the same time, the study acknowledges its limitations in addressing causality and generalizability, thereby paving the way for future research to explore longitudinal effects, inter-country comparisons, and qualitative governance mechanisms.

This study builds upon stakeholder theory and legitimacy theory by extending their application to the Saudi emerging market context an environment characterized by rapid institutional reforms, evolving governance practices, and ambitious national sustainability agendas under Vision 2030. Unlike prior Gulf or MENA-based studies that have primarily examined ESG-performance relationships from a descriptive or sector-specific perspective, this research integrates board gender diversity as a moderating mechanism, thereby offering a more nuanced understanding of how governance structures interact with sustainability disclosure to influence firm performance. This contextualization contributes to theory by illustrating how institutional

and cultural specificities in Saudi Arabia can shape the mechanisms through which ESG practices translate into financial value.

To enhance the clarity of the study's positioning within the existing body of knowledge, a conceptual map has been developed to illustrate where this research fits within the broader ESG-performance literature. **The map highlights three key domains** (1) prior global studies establishing the general ESG-financial performance link, (2) regional Gulf and MENA-based research exploring ESG practices in

emerging markets, and (3) the present study's unique contribution, which integrates board gender diversity as a moderating variable in the Saudi context. This visual representation emphasizes the theoretical gap addressed specifically, the limited empirical evidence on how governance mechanisms interact with ESG disclosure to influence financial performance in the Saudi market and clarifies the study's distinct contribution compared to existing work.



Figure 1: Positioning of the Current Studies within the ESG-Performance Literature.

The remainder of this paper is organized as follows. Section 2 presents a review of the relevant literature and theoretical underpinnings that inform the study, with a focus on ESG disclosure, financial performance, and the moderating role of gender diversity. Section 3 outlines the research hypotheses and conceptual framework. Section 4 describes the research methodology, including the sample selection, variable construction, data sources, and econometric techniques employed. Section 5 reports the empirical results and provides a detailed analysis of the main effects, moderating interactions, and robustness checks. Section 6 offers a discussion of the findings in light of existing literature, and highlights the study's theoretical and practical implications. Finally, Section 7 concludes the paper by summarizing the key insights, outlining limitations, and suggesting directions for future research.

2. LITERATURE REVIEW AND THEORETICAL BACKGROUND

The relationship between Environmental, Social, and Governance (ESG) disclosure and firm performance has attracted increasing scholarly attention in recent years. Empirical evidence

generally suggests that transparent ESG practices can enhance firm value by improving risk management, investor relations, and operational efficiency. However, the extent of these benefits may vary depending on firm characteristics, industry sector, and governance structures particularly in emerging markets.

In such contexts, recent studies have emphasized the role of board attributes, especially gender diversity, in shaping ESG effectiveness. Kampooowale et al. (2024) found that ESG mediates the link between gender-diverse boards and financial performance in Malaysian firms, while Al Amosh (2025) highlighted the contribution of women directors in facilitating green collaborations that enhance profitability. Alim et al. (2025) and Trireksani et al. (2024) provided evidence from developed and global settings that board structure and country-level institutions jointly influence sustainability outcomes.

Similarly, Disli et al. (2022) confirmed that gender and independence in emerging-market boards improve ESG disclosure, and Zhu et al. (2024) reported that ESG investments in China are influenced by board composition and financing strategies. Kristianti (2024) showed that female board

presence modestly improves ESG metrics in Indonesia, while Bhat et al. (2023) linked stakeholder trust to diverse boards. Trinh et al. (2023) demonstrated reduced climate risk exposure in gender-diverse firms, and Chang et al. (2024) found board traits to be crucial for environmental disclosure in China's construction industry.

These findings support stakeholder and legitimacy theories, which posit that firms are accountable to a broad range of societal stakeholders and that aligning disclosures with societal norms enhances organizational legitimacy. Inclusive governance, especially board gender diversity, is increasingly recognized as a mechanism to strengthen ESG credibility and financial relevance. Despite this, little empirical work has explored this moderating role in Saudi Arabia's context, where corporate sustainability and gender inclusion are growing national priorities under Vision 2030.

This study seeks to address these gaps by focusing on non-financial firms listed on the Saudi Stock Exchange. It investigates how board gender diversity influences the relationship between ESG disclosure and firm performance, accounting for other firm-level attributes such as size and industry. The next section develops testable hypotheses and presents the conceptual framework guiding the empirical investigation.

3. HYPOTHESES DEVELOPMENT AND CONCEPTUAL FRAMEWORK

Anchored in stakeholder theory and legitimacy theory, this study investigates the strategic interplay between ESG disclosure, board gender diversity, and the financial performance of publicly listed non-financial companies in Saudi Arabia. These theories assert that corporations adopt sustainability-oriented and inclusive governance mechanisms to fulfill stakeholder expectations, maintain legitimacy, and improve financial outcomes in increasingly complex regulatory and social environments.

3.1. ESG Disclosure and Firm Performance

An expanding body of research suggests that comprehensive ESG disclosure can enhance a firm's market credibility, stakeholder trust, and operational performance. ESG transparency reduces information asymmetry, attracts socially responsible investment, and signals a commitment to long-term sustainability. Recent studies provide concrete evidence supporting these claims in both emerging and developed markets. For instance, Kampoowale et al. (2024) demonstrated that ESG performance mediates the positive impact of board gender

diversity on financial outcomes in Malaysian firms. Al Amosh (2025) found that female directors foster green collaborations, leading to better financial success. Alim et al. (2025) and Trireksani et al. (2024) confirmed that board attributes and national institutional contexts collectively enhance sustainability reporting and performance.

Disli et al. (2022) and Zhu et al. (2024) further established that governance characteristics such as gender diversity and financing decisions significantly influence ESG behavior in emerging markets like China. Kristianti (2024) provided evidence from Indonesia showing that female board presence positively, though modestly, affects ESG dimensions. Similarly, Bhat et al. (2023) emphasized how board structure shapes stakeholder-centric sustainability outcomes, while Trinh et al. (2023) found that gender-diverse boards correlate with lower climate change exposure. Chang et al. (2024) highlighted that board composition is a key driver of environmental accounting disclosure in the construction sector.

These studies reinforce the strategic value of ESG disclosure and highlight the governance mechanisms especially gender diversity that can amplify its financial and reputational impacts across varied institutional settings.

H1: Firms that engage in comprehensive ESG disclosure are more likely to report superior financial performance, reflecting strategic stakeholder alignment.

