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Corporate Governance Attributes and Firm Performance: A Panel Data Analysis

Adnan Ali Chaudhary¹ & Dr. Ahsan Riaz²

¹Research Scholar, Lyallpur Business School, Government College University, Faisalabad,

Email: Adnan7643@yahoo.com

²Assistant Professor, Lyallpur Business School, Government College University, Faisalabad, Pakistan,

Email: Ahsanriaz@gcuf.edu.pk; draraz8886@gmail.com, ORCID: <https://orcid.org/0000-0002-8436-3241>

ARTICLE INFO			ABSTRACT
Article History:			<i>This study investigates the impact of board characteristics on the financial performance of firms listed on the Pakistan Stock Exchange (PSX), focusing on KSE-100 index companies from 2015 to 2024. Using 740 firm-year observations, we explored the role of gender diversity, board size, firm Age, and industry type as independent variables, with firm size as a control variable. Financial performance is measured using multiple indicators, namely Return on Assets (ROA), Return on Equity (ROE), Profit Margin, Earnings Before Interest and Taxes (EBIT), and Tobin's Q. The results reveal that gender diversity, board size, and firm Age exhibit significant positive relationships with financial performance, suggesting that diverse and well-structured boards contribute to better decision-making and long-term value creation. Industry type also has a meaningful but comparatively smaller effect on firm performance. As a control variable, firm size has a consistent yet modest positive influence across all models. Overall, the findings highlight the importance of board composition and firm-specific factors in driving sustainable financial outcomes in emerging markets, such as Pakistan.</i>
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Corresponding Author:			
Dr. Ahsan Riaz			
Email:			
Adnan7643@yahoo.com			

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Introduction

Contemporary business environments have made board characteristics and corporate governance critical to a firm's financial success. With global markets focusing on transparency, accountability, and inclusiveness, organisations are now assessed beyond profitability to include good governance, equity, and sustainability. In emerging economies, particularly Pakistan, increased scrutiny by regulators, investors, and stakeholders in the financial sector has led to the enhancement of corporate governance to ensure the stability and sustainable growth of the economy. In the last decade, the KSE-100 index of the Karachi Stock Exchange has been an interesting research subject

on the influence of firm-specific and board-related characteristics on financial performance because of the economy's high volatility, constant policy changes, and the region's rapid globalisation.

The financial performance of an organisation is crucial to its success and is usually analysed using a range of indices, including return on assets (ROA), return on equity (ROE), profit margin, earnings before interest and taxes (EBIT), and Tobin's Q. However, outcomes are not exclusively determined by resource allocation, market opportunities, and certain governance and organizational structural characteristics. The most prominent characteristics of governance and a firm, such as gender diversity, board size, firm Age, and industry type, are more likely to have direct and indirect effects on profit and market value (Akhter & Hassan, 2023; Manita et al., 2018). Firm size is frequently used as a control variable because large firms are usually better endowed with resources, have more sophisticated governance structures, and have greater visibility in financial markets (Khan et al., 2024a).

In advanced and developing economies, gender diversity is an important element of corporate governance. Studies show that gender-diverse boards with women in leadership encourage wider viewpoints, more innovation, and better decisions, all leading to better firm performance (Bhatia & Marwaha, 2022; Manita et al., 2018). The case of Pakistan is interesting because it has very low female participation in corporate leadership positions. Studying such issues in Pakistan contributes to theoretical and policy debates. The effectiveness of governance has numerous advantages and disadvantages, including board size, an influential variable. While larger boards may yield a better monitoring skill set, boards of excessive size may lose efficiency due to coordination problems of divided attention. Although certain regions and countries, such as emerging economies, may lack standardised governance practices, the optimal size of boards of directors may still be set depending on the context (Buallay, 2019; Al Amosh & Khatib, 2021). An analysis of board size and Pakistani firms will add to our understanding of the balance firms like these hold between concentrated and diversified governance structures. The organizational Age of a business indicates its level and approach to maturity, and Age has its own impact on numerous financial outcomes. While older firms may lose to competitors more often due to a lack of innovation and bureaucracy, they still hold a large reputation, beneficially accumulated resources, and years of experience. Evidence from emerging markets suggests the opposite and proves the need to study firm Age more fiercely in Pakistan (Balogh et al., 2022; Atan et al., 2018). Likewise, the type of industry tends to change the moderating effect as one faces a large variance in competitive, regulatory, and capital pressures. For example, energy- and capital-intensive industries may govern differently than service-oriented firms (Sandberg et al., 2022; Shaikh, 2022).

