Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 9, No. 5, 1508-1521
2025
Publisher: Learning Gate
DOI: 10.55214/25768484.v9i5.7187

Greenwashing and board effectiveness: Moderating role of CSR committee from Malaysia evidence

Nurul Nazlia Jamil[1]*, Ersa Tri Wahyuni[2]
[1]Universiti Sains Islam Malaysia, Malaysia; nurulnazlia@usim.edu.my (N.N.J.).
[2]Universitas Padjajaran, Bandung, Indonesia; ersa@unpad.ac.id (E.T.W.).

Abstract: Greenwashing comes in many forms from misleading claims and ambiguous terms to using nature imagery to suggest sustainability. As ESG obligations and transparency demands grow, so does the scrutiny around greenwashing. The purpose of the study is to examine the role of board effectiveness (diversity, independence, size and expertise) on greenwashing with the role of CSR committee as the moderator in the Malaysian listed companies. This paper analyzes data from the year 2021-2023 with a sample of 1068 firm year observations. The regression analyses have been conducted and the result highlighted that the board effectiveness (diversity, independence, size and expertise) negatively related with the greenwashing behaviour in Malaysian listed companies. Furthermore, the CSR role has shown negatively moderate the relationship between board effectiveness and greenwashing relationship. The results imply that the synergy from the effective board of directors able to curb greenwashing behaviour in the companies. This study goes beyond only offering greenwashing; instead, it offers some policy implications for businesses to be sustainable.
Keywords: *Board effectiveness, CSR committee, Greenwashing.*

1. Introduction

Large multinational corporations are walking a tightrope between driving economic growth and being ESG (Environmental, Social, and Governance) compliant. While some critics argue that ESG initiatives are merely a 'public-relations move" or 'greenwashing', others see them as essential for long-term sustainability and business growth. The reality is that ESG considerations are becoming increasingly important in companies' decision-making processes. Many corporations are making significant commitments to science-based targets, discontinuing operations in countries with questionable human right records, and organizing relief efforts. This shift towards ESG compliance is driven by the growing recognition that social license - the perception that a business is acting fairly and deserves trust - is crucial for sustaining long term value.

Kateb and Alahdal [1] argues that sustainability should be a core strategic element, not just a compliance or CSR issue. Boards must ensure that sustainability aligns with business objectives and drives long-term value. This involves integrating sustainability into governance structures and collaborating across committees like audit and compensation. Increasingly, companies are tying sustainability metrics, such as emissions reductions, to executive compensation. Balancing the expectations of shareholders, employees, and customers is another critical task for boards. Dempere, et al. [2] warns against "greenwashing" and stresses the need for accurate, consistent sustainability reporting that aligns with business strategy.

Greenwashing, once a cynical marketing tactic, is rapidly evolving into a major legal and reputational risk for businesses. A wave of lawsuits, new regulations, and growing consumer awareness are forcing companies to ditch misleading environmental claims and embrace genuine sustainability practices. The numbers speak for themselves. Over 230 greenwashing lawsuits have been filed globally

History: Received: 4 February 2025; Revised: 16 April 2025; Accepted: 21 April 2025; Published: 14 May 2025
* Correspondence: nurulnazlia@usim.edu.my

since 2015, and the trend shows no signs of slowing. These lawsuits target companies that mislead consumers about their environmental impact, from pollution to "sustainable" products that aren't so sustainable after all. The consequences of losing such a case can be devastating hefty fines, brand erosion, and even ousted CEOs.

But it is not just lawsuits that companies need to worry about. Shareholders are increasingly demanding transparency and action on climate change. They want companies to follow through on their sustainability promises, not just use them as empty marketing speak. In the past two years, a wave of regulations has emerged specifically to combat misleading environmental claims. The EU Green Claims Directive, for example, empowers consumers to hold companies accountable for greenwashing in their marketing and communications [3]. Companies found guilty face fines of up to 4% of their annual revenue, alongside potential bans from public procurement and forced corrective advertising. Similar regulations are popping up worldwide, from the UK's Financial Conduct Authority's anti-greenwashing rule to the US Federal Trade Commission's updated Green Guides.