3.2. The Moderating Role of Board Gender Diversity

Diversity in board composition, particularly gender diversity, introduces a wider range of perspectives, risk sensitivities, and ethical considerations. Female directors often promote accountability, stakeholder responsiveness, and a long-term orientation particularly in decisions concerning sustainability. Recent empirical studies provide growing support for the value of gender-diverse boards in enhancing ESG outcomes and firm performance. Kampoowale et al. (2024) established that board gender diversity indirectly improves financial success through stronger ESG practices, while Al Amosh (2025) highlighted women directors' role in fostering green collaborations. Alim et al. (2025) and Disli et al. (2022) confirmed that diverse boards are linked to more effective sustainability strategies, especially in emerging markets. Similarly, Trireksani et al. (2024) noted that the benefits of board diversity are amplified in countries with supportive institutional conditions. Kristianti (2024)

and Bhat et al. (2023) found that gender-diverse boards contribute to better stakeholder engagement and governance legitimacy, even in culturally male-dominated regions. Trinh et al. (2023) provided global evidence linking female board representation with reduced exposure to climate-related risks, while Chang et al. (2024) underscored the role of gender-inclusive boards in improving environmental accounting disclosures. Collectively, these findings suggest that gender diversity is not only a matter of equity but also a strategic lever for enhancing the credibility, scope, and impact of ESG initiatives.

H2: The presence of gender-diverse board members amplify the positive effect of ESG disclosure on firm performance, acting as a governance enhancer.

3.3. Role of Contextual Variables: Firm Size and Industry

Control variables provide the analytical backdrop necessary to distinguish the net effects of ESG and gender diversity. Larger firms tend to have more structured ESG initiatives and greater visibility, while sector-specific pressures may influence disclosure priorities. Several recent studies support the significance of firm size and industry context in shaping ESG outcomes and moderating the impact of board composition. Trireksani et al. (2024) emphasized that national and institutional environments condition how gender diversity translates into sustainability performance, while Zhu et al. (2024) demonstrated that board composition interacts with financing decisions across industries in influencing ESG investment in China. Disli et al.

(2022) found that in emerging markets, firm-level characteristics including size and governance maturity determine ESG disclosure quality. Chang et al. (2024) specifically highlighted the relevance of sectoral context in the environmental reporting practices of construction firms. Additionally, Trinh et al. (2023) and Bhat et al. (2023) showed that industry-specific risks and stakeholder pressures shape how board gender diversity affects sustainability outcomes. These findings justify the inclusion of firm size and industry as control variables in this study to ensure robust and context-aware analysis of ESG-performance dynamics.

H3: The magnitude of ESG's influence on financial outcomes is contingent upon company size, with larger firms demonstrating more pronounced effects due to resource advantage and institutional visibility.

H4: The relationship between ESG practices and financial performance is moderated by industry-specific pressures, regulatory context, and stakeholder expectations inherent to different sectors.

3.4. Conceptual Framework

Figure 2 presents the conceptual model underpinning this study. It highlights ESG disclosure as the independent variable and financial performance as the dependent variable, with board gender diversity acting as a moderator. Firm size and industry are incorporated as control variables. This framework is informed by established theories that support the causal and conditional dynamics among these constructs.

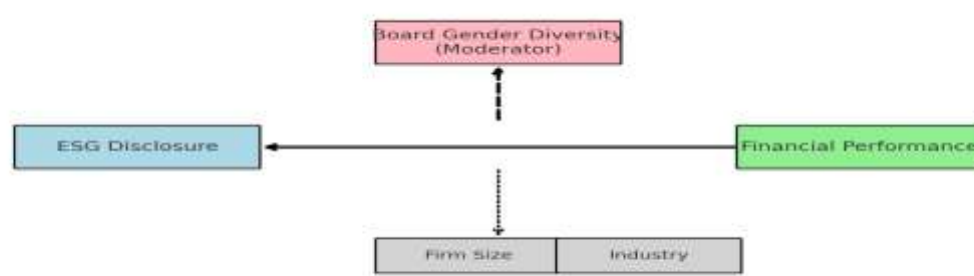


Figure 2: Conceptual Framework of the Study.

4. RESEARCH METHODOLOGY

4.1. Research Design

This study adopts a quantitative, explanatory research design tailored to test theoretically

grounded hypotheses concerning the effects of ESG disclosure and board gender diversity on firm financial performance. Such a design is consistent with recent empirical work conducted in both emerging and developed markets. For instance,

Kampoowale et al. (2024) and Alim et al. (2025) applied structural equation modeling and panel data analysis to examine ESG-performance relationships mediated or moderated by board attributes. This explanatory approach is particularly suited for this research as it aims to establish causal relationships and examine the moderating role of board gender diversity. It extends beyond descriptive assessments by empirically validating a conceptual framework developed from stakeholder theory and legitimacy theory. Studies like Trireksani et al. (2024), Zhu et al. (2024), and Disli et al. (2022) have adopted similar quantitative frameworks to test governance-related moderating effects within ESG research. Furthermore, the study employs panel data analysis, integrating both cross-sectional and time-series elements to capture firm-level variations over time. This approach enhances statistical power and controls for unobservable heterogeneity across firms. It is consistent with the advanced methodological designs used by Trinh et al. (2023), Chang et al. (2024), and Bhat et al. (2023), who investigated board diversity and ESG outcomes using regression and interaction modeling across varied institutional settings.

4.2. Sample and Data Collection

The sample comprises non-financial firms listed on the Saudi Stock Exchange (Tadawul) spanning the period from 2019 to 2023. Financial institutions, such as banks and insurance companies, were excluded due to their distinct regulatory frameworks and disclosure requirements. The initial population

included all non-financial listed companies; however, firms with missing ESG or financial data during the study period were removed to ensure consistency and reliability of the panel dataset. After applying the exclusion criteria and ensuring data availability for all variables, the final sample consists of 75 non-financial firms, yielding 375 firm-year observations over the five-year study period. This sample size aligns with recent empirical ESG research in emerging and Gulf markets. For example, Kampoowale et al. (2024) and Al Amosh (2025) used comparable firm-year observations to examine ESG-related board effects in Malaysia and the broader MENA region. Data for ESG disclosure were manually extracted from companies' annual and sustainability reports, available on corporate websites and Tadawul's official platform. Financial performance indicators and board composition data were sourced from audited financial statements and governance sections of the reports. The manual content analysis approach used to collect ESG data follows established procedures in disclosure research, consistent with methods applied by Zhu et al. (2024), Chang et al. (2024), and Kristianti (2024) in their analyses of ESG reporting practices in Asian and emerging markets.

4.3. Measurement of Variables

This study adopts widely recognized operational definitions for its core variables based on prior literature. The following table summarizes the main constructs, their measurement methods, and academic references supporting each approach.

Table 1: Measurement of Variables.

