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The influence of environmental performance, board gender diversity, and corporate reputation on financial performance with firm size as a moderating variable

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Abstract

This study aims to explore and analyze the influence of environmental performance, board gender diversity, and corporate reputation on financial performance, with firm size as a moderating variable. The research objects include companies in the oil, gas, and coal subsector as well as the agricultural food products industry listed on the Indonesia Stock Exchange (IDX) during the 2020–2023 period. The population consists of all companies within these subsectors and industries. Using purposive sampling techniques, a sample of 15 companies that met the research criteria was obtained. Data analysis was conducted using the SEM-PLS method with the SmartPLS 3.0 software. The results show that environmental performance and board gender diversity have a positive but not significant effect on financial performance. Meanwhile, corporate reputation has a positive and significant effect on financial performance. The role of firm size as a moderating variable does not show a significant influence in strengthening or weakening the relationship between the three independent variables and financial performance. This study implies that companies should maintain and enhance their reputation, optimize the potential of gender diversity at the board level, and improve their environmental performance in order to sustainably boost financial performance, regardless of company size.

Keywords: Board Gender Diversity; Corporate Reputation; Environmental Performance; Financial Performance; Firm Size

1. Introduction

Every company operates with the goal of generating profit and increasing shareholder wealth through higher earnings or stock value. In achieving this objective, companies face both internal and external challenges, particularly in the era of Industry 5.0, which intensifies competition. This competition spans across various sectors, including manufacturing, finance, transportation, agriculture, and mining, demanding improved performance to remain competitive [1]. As competition increases, companies are indirectly required to enhance their performance to maintain a competitive edge in a constantly changing environment [2].

The mining and agricultural sectors contribute significantly to the national Gross Domestic Product (GDP). The mineral and coal sector contributed IDR 2,198 trillion or 10.5% to Indonesia's GDP in 2023 [3], while the agricultural sector contributed 12.53% [4]. Financial performance is a key indicator in assessing a company's success and competitiveness, one of which is measured by Return on Assets (ROA).

The movement of financial performance, particularly as indicated by ROA trends, has shown fluctuations during the 2020–2023 period among companies in the oil, gas, and coal subsector, as well as the agricultural food product industry listed on the Indonesia Stock Exchange (IDX). This fluctuation can be observed in the diagram below:

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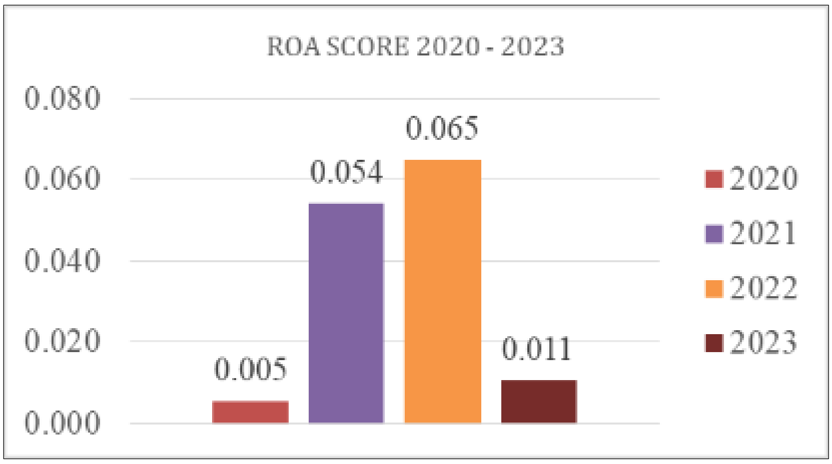


Figure 1 Trend of Financial Performance (ROA) in Mining and Agricultural Companies, 2020–2023

The fluctuating movement of financial performance has become a compelling reason for both business practitioners and academics to further examine the causes behind such rapid changes, not only from external factors but also internal ones. Given the critical role of the mining and agricultural sectors for society, this issue becomes particularly relevant for companies operating in these areas.

