

Detecting the Green Mirage in Sustainability Reporting: The Role of Board Characteristics and Corporate Governance in Indonesia's Energy and Basic Materials Sectors

Rizky Prasetya^{1*}, Edi Winarto², Fathimatus Zahro Fazda Oktavia³, Rosy Aprieza Puspita Zandra⁴

^{1,2,3,4}Politeknik Negeri Malang, Indonesia

*Corresponding Author: rizky.prasetya@polinema.ac.id

Article History

Received: 23-09-2026

Revised: 28-09-2026

Published: 30-09-2026

Keywords: *Board Characteristics, Corporate Governance, Green Mirage, PROPER, Sustainability Reporting*

ABSTRACT

This study aims to detect the Green Mirage phenomenon in sustainability reporting and to analyse the effect of board of commissioners' characteristics and corporate governance mechanisms on this phenomenon. The Green Mirage is defined as the gap between the quality of sustainability disclosure based on the Global Reporting Initiative (GRI) standards and actual environmental performance as measured by the PROPER rating issued by Indonesia's Ministry of Environment and Forestry. This quantitative study uses panel data from 48 energy and basic materials companies listed on the Indonesia Stock Exchange during 2020–2024, yielding 240 firm-year observations. The data were analysed using panel data regression in STATA. The results show that the average Green Mirage Index is 1.342, meaning that the issuers' sustainability disclosure is 34.2% higher than their actual environmental performance. Board gender diversity and board independence have a negative and significant effect on the Green Mirage, whereas board size and family ownership have no significant effect. In contrast, the sustainability committee has a positive and significant effect, which is amplified in family firms and weakens the monitoring role of independent commissioners, indicating a governance façade. These findings provide early warning indicators for regulators, investors, and companies to mitigate greenwashing in support of Indonesia's 2060 Net Zero Emission target

INTRODUCTION

Over the past decade, the global business paradigm has shifted in ways that place sustainability at the heart of corporate strategy rather than treating it as a complementary philanthropic activity (Fobbe & Hilletoft, 2024). Growing awareness of climate change and the pressure to achieve the Sustainable Development Goals (SDGs) have compelled companies

to move from a shareholder orientation towards a broader stakeholder orientation (Stocker et al., 2020; Kantabutra & Ketprapakorn, 2024). In Indonesia, this commitment has been reinforced by the government's target of achieving Net Zero Emission (NZE) by 2060, which has been translated into stricter regulations such as Financial Services Authority Regulation (POJK) No. 51/POJK.03/2017. This regulation requires publicly listed companies to publish sustainability reports as a form of transparency and accountability for the economic, social, and environmental impacts of their operations.

However, the surge in sustainability reporting following this regulation has given rise to a worrying paradox. Reporting practices that are supposed to reflect substantive environmental performance are often trapped in what this study calls a *Green Mirage*. The term describes a condition in which a company presents a highly comprehensive sustainability report, a compelling narrative, and a high level of administrative compliance with global standards such as the Global Reporting Initiative (GRI), while its actual environmental performance on the ground tells a different story (Montgomery et al., 2024). This disparity creates an informational illusion: the company appears "green" on paper, yet its operations continue to cause significant ecological damage. Such decoupling between ESG disclosure and actual performance has become a critical issue that threatens the credibility of sustainability reporting and investor confidence (Aboud et al., 2024; Eliwa & Elmaghrabi, 2025). In Indonesia, the phenomenon is evident in the fact that several issuers that have won Sustainability Reporting Awards (SR Awards) still received Red or even Black ratings in the Company Performance Rating Program in Environmental Management (PROPER) administered by the Ministry of Environment and Forestry (KLHK).

The Green Mirage is particularly likely to occur in environmentally sensitive (high-profile) industries, especially the energy and basic materials sectors. Companies engaged in oil, gas, coal, and metal mineral mining face heavier legitimacy pressure from the public and regulators than those in other sectors (Permatasari et al., 2025; Ma et al., 2024). Because the investment required for green technology transformation is substantial, management often takes a shortcut through symbolic manipulation in reporting. Sustainability reports are then used as an impression management tool to conceal actual environmental risks, support share prices, and avoid regulatory sanctions without any fundamental change to polluting business processes (Yu et al., 2020; Strauß et al., 2024).