Despite the risks, some companies persist with greenwashing tactics. The responsibility for tackling greenwashing falls squarely on the shoulders of company leadership, particularly boards of directors. Boards must set the tone for transparency and integrity, ensuring their companies operate with a focus on genuine sustainability. This means establishing clear processes for handling all environmental claims, both explicit and implicit, in external communications.

The study aims to determine how gender diversity in the board influences companies' greenwashing behavior, whether board members' independence, size, and expertise matter in the context of greenwashing by Malaysia firms, and the role of the CSR committee in the board effectiveness in curbing the greenwashing behavior. The study investigates the following research question: What is the role of corporate governance in the context of greenwashing behavior among Malaysia firms? This study adds to the body of knowledge on greenwashing in a few ways. First, it adds to our understanding of the little-known causes of greenwashing, such as how corporate reforms pertaining to the representation of women on corporate boards enhance businesses' environmental performance by curbing greenwashing. Despite the substantial governance improvements implemented by Malaysia's regulators, they are nonetheless inadequate when compared to those implemented in other nations.

As corporate governance instruments to reduce ESG incidents, our study emphasizes the need to increase the number of women on the board of directors, ensure the board has more independence, and include members with international expertise. Second, by refuting the notion that CSR committees are merely symbolic, our analysis emphasizes the significance of these committees in preventing greenwashing. One encouraging sign is that 78% of the top 100 corporations in Malaysia have CSR committees. Our results might encourage other businesses to organize CSR committees in order to enhance their environmental performance and lessen greenwashing. Lastly, the indirect participation of the CSR committee enhances the empirical evidence on board traits and greenwashing. The stakeholder theory view is theoretically supported by the study. A diversified board with a range of expertise should guarantee improved internal control, which should reduce CSR problems and increase openness in the sharing of environmental information. A CSR committee could also help to alleviate agency conflicts between principals and agents, according to the report.

This article's remaining content is arranged as follows. The theoretical foundation, hypothesis construction, and literature review are presented in Sector 2. The econometric model, data sources, and research methodology are covered in Section 3. Section 4 presents the results, and Section 5 addresses the findings, restrictions, and potential avenues for further study.

2. Literature Review

Greenwashing is ultimately an ethical issue that demands collective responsibility. Companies need to be mindful about disclosures, ensuring all claims are based on real, measurable environmental impact. Transparency is key, but it's not the whole story. Businesses should avoid "greenhushing," the act of downplaying or concealing sustainability efforts to avoid scrutiny.

The key lies in striking the perfect balance between credibility and visibility. Sustainability efforts should not be mere marketing tactics, but genuine steps towards a sustainable future. According to Kurpierz and Smith [4] while communication is vital for differentiation and attracting customers in a crowded marketplace, companies that master the art of communicating sustainability authentically will build lasting trust with consumers and reap long-term rewards.

In order to determine the costs associated with taking environmental action or not, corporations especially those with significant financial materiality must now examine both their total amount of GHG emissions and their GHG intensity. Boards that have directors appointed after the company's CEO took office are known as co-opted boards.

Manchester Metropolitan University researchers looked at the carbon performance of a set of big US firms in the Russell 3000 Index and how the composition of their board influences the company's environmental actions. They discovered that these sectors' greenhouse gas emissions intensity is declining as a result of co-opted boards [5]. They found no influence in other industries where climate change has no effect on firm value.

RepRisk's research on greenwashing shows trends in the number of businesses connected to deceiving the public about their environmental impact for the third year in a row. For the first time since 2019, RepRisk data indicates a 12% decline in the total number of businesses linked to greenwashing risk.

To ensure ESG initiatives are more than mere rhetoric, corporate boards and leadership teams must champion sustainability at the highest level. A dedicated board committee for ESG oversight can drive accountability, set strategic goals, and assess progress on sustainability metrics [6-8]. Linking executive compensation to ESG performance further demonstrates a company's commitment, incentivising leadership to pursue sustainability targets actively. When ESG becomes a leadership priority, it permeates the organisation, creating alignment between corporate vision and day-to-day operations. Board-level commitment signals to stakeholders that the company is serious about long-term impact, elevating its credibility and influence in the market.