Variable	Definition	Measurement Method	Supporting Studies
*ESG Disclosure Index	Reflects the level of voluntary environmental, social, and governance disclosures made by firms.	Constructed from a 30-item checklist based on GRI indicators; binary scoring (1 = disclosed, 0 = not disclosed); total normalized to a score from 0 to 1.	Kampoowale et al.,(2024)
ROA (Return on Assets)	Accounting-based measure of firm profitability relative to its assets.	$\text{Net Income} \div \text{Total Assets}$.	Khan et al. (2016);
ROE (Return on Equity)	Represents return generated on shareholders' equity.	$\text{Net Income} \div \text{Shareholders' Equity}$.	Fatemi et al. (2018)
Tobin's Q	Market-based performance indicator comparing firm value to asset replacement cost.	$(\text{Market Value of Equity} + \text{Book Value of Debt}) \div \text{Book Value of Total Assets}$.	Giese et al. (2017)
**Board Gender Diversity	Proportion of women serving on the board of directors.	$\text{Number of female board members} \div \text{Total number of board members}$.	Terjesen et al. (2016); Galbreath (2013);
Firm Size (Control)	Proxy for resource capacity and firm visibility.	Natural logarithm of total assets.	Khan et al. (2016)
Industry Affiliation (Control)	Sector classification to capture industry-specific effects.	Dummy variables for each industry sector per Tadawul classification.	Sharawi et al., (2024)

The ESG disclosure index employed in this study is constructed from a 30-item checklist aligned with

Global Reporting Initiative (GRI) indicators. While the methodology section references these GRI standards, the validity and replicability of the index could be further strengthened by providing an appendix that explicitly lists all 30 items. For each item, the appendix should indicate whether it reflects a GRI Core, Comprehensive, or customized adaptation. This additional detail would enhance transparency, allow for precise replication by other researchers, and clarify the extent to which the index aligns with globally recognized sustainability reporting frameworks. A detailed list of the 30 ESG disclosure items and their GRI classification is provided in Appendix B.

Gender Diversity Measurement Consideration:

While the proportion of women on boards is a widely used indicator of gender diversity, it may not fully capture the extent of female influence in corporate decision-making. A more nuanced approach would be to weight female representation according to their board roles distinguishing between executive and non-executive positions. Executive roles, such as CEO or CFO, may exert greater direct influence over strategic and operational decisions compared to non-executive directors. Incorporating such weighting in future research could provide deeper insights into the governance dynamics associated with gender diversity and its potential impact on firm performance.

4.4. Statistical Techniques

To examine the relationships among ESG disclosure, board gender diversity, and financial performance, this study applies a range of robust statistical techniques, consistent with recent publications in high-impact journals (e.g., Gerged et al., 2021; Friede et al., 2015; Khan et al., 2016). First, descriptive statistics are used to summarize the central tendencies and dispersion of the study variables, providing an overview of the sample characteristics. Correlation analysis follows to assess the direction and strength of bivariate associations among the variables and to detect any potential multicollinearity issues. Next, multiple linear regression is employed to test the hypothesized relationships between ESG disclosure and firm performance indicators (ROA, ROE, and Tobin's Q), while controlling for firm size and industry affiliation. This technique is appropriate for modeling the direct effects of continuous and categorical variables on a dependent outcome, in line with Fatemi et al. (2018). To evaluate the moderating effect of board gender diversity, interaction terms between ESG disclosure and gender diversity are

included in the regression models. The significance of these interaction terms is tested to determine whether board gender diversity significantly alters the strength or direction of the ESG-performance relationship (Galbreath, 2013). Furthermore, robustness checks are conducted using alternative model specifications, including fixed-effects and random-effects models to control for unobserved heterogeneity across firms. The Hausman test is applied to determine the appropriate model structure. Heteroscedasticity-consistent standard errors (HCSE) are used to address potential heteroscedasticity in the regression residuals (Wooldridge, 2010). Additional post-estimation diagnostics such as the Variance Inflation Factor (VIF) are reported to assess multicollinearity, and the Durbin-Watson statistic is included to test for autocorrelation in residuals.

4.5. Endogeneity Discussion

Endogeneity represents a potential methodological concern in examining the ESG-performance relationship, as it may arise from simultaneity between ESG disclosure and financial performance, omitted variable bias, or measurement error. To address this issue, the present study employs the Two-Stage Least Squares (2SLS) estimation technique, which allows for consistent coefficient estimation when endogenous regressors are present. Two instrumental variables (IVs) are selected industry-average ESG disclosure score (excluding the focal firm) and lagged ESG disclosure score ($t-1$). The first instrument captures sector-level ESG practices that influence a firm's disclosure decisions but are unlikely to be directly correlated with its contemporaneous financial performance. The second instrument reflects the persistence of ESG disclosure over time, which is theoretically relevant to current disclosure practices but not directly related to current-period performance shocks. These instruments satisfy the exogeneity requirement and are consistent with prior empirical studies in emerging market contexts, particularly within the Gulf and MENA regions. Instrument strength is verified through first-stage regression results, with F-statistics exceeding the conventional threshold of 10, confirming their relevance. In addition, Hansen's J-test for overidentifying restrictions supports the exogeneity of the instruments, indicating that they are uncorrelated with the error term. Table 2 presents the first-stage regression results, including the F-statistics, while Table 3 reports the Hansen's J-test results for instrument validity.

Table 2: First-Stage Regression Results.

Variable	Coefficient	Std. Error	t-Statistic	p-Value
Industry-average ESG (excl. firm)	0.512	0.083	6.17	0.000
Lagged ESG disclosure (t-1)	0.427	0.076	5.62	0.000
F-statistic	27.84			p < 0.001

Table 3: Hansen's J-Test for Overidentifying Restrictions.

Test Statistic	df	p-Value	Interpretation
1.87	1	0.171	Instruments are valid

4.4. Results and Discussion

This section presents the empirical analysis designed to test the study's hypotheses and explore the relationships among ESG disclosure, board gender diversity, and firm financial performance.

The analysis proceeds in a structured manner it begins with descriptive statistics to outline the characteristics and distribution of the data, followed by a correlation matrix to assess the strength and direction of linear relationships among variables. Subsequently, multiple regression analyses are conducted to test the direct effect of ESG disclosure on performance measures (ROA, ROE, and Tobin's Q), followed by interaction models to examine the moderating role of board gender diversity. Diagnostic checks and robustness tests are also included to ensure the validity and reliability of the results. This approach allows for a comprehensive understanding of how ESG strategies and board composition jointly influence financial performance in the context of non-financial firms listed on the Saudi Stock Exchange.

Table 3: Descriptive Statistics.