According to Nuraini & Andrew (2023) [5], factors influencing financial performance include green accounting and environmental performance. Meanwhile, Low et al. (2015) [6] emphasize the role of board gender diversity in affecting financial outcomes. In addition, Fourati & Dammak (2021) [7] highlight the importance of corporate reputation and corporate social responsibility disclosure. Based on these studies, this research focuses on three key variables: environmental performance, board gender diversity, and corporate reputation, to analyze their influence on a company's financial performance.

The theoretical foundation employed in this study is stakeholder theory, developed by Freeman (2010) [8], which posits that companies are obliged to create added value for all stakeholders including governments, employees, shareholders, customers, suppliers, and others, through transparent disclosure of business activities.

The first factor considered to influence financial performance is environmental performance, which refers to the extent to which a company manages waste, conserves energy, and uses natural resources sustainably. Strong environmental performance helps build a positive public and investor image. One of the government's initiatives to encourage better corporate environmental practices is the PROPER (Program for Rating Company Performance in Environmental Management), implemented by the Ministry of Environment and Forestry [9].

Companies that achieve a high PROPER rating tend to gain greater trust and a more favorable public image, which can ultimately enhance sales and profits. This is supported by Dita & Ervina (2021) [10], who found a positive influence of environmental performance on financial performance, aligned with Putri et al. (2019) [11]. However, Nuraini & Andrew (2023) [5] reported that the influence was not statistically significant, revealing inconsistencies in previous findings.

The second factor is board gender diversity. Although female participation in management and board membership is growing, representation remains relatively low in Indonesia [12]. Gender diversity can enhance creativity, innovation, and decision-making effectiveness. The presence of women brings new perspectives and values, and may heighten sensitivity to social issues [13]. Reguera-Alvarado et al. (2017) [14] also advocate for women's involvement on boards to improve economic outcomes.

Sanan (2016) [15] supports this view, finding that board gender diversity influenced corporate financial performance in India between 2008 and 2013. However, studies by Fernández-Temprano & Tejerina-Gaite (2020) [16], and Unite et al. (2019) [17] reported no significant influence, it is highlighting a research gap that needs further exploration.

The third factor is corporate reputation. A strong reputation enables companies to more easily access financing, attract investors, and strengthen relationships with customers and business partners [18]. Effective communication with stakeholders is also essential in maintaining a solid reputation.

Research by Oktavianus et al. (2022) [19] shows that corporate reputation has a significant impact on financial performance, in line with studies by Blajer-Gołębiewska & Kozłowski (2016) [20] and Kaur & Singh (2019) [21]. However, Mayliza & Maihidayah (2022) [22] found no significant effect, again indicating divergent results in the literature.

These inconsistent findings regarding the impact of the three factors on financial performance suggest the need for a moderating variable to deepen the analysis and bridge the research gap. A relevant moderating factor is firm size, which Chen (2019) [23] measures using the logarithm of total assets. Larger firms tend to have more stakeholders and attract greater scrutiny [24], meaning the influence of environmental performance, gender diversity, and reputation may differ compared to smaller firms.

Based on this background, the objective of this study is to analyze the influence of environmental performance, board gender diversity, and corporate reputation on financial performance with firm size as a moderating variable in oil, gas, and coal subsector companies, as well as agricultural food product industry firms listed on the Indonesia Stock Exchange (IDX) during the 2020–2023 period. The findings are expected to provide meaningful contributions to both academic literature and business practices in Indonesia’s strategic sectors.

2. Material and methods

2.1. Grand Theory

2.1.1. Stakeholder theory

According to Freeman (2010) [8], stakeholders are parties who can affect or be affected by the achievement of an organization's objectives. This theory emphasizes the importance of companies providing benefits to all stakeholders, including through the disclosure of information related to company activities that have a direct impact on them [1]. Furthermore, companies are expected to adapt by managing all operations optimally and efficiently, and by maximizing the use of available resources to improve financial performance in line with stakeholder expectations [25].

2.1.2. Legitimacy Theory

Legitimacy theory, introduced by Dowling & Pfeffer (1975) [26], states that companies must operate in accordance with prevailing social values and norms in order to obtain and maintain legitimacy. Social and environmental activities serve as a means for companies to uphold their social contract with society. Khairiyani et al. (2019) [27] emphasize that strong environmental performance can enhance a company’s public image and attract investors, ultimately increasing the firm’s value.