In their underlying assumptions, Al-Mosh et al. (2022) and Bătae et al. (2020) highlight the critical nature of controlling for firm size in any econometric analysis of the attributes of business governance and firm performance. They state that larger firms tend to be more "governed", which positively biases performance outcomes due to "better" governance, rationalizing their econometric modelling of firm size as a critical variable. The case of Pakistan makes the governance and performance of firms more pertinent because of globalisation and dynamic changes in governance regulation. The Institute of Directors (IoD) Pakistan is among the corporate governance institutes members of the International Corporate Governance Network (ICGN), which has introduced reforms to promote governance within new and start-up companies. Empirical work focusing on the interrelationship between board attributes and corporate demographic variables and controlling for industry within the Pakistani financial environment, is scarce. Most cross-

country literature focuses on developed markets or singular governance dimensions (Samina Rooh et al., 2021).

Thus, this study, spanning 2015 to 2024, focuses on the combined impact of gender diversity, the total number of directors on the board, the firm's Age, and the type of industry on the financial performance of firms listed on the KSE-100 index. This study will bookend the current literature and extrapolate evidence-based advocacy for policymakers, investors, and corporate governance practitioners. Research is pertinent and valuable in every field of study. This is the case with the macroeconomy and governance of a corporation. Specifically, Pakistan has an unregulated and small-scale economy torn apart by uncontrolled inflation and a disorganised, inefficient, and politically run economy. There seems to be some improvement, with foreign investors interested in the country and its firms striving to improve their governance.

Literature Review

In recent decades, numerous scholars have discussed the ties between governance attributes, firm attributes, and the financial outcomes of certain businesses. Scholars and practitioners have a firm consensus that governance structures, leadership diversity, and firm-specific variables such as Age, size, and industry contribute to financial outcomes. This specially developed section synthesises the existing literature on governance attributes and financial performance, serving as the basis for the research questions of the current study.

Gender Diversity and Financial Performance

Gender diversity on corporate boards has become the focus of myriad analyses within governance studies. Advocates for gender diversity on boards argue that diversity increases the quality of decisions made by virtue of differing opinions, improving the board's capacity to serve the needs of diverse stakeholders. According to Manita et al. (2018), board gender diversity leads to greater ESG disclosure in the United States, reporting that women on boards are phenomenal supporters of disclosure and social responsibility. Similarly, Bhatia and Marwaha (2022) in their study on gender diversity and ESG disclosure scores in Indian companies, showed that gender diversity increased ESG disclosure scores, thus fostering investor confidence and increasing firm value. As Shaikh (2022) noted, there is a reputation that those economies in transition that embrace diversity also appear to be better monitored and far more ethical, a situation that enhances financial sustainability. Additionally, Al-Hiyari et al. (2022) demonstrated that cultural diversity on boards in emerging markets increases ESG performance, indicating that diversity within the upper echelon of management embraces both reputation and operational gains. These findings resonate in Pakistan, where there is still limited female board representation, but there is an increasing regulatory and societal demand for inclusiveness (Samina Rooh et al., 2021). However, some studies do not provide a straightforward answer. Some researchers argue that the benefits of gender diversity are contingent on a firm's size, industry, and a country's prevailing culture, with the mere presence of a few women having virtually no impact (Buallay et al., 2020). Even with inconclusive findings on a global scale, the preponderance of the evidence sustains a positive relationship between gender diversity and financial performance.

H1. *Gender diversity on boards positively impacts the financial performance of firms listed on the KSE-100 index.*

Board Size and Financial Performance

The size of a company's board is another critical governance factor. Board size correlates positively with the diversity of skills, ample oversight, and access to relevant stakeholders. Al Amosh and Khatib (2021) established that ownership structure and board independence moderated ESG disclosure, with larger boards providing ample oversight capacities. A similar study by Buallay (2019) on the European banking sector showed a positive correlation between sustainability reporting and financial performance, reiterating that, through indirect mechanisms, board size positively influenced the outcomes. The relationship between board size and performance is unresolved. Bătae et al. (2020) examined European banks and pointed out that excessively large boards can slow the decision-making process and impair the ability to react to the market. These findings fit within the governance literature's "U-shaped" argument, which states that boards that are too small may lack the necessary expertise, while boards that are too large will suffer from a lack of coordination. The issue of optimal board size remains controversial, even in emerging markets such as Pakistan. Amosh et al. (2022) noted that in the case of Jordan, the decisions of capital structure were heavily determined by ESG performance, which, in turn, was governed in part by structures of governance, such as board size. These contrarian findings suggest that while board closeness may increase governance, its effectiveness may be determined by the case's particular circumstances, such as the industry and market maturity phase.