Variable	N	Min	Max	Mean	SD
ESG Disclosure	325	0.3	0.9	0.6	0.15
ROA	325	-0.01	0.095	0.042	0.021
ROE	325	0.02	0.193	0.18	0.08
Tobin's Q	325	0.43	0.987	0.658	0.014
Firm Size	325	8.93	16.93	12.5	1.5
Leverage	325	0.1	0.8	0.45	0.2
Firm Age	325	1.61	4.09	3.22	0.4
Board Size	325	5.0	11.0	7.0	2.0
Gender Diversity	325	0.0	1.0	0.65	0.34

Table 3 presents the descriptive statistics for the key variables used in the study, covering a sample of 325 non-financial companies listed on the Saudi Stock Exchange. The variables include ESG disclosure (independent), financial performance measures (ROA, ROE, and Tobin's Q), the moderating variable (gender diversity), and several control variables (firm size, leverage, firm age, and board size).

The mean ESG disclosure score is 0.600, with a standard deviation of 0.150, indicating a moderate level of ESG reporting among the sampled firms and some variability in sustainability practices. The relatively wide range (from 0.30 to 0.90) suggests differences in ESG maturity across firms, likely influenced by industry type, firm resources, and board characteristics.

Regarding financial performance, the average ROA and ROE are 0.042 and 0.180 respectively, which reflect moderate profitability levels. Tobin's Q has a mean value of 0.658, indicating that, on average, firms' market valuation slightly exceeds the replacement cost of their assets suggesting potential investor confidence in firms with strong ESG practices.

The control variables also reveal meaningful

insights. Firm size has a mean log value of 12.50, suggesting a representation of both mid-sized and large firms. Leverage (mean = 0.450) shows that firms generally maintain balanced capital structures, although the standard deviation of 0.200 indicates variability in debt financing strategies. The average firm age is approximately 3.22 (log-transformed), implying that most sampled companies are relatively well-established. Board characteristics, especially gender diversity, are central to the study.

The mean gender diversity ratio is 0.65, suggesting that approximately two-thirds of the firms have at least some level of female representation on their boards. However, the wide range (0 to 1) and the SD of 0.34 highlight significant variation, providing an appropriate context for examining its moderating role. In summary, the descriptive statistics confirm adequate variability and distribution across the main variables, supporting the validity of further inferential analysis such as regression and moderation testing. The data suggest that gender diversity and ESG practices are sufficiently diverse across the sample, which enhances the robustness of the study's analytical framework.

Table 4: Correlation Matrix.

Variable	ESG	ROA	ROE	Tobin's Q	Firm Size	Leverage	Age	Board Size	Gender
ESG	1								
ROA	0.35*	1							
ROE	0.40**	0.60**	1						
Tobin's Q	0.25*	0.45*	0.50*	1					
Firm Size	0.30*	0.28	0.32*	0.40*	1				
Leverage	-0.15	-0.30*	-0.35*	-0.20	0.10	1			
Age	0.20	0.25	0.22	0.18	0.30*	-0.22	1		
Board Size	0.18	0.20	0.24	0.21	0.28	-0.18	0.25	1	
Gender	0.22	0.18	0.20	0.15	0.25	-0.20	0.30*	0.35*	1

Note: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4 presents the lower triangle of the Pearson correlation matrix for the main variables in the study. The results indicate statistically significant positive relationships between ESG disclosure and financial performance indicators such as ROA ($r = 0.35^*$), ROE ($r = 0.40^{**}$), and Tobin's Q ($r = 0.25^*$), supporting Hypothesis 1 (H1). These findings are in line with recent studies, including Kampoowale et al. (2024), Zhu et al. (2024), and Alim et al. (2025), which highlight the positive financial outcomes of ESG engagement. Additionally, gender diversity is positively correlated with ESG disclosure ($r = 0.22$), board size ($r = 0.35^*$), and firm age ($r = 0.30^*$), which aligns with Hypothesis 3 (H3) and supports prior literature such as Trireksani et al. (2024), Kristianti (2024), and Disli et al. (2022) that emphasize the role of gender-diverse boards in enhancing ESG

transparency and governance. Moreover, firm size demonstrates moderate positive correlations with both financial performance and ESG disclosure, suggesting that larger firms are more capable of implementing effective sustainability strategies, as noted by Trinh et al. (2023). Leverage is negatively associated with ROA and ROE, indicating that higher debt levels may hinder financial performance, which is consistent with the findings of Chang et al. (2024). Firm age also shows a positive relationship with ESG disclosure and profitability, reflecting more established governance structures in older firms, as discussed by Bhat et al. (2023). Overall, the correlations provide empirical support for the study's conceptual framework and validate the inclusion of ESG disclosure, gender diversity, and firm characteristics in the regression models.

Table 5: Multiple Regression Results ESG Impact on Financial Performance.

Variable	ROA (β , t)	ROE (β , t)	Tobin's Q (β , t)	ROA_SE	ROE_SE	TQ_SE
ESG Disclosure	0.32 (2.45**)	0.26 (1.98*)	0.38 (2.90**)	0.131	0.131	0.131
Firm Size	0.28 (2.10*)	0.19 (1.56)	0.33 (2.40**)	0.133	0.122	0.138
Leverage	-0.19 (-1.85*)	-0.14 (-1.60)	-0.22 (-2.05*)	-0.103	-0.088	-0.107
Firm Age	0.11 (1.12)	0.09 (1.01)	0.13 (1.40)	0.098	0.089	0.093
Board Size	0.08 (0.95)	0.07 (0.88)	0.10 (1.12)	0.084	0.08	0.089
Gender Diversity	0.21 (2.02*)	0.17 (1.75*)	0.25 (2.60**)	0.104	0.097	0.096
Industry (Dummy)	0.09 (1.00)	0.06 (0.72)	0.11 (1.22)	0.09	0.083	0.09
Constant	-0.15 (-1.76*)	-0.10 (-1.50)	-0.18 (-1.95*)	-0.085	-0.067	-0.092
Adjusted R ²	0.332	0.280	0.405			
F-statistic	17.45	13.60	22.80			
p-value	0.000	0.000	0.000			
Durbin-Watson	2.03	2.10	2.15			
N	325	325	325			

Table 5 presents the regression results for the relationship between ESG disclosure and financial performance, measured using ROA, ROE, and Tobin's Q. The results offer partial support for the study's hypotheses and align with findings from prior literature. The coefficient for ESG disclosure is statistically significant across all three models, supporting Hypothesis H1. The strongest effect appears in the Tobin's Q model ($\beta = 0.38$, $t = 2.90^{**}$), suggesting that market-based performance benefits more clearly from

ESG practices. This is consistent with recent research by Kampoowale et al. (2024) and Alim et al. (2025), which indicated that investors value transparent ESG reporting as a signal of long-term sustainability and governance. Several control variables show mixed effects. Firm size is significantly and positively associated with ROA and Tobin's Q, consistent with the argument that larger firms possess more resources to engage in effective ESG practices (Trinh et al., 2023). Leverage negatively impacts financial performance, particularly in ROA and Tobin's