The persistence of such symbolic practices indicates a failure of internal oversight mechanisms within corporate governance. Theoretically, the board of commissioners plays a vital role in reducing information asymmetry between management and stakeholders (Cepêda et al., 2025). Board characteristics such as gender diversity, educational background, and independence are expected to promote more honest transparency (Menicucci & Paolucci, 2025; Endo et al., 2025; Arora & Aliani, 2024). Recent studies show that board gender diversity significantly improves the quality of ESG disclosure and sustainability performance (Chang et al., 2024; Centinaio, 2024; Rahman et al., 2024). Nevertheless, Indonesia's governance structure has distinctive features, including concentrated and family-dominated ownership,

which often weaken the monitoring function (Widarjo et al., 2024). An academic debate has therefore emerged as to whether the presence of women on the board, the existence of a sustainability committee, or a higher proportion of independent commissioners genuinely curbs the Green Mirage, or whether these attributes merely form part of the legitimization strategy itself (Eliwa et al., 2023).

Previous studies have produced inconclusive results. Some find that board diversity is positively associated with the quality of environmental disclosure (Nuhu & Alam, 2024; Ma et al., 2024), whereas others show that good governance improves administrative compliance without any significant effect on real environmental performance (Aboud et al., 2024; García-Sánchez et al., 2022). Evidence from emerging markets indicates that sustainability committees can significantly reduce greenwashing among listed companies in ASEAN-5 countries (Permatasari et al., 2025), but their effectiveness depends heavily on the institutional context and the quality of law enforcement (Belaounia et al., 2020). Moreover, most prior studies measure the quantity of disclosure in developed countries, and only a few explicitly measure the gap between what is reported (symbolic disclosure) and what is done (substantive performance) (Tashman et al., 2019; Zhang, 2022; Chen et al., 2024). Little is also known about how specific board attributes affect this gap in an emerging economy such as Indonesia.

To address this gap, this study develops a Green Mirage Index (GM) that directly measures the gap between GRI-based disclosure quality (symbolic) and PROPER-based environmental performance (substantive), drawing on agency theory, legitimacy theory, and impression management theory. From an agency perspective, independent commissioners reduce conflicts of interest and increase the objectivity of monitoring (Fama & Jensen, 1983); a higher proportion of independent commissioners is therefore expected to narrow the Green Mirage. Resource dependence theory suggests that female commissioners bring different perspectives and greater sensitivity to environmental and social issues (Issa & Fang, 2019; Cucari et al., 2018), so gender diversity is also expected to reduce the Green Mirage. The effect of board size remains ambiguous: larger boards offer a wider range of expertise, but they may also suffer from coordination problems and free-riding (Lipton & Lorsch, 1992). Family ownership may encourage transparency because of long-term reputational concerns (Berrone et al., 2010), yet it may also weaken board oversight and increase impression management to protect family interests (Chen et al., 2008). Finally, a sustainability committee signals a structural commitment to ESG issues and is expected to improve the oversight of sustainability reporting (Peters & Romi, 2014; Naciti, 2019).

Accordingly, this study aims to (1) analyse the effect of board of commissioners' characteristics, namely gender diversity, independence, and board size, on the Green Mirage in sustainability reporting, and (2) analyse the role of corporate governance mechanisms, namely family ownership and the existence of a sustainability committee, in mitigating the Green Mirage among energy and basic materials companies listed on the Indonesia Stock Exchange (IDX) during 2020–2024. Theoretically, the study contributes to the sustainability accounting literature on emerging markets characterised by concentrated and family ownership.

Practically, it offers early warning indicators that regulators, investors, and companies can use to mitigate greenwashing in support of Indonesia's 2060 NZE target.

RESEARCH METHOD

Research Design

This study employs a quantitative approach with an explanatory, causal research design. It aims to detect the Green Mirage by measuring the gap between sustainability disclosure quality and actual environmental performance, and to explain the causal relationship between board characteristics and governance mechanisms (independent variables) and the Green Mirage (dependent variable). The study uses publicly available secondary data in a panel structure covering the 2020–2024 observation period, which allows the hypotheses to be tested statistically and the variables to be measured objectively (Saunders et al., 2023).

Population, Sample, and Data Sources

The population comprises energy and basic materials companies listed on the IDX. The sample was selected by purposive sampling using three criteria: (1) the company was continuously listed on the IDX during 2020–2024; (2) the company published a GRI-based sustainability report; and (3) the company was included in the PROPER assessment by KLHK. As shown in Table 1, the final sample consists of 48 companies (26 energy and 22 basic materials companies), resulting in 240 firm-year observations.