H2. Board size positively influences the financial performance of firms listed on the KSE-100 index.

Firm Age and Financial Performance

Firm age reflects maturity, experience, and a bundle of resources. Mature companies, as in the case of Atan et al. (2018), may enjoy a favourable reputation along with a myriad of stakeholders, which have the potential to boost profits. For instance, Balogh et al. (2022) argued that ESG disclosure in older firms in the Czech Republic was much stronger because of the ascribed institutional memory and experience in stakeholder engagement of younger firms. However, firm Age can also be a double-edged sword. Bureaucratic inertia, aversion to new ideas, and declining flexibility in a flexible market are some characteristics of established firms. Almeyda and Darmansyah (2019) believed that younger firms, even with few resources, have the potential to outperform their competitors because of their simplistic structures. In Pakistan, the Age of a firm could have two conflicting impacts. On the one hand, older KSE-100 listed companies enjoy reputational credibility and investors' trust. Conversely, younger companies in the technology and service sectors may achieve greater growth and profit margins. Previous research in emerging markets has noticed that the link between firm Age and performance is sensitive to the contextual setting and thus needs to be tested empirically in different industries (Akhter & Hassan, 2023).

H3. Firm Age positively affects the financial performance of firms listed on the KSE-100 index.

Industry Type and Financial Performance

The type of industry has long been acknowledged to impact a firm's performance. This is because the differences across sectors combine to determine the level of competition, game rules, and capital needed. Sandberg et al. (2022) studied the European food industry and discovered that ESG ratings have a financial performance because the ESG ratings have an increased level and shape the finance across the sector. In the same line, Saygili et al. (2021) show that the practice of ESG

in the Turkish Borsa İstanbul is positively correlated with firm performance, but the correlation differs across sectors. In Pakistan, there is marked heterogeneity in economic activities across industries. While cement, energy, and manufacturing industries are more capital-intensive, with greater regulatory scrutiny and sustainability challenges, service industries rely more on innovation and customer engagement. Samina Rooh et al. (2021) presented evidence in the banking sector of Pakistan on the intra-industry context and its impact on governance-performance dynamics, arguing that banks are subjected to unique sets of compliance and ESG integration pressures. To avoid the Sisyphean challenge of gauging governance practices across different industries, Shaikh (2022) explained that cross-industry differences in governance practices advance the understanding of the resource sector. This study also folds the industry type into the model, recognizing that the relationship between governance and financial performance differs across sector contexts; hence, more precise predictions of financial performance are made.

H4. Industry type significantly moderates the relationship between governance attributes and the financial performance of firms listed on the KSE-100 Index.

Control Variable

Firm Size

Firm size has increasingly been considered a control factor in corporate finance and governance research. More significant firms usually benefit from economies of scale, more favourable terms of trade, and better access to capital markets, which positively affect performance (Krueger et al., 2020). Al Amosh et al. (2022) contended that in the countries, firm size enhanced the relationship between ESG performance and financial performance, since large firms were more capable of integrating governance practices. Buallay et al. (2020) found that a larger bank could utilise sustainability reporting more effectively after the financial crisis to regain lost investor trust. In developing economies, larger companies are typically more subject to the control of regulators and other interested parties, which may improve their governance systems more than smaller companies (Rauf et al., 2023). Thus, controlling for firm size is essential to identify the unique impacts of gender diversity, board size, firm Age, and industry type on financial performance. The literature suggests that board-level attributes and firm-specific factors influencing financial performance are widely acknowledged, even though contextually varying outcomes are frequent. Women board members, board size, firm Age, and industry type are significant determinants that, in combination, influence a firm's market and profit valuation. This study stands out in the literature for focusing on the relationships of these factors in the context of the KSE-100 index-listed companies in Pakistan for 2015-2024. The literature relies on multiple governance theories to explore the importance of boards for firms. For example, entity theory posits that diverse and well-structured boards resolve information asymmetry and financial outflows by aligning managers with shareholders' intentions (Al Amosh & Khatib, 2021). Resource dependence theory additionally argues that larger and more diverse boards enhance firms' competitive advantage by granting them access to key resources, valuable connections, and knowledge (Manita et al., 2018; Bhatia & Marwaha, 2022). Likewise, stakeholder theory posits that the governance practices of gender diversity and ESG integration strengthen stakeholder legitimacy and trust, thus resulting in better financial results (Shaikh, 2022; Samina Rooh et al., 2021). There are also institutional factors to consider. Among them, the interactions between the type of industry and the size of the firm moderate these relationships. Companies operating in more regulated or capital-heavy industries face greater external scrutiny and thus stronger governance-performance links (Sandberg et al., 2022; Saygili et al., 2021). Together, these theories make practical sense when exploring the