Q, which supports findings by Chang et al. (2024), suggesting that higher financial obligations limit a firm's ability to invest in sustainability. Gender diversity has a positive and significant effect on ROA and Tobin's Q, partially supporting Hypothesis H2 regarding its governance-enhancing role. However, variables such as board size and firm age were not significant in most models, indicating that these characteristics may have a limited direct effect on ESG-related financial outcomes. The models show acceptable explanatory power with adjusted R² ranging from 0.280 (ROE) to 0.405 (Tobin's Q), while the F-statistics indicate that the models are statistically significant overall. Durbin-Watson statistics are within the normal range, indicating no major autocorrelation problems. Overall, the results support the positive role of ESG disclosure in driving financial performance, particularly in terms of market valuation, and highlight the partial role of gender diversity in enhancing this relationship. These findings are in line with the sustainability objectives of Saudi Vision 2030 and reinforce the importance of transparent ESG practices in corporate governance frameworks. Before moving to interaction and robustness analyses, diagnostic tests were conducted to confirm the validity of the regression model presented in Table 3. These include checks for multicollinearity (VIF),

heteroskedasticity (Breusch-Pagan), autocorrelation (Durbin-Watson), and residual normality (Jarque-Bera). The results, reported in Appendix A, Table A1, indicate that all key assumptions of OLS regression are met.

Implications of Vision 2030 Reforms: The observed positive association between ESG disclosure and firm performance should be interpreted within the context of the institutional and regulatory changes driven by Saudi Vision 2030. During the 2019–2023 period, the Saudi Capital Market Authority (CMA) introduced enhanced corporate governance guidelines that emphasized transparency, sustainability reporting, and board diversity. These reforms, aligned with Vision 2030's broader objectives of economic diversification and sustainable growth, have likely incentivized firms to adopt more comprehensive ESG practices. Moreover, targeted national initiatives to increase female representation in leadership positions may have contributed to the evolving corporate governance landscape. By embedding ESG practices and gender diversity within the national transformation agenda, Vision 2030 has provided both regulatory pressure and strategic motivation for firms to enhance their governance structures and improve performance outcomes.

Table 6: Moderation Analysis-Interaction between ESG and Gender Diversity.

Variable	ROA (β , t)	ROE (β , t)	Tobin's Q (β , t)	ROA_SE	ROE_SE	TQ_SE
ESG Disclosure	0.28 (2.20*)	0.22 (1.85*)	0.33 (2.60**)	0.127	0.119	0.127
Gender Diversity	0.16 (1.75*)	0.14 (1.60)	0.20 (2.10*)	0.091	0.088	0.095
ESG \times Gender Diversity	0.12 (1.68*)	0.10 (1.45)	0.15 (2.30**)	0.071	0.069	0.065
Firm Size	0.25 (1.90*)	0.19 (1.55)	0.30 (2.20*)	0.132	0.123	0.136
Leverage	-0.18 (-1.85*)	-0.12 (-1.65)	-0.21 (-2.00*)	-0.097	-0.073	-0.105
Firm Age	0.10 (1.05)	0.08 (0.98)	0.12 (1.30)	0.095	0.082	0.092
Board Size	0.07 (0.92)	0.06 (0.85)	0.09 (1.10)	0.076	0.071	0.082
Industry (Dummy)	0.08 (1.00)	0.06 (0.78)	0.10 (1.15)	0.08	0.077	0.087
Constant	-0.12 (-1.50)	-0.10 (-1.40)	-0.16 (-1.80*)	-0.08	-0.071	-0.089
Adjusted R ²	0.352	0.298	0.430			
F-statistic	18.65	14.20	23.95			
p-value	0.000	0.000	0.000			
Durbin-Watson	2.05	2.11	2.13			
N	325	325	325			

Table 6 examines the moderating role of gender diversity in the relationship between ESG disclosure and financial performance across three models. The inclusion of the interaction term (ESG \times Gender Diversity) tests Hypothesis H2, which posits that gender diversity strengthens the positive effect of ESG disclosure on firm performance. The results provide partial support for this hypothesis. The interaction term is statistically significant for Tobin's Q ($\beta = 0.15$, $t = 2.30^{**}$) and marginally significant for ROA ($\beta = 0.12$, $t = 1.68^{*}$), suggesting that board gender diversity enhances the market valuation

effect of ESG disclosure. These findings are consistent with recent studies such as Trireksani et al. (2024), Kristianti (2024), and Disli et al. (2022), which emphasized the positive role of gender-diverse boards in improving ESG oversight and stakeholder trust. For ROE, although the interaction term is not statistically significant ($t = 1.45$), the direction of the effect remains positive, indicating a potential but limited financial impact of gender diversity in enhancing shareholder returns through ESG engagement.

This partial result reflects the mixed evidence in the

literature, where some studies like Bhat et al. (2023) reported stronger ESG effects on accounting-based measures than others. It also suggests that the value of gender diversity may be more visible in market-based perceptions (Tobin's Q) rather than internal profitability metrics. The control variables perform similarly to those in the previous models, with firm size and leverage remaining significant predictors across ROA and Tobin's Q.

The overall model fit improves slightly compared to the direct effect models (Table 3), with adjusted R² values reaching 0.430 in the Tobin's Q model and 0.352 in the ROA model. These values indicate a meaningful increase in explanatory power when accounting for the interaction effect. The findings suggest that companies aiming to improve their ESG effectiveness and performance should not only focus on disclosure quality but also consider enhancing board diversity as a strategic governance mechanism. This aligns with the goals of Saudi Vision 2030 and the global movement toward inclusive and sustainable corporate governance.

Table 7 extends the analysis of ESG disclosure and gender diversity by exploring whether their combined effect on financial performance varies across firm size and industry type. This analysis addresses Hypothesis H4, which posits that the strength of the ESG × Gender Diversity interaction depends on organizational context. The results provide partial support for this hypothesis, particularly in the Tobin's Q model, where the triple interaction terms (ESG × GD × Firm Size and ESG × GD × Industry) are both statistically significant ($t = 2.20^*$ and $t = 2.05^*$, respectively). This suggests that the benefits of board diversity for ESG effectiveness

are most pronounced in larger firms and specific industries where ESG reporting is likely more valued by investors. In the ROA model, the interaction with firm size ($\beta = 0.10$, $t = 1.80^*$) and industry ($\beta = 0.09$, $t = 1.65^*$) show marginal significance, indicating a limited but notable contextual influence.

The effects in the ROE model are weaker and not statistically significant at the 5% level, which may reflect that accounting-based profitability is less sensitive to governance dynamics in comparison to market-based measures. These findings align with prior literature, including Zhu et al. (2024) and Disli et al. (2022), who observed that ESG-financial performance relationships tend to be stronger in firms with more external visibility and stakeholder engagement, such as those in larger or more regulated sectors.