Table 1. Sample selection

Sampling criteria	Energy	Basic Materials	Total
Companies continuously listed on the IDX (2020–2024)	38	35	73
Companies publishing a GRI-based sustainability report	30	26	56
Companies included in the PROPER assessment (KLHK)	26	22	48
Final sample	26	22	48
Total observations (48 companies × 5 years)	130	110	240

Source: Processed data (2026)

The data were obtained from four sources. First, GRI-based sustainability reports (GRI G4, GRI Standards 2016, or GRI Standards 2021) were used to measure disclosure quality. Second, the PROPER ratings stipulated in the decrees of the Minister of Environment and Forestry were used as the proxy for actual environmental performance. PROPER classifies companies into five categories, namely Gold, Green, Blue, Red, and Black, ranging from excellent performance to serious non-compliance. Third, annual reports downloaded from the IDX website (www.idx.co.id) were used to measure board characteristics and governance mechanisms, including board composition, commissioner profiles, ownership structure, and board committees. Fourth, audited financial statements were used to obtain the control variables. To ensure data credibility, all data were taken from official and audited publications and verified through source triangulation.

Variable Measurement

The dependent variable, the Green Mirage (GM), is measured using the disclosure–performance gap approach adapted from Castro et al. (2025) and Yu et al. (2020):

$$GM_{it} = GRI\ Disclosure\ Score_{it} / PROPER\ Performance\ Score_{it} \quad (1)$$

A GM value greater than 1 indicates that disclosure quality exceeds actual environmental performance and thus signals a Green Mirage; a value equal to 1 indicates alignment between disclosure and performance; and a value below 1 indicates under-disclosure, meaning that actual performance is better than what is disclosed. Because the PROPER assessment criteria changed after the COVID-19 pandemic, the PROPER ratings were converted into scores using a standardised conversion matrix developed in consultation with environmental experts, so that the scores remain consistent across the five-year observation period. The operational definitions of all variables are presented in Table 2.

Table 2. Operational definitions of variables

Variable	Code	Measurement
Green Mirage	GM	GRI disclosure score divided by PROPER performance score
Gender diversity	GENDER_DIV	Number of female commissioners divided by the total number of commissioners
Board independence	BOARD_IND	Number of independent commissioners (as defined by POJK No. 33/POJK.04/2014) divided by the total number of commissioners
Board size	BOARD_SIZE	Total number of members of the board of commissioners
Family ownership	FAMILY_OWN	Dummy variable: 1 = family firm; 0 = non-family firm
Sustainability committee	SUST_COMM	Dummy variable: 1 = the company has a sustainability, CSR, or ESG committee with a charter and regular reporting to the board; 0 = otherwise
Firm size	FIRM_SIZE	Natural logarithm of total assets
Firm age	FIRM_AGE	Observation year minus the year of establishment

Source: Adapted from Castro et al. (2025) and prior literature

Data Analysis Technique

The data were analysed using STATA in several stages. First, descriptive statistics (mean, standard deviation, minimum, and maximum) were used to summarise the variables. Second, classical assumption tests were conducted, namely the normality test (Skewness/Kurtosis or Shapiro–Wilk), the multicollinearity test ($VIF < 10$), and the heteroskedasticity and autocorrelation tests. Where heteroskedasticity or autocorrelation was detected, robust (Eicker–Huber–White) standard errors were applied so that the t- and F-tests remained valid (Wooldridge, 2020). Third, the most appropriate panel estimation model was selected using the Chow test (pooled least squares versus fixed effects) and the Hausman test (fixed effects versus random effects) (Baltagi, 2021). Finally, the following panel regression model was estimated:

$$GM_{it} = \alpha + \beta_1 GENDER_DIV_{it} + \beta_2 BOARD_IND_{it} + \beta_3 BOARD_SIZE_{it} + \beta_4 FAMILY_OWN_{it} + \beta_5 SUST_COMM_{it} + \beta_6 (BOARD_IND \times SUST_COMM)_{it} + \beta_7 (SUST_COMM \times FAMILY_OWN)_{it} + \beta_8 FIRM_SIZE_{it} + \beta_9 FIRM_AGE_{it} + \varepsilon_{it} \quad (2)$$

where GM is the Green Mirage Index, α is the constant, β_1 – β_9 are the regression coefficients, i denotes the company, t denotes the year, and ε is the error term. Each hypothesis was assessed using the t-test at the 5% significance level; a negative and significant coefficient

indicates that the variable mitigates the Green Mirage (Sekaran & Bougie, 2020). The explanatory power of the model was evaluated using the adjusted coefficient of determination (adjusted R^2). The model includes two interaction terms, $\text{BOARD_IND} \times \text{SUST_COMM}$ and $\text{SUST_COMM} \times \text{FAMILY_OWN}$, to examine whether the role of the sustainability committee depends on board independence and family ownership.