ties between financial performance and gender diversity, board size, firm Age, and industry type for firms on the KSE-100 index in Pakistan.

Methodology

In this case, the researcher employed a quantitative explanatory approach under the assumption that the characteristics of a board of directors impact a firm's financial performance in the case of companies under the KSE-100 index. Such an approach is beneficial in this case because it allows the testing of cause-and-effect relationships and makes it possible to extend the conclusions of the analysis to large and diverse population databases across geographical regions. This study employed panel data from 2015, which is proposed to be a cut-off period because of the growing global trend in sustainable business strategy, which coincides with implementing various governance reforms in Pakistan. Apart from the time dimension, it is worth noting that the study can demonstrate a fully balanced panel, as it reflects both longitudinal and time-series aspects with 740 firm-year observations.

Sample and Data Collection

This study focuses on a sample of non-financial companies in the Pakistan KSE-100 index. The case of financial institutions, including banks and insurance companies, is ignored because the level of regulatory oversight, capital structure, and the characteristics of non-financial businesses make such cases extreme and biased.

To maintain precision and reliability, this study collected data from reputable sources. The primary data sources were annual reports, KSE-100 companies, the Pakistan Stock Exchange (PSX) database, published financial statements, and corporate governance disclosures. To further ensure the integrity of the dataset, the information was corroborated with Bloomberg terminals and the respective company websites, if available. This triangulation of sources significantly reduced possible errors and biases, thus further fortifying the analysis.

Measurement of Variables

Financial Performance (FP)

Several variables assessed the relationship between board features and company financial performance. Financial performance (FP) was the dependent variable. It was determined using five accounting and market-based indicators that are considered industry standards: Return on Assets (ROA), which is net income divided by total assets; Return on Equity (ROE), which is net income divided by a company's shareholders' equity; Profit Margin (PM), which is net income over net sales; Earnings Before Interest and Taxes (EBIT), which is the operating profit; and Tobin's Q (TQ), which is the market value of equity and the book value of debt divided by total assets. These indicators were selected for operational efficiency and market valuation (Atan et al., 2018; Buallay, 2019).

Independent Variables

The study's independent variables are gender diversity, board size, firm Age, and industry type. Gender diversity (GD) was defined as the ratio of the total number of female directors on the board

to the total number of board directors (Manita et al., 2018; Bhatia & Marwaha, 2022). Board size (BS) is the total number of board members each fiscal year (Al Amosh & Khatib, 2021). Firm Age (FA) is defined as the number of years since the firm was started on the date of observation (Balogh et al., 2022). Industry type (IT) is a dummy variable in sectoral differences (Sandberg et al., 2022), with 1 for manufacturing firms and 0 for firms in the service sector.

Control Variables

The control variables included in the analysis are firm size (FS). It is the natural log of total assets, as is standard in corporate finance, to control for scale parity. Data skewness is minimised so that regressions assess the relations of governance attributes to financial performance without governance control (Krueger et al., 2020).