As mentioned by Chen and Dagestani [9] for board directors, understanding greenwashing is not just an ethical imperative but a strategic necessity. Directors are entrusted with the responsibility of overseeing corporate governance and ensuring that the company operates in the best interests of its stakeholders. In today's business environment, where sustainability is increasingly linked to competitive advantage, board directors must prioritise authentic environmental practices. By doing so, they can enhance the company's reputation, meet regulatory requirements, and contribute to a more sustainable future. The challenge is significant, but with informed and proactive leadership, it is possible to navigate the complexities of greenwashing and foster genuine, impactful sustainability.

Accountability is crucial to controlling the risk of greenwashing, as it is with any governance issues. For instance, it is crucial to hold senior executives accountable for reaching their key performance indicators and make sure they are in line with disclosures and forward-looking statements [10]. The practice of "greenwashing" is harmful and has far-reaching effects. Governance experts have a crucial role to play in tackling it, which calls for teamwork. In order to prevent greenwashing, firm-level governance elements are more crucial than those at the national level.

In many respects, any discrepancy between an organization's stated goals and the actual course of its operations can be interpreted as a governance failure. Thus, establishing strong governance frameworks is a first step in reducing the financial, legal, and reputational risks associated with greenwashing. Professionals in governance can also be very helpful in bringing together various teams within an organization and organizing communities of practice.

The effectiveness of corporate boards plays a critical role in influencing firms' environmental strategies and the likelihood of engaging in greenwashing. Effective boards, characterized by independence, diversity, and environmental expertise, can enhance corporate accountability and ensure that sustainability claims align with actual business practices [11]. Board independence, in particular, strengthens oversight by reducing managerial opportunism, thereby minimizing the chances of misleading sustainability disclosures [12]. Additionally, when firms incorporate directors with expertise in environmental, social, and governance (ESG) issues, they are more likely to engage in substantive sustainability practices rather than symbolic actions [13].

Weak governance structures, on the other hand, create conditions conducive to greenwashing, as ineffective boards may fail to scrutinize misleading sustainability claims. Firms with concentrated ownership or CEO dominance often exhibit lower board effectiveness, allowing managerial discretion to override genuine sustainability initiatives in favor of reputation management [14]. In such cases, firms prioritize external perceptions of sustainability without implementing meaningful environmental actions, misleading stakeholders about their true ESG performance [15]. Research suggests that firms with weak governance mechanisms are more likely to engage in selective sustainability disclosures, revealing only favorable environmental information while concealing negative impacts [16].

Moreover, board diversity, particularly in terms of gender and expertise, plays a vital role in preventing greenwashing. Studies have shown that gender-diverse boards contribute to more ethical decision-making and greater corporate transparency in sustainability reporting [17]. Female directors often advocate for stronger ESG commitments and ethical business conduct, reducing the probability of misleading environmental claims [18]. Furthermore, firms with a higher proportion of independent directors are less likely to manipulate sustainability disclosures, as external board members bring an objective perspective and hold management accountable for their environmental strategies [19].

Corporate Social Responsibility (CSR) committees have emerged as key governance mechanisms to enhance firms' sustainability strategies and mitigate unethical practices such as greenwashing. Greenwashing refers to misleading sustainability disclosures intended to improve corporate reputation without genuine environmental commitment [20]. While an effective board structure comprising attributes such as independence, gender diversity, size, and expertise can mitigate greenwashing [13] the presence of a CSR committee may further strengthen or weaken this relationship. This literature review explores how CSR committees moderate the impact of board effectiveness on greenwashing, drawing on corporate governance and sustainability research.

Given their sustainability oversight role, CSR committees can strengthen or weaken the relationship between board effectiveness and greenwashing as when CSR committees are well-structured and influential, they enhance board oversight by providing specialized knowledge on sustainability issues. This reinforces board independence, gender diversity, and expertise in curbing greenwashing [13]. Firms with both effective boards and active CSR committees are more likely to engage in genuine sustainability practices rather than misleading disclosures [21].