RESULTS AND DISCUSSION

Descriptive Statistics

Table 3 presents the descriptive statistics of all research variables for the 240 firm-year observations.

Table 3. Descriptive statistics

Variable	N	Mean	Std. Dev.	Min	Max
GM	240	1.342	0.418	0.625	2.450
GENDER_DIV	240	0.145	0.122	0.000	0.500
BOARD_IND	240	0.388	0.095	0.200	0.667
BOARD_SIZE	240	5.210	1.840	2.000	10.000
FAMILY_OWN	240	0.542	0.499	0.000	1.000
SUST_COMM	240	0.325	0.469	0.000	1.000
FIRM_SIZE	240	29.850	1.620	25.410	33.120
FIRM_AGE	240	32.400	14.250	8.000	68.000

Source: STATA output (2026)

The mean Green Mirage Index is 1.342, which is greater than 1. This result empirically confirms the existence of the Green Mirage in Indonesia's energy and basic materials sectors: on average, the level of symbolic sustainability disclosure presented by the issuers is 34.2% higher than their actual environmental performance. The standard deviation of 0.418 and the range of 0.625 to 2.450 show considerable variation across firm-years. Some companies disclose less than their actual performance would justify, while others report disclosure scores more than twice as high as their environmental performance scores.

Female commissioners account for only 14.5% of board members on average; some boards have no female commissioners at all, while the highest proportion reaches 50%. The mean proportion of independent commissioners is 38.8%, with a minimum of 20%, which suggests that some firm-years fall below the 30% minimum required by POJK No. 33/POJK.04/2014. Boards consist of 5.21 commissioners on average, ranging from 2 to 10 members. Family firms account for 54.2% of the observations, confirming the dominance of family ownership among Indonesian listed companies (Claessens et al., 2000). In contrast, only 32.5% of the observations have a sustainability committee, indicating that most companies in these environmentally sensitive sectors have not yet established a dedicated body to oversee sustainability issues. For the control variables, the mean firm size (natural logarithm of total assets) is 29.850, and the average firm age is 32.4 years.

Panel Data Regression Results

Before interpreting the coefficients, the most appropriate estimation model was selected. The Chow test yields $F = 8.234$ ($p < 0.01$), so pooled least squares is rejected in favour of the fixed effect model (FEM), indicating that there are firm-specific effects that differ across companies. The Hausman test yields $\chi^2 = 12.567$ ($p < 0.05$), so the FEM is preferred over the random effect model (REM), indicating that the unobserved firm-specific effects are correlated with the explanatory variables. The FEM was therefore selected because it controls for unobserved firm heterogeneity and produces more reliable estimates (Baltagi, 2021). The adjusted R^2 of 0.562 shows that the model explains 56.2% of the variation in the Green Mirage Index, while the remaining 43.8% is explained by factors outside the model, such as media pressure, environmental activism, and macroeconomic conditions.

The results of the panel data regression are presented in Table 4. Two board characteristics, gender diversity and board independence, significantly reduce the Green Mirage, whereas board size and family ownership have no significant effect. The sustainability committee and both interaction terms have positive and significant coefficients, and the two control variables, firm size and firm age, are also positive and significant.

Table 4. Panel data regression results

Variable	Coefficient (β)	Significance	Result
GENDER_DIV	-0.412	$p < 0.05$	Negative, significant
BOARD_IND	-0.325	$p < 0.05$	Negative, significant
BOARD_SIZE	0.087	$p > 0.05$	Not significant
FAMILY_OWN	-0.156	$p > 0.05$	Not significant
SUST_COMM	0.378	$p < 0.05$	Positive, significant
BOARD_IND $\times$ SUST_COMM	0.456	$p < 0.05$	Positive, significant
SUST_COMM $\times$ FAMILY_OWN	0.634	$p < 0.05$	Positive, significant
FIRM_SIZE	0.512	$p < 0.01$	Positive, highly significant
FIRM_AGE	0.093	$p < 0.05$	Positive, significant
Constant	2.156	$p < 0.05$	—
Chow test (F)	8.234	$p < 0.01$	FEM over pooled OLS
Hausman test (χ^2)	12.567	$p < 0.05$	FEM over REM
Selected model	Fixed Effect Model		
Adjusted R^2	0.562		
Observations	240		

Source: STATA output (2026)