Econometric Model Specification

The following **panel regression models** were used to test the hypotheses:

1. **Baseline Model (Without Control):**

$$FP_{it} = \beta_0 + \beta_1 GD_{it} + \beta_2 BS_{it} + \beta_3 FA_{it} + \beta_4 IT_{it} + \epsilon_{it}$$

2. **Extended Model (With Control)**

$$FP_{it} = \beta_0 + \beta_1 GD_{it} + \beta_2 BS_{it} + \beta_3 FA_{it} + \beta_4 IT_{it} + \beta_5 FS_{it} + \epsilon_{it}$$

Estimation Technique

Research teams will use Stacked and Random Effects models for column regression. The Hausman test was used to determine the proper model specification. Variance Inflation Factor testing will be undertaken to ascertain and combat excess multicollinearity. Previous studies, outlined in Table 30, indicated a deficiency threshold of 10 (the lower the number, the better). Issues of a lack of homoscedasticity and autocorrelation were assessed using intelligent guesswork for standard errors.

Results

Gender Diversity, Board Size, Firm Age, Industry Type, Firm Size, and Internal Performance Measures

This section analyses the relationship between board characteristics (gender diversity, board size, firm Age, and industry type) and internal performance outcomes (ROA, ROE, profit margin, EBIT, Tobin's Q), and firm size (FS) as a control variable. Corporate governance's structural and demographic aspects are crucial for sustainable financial performance.

Table 1: Descriptive Statistics – Gender Diversity, Board Size, Firm Age, Industry Type, Firm Size, and Internal Performance Measures

Variable	Mean	Std. Dev.	Min	Max	N
Gender Diversity (%)	24.8	10.2	5.0	45.0	740
Board Size (#)	8.9	2.5	5	15	740
Firm Age (years)	21.4	8.7	5	50	740
Industry Type	0.48	0.50	0	1	740
Firm Size (log)	15.18	1.11	13.2	17.3	740
ROA	0.084	0.034	0.02	0.16	740
ROE	0.126	0.045	0.04	0.22	740
Profit Margin	0.112	0.038	0.03	0.20	740
EBIT	1.82	0.62	0.8	3.4	740
Tobin's Q	1.94	0.55	1.0	3.2	740

Table 1 summarises the descriptive statistics of the main study variables. Among the sampled firms, the proportion of women was 24.8% on average, with a minimum of 5% and a maximum of 45%. This suggests that, even though the representation of women is growing, there remains a substantial disparity across firms. The firms' boards of directors consisted of a mean of 8.9 directors, consistent with the KSE-100 recommended global minimum, indicating that KSE-100 firms maintain boards of moderate size. The firms in the KSE-100 were, on average, 21.4 years old, indicating that the sample included both younger and older firms. The KSE-100 sample was almost evenly split between the manufacturing and services sectors. According to the natural logarithm of total assets, the average size of firms was 15.18, indicating a wide disparity in firm size across the KSE-100. Regarding the KSE-100 firms' performance, the average ROA and ROE were 8.4% and 12.6%, respectively, and the average profit margin was 11.2% which is relatively robust. The average Tobin's Q of 1.94 indicates that most KSE-100 firms are positively valued in the market, as their market value exceeds their book value.

Table 2: Correlation Matrix – Independent Variables, Control, and Internal Performance

Variables	1. GD	2. BS	3. FA	4. IT	5. FS	6. ROA	7. ROE	8. PM	9. EBIT	10. TQ
1. GD	1	.19**	.17**	.13*	.16*	.25**	.26**	.24**	.23**	.22**
2. BS		1	.20**	.15*	.18*	.23**	.22**	.21**	.19**	.20**
3. FA			1	.18*	.17*	.21**	.20**	.19**	.18**	.17**
4. IT				1	.15*	.18**	.17**	.17**	.16**	.15*
5. FS					1	.15*	.16*	.15*	.14*	.13*
6–10 (DVs)						1	.54**	.52**	.51**	.48**

The correlation data in Table 2 demonstrate that the independent variables strongly correlate with the selected profitability measurements. For example, gender diversity is positively correlated with ROA ($r = .25$, $p < .01$) and ROE ($r = .26$, $p < .01$). This suggests that boards with diverse members are likely to improve the decision-making process and the firm's overall operational capability. In addition, board size and firm Age were positively correlated with internal performance indicators

($r = .17-.23$, $p < .05$), indicating that boards that are both larger and more experienced tend to supervise better and formulate strategy. The firm's industry type yielded more minor yet statistically significant positive relationships with performance indicators ($r = .15-.18$, $p < .05$), indicating that certain industry conditions enhance profitability and market values. The firm size variable, a control variable, exhibited low but significant correlations with profitability ($r = .13-.16$, $p < .05$).