2.1.3. Resource Dependency Theory

According to Pfeffer & Salancik (2015) [28], organizations depend on external environments for essential resources, and managers must manage this dependency through the use of power. This theory highlights the importance of external relationships, including board diversity, as a means of building networks and expanding access to critical resources [29] [30]. Female directors are also viewed as strategic links who help enhance a company’s reputation and performance [30].

2.1.4. Signaling Theory

Spence (1978) [31] developed signaling theory to explain the information asymmetry between management and stakeholders. The disclosure of information aims to reduce this imbalance and enhance public trust [32] [33]. Positive disclosures of environmental and financial information will called"good news" and can enhance a company's reputation and stock price. Conversely, a lack of transparency is perceived as a negative signal. Rahmawati & Nur (2024) [34] emphasize that the market's interpretation of these signals can significantly influence a company's stock value.

2.2. Correlation between Variables

2.2.1. Environmental Performance and Financial Performance

Stakeholder theory posits that companies are accountable not only to shareholders but also to a broad range of stakeholders, including society, government, and the environment [35]. Within this context, environmental performance reflects the implementation of stakeholder theory [8], as environmental reporting demonstrates responsiveness to social expectations. Companies with strong environmental commitments tend to receive greater support from investors and the public, while also benefiting from cost efficiencies and enhanced reputation [36]. Prior studies by Putri et al. (2019) [11], Saputra (2020) [37], and Rosaline et al. (2020) [38] support a positive relationship between environmental performance and financial performance.

- Hypothesis 1 (H1): Environmental performance has a positive effect on financial performance.

2.2.2. Board Gender Diversity and Financial Performance

Gender diversity on the board of directors is believed to enhance innovation, transparency, and more inclusive decision-making [39]. It reflects societal demands for equality and inclusion. Female presence on boards is often associated with improved governance and sensitivity to social issues, which in turn strengthens stakeholder trust and financial performance. Studies by Đặng et al. (2020) [40], Aggarwal et al. (2019) [41], and Sanan (2016) [15] have shown a significant positive impact of board gender diversity on financial performance.

- Hypothesis 2 (H2): Board gender diversity has a positive effect on financial performance.

2.2.3. Corporate Reputation and Financial Performance

Stakeholder theory also underscores the importance of maintaining a good corporate reputation as a strategy to build strong relationships with various stakeholders [42]. A strong reputation increases trust, eases access to capital, and strengthens market position. According to Daromes et al. (2022) [43], corporate reputation can serve as a strategic asset that provides long-term competitive advantages. Research by Oktavianus et al. (2022) [19] and Kaur & Singh (2019) [21] confirms a positive correlation between corporate reputation and financial performance.

- Hypothesis 3 (H3): Corporate reputation has a positive effect on financial performance.

2.2.4. Firm Size as a Moderator between Environmental Performance and Financial Performance

Firm size plays a crucial role in strengthening the relationship between environmental and financial performance. Larger companies typically possess more resources, receive greater scrutiny, and have stronger incentives to maintain their environmental reputation. Maryanti (2020) [44] found that larger firms perform better in environmental management and gain higher investor trust. Thus, firm size may enhance the positive impact of environmental performance on financial outcomes.

- Hypothesis 4 (H4): Firm size moderates the relationship between environmental performance and financial performance.

2.2.5. Firm Size as a Moderator between Board Gender Diversity and Financial Performance

In large organizations, complex bureaucratic structures may hinder the effectiveness of board gender diversity, particularly in collaborative decision-making processes [45]. Conversely, smaller firms are more flexible, allowing diverse ideas and practices to be more readily implemented [46]. Li & Chen (2018) [47] found that firm size could weaken the positive effect of gender diversity on financial performance. Therefore, firm size may act as a moderator in this relationship.

- Hypothesis 5 (H5): Firm size moderates the relationship between board gender diversity and financial performance.