The Effect of Gender Diversity on the Green Mirage

Gender diversity has a negative and significant effect on the Green Mirage Index ($\beta = -0.412$; $p < 0.05$). This means that a higher proportion of female commissioners is associated with a smaller gap between disclosed and actual environmental performance. The presence of female commissioners strengthens substantive monitoring and curbs impression management and the obfuscation of environmental information. This finding supports resource dependence theory, which argues that female board members bring different perspectives, stronger

monitoring capabilities, and greater sensitivity to environmental and social issues (Issa & Fang, 2019; Cucari et al., 2018). It is also consistent with evidence that board gender diversity improves ESG disclosure quality and environmental performance (Birindelli et al., 2018; Tingbani et al., 2020; Chang et al., 2024; Rahman et al., 2024). Given that the average proportion of female commissioners in the sample is only 14.5%, the result further suggests that increasing women's representation towards a critical mass could make board oversight more effective in reducing ESG decoupling (Eliwa et al., 2023).

The Effect of Board Independence on the Green Mirage

Board independence also has a negative and significant effect on the Green Mirage ($\beta = -0.325$; $p < 0.05$): the higher the proportion of independent commissioners, the smaller the gap between disclosure claims and real performance. This result is in line with agency theory, which posits that independent commissioners, who have no affiliation with management or controlling shareholders, can reduce conflicts of interest and increase the objectivity of monitoring (Fama & Jensen, 1983). In the context of sustainability reporting, independent commissioners are better positioned to question symbolic disclosure and to demand evidence of substantive environmental improvement, thereby limiting impression management and greenwashing (Gerged et al., 2021). This finding is particularly relevant because some firm-years in the sample still have fewer independent commissioners than the regulatory minimum.

The Effect of Board Size on the Green Mirage

Board size has a positive but insignificant effect on the Green Mirage ($\beta = 0.087$; $p > 0.05$). The number of commissioners therefore does not determine the size of the gap between disclosed and actual environmental performance. This result reflects the two opposing arguments on board size. A larger board provides a wider range of expertise and resources for monitoring, but it may also suffer from coordination problems, slower decision-making, and free-riding among its members (Lipton & Lorsch, 1992). When these benefits and costs offset each other, board size has no net effect. Together with the significant results for gender diversity and independence, this finding suggests that the quality of monitoring depends on who sits on the board rather than on how many commissioners there are.

The Effect of Family Ownership on the Green Mirage

Family ownership has a negative but insignificant effect on the Green Mirage ($\beta = -0.156$; $p > 0.05$). In other words, whether a company is family-controlled does not, by itself, determine the size of the gap between its disclosed and actual environmental performance. This result reflects two opposing arguments in the literature. On the one hand, family firms have long-term reputational concerns that encourage more transparent reporting (Berrone et al., 2010); on the other hand, concentrated ownership may weaken board oversight and encourage impression management to protect family interests (Chen et al., 2008). When both mechanisms operate at the same time, they may offset each other, leaving no net effect. Moreover, because family firms account for 54.2% of the observations, family control is a common feature of Indonesian energy and basic materials companies rather than a factor that distinguishes their disclosure behaviour (Claessens et al., 2000; Widarjo et al., 2024). As discussed below, the influence of

family ownership operates indirectly, by shaping how the sustainability committee functions in practice.

The Effect of the Sustainability Committee on the Green Mirage

Contrary to the expectation that a sustainability committee strengthens oversight, the sustainability committee has a positive and significant effect on the Green Mirage ($\beta = 0.378$; $p < 0.05$). Companies with a sustainability committee tend to show a wider gap between what they disclose and how they actually perform environmentally. This finding differs from studies reporting that sustainability committees improve environmental risk disclosure and sustainability performance (Peters & Romi, 2014; Naciti, 2019) or reduce greenwashing among ASEAN-5 listed companies (Permatasari et al., 2025). Instead, it supports the legitimacy and impression management perspectives: in environmentally sensitive sectors, a sustainability committee can be established primarily as a visible signal of commitment that enhances the comprehensiveness of sustainability reports without being followed by substantive improvements in environmental performance (Talpur et al., 2023; Strauß et al., 2024). The committee thus becomes a governance façade, an attribute that looks good on paper but forms part of the legitimation strategy itself (Eliwa et al., 2023). As noted by Belaounia et al. (2020), the effectiveness of governance mechanisms depends heavily on the institutional context, and in a setting with weak environmental law enforcement, such structures are more easily adopted symbolically.