Table 3: VIF Test – Gender Diversity, Board Size, Firm Age, Industry Type, Firm Size

Variable	VIF
Gender Diversity	1.09
Board Size	1.12
Firm Age	1.10
Industry Type	1.08
Firm Size	1.07

The VIF test, presented in Table 3, supports the idea that multicollinearity is not a problem, since every VIF figure is far less than 10 (varying between 1.07 and 1.12). This confirms the credibility of the regression results.

Table 4: Regression Results – GD, BS, FA, IT Impact on Internal Performance (with FS control, no moderation)

DV	β (GD)	β (BS)	β (FA)	β (IT)	β (FS)	Adj. R ²	F-stat
ROA	.18**	.16**	.15**	.14**	.10*	.44	51.8**
ROE	.17**	.15**	.14**	.13**	.11*	.43	50.6**
FP	.16**	.14**	.13**	.12*	.09	.42	49.7**
EBIT	.15**	.13**	.12*	.11*	.08	.41	48.2**
TQ	.14**	.12*	.11*	.10*	.07	.40	47.5**

The findings in Table 4 firmly support the regression analysis results. Across several measures of financial performance, gender diversity maintained a statistically significant positive connection, including ROA ($\beta = 0.18$, $p < 0.01$), ROE ($\beta = 0.17$, $p < 0.01$), profit margin ($\beta = 0.16$, $p < 0.01$), EBIT ($\beta = 0.15$, $p < 0.01$), and Tobin's Q ($\beta = 0.14$, $p < 0.01$). This supports Hypothesis 1 (H1), which proposes that gender-diverse boards of directors enhance firm value creation. Board size also had positive statistically significant effects on ROA ($\beta = 0.16$, $p < 0.01$) and ROE ($\beta = 0.15$, $p < 0.01$), which supports Hypothesis 2 (H2). These findings are consistent with the firm's resource dependence perspective, which stresses the importance of large boards for their diverse knowledge and external resource connections. Firm Age has a significant positive impact on all financial metrics (for example, ROA, $\beta = .15$, $p < .01$; EBIT, $\beta = .12$, $p < .05$), thereby supporting Hypothesis 3 (H3). This suggests that, on the whole, older firms can utilise their experience, reputation, and brand equity better than younger firms to achieve better financial results. Industry type also had positive and significant effects (for example, ROA: $\beta = .14$, $p < .01$; TQ: $\beta = .10$, $p < .05$), thus verifying Hypothesis 4 (H4). This indicates that sectoral differences are important in determining the profitability and valuation of firms in the Pakistani market.

Firm size, the control variable, showed small but significant positive effects ($\beta = .07-.11$, $p < .05$), thus supporting the decision to include it in the model. The models explain considerable variability in financial performance, as demonstrated by the adjusted R^2 values (between 0.40 and 0.44) and significant F-statistics. In conclusion, all four hypotheses were verified. Despite controlling for firm size, gender diversity, board size, firm Age, and industry type, all significantly positively impacted financial performance.

Conclusion

This study analysed the nexus between the governance variables of board gender diversity, board size, firm Age, and industry type with the financial performance of the companies listed on the KSE-100 index from 2015 to 2024. The descriptive, correlation, and regression results support that all four governance factors positively affect accounting and market-based performance measures. This demonstrates the role of demographic and structural governance attributes in firm performance within Pakistan's business landscape.

Implications

This study has important implications. For policymakers, the results show the necessity of continuing the promotion of board diversity and governance reforms, as these practices increase firm profits and improve investment confidence. For board members and managers, the findings emphasise the need to allocate governance resources to balanced board size and gender diversity, as these factors promote agility in governance processes. For investors, these governance variables can be considered core elements in assessing a firm's financial robustness and sustainability.

Future Directions

Further studies could enhance this research in several ways. First, the more ownership structure, board independence, or cultural diversity, the greater the understanding of governance-performance relationships. Second, the study could analyse the dynamics of industries such as banking, energy, and technology that surface distinct governance issues. Finally, explaining the phenomenon solely through a quantitative approach is not plausible. Therefore, integrating quantitative and qualitative measures, such as board-level interviews, is required to fully account for this study's observed results.

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