2.2.6. Firm Size as a Moderator between Corporate Reputation and Financial Performance

Larger companies tend to be more recognizable and respected, which can amplify the impact of reputation on financial performance [43]. Their scale allows for greater business expansion and easier access to resources. Kaur & Singh (2019) [21] noted that large firms have stronger brand recall in the market and better reputations. As such, firm size may strengthen the link between corporate reputation and financial outcomes.

- Hypothesis 6 (H6): Firm size moderates the relationship between corporate reputation and financial performance.

2.3. Research Method

This study employs a quantitative approach using secondary data, including financial statements, sustainability reports, and PROPER ratings from 2020 to 2023 for companies in the oil, gas, coal sub-sector and the agricultural food industry listed on the Indonesia Stock Exchange (IDX). A total of 15 companies were selected using a purposive sampling technique based on specific criteria, resulting in 60 observation data points. Data were collected through documentation study, with sources obtained from the official websites of the IDX, the respective companies, and the Ministry of Environment and Forestry of Indonesia. The indicators used to measure each variable are summarized in the table below:

Table 1 Variable and Indicator

No	Variable	Indicator / Measurement
1	Environmental Performance	Rating of PROPER
		Score 1: Black Rank
		Score 2: Red Rank
		Score 3: Blue Rank
		Score 4: Green Rank
		Score 5: Gold Rank
2	Board Gender Diversity	Percentage of board members who are female
3	Corporate Reputation	Total Shareholder Return (TSR)
4	Financial Performance	Return on Assets (ROA)
5	Firm Size	Natural logarithm of total assets

Data analysis was conducted using the Structural Equation Modeling – Partial Least Squares (SEM-PLS) method with the help of SmartPLS 3.0 software. The analysis process began with descriptive statistics, followed by an outer model evaluation to assess convergent and discriminant validity and reliability. The inner model evaluation was carried out through R-square values and hypothesis testing using p-values and bootstrapping procedures. Additionally, moderation analysis was performed to examine the interaction effects between the moderating variable and independent variables on the dependent variable

3. Results

This study uses the Partial Least Square (PLS) approach through SmartPLS 3.0 software. PLS is known as a flexible soft modeling method because it does not require classical OLS regression assumptions such as data normality or large sample sizes. Before hypothesis testing, an outer model and inner model assessment were conducted to ensure the model's adequacy.

3.1. Measurement Model Evaluation (Outer Model)

The measurement model, or outer model, represents the relationship between indicators and the latent variables being studied. Testing this model aims to assess the validity and consistency of the instruments used through convergent validity, and reliability tests.

3.1.1. Convergent Validity

Table 2 Loading Factor Values

	Board Gender Diversity	Corporate Reputation	Enviromental Performance	Financial Performance	Firm Size	Moderasi X1	Moderasi X2	Moderasi X3
Board Gender Diversity * Firm Size							1.117	
Corporate Reputation * Firm Size								0.840
Enviromental Performance * Firm Size						0.853		
LN ASSET					1.000			
P-WOMAN	1.000							
PROPER			1.000					
ROA				1.000				
TSR		1.000						

Source: SmartPLS Processed Data

The table shows that all loading factor values for the indicators are above 0.70. This indicates that all indicators meet the criteria for convergent validity, as none fall below the threshold.