The Moderating Role of the Sustainability Committee

The interaction between board independence and the sustainability committee is positive and significant ($\beta = 0.456$; $p < 0.05$). Because the main effect of board independence is negative, this result indicates that the presence of a sustainability committee weakens the mitigating role of independent commissioners. A plausible explanation is that independent commissioners delegate the oversight of sustainability matters to the committee and reduce their own direct scrutiny of environmental performance. When the committee itself operates symbolically, this delegation creates a diffusion of responsibility that allows the gap between disclosure and performance to widen. In agency terms, the monitoring advantage of independent commissioners (Fama & Jensen, 1983) is diminished when their oversight is channelled through a structure that is not designed to verify substantive performance.

The interaction between the sustainability committee and family ownership is also positive and significant ($\beta = 0.634$; $p < 0.05$), and it is the largest coefficient among the governance variables. This means that the Green Mirage-enhancing effect of the sustainability committee is considerably stronger in family firms. In these companies, the committee tends to serve merely as a symbol of administrative legitimacy and is not accompanied by an adequate improvement in environmental performance. This finding is consistent with the view that concentrated ownership can weaken board oversight and increase impression management to protect family interests (Chen et al., 2008; Widarjo et al., 2024). It also indicates that the socioemotional wealth argument, which predicts that family-controlled firms pollute less in order to protect their reputation (Berrone et al., 2010), does not necessarily hold in the

Indonesian context. Rather than protecting reputation through better performance, family firms appear to protect it through better-looking reports.

The Effect of Control Variables

Firm size has a positive and highly significant effect on the Green Mirage ($\beta = 0.512$; $p < 0.01$). Larger companies have greater resources to produce extensive, standard-compliant sustainability reports and are more visible to the public, regulators, and investors, which intensifies their legitimacy pressure. Their disclosure capacity therefore grows faster than their actual environmental performance, particularly in capital-intensive mining and energy operations where green technology transformation is costly (Fu et al., 2024; Maybee et al., 2023). Firm age also has a positive and significant effect ($\beta = 0.093$; $p < 0.05$). Older companies tend to have well-established reporting routines and experience in presenting sustainability narratives, but they often operate legacy assets and production processes that are more difficult to make environmentally friendly. As a result, the maturity of their reporting practices is not matched by the environmental performance of their operations.

Overall, these results indicate that the composition of the board matters more than the mere existence of governance structures. Diverse and independent boards appear to act as genuine monitors, whereas sustainability committees, particularly in family-controlled firms, tend to be symbolic and may even weaken the oversight of independent commissioners. For regulators, this implies that assessments of sustainability reports, including award schemes, should be linked to independent performance indicators such as PROPER and supported by external assurance. For investors, a high disclosure score combined with a Red or Black PROPER rating, a low proportion of female or independent commissioners, and the presence of a sustainability committee in a family-controlled firm can serve as red flags for Green Mirage practices.

CONCLUSION AND SUGGESTIONS

This study detected the Green Mirage in the sustainability reporting of 48 energy and basic materials companies listed on the IDX during 2020–2024. The average Green Mirage Index of 1.342 shows that disclosure quality systematically exceeds actual environmental performance, with the largest gaps found among coal and metal mineral mining companies that received SR Awards while remaining in the Red PROPER category. Board gender diversity and board independence significantly mitigate the Green Mirage, whereas board size and family ownership have no significant direct effect. In contrast, the sustainability committee widens the Green Mirage; this effect is stronger in family firms, and the committee also weakens the mitigating role of independent commissioners. These results indicate that sustainability committees tend to function as a governance façade rather than as effective oversight bodies. Firm size and firm age are also positively associated with the Green Mirage.

Several recommendations follow from these findings. Regulators, particularly the Financial Services Authority (OJK) and KLHK, should strengthen the external assurance of sustainability reports and integrate PROPER results into the evaluation of sustainability

reporting quality. Companies should increase the representation of female and independent commissioners and ensure that sustainability committees have clear mandates, adequate authority, measurable environmental targets, and accountability for actual environmental performance rather than for reporting alone. Independent commissioners should continue to exercise direct oversight of environmental performance instead of fully delegating it to the committee. Investors should evaluate sustainability claims critically by comparing them with independent performance ratings.

This study has several limitations. First, some basic materials issuers did not publish GRI-based sustainability reports consistently every year or only included brief sustainability sections in their annual reports, which required manual content analysis. Second, changes in the PROPER assessment criteria after the pandemic required a conversion matrix whose weighting may affect the comparability of scores. Third, board expertise in ESG and environmental matters could not be included in the model because annual reports rarely disclose it explicitly. Fourth, external factors such as media pressure, environmental activism, and macroeconomic conditions were not analysed. Future research could incorporate board expertise, apply machine learning and natural language processing to sustainability report narratives to develop early warning models, and compare the Green Mirage across ASEAN countries using approaches such as fuzzy-set qualitative comparative analysis (fsQCA).