On the other hand, if CSR committees lack authority or expertise, they may serve as symbolic entities rather than effective governance mechanisms. In such cases, even highly effective boards may struggle to prevent greenwashing, as CSR committees fail to enforce sustainability standards [16]. Empirical research supports the notion that CSR committees' moderate sustainability governance outcomes. For example, companies with strong CSR committees have been found to exhibit lower levels of greenwashing, particularly when paired with independent and diverse boards [18]. Additionally, CSR committees that engage with external stakeholders and regulatory bodies further reduce the risk of misleading sustainability claims [22].

CSR committees play a crucial moderating role in the relationship between board effectiveness and greenwashing. When CSR committees are well-structured and influential, they enhance board oversight, ensuring that sustainability disclosures reflect genuine corporate commitments. Conversely, weak CSR committees may fail to curb greenwashing, even in firms with otherwise effective boards. Future research should explore the conditions under which CSR committees are most effective in sustainability governance, considering factors such as industry context, regulatory frameworks, and stakeholder engagement.

Thus, board effectiveness serves as both a deterrent to greenwashing and a driver of genuine corporate sustainability. Strong governance mechanisms, independence, diversity, and ESG expertise collectively ensure that firms uphold transparency and accountability in their environmental practices.

In contrast, weak boards, characterized by managerial entrenchment and insufficient oversight, enable deceptive sustainability claims, ultimately eroding stakeholder trust and corporate credibility.

3. Theoretical Framework

Stakeholder theory suggests that instead of concentrating only on maximizing shareholder wealth, businesses should take into account the interests of all stakeholders, including workers, consumers, investors, communities, and the environment [23]. This viewpoint places a strong emphasis on ethical decision-making, corporate responsibility, and sustainable business practices. According to stakeholder theory, in order to encourage real sustainability initiatives and counteract dishonest tactics like greenwashing, businesses should match stakeholder expectations with their governance structures, including board effectiveness [24].

Board effectiveness is crucial in ensuring that firms balance stakeholder interests while maintaining corporate integrity. Effective boards, characterized by independence, diversity, and expertise, enhance corporate governance by holding management accountable for sustainability practices and preventing misleading environmental claims [11]. According to stakeholder theory, firms with strong governance structures are more likely to engage in authentic sustainability initiatives due to increased pressure from external stakeholders [25]. Furthermore, independent directors and those with environmental expertise act as monitors, ensuring that corporate social responsibility (CSR) efforts are not merely symbolic but result in real environmental impact [13].

From a stakeholder perspective, ineffective boards enable greenwashing by failing to align corporate actions with stakeholder expectations. Greenwashing occurs when firms exaggerate or misrepresent their sustainability performance to gain reputational advantages without substantive environmental commitment [15]. Weak governance structures, such as boards dominated by insiders or lacking environmental expertise, may allow managerial opportunism, where firms prioritize profit-driven motives over stakeholder concerns [14]. In firms where the board lacks independence or oversight mechanisms, sustainability disclosures are more likely to be used as public relations tools rather than reflecting genuine environmental responsibility [16].

An essential aspect of stakeholder theory is the active engagement of diverse stakeholders in corporate governance [24]. Boards that integrate stakeholder concerns into decision-making are more likely to enforce transparency and accountability in sustainability reporting [19]. For example, gender-diverse boards have been found to be more responsive to stakeholder expectations regarding environmental sustainability, reducing the likelihood of greenwashing [17]. Additionally, firms that actively engage with investors, regulators, and non-governmental organizations (NGOs) in sustainability governance tend to have more credible ESG commitments, as external scrutiny discourages deceptive environmental claims [18].

4. Hypotheses Development

Corporate governance, particularly board characteristics, plays a critical role in shaping firms' sustainability strategies and their likelihood of engaging in greenwashing. Board attributes such as gender diversity, independence, size, and expertise influence firms' environmental transparency and the authenticity of their sustainability commitments. Based on existing literature, the following hypotheses are developed to examine the impact of these board characteristics on greenwashing.