3.1.2. Reliability Test

Table 3 Cronbach's Alpha Values

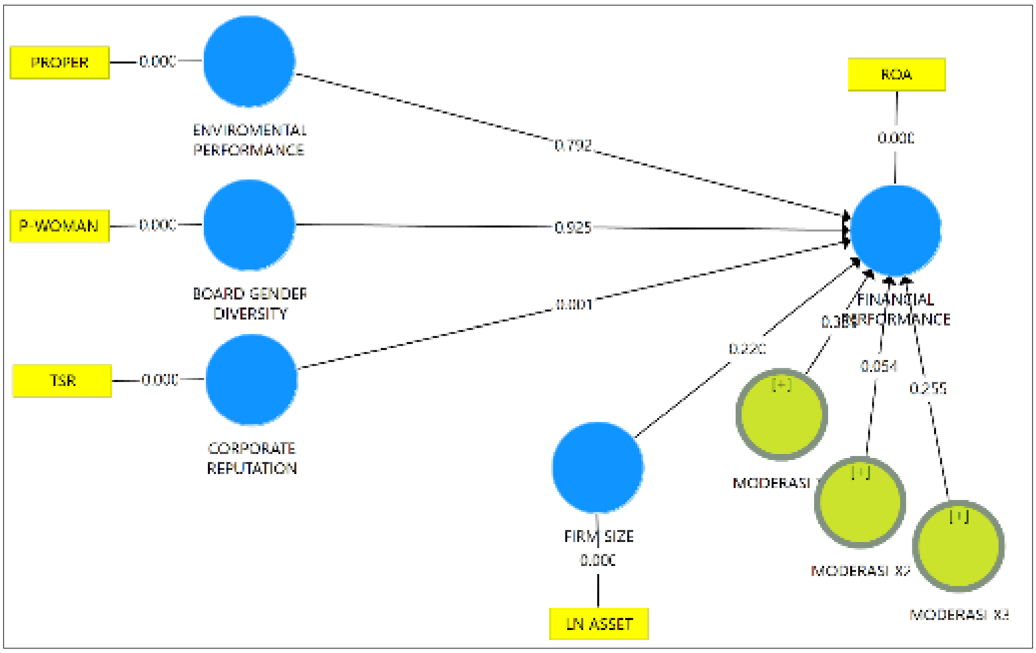
	Cronbach's Alpha
Board Gender Diversity	1.000
Corporate Reputation	1.000
Enviromental Performance	1.000
Financial Performance	1.000
Firm Size	1.000
Moderasi X1	1.000
Moderasi X2	1.000
Moderasi X3	1.000

Source: SmartPLS Processed Data

Based on the PLS algorithm results in the outer model, all constructs have Cronbach's Alpha values above 0.70. This confirms that the instruments used in this study have strong and reliable internal consistency.

3.1.3. Structural Model Evaluation (Inner Model)

This part of the study involves R-Square testing, hypothesis testing, and moderation testing. Bootstrapping was performed to evaluate the inner model. The bootstrapping results are as follows:



Source: SmartPLS Processed Data

Figure 2 Bootstrapping Output

3.1.4. R-Square

The R-Square value obtained is 0.504, indicating that 50.4% of the variation in financial performance can be explained by board gender diversity, corporate reputation, firm size, and the interactions among these variables. This shows that the structural model has a moderate explanatory power, while the remaining 49.6% is influenced by other factors not covered in this study.

3.1.5. Hypothesis Testing

Table 4 Original Sample Values and P-Values

	Original Sample (O)	**Sample Mean (M)**	**Standard Deviation (STDEV)**	**T Statistics (|O/STDEV|)**	**P Values**
Board Gender Diversity -> Financial Performance	0.010	0.013	0.102	0.094	0.925
Corporate Reputation -> Financial Performance	0.565	0.559	0.175	3.220	0.001
Enviromental Performance -> Financial Performance	0.029	0.028	0.112	0.264	0.792
Moderasi X1 -> Financial Performance	0.123	0.131	0.128	0.958	0.339
Moderasi X2 -> Financial Performance	0.181	0.198	0.094	1.928	0.054
Moderasi X3 -> Financial Performance	0.207	0.218	0.182	1.139	0.255

Source: SmartPLS Processed Data

The results of hypothesis testing vary across constructs, as elaborated below:

4. Discussion

4.1. The Influence of Environmental Performance on Financial Performance

The first hypothesis states that environmental performance has a positive effect on financial performance. However, the hypothesis testing results indicate that environmental performance does not have a significant effect on financial performance, thus the first hypothesis (H1) is not supported and cannot be accepted. Therefore, it can be concluded that environmental performance is not a direct factor influencing the company's financial performance.