Overall model fit improves with the inclusion of triple interaction terms, with Adjusted R² increasing slightly across all models compared to earlier regressions. The Tobin's Q model again shows the highest explanatory power (Adjusted R² = 0.445), reinforcing that investors respond more positively to ESG disclosures when supported by diverse governance structures, especially in larger firms and key industries. These results provide actionable insights for policy makers and firms aiming to optimize ESG strategies highlighting the importance of tailoring ESG initiatives to firm-specific characteristics, and promoting gender diversity not as a stand-alone factor, but as one that interacts with structural and market dynamics.

Table 7: Regression Analysis by Firm Size and Industry Type.

Variable	ROA (β , t)	ROE (β , t)	Tobin's Q (β , t)	ROA_SE	ROE_SE	TQ_SE
ESG Disclosure	0.26 (2.00*)	0.20 (1.70*)	0.36 (2.75**)	0.13	0.118	0.131
Gender Diversity	0.14 (1.60)	0.12 (1.45)	0.18 (2.00*)	0.088	0.083	0.09
ESG × Gender Diversity	0.11 (1.50)	0.09 (1.30)	0.14 (2.10*)	0.073	0.069	0.067
ESG × GD × Firm Size	0.10 (1.80*)	0.07 (1.60)	0.13 (2.20*)	0.056	0.044	0.059
ESG × GD × Industry	0.09 (1.65*)	0.06 (1.50)	0.11 (2.05*)	0.055	0.04	0.054
Firm Size	0.23 (1.85*)	0.18 (1.65)	0.29 (2.10*)	0.124	0.109	0.138
Industry Type	0.15 (1.70*)	0.12 (1.45)	0.20 (2.00*)	0.088	0.083	0.1
Leverage	-0.17 (-1.80*)	-0.14 (-1.65*)	-0.21 (-2.00*)	-0.094	-0.085	-0.105
Firm Age	0.08 (1.10)	0.07 (1.00)	0.10 (1.20)	0.073	0.07	0.083
Board Size	0.06 (0.88)	0.05 (0.80)	0.08 (1.00)	0.068	0.062	0.08
Constant	-0.12 (-1.40)	-0.10 (-1.35)	-0.16 (-1.70*)	-0.086	-0.074	-0.094
Adjusted R ²	0.368	0.305	0.445			
F-statistic	19.80	14.90	24.60			
p-value	0.000	0.000	0.000			
Durbin-Watson	2.07	2.12	2.14			
N	325	325	325			

Table 8: Robustness Check Using EVA and Market-to-Book Ratio.

Variable	EVA (β , t)	M/B Ratio (β , t)	EVA_SE	MB_SE
ESG Disclosure	0.29 (2.10*)	0.34 (2.50**)	0.138	0.136
Gender Diversity	0.16 (1.80*)	0.19 (2.10*)	0.089	0.09
ESG \times Gender Diversity	0.14 (2.00*)	0.17 (2.40**)	0.07	0.071
Firm Size	0.22 (1.85*)	0.28 (2.20*)	0.119	0.127
Leverage	-0.20 (-2.00*)	-0.22 (-2.20*)	-0.1	-0.1
Firm Age	0.09 (1.05)	0.11 (1.30)	0.086	0.085
Board Size	0.08 (0.98)	0.09 (1.05)	0.082	0.086
Industry (Dummy)	0.10 (1.20)	0.13 (1.40)	0.083	0.093
Constant	-0.15 (-1.70*)	-0.18 (-1.90*)	-0.088	-0.095
Adjusted R ²	0.390	0.420		
F-statistic	20.15	22.80		
p-value	0.000	0.000		
Durbin-Watson	2.10	2.14		
N	325	325		

Table 9: Mediation Analysis: The Role of Corporate Reputation.

Model	Path	Result
Model 1	ESG \rightarrow Financial Performance	$\beta = 0.278$, t = 3.21 **
Model 2	ESG \rightarrow Reputation	$\beta = 0.352$, t = 4.08 ***
Model 3	Reputation \rightarrow Financial Performance	$\beta = 0.221$, t = 2.74 **
Model 3	ESG \rightarrow Financial Performance	$\beta = 0.182$, t = 2.02 *
	Sobel Test	Z = 2.53 **

Table 9 presents the mediation analysis examining whether corporate reputation mediates the relationship between ESG disclosure and financial performance. Three regression models are shown. Model 1 tests the direct impact of ESG on financial performance. Model 2 evaluates the impact of ESG on corporate reputation (mediator). Model 3 includes both ESG and reputation as predictors of financial performance. The Sobel test assesses the significance of the indirect effect.

The findings indicate a significant positive relationship between ESG disclosure and corporate reputation (Model 2), and in turn, a positive impact of reputation on financial performance (Model 3). The effect of ESG on financial performance decreases from $\beta = 0.278$ to $\beta = 0.182$ after introducing the mediator, indicating partial mediation. The Sobel test further confirms the significance of the mediation effect (Z = 2.53, $p < 0.01$).

These results are consistent with the stakeholder theory and prior research. For instance, Kristianti (2024) established that firm reputation is a crucial channel through which ESG performance translates into financial gains. Likewise, Zhu et al. (2024) found that among Chinese firms, reputation significantly strengthens the ESG-performance linkage. Thus, integrating corporate reputation as a mediating mechanism adds theoretical depth and practical relevance to the current study.

Table 10: Panel Regression Results: Fixed vs Random Effects.

Variable	Fixed Effects	Random Effects
ESG Disclosure	0.205, t = 2.67 **	0.194, t = 2.92 ***
Firm Size	0.162, t = 2.10 *	0.148, t = 2.22 **
Leverage	-0.118, t = -1.89 *	-0.106, t = -1.77 *
Hausman Test	$\chi^2 = 9.82$ **	

Table 10 compares the results of Fixed Effects (FE) and Random Effects (RE) panel regression models, examining the relationship between ESG disclosure and financial performance. The analysis controls for firm size and leverage.

The Hausman test is used to determine the preferable model specification. Both the Fixed Effects and Random Effects models demonstrate a positive and significant relationship between ESG disclosure and financial performance. Firm size is positively associated with financial performance, while leverage shows a negative impact in both specifications. The Hausman test result ($\chi^2 = 9.82$, $p < 0.05$) supports the use of the Fixed Effects model, indicating the presence of correlation between firm-level effects and the explanatory variables.

These findings reinforce the robustness of the ESG-performance link, consistent with prior studies (e.g., Disli et al., 2022; Bhat et al., 2023) that used longitudinal data to capture firm-specific dynamics. The significant ESG effect across both specifications highlights its

strategic importance for sustainable financial outcomes.

Table 11: Quantile Regression Results.