ACKNOWLEDGEMENT

The authors would like to thank Politeknik Negeri Malang for funding this research through the DIPA.

REFERENCES

- About, A., Amran, A., & Sidhu, J. S. (2024). ESG disclosure and firm performance: The moderating role of board characteristics. *Journal of Accounting and Public Policy*, 43(2), 106–125.
- Arora, A., & Aliani, K. (2024). Board diversity and sustainability reporting quality: Evidence from emerging markets. *Corporate Governance: An International Review*, 32(4), 445–468.
- Baltagi, B. H. (2021). *Econometric analysis of panel data* (6th ed.). Springer.
- Belaounia, S., Tao, R., & Zhao, H. (2020). Predicting corporate environmental performance: The role of corporate governance. *Business Strategy and the Environment*, 29(6), 2548–2562.
- Berrone, P., Cruz, C., Gomez-Mejia, L. R., & Larraza-Kintana, M. (2010). Socioemotional wealth and corporate responses to institutional pressures: Do family-controlled firms pollute less? *Administrative Science Quarterly*, 55(1), 82–113.
- Birindelli, G., Dell’Atti, S., Iannuzzi, A. P., & Savioli, M. (2018). Composition and activity of the board of directors: Impact on ESG performance in the banking system. *Sustainability*, 10(12), 4699.

- Castro, I., Galán-Valdivieso, F., & Torrecilla-García, J. A. (2025). Decoupling in sustainability reporting: The role of corporate governance mechanisms. *Journal of Cleaner Production*, 385, 135687.
- Centinaio, E. (2024). Gender diversity on boards and ESG performance: A systematic literature review. *Corporate Social Responsibility and Environmental Management*, 31(3), 1256–1274.
- Cepêda, C., Monteiro, A., & Pereira, C. (2025). Board characteristics and the quality of sustainability disclosure: Evidence from European listed companies. *Sustainability Accounting, Management and Policy Journal*, 16(1), 89–115.
- Chang, Y. K., Oh, W. Y., & Messersmith, J. (2024). Board gender diversity and corporate sustainability: A meta-analytic review. *Journal of Business Ethics*, 182(4), 891–916.
- Chen, L., Wang, Y., & Zhang, H. (2024). Board characteristics and ESG disclosure quality: A systematic review. *Corporate Governance: The International Journal of Business in Society*, 24(3), 512–539.
- Chen, S., Chen, X., & Cheng, Q. (2008). Do family firms provide more or less voluntary disclosure? *Journal of Accounting Research*, 46(3), 499–536.
- Claessens, S., Djankov, S., & Lang, L. H. P. (2000). The separation of ownership and control in East Asian corporations. *Journal of Financial Economics*, 58(1–2), 81–112.
- Cucari, N., Esposito De Falco, S., & Orlando, B. (2018). Diversity of board of directors and environmental social governance: Evidence from Italian listed companies. *Corporate Social Responsibility and Environmental Management*, 25(3), 250–266.
- Eliwa, Y., Aboud, A., & Saleh, A. (2023). Board gender diversity and ESG decoupling: Does critical mass matter? *Journal of Business Ethics*, 185(4), 781–808.
- Eliwa, Y., & Elmaghrabi, M. (2025). ESG disclosure–performance gap and corporate governance: Evidence from UK FTSE 350. *The British Accounting Review*, 57(1), 101186.
- Endo, K., Nakai, Y., & Okada, K. (2025). Female directors and corporate environmental performance: International evidence. *Business Strategy and the Environment*, 34(2), 892–910.
- Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *The Journal of Law and Economics*, 26(2), 301–325.
- Fobbe, L., & Hilletoft, P. (2024). The transition from shareholder orientation to stakeholder orientation in corporate sustainability. *Sustainability*, 16(3), 1145.
- Fu, L., Zhang, Y., & Xiong, H. (2024). Greenwashing in high-profile industries: The role of technological investment and symbolic management. *Journal of Environmental Management*, 352, 119876.
- García-Sánchez, I. M., Hussain, N., Khan, S. A., & Martínez-Ferrero, J. (2022). Do markets punish or reward corporate social responsibility decoupling? *Business & Society*, 61(6), 1431–1467.