This is supported by data showing that fluctuations in PROPER ratings do not align with changes in ROA during the observation period. From the stakeholder theory perspective, although companies have demonstrated concern for the environment to meet the expectations of society and investors, this does not necessarily impact the company's profitability. This finding is consistent with Nuraini & Andrew (2023) [5], who also concluded that environmental performance does not significantly affect financial performance, as companies tend to maintain environmental aspects for operational continuity rather than short-term profits. However, this result contradicts previous studies such as Putri et al. (2019) [11], Saputra (2020) [37], and Rosaline et al. (2020) [38], which found that improvements in environmental performance can enhance financial performance.

Conversely, this finding aligns more closely with legitimacy theory, which states that companies maintain environmental performance as a form of fulfilling social contracts to gain legitimacy from the surrounding community, rather than to directly increase Return on Assets (ROA) as an indicator of financial performance.

4.2. The Effect of Board Gender Diversity on Financial Performance

The second hypothesis states that board gender diversity positively affects financial performance. However, the test results show that board gender diversity does not have a significant impact on the company's financial performance, so the second hypothesis (H2) is not supported and cannot be accepted.

This is in line with Wijaya (2022) [48], who showed that the low representation of women on boards leads to suboptimal diversity impact. This study's data notes that female representation on boards only reaches 35%, thus the potential positive characteristics such as more careful oversight and a collaborative approach are not fully reflected. This finding is also supported by Fernández-Temprano & Tejerina-Gaite (2020) [16] and Unite et al. (2019) [17]. On the other hand, these results contradict several prior studies, such as Reguera-Alvarado et al. (2017) [14], which showed that gender diversity on boards can enhance governance effectiveness, innovation, and corporate image.

Theoretically, this study’s results do not support stakeholder theory, which emphasizes the importance of considering various stakeholder interests, including inclusive representation in corporate decision-making. Gender imbalance on the board can cause stakeholder needs to be suboptimally accommodated. Furthermore, from the perspective of Resource Dependency Theory, the presence of women on boards does not necessarily increase access to strategic resources if their roles are insignificant or if they do not have networks equivalent to male members.

Thus, although theoretically board gender diversity has the potential to improve financial performance, its implementation in Indonesia is still constrained by structural and cultural factors. Therefore, increasing the role of women on boards requires not only policy changes but also organizational cultural transformation toward greater inclusivity. The government is also expected to encourage regulations that support gender equality at top management levels across Indonesian companies.

4.3. The Effect of Corporate Reputation on Financial Performance

The third hypothesis states that corporate reputation positively influences financial performance. Based on the test results, it is found that corporate reputation does have a significant effect on the company’s financial performance, so the third hypothesis (H3) is supported and accepted.

This finding aligns with Oktavianus et al. (2022) [19], who showed that corporate reputation as an intangible asset can create sustainable competitive advantage by increasing stakeholder trust, customer loyalty, and harmonious relationships with relevant parties. This result is also strengthened by studies from Blajer-Gołębiewska & Kozłowski (2016) [20] and Kaur & Singh (2019) [21], which found that a good corporate reputation, built through past performance, contributes to positive market perception and impacts increased purchasing decisions and investments.

Within the stakeholder theory framework, reputation reflects how well a company meets the expectations of stakeholders such as investors, customers, and the community, ultimately strengthening financial performance. Additionally, this finding is relevant to signalling theory, where high reputation and total shareholder return (TSR) send positive signals to the market about the company's condition and prospects, thus encouraging consumer preference and increased investment.

4.4. The Moderating Role of Firm Size in the Environmental Performance–Financial Performance Relationship

The fourth hypothesis states that firm size moderates the relationship between environmental performance and financial performance. However, the hypothesis testing results show that firm size does not play a moderating role in this relationship, so the fourth hypothesis (H4) is not supported and cannot be accepted.

Firm size does not always reflect its capability to manage environmental aspects effectively, as large firms, despite having more resources, do not necessarily implement optimal environmental management systems. Conversely, small or medium-sized firms with high commitment to sustainability are often more adaptive in implementing environmentally friendly policies, which can positively impact financial performance.

This result contradicts Maryanti (2020) [44], who stated that large firms are more capable of moderating this relationship due to wider access to information and more transparent reporting systems, thus building positive investor perceptions. Nevertheless, the author argues that successful environmental management is more determined by managerial commitment and company strategy rather than firm size alone. This indicates that large firms are not necessarily superior in environmental management compared to smaller firms.