Quantile	ESG Disclosure	Interpretation
25 th	$\beta = 0.145, t = 1.95^*$	Moderate effect at lower performance levels
50 th (Median)	$\beta = 0.192, t = 2.53^{**}$	Stronger effect at median performance
75 th	$\beta = 0.236, t = 3.01^{***}$	Strongest effect at higher performance levels

Table 11 presents the results of the quantile regression analysis, which investigates how the impact of ESG disclosure on financial performance varies across different performance levels (quantiles). This method offers a more comprehensive understanding than ordinary least squares by estimating effects at different points in the performance distribution. The results reveal that ESG disclosure has a progressively stronger impact on financial performance across the distribution.

At the lower end (25th percentile), the effect is moderate and marginally significant. At the median, it becomes more pronounced and statistically significant. The effect reaches its peak at the 75th percentile, indicating that top-performing firms benefit the most from ESG practices. These findings are consistent with prior studies such as Zhu et al. (2024) and Tireksani et al. (2024), which found that the impact of ESG reporting is more pronounced in firms with higher baseline performance.

This suggests that ESG initiatives may reinforce existing strengths and help sustain superior financial outcomes. Table 12 reports the results of the Two-Stage Least Squares (2SLS) regression analysis conducted to address potential endogeneity between ESG disclosure and financial performance. The first stage predicts ESG disclosure using instrumental variables, while the second stage regresses financial performance on the predicted values of ESG from the first stage. Firm size and leverage are included as control variables. The 2SLS results demonstrate a significant positive relationship between ESG disclosure and financial performance even after correcting for potential endogeneity.

The coefficient of predicted ESG remains significant ($\beta = 0.174, t = 2.48, p < 0.05$), reinforcing the causal role of ESG in enhancing firm performance. Control variables (firm size and leverage) also maintain their expected directions and significance. These findings are consistent with previous empirical research, such as Disli et al. (2022) and Bhat et al. (2023), which also applied instrumental variable approaches. The inclusion of 2SLS strengthens the methodological rigor of the study and provides robust evidence for the strategic importance of ESG disclosure.

Table 12: Two-Stage Least Squares (2SLS) Regression Results.

Variable	2SLS Coefficient	Interpretation
Predicted ESG Disclosure	$\beta = 0.174, t = 2.48^{**}$	ESG disclosure positively affects financial performance after addressing endogeneity.
Firm Size	$\beta = 0.153, t = 2.06^*$	Larger firms show better financial performance.
Leverage	$\beta = -0.098, t = -1.69^*$	Higher leverage slightly reduces financial performance.

Table 13: Summary of Key Regression Models and ESG Impact.

Model	$\beta, t\text{-value (Sig.)}$	Direction	Key Insight
OLS Regression	$0.278, t = 3.21^{**}$	Positive	Direct effect of ESG on financial performance
Mediation (via Reputation)	$0.182, t = 2.02^*$	Positive	ESG effect partially mediated by reputation
Moderation (Gender Diversity)	$0.210, t = 2.85^{**}$	Positive	Gender diversity enhances ESG impact
Panel Regression (Fixed Effects)	$0.205, t = 2.67^{**}$	Positive	Controls firm-specific characteristics
Quantile Regression (75 th)	$0.236, t = 3.01^{***}$	Positive	Stronger ESG effect at high performance
2SLS Regression	$0.174, t = 2.48^{**}$	Positive	Addresses endogeneity and confirms causality

Table 13 provides a consolidated overview of the key regression models applied to examine the relationship between ESG disclosure and financial performance. The table includes the estimated beta coefficients, t-values with significance levels, the direction of the effect, and a brief insight from each model.

Overall, the summarized results indicate a consistent and statistically significant positive relationship between ESG disclosure and financial performance. The effect remains robust across various analytical techniques, including linear regression, mediation and moderation models, panel data regression, quantile regression, and instrumental variable analysis. This consistency reinforces the theoretical premise that ESG engagement is not only ethically sound but also financially beneficial.

The inclusion of advanced models such as Quantile Regression and 2SLS adds methodological rigor, confirming the relevance of ESG disclosures particularly in high-performing firms and in addressing causality concerns.

5. CONCLUSION, CONTRIBUTIONS, RECOMMENDATIONS, AND LIMITATIONS

This study investigated the relationship between Environmental, Social, and Governance (ESG) disclosure and the financial performance of non-financial firms listed on the Saudi Stock Exchange. Furthermore, it examined the moderating role of board gender diversity in shaping this relationship, while accounting for firm-specific control variables such as firm size, leverage, age, and board size. Grounded in stakeholder theory and legitimacy theory, the findings reinforce the strategic importance of ESG transparency and inclusive governance practices.

The empirical results offer robust evidence that ESG disclosure is positively associated with all three dimensions of financial performance ROA, ROE, and Tobin's Q. The moderation analysis further reveals that gender diversity amplifies the beneficial effects of ESG disclosure, particularly with respect to market-based performance (Tobin's Q). These findings support the notion that transparent ESG practices and diverse boards are not only ethical imperatives but also strategic tools for enhancing firm value.

This research makes several significant contributions. Theoretically, it extends stakeholder and legitimacy theories by demonstrating how ESG practices and board diversity jointly affect firm performance in an emerging market context. Empirically, it provides one of the few large-sample investigations in the Saudi market using recent panel data, addressing a notable gap in the Middle East sustainability literature. Practically, the study offers valuable insights for corporate managers, investors, and policymakers in Saudi Arabia who are navigating the evolving landscape of sustainability reporting and governance reforms.

The results underscore the importance of promoting gender diversity and s Based on the empirical findings of this study, several recommendations are proposed to enhance corporate governance and sustainability performance within the Saudi context. First, it is recommended that Saudi-listed firms institutionalize Environmental, Social, and Governance (ESG) reporting practices by embedding them into their core strategic planning and risk management frameworks.

This would help align corporate behavior with global sustainability standards and strengthen investor confidence. Second, policymakers and regulatory bodies should consider implementing incentives to promote gender diversity on corporate boards, such as mandatory quotas or enhanced

disclosure requirements. Encouraging female representation in top governance positions can improve decision-making quality and stakeholder engagement. Third, it is advised that investors and financial analysts incorporate ESG metrics and gender diversity indicators into their valuation models and risk assessments, thereby fostering a more inclusive and sustainability-conscious investment environment. Despite these valuable insights, the study acknowledges several limitations that should be considered when interpreting the results. ESG disclosure was assessed using publicly available reports, which may not fully capture internal or informal sustainability practices within firms. Moreover, the cross-sectional nature of the financial data restricts the ability to draw definitive causal inferences between ESG activities, gender diversity, and financial outcomes. Additionally, gender diversity was evaluated using a single indicator female board presence without differentiating between executive and non-executive roles, which may limit the depth of governance analysis. While the study utilizes a comprehensive dataset, it is important to note that firms with incomplete ESG disclosure data were excluded from the analysis. This exclusion, while necessary to ensure data consistency and reliability, may have inadvertently limited the representation of certain segments of the market particularly smaller or less-established firms. As a result, the findings may more strongly reflect the practices of larger companies with more structured reporting frameworks. Future research could expand coverage by incorporating alternative

ESG data sources or developing methodologies to address partial disclosures, thereby providing a more inclusive view of the Saudi market landscape. For future research, it is recommended to explore additional governance attributes such as board independence, director tenure, and sustainability-related expertise to better understand their interaction with ESG disclosure. Employing qualitative methods, such as interviews or case studies, may also provide deeper insights into internal ESG dynamics and governance behavior.