4.1. Board Gender Diversity and Greenwashing

Board gender diversity has been widely associated with enhanced corporate governance and ethical decision-making. Female directors are often found to be more stakeholder-oriented, risk-averse, and concerned with sustainability issues than their male counterparts [17]. Studies suggest that gender-diverse boards promote transparency in sustainability reporting, reducing the likelihood of greenwashing [18]. Women on boards are more likely to advocate for genuine environmental and social responsibility initiatives rather than symbolic or misleading sustainability claims [13].

ISSN: 2576-8484
Vol. 9, No. 5: 1508-1521, 2025
DOI: 10.55214/25768484.v9i5.7187

H_1: Board gender diversity is negatively associated with greenwashing.

4.2. Board Independence and Greenwashing

Board independence is a key governance mechanism that enhances oversight and reduces managerial opportunism. Independent directors provide unbiased scrutiny over corporate sustainability practices, ensuring that environmental disclosures are accurate and not merely used for reputational management [12]. Firms with a higher proportion of independent directors are less likely to engage in greenwashing, as these directors act in the best interests of stakeholders and prevent deceptive reporting [19]. Moreover, independent boards tend to impose stricter sustainability policies and discourage superficial environmental claims [13].

H_2: Board independence is negatively associated with greenwashing.

4.3. Board Size and Greenwashing

Board size influences the effectiveness of corporate governance, with larger boards potentially bringing diverse perspectives and expertise to sustainability discussions. A larger board provides a broader knowledge base and enhances decision-making regarding corporate environmental policies [26]. However, some studies suggest that excessively large boards may suffer from coordination inefficiencies and reduced accountability, potentially increasing the risk of greenwashing [22]. Therefore, the relationship between board size and greenwashing may not be straightforward, requiring empirical validation.

H_3: Board size has a nonlinear relationship with greenwashing.

4.4. Board Expertise and Greenwashing

Board expertise, particularly in environmental, social, and governance (ESG) issues, significantly impacts corporate sustainability performance. Directors with environmental expertise are more likely to ensure that sustainability initiatives are implemented effectively and transparently, reducing the chances of greenwashing [21]. Firms with ESG-literate boards are better equipped to make informed decisions on environmental matters, preventing misleading disclosures [27]. Additionally, expert directors can challenge management's sustainability claims, ensuring alignment between corporate rhetoric and actual performance.

H_4: Board expertise in sustainability is negatively associated with greenwashing.

Board characteristics play a pivotal role in influencing firms' sustainability practices and their engagement in greenwashing. Gender-diverse, independent, and ESG-expert boards tend to discourage misleading environmental disclosures, promoting corporate accountability and transparency. While larger boards may provide diverse perspectives, their effectiveness in preventing greenwashing depends on governance efficiency. These hypotheses provide a foundation for empirical investigations into how board composition influences corporate sustainability integrity.

4.5. The Moderating Role of the CSR Committee

Corporate governance plays a crucial role in shaping firms' environmental strategies and sustainability reporting. A board's effectiveness, determined by its diversity, independence, and size, can significantly impact the extent of greenwashing the practice of misleading stakeholders about a firm's environmental performance. However, the presence of a CSR committee may moderate this relationship by strengthening or mitigating the board's influence on greenwashing.

Board diversity, in terms of gender, expertise, and international experience, enhances decision-making by incorporating diverse perspectives [28]. A more diverse board is expected to reduce greenwashing as it fosters ethical decision-making and stakeholder-oriented governance [17]. However, diversity alone may not be sufficient in preventing misleading sustainability disclosures.

A CSR committee, dedicated to overseeing environmental and social policies, reinforces the accountability and transparency of sustainability reporting. When a CSR committee is present, it

ISSN: 2576-8484
Vol. 9, No. 5: 1508-1521, 2025
DOI: 10.55214/25768484.v9i5.7187

strengthens the monitoring mechanisms that ensure genuine sustainability efforts, thereby reducing greenwashing practices. Thus, we propose:

H_5: The association between board diversity and greenwashing is adversely moderated by the existence of a CSR committee

Board independence, measured by the proportion of non-executive or independent directors, enhances oversight by mitigating managerial opportunism [29]. Independent directors are expected to ensure corporate accountability, thereby discouraging greenwashing. However, the effectiveness of independent directors in curbing greenwashing can be constrained by information asymmetry and managerial influence.