In the stakeholder theory context, both large and small firms have responsibilities to meet stakeholder expectations. Therefore, even though firm size is not proven as a significant moderating variable, attention to sustainability and environmental management remains an important aspect contributing to improving the company's financial performance.

4.5. The Moderating Role of Firm Size in the Board Gender Diversity–Financial Performance Relationship

The fifth hypothesis in this study states that firm size moderates the relationship between board gender diversity and financial performance. However, based on the test results for the fifth hypothesis (H5), it was found that firm size does not significantly moderate this relationship, so H5 is not supported and cannot be accepted.

This finding indicates that the effect of gender diversity on the board of directors on financial performance is consistent regardless of firm size. Gender diversity adds value through diverse perspectives [12], more inclusive decision-making, and enhanced corporate image, but this effect is not influenced by the scale of the company.

One reason firm size does not act as a moderator is because other variables, such as organizational culture, quality governance, and internal policies supporting diversity, play a more dominant role in maximizing the contribution of gender diversity. Therefore, firm size is not the primary determinant of how much gender diversity influences financial performance.

From the stakeholder theory perspective, this result confirms that the contribution of board gender diversity to financial performance can occur without depending on firm size. Good diversity management and company commitment to inclusion can strengthen the positive impact of gender diversity in both large and small companies. However, this result contradicts findings by Ressita et al. (2024) [30], who stated that firm size can strengthen the influence of gender diversity, audit committees, and capital structure on financial performance.

4.6. The Moderating Role of Firm Size in the Corporate Reputation–Financial Performance Relationship

The sixth hypothesis in this study states that firm size moderates the relationship between corporate reputation and financial performance. However, based on the test results for the sixth hypothesis (H6), it was found that firm size does not moderate this relationship, so H6 is not supported and cannot be accepted. This result indicates that the effect of corporate reputation on financial performance is universal and does not depend on the size of the firm. Both large and small firms, a good reputation still plays an important role in building market trust, demonstrating management credibility, and reflecting the company's growth prospects, ultimately improving financial performance.

The lack of firm size moderation can be explained by the fact that corporate reputation is more determined by public and investor perceptions of the company's values, integrity, and track record, not by operational scale or total assets owned. Even small, agile companies focused on innovation and sustainability can build a strong and relevant reputation among stakeholders. On the other hand, large companies are not always efficient in maintaining reputation due to internal coordination challenges and bureaucratic complexities. This shows that reputation has a direct influence on financial performance without being significantly affected by firm size.

From the signalling theory perspective, corporate reputation acts as a signal to the market regarding the quality and prospects of the company. The effectiveness of this signal is more determined by the clarity, consistency, and credibility of the information provided [49], rather than external attributes like firm size. In other words, the market responds to reputation based on the quality of the signal sent, not based on how large the company sending it is.

Nevertheless, this study shows that reputation still impacts financial performance but is not influenced by firm size. This reinforces that effective reputation management strategies can be implemented by companies of various scales, as long as they are supported by strong corporate values, transparent communication, and commitment to quality and sustainability.

5. Conclusion

This study shows that environmental performance and board gender diversity do not have a significant effect on the company’s financial performance. Although companies pay attention to sustainability and diversity, their impact on short-term profitability remains limited. In contrast, corporate reputation is proven to have a positive influence on financial performance, with a good reputation enhancing the company’s credibility in the eyes of investors and customers. Additionally, firm size does not moderate the relationship between these three variables and financial performance, indicating that these factors remain relevant for both large and small companies.

Based on these findings, companies are advised to integrate sustainability strategies into their business models, promote gender empowerment on corporate boards, and focus on reputation management by maintaining transparency and meeting investor expectations. Companies should also develop sustainable strategies aligned with their capacities and build an inclusive culture that supports diversity. The limitations of this study include that not all companies participated in the PROPER program, and the limited involvement of women in top leadership positions, which affected the amount of available data

Compliance with ethical standards

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Disclosure of conflict of interest

The author declared no potential conflicts of interest.

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