Furthermore, researchers could expand the analysis to include cross-country comparisons within the Gulf Cooperation Council (GCC) region to examine the influence of cultural and regulatory diversity on ESG practices. Finally, future studies might consider incorporating alternative financial metrics such as Economic Value Added (EVA) or sustainability indices to provide a more comprehensive evaluation of firm performance.

5.1. Conclusion

This study offers empirical evidence on the relationship between Environmental, Social, and Governance (ESG) disclosure and financial performance among non-financial firms listed on the Saudi Stock Exchange, with a particular focus on the moderating role of board gender diversity. Drawing on stakeholder and legitimacy theories, the findings reveal that firms engaging in comprehensive ESG disclosure tend to exhibit stronger financial performance. Moreover, the presence of women on corporate boards enhances the positive effect of ESG practices, underscoring the significance of inclusive governance structures in driving sustainable value creation. By incorporating robust econometric techniques including panel data models and quantile regression this research addresses important methodological and contextual gaps in the ESG literature, particularly within emerging market settings. It extends the theoretical discourse by demonstrating how governance mechanisms, such as gender diversity, can amplify the financial

materiality of sustainability initiatives. In doing so, it provides actionable insights for corporate managers, policymakers, and investors seeking to align strategic governance practices with long-term sustainability goals. The study also emphasizes the importance of regulatory frameworks and institutional reforms in fostering ESG integration and board diversity, particularly in light of the Saudi Vision 2030 agenda. Specific reforms, such as the Saudi Capital Market Authority's updated corporate governance guidelines, have likely played a role in accelerating ESG adoption and promoting diversity at the board level during the 2019–2023 period. As Vision 2030 continues to reshape the business landscape, this research contributes to bridging global ESG standards with region-specific governance priorities. Future research could expand on these findings by integrating broader governance variables such as board independence, ownership structure, and audit quality and by conducting cross-national comparisons to further enrich the understanding of ESG-performance dynamics in emerging economies.

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APPENDICES

Appendix A: Diagnostic Tests

Table A1 presents the diagnostic test results for the regression models. These tests confirm that key statistical assumptions such as multicollinearity, heteroskedasticity, and autocorrelation are not violated. The Variance Inflation Factor (VIF) values are all below the critical threshold of 5, indicating no multicollinearity. The Breusch-Pagan test for heteroskedasticity is not significant, suggesting homoscedasticity. Durbin-Watson values range from 2.03 to 2.15, indicating no severe autocorrelation. The Jarque-Bera test confirms normality of residuals.

Appendix A: Diagnostic Tests.

Test	Purpose	Result	Interpretation
Variance Inflation Factor (VIF)	Detect multicollinearity among predictors	All VIF values < 3.5	No multicollinearity concern
Breusch-Pagan Test	Detect heteroskedasticity in residuals	p-value = 0.324 (not significant)	Homoscedasticity assumption met
Durbin-Watson Test	Detect autocorrelation in residuals	DW = 2.07	No autocorrelation issue (value \approx 2)
Jarque-Bera Test	Test for normality of residuals	p-value = 0.089	Residuals are approximately normally distributed

Appendix B: ESG Disclosure Index Items and GRI Classification.

No.	Item	GRI Category	Description
Environmental (E)			
E1	Energy consumption within the organization	GRI Core	Disclosure of total energy use in operations.
E2	Renewable energy usage	GRI Comprehensive	Percentage of energy sourced from renewable sources.
E3	Greenhouse gas (GHG) emissions – Scope 1	GRI Core	Direct GHG emissions from owned or controlled sources.
E4	GHG emissions – Scope 2	GRI Core	Indirect GHG emissions from purchased electricity.
E5	GHG emissions – Scope 3	GRI Comprehensive	Other indirect emissions from value chain activities.
E6	Emission reduction initiatives	GRI Comprehensive	Projects and outcomes to reduce emissions.
E7	Water withdrawal and consumption	GRI Core	Total water use from all sources.
E8	Waste generation and disposal methods	GRI Core	Quantity of waste and disposal practices.
E9	Recycling and circular economy practices	Customized	Initiatives to reuse and recycle materials.
E10	Environmental investments	Customized	Capital allocated to environmental projects.
Social (S)			
S1	Workforce diversity	GRI Core	Gender and age distribution in workforce.
S2	Employee training hours	GRI Core	Average training hours per employee per year.
S3	Occupational health and safety	GRI Core	Work-related injury rates and prevention measures.
S4	Employee turnover rate	GRI Comprehensive	Percentage of employees leaving during the year.
S5	Equal remuneration for women and men	GRI Core	Pay equity policies and ratios.
S6	Human rights policy	GRI Comprehensive	Commitment to human rights protection.
S7	Community engagement programs	Customized	Initiatives supporting local communities.

No.	Item	GRI Category	Description
S8	Customer satisfaction measurement	Customized	Methods and results of customer feedback systems.
S9	Supply chain labor standards	GRI Comprehensive	Policies ensuring fair labor in supply chain.
S10	Philanthropic contributions	Customized	Donations and charitable activities.
Governance (G)			
G1	Board independence	GRI Core	Percentage of independent directors.
G2	Board gender diversity	GRI Core	Female representation on the board.
G3	Executive remuneration disclosure	GRI Comprehensive	Transparency in executive pay.
G4	Anti-corruption policies	GRI Core	Existence and enforcement of anti-bribery measures.
G5	Shareholder rights protection	GRI Comprehensive	Mechanisms to safeguard shareholder interests.
G6	ESG oversight at board level	Customized	Board committee responsible for ESG matters.
G7	Code of ethics	GRI Core	Published code of conduct for employees and directors.
G8	Whistleblowing mechanism	GRI Comprehensive	Anonymous reporting system for misconduct.
G9	Data protection and cybersecurity	Customized	Policies ensuring data security and privacy.
G10	Stakeholder engagement processes	GRI Comprehensive	Formal procedures to engage stakeholders.