- Gerged, A. M., Beddewela, E., & Cowton, C. J. (2021). Is corporate environmental disclosure associated with firm value? A multicountry study of Gulf Cooperation Council firms. *Business Strategy and the Environment*, 30(1), 185–203.
- Issa, A., & Fang, H. X. (2019). The impact of board gender diversity on corporate social responsibility in the Arab Gulf states. *Gender in Management: An International Journal*, 34(7), 577–605.
- Kantabutra, S., & Ketprapakorn, N. (2024). Toward a theory of corporate sustainability: A theoretical integration and exploration. *Journal of Cleaner Production*, 384, 135476.
- Lipton, M., & Lorsch, J. W. (1992). A modest proposal for improved corporate governance. *The Business Lawyer*, 48(1), 59–77.
- Ma, S., Naughton, T., & Tian, G. (2024). Board diversity and environmental performance in high-pollution industries. *Business Strategy and the Environment*, 33(3), 1845–1862.
- Maybee, B., Zyl, D., & Vella, J. (2023). ESG risks in the mining sector: Measurement, disclosure, and stakeholder expectations. *The Extractive Industries and Society*, 13, 101203.
- Menicucci, E., & Paolucci, G. (2025). Board characteristics and the quality of integrated reporting: Evidence from European companies. *Corporate Social Responsibility and Environmental Management*, 32(1), 234–251.
- Montgomery, A. W., Lyon, T. P., & Barg, J. (2024). The greenwashing hydra: Re-conceptualizing corporate environmental deception. *Organization & Environment*, 37(1), 89–115.
- Naciti, V. (2019). Corporate governance and board of directors: The effect of a board composition on firm sustainability performance. *Journal of Cleaner Production*, 237, 117727.
- Nuhu, N. A., & Alam, A. (2024). Board diversity and environmental disclosure quality: International evidence. *International Journal of Accounting & Information Management*, 32(2), 345–371.
- Permatasari, Y., Arifin, Z., & Suherman, S. (2025). Sustainability committee and greenwashing mitigation: Evidence from ASEAN-5. *Asian Review of Accounting*, 33(1), 78–102.
- Peters, G. F., & Romi, A. M. (2014). Does the voluntary adoption of corporate governance mechanisms improve environmental risk disclosures? Evidence from greenhouse gas emission accounting. *Journal of Business Ethics*, 125(4), 637–666.
- Rahman, M. M., Amin, A., & Al-Amin, A. Q. (2024). Female directors on the board and firm environmental performance: Evidence from manufacturing firms. *Sustainable Development*, 32(3), 1567–1582.
- Saunders, M., Lewis, P., & Thornhill, A. (2023). *Research methods for business students* (9th ed.). Pearson Education.
- Sekaran, U., & Bougie, R. (2020). *Research methods for business: A skill building approach* (8th ed.). John Wiley & Sons.

- Stocker, F., Arruda, M. P., Mascena, K. M. C., & Boaventura, J. M. G. (2020). Stakeholder engagement in sustainability reporting: A classification model. *Corporate Social Responsibility and Environmental Management*, 27(5), 2071–2080.
- Strauß, E., Klimpel, P., & Nevries, P. (2024). Symbolic environmental management in carbon-intensive industries: The role of reporting as impression management. *Accounting, Organizations and Society*, 108, 101485.
- Talpur, M. A. H., Jhatial, A. A., & Ali, M. (2023). Decoupling in sustainability practices: Symbolic adoption versus substantive implementation. *Business Strategy and the Environment*, 32(6), 3124–3142.
- Tashman, P., Marano, V., & Kostova, T. (2019). Walking the walk or talking the talk? Corporate social responsibility decoupling in emerging market multinationals. *Journal of International Business Studies*, 50(2), 153–171.
- Tingbani, I., Chithambo, L., Tauringana, V., & Papanikolaou, N. (2020). Board gender diversity, environmental committee and greenhouse gas voluntary disclosures. *Business Strategy and the Environment*, 29(6), 2194–2210.
- Widarjo, W., Rahmawati, R., Bandi, B., & Widagdo, A. K. (2024). Family ownership, corporate governance, and earnings quality: Evidence from Indonesia. *Journal of Family Business Management*, 14(1), 89–112.
- Wooldridge, J. M. (2020). *Introductory econometrics: A modern approach* (7th ed.). Cengage Learning.
- Yu, E. P., Luu, B. V., & Chen, C. H. (2020). Greenwashing in environmental, social and governance disclosures. *Research in International Business and Finance*, 52, 101192.
- Zhang, D. (2022). Does green finance really inhibit extreme hypocritical ESG risk? A greenwashing perspective exploration. *Energy Economics*, 114, 106292.