A CSR committee can enhance the influence of independent directors by institutionalizing sustainability governance and providing dedicated expertise to scrutinize environmental claims. By fostering stronger oversight mechanisms, a CSR committee reduces managerial discretion in sustainability reporting and discourages deceptive practices. Hence, we hypothesize:

H_6: The association between board independence and greenwashing is adversely moderated by the existence of a CSR committee.

Board size can influence greenwashing in two contrasting ways. Larger boards provide diverse expertise and enhance corporate oversight, potentially reducing misleading sustainability claims [30]. Conversely, larger boards may suffer from coordination challenges, leading to weaker monitoring and a higher likelihood of greenwashing.

A CSR committee serves as a governance mechanism that enhances the effectiveness of larger boards by streamlining sustainability oversight. It reduces collective action problems by centralizing responsibility for environmental issues, ensuring that greenwashing risks are mitigated. Accordingly, we propose:

H_7: The association between board size and greenwashing is adversely moderated by the existence of a CSR committee.

H_8: The association between board expertise are less likely to engage in greenwashing when a CSR committee is in place because the presence of a CSR committee negatively moderates the association between board expertise and greenwashing.

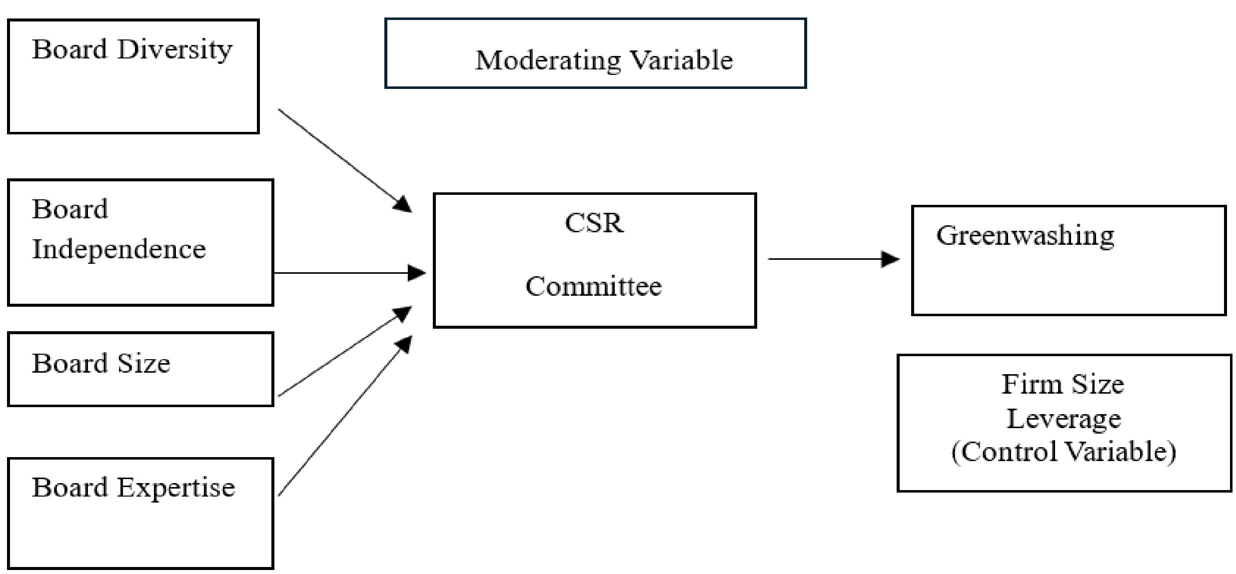

Figure 1.
Conceptual Framework.

5. Research Methodology

The study examined the companies that is listed in Bursa Malaysia for the year 2021- 2023. The study also excluded the financial sector companies as their financial reporting standard is different. The study considered 1068 firms. The board of directors' data are drawn from financial database and annual report which availably access by the public. Greenwashing data were drawn from Bloomberg and Refinitive databases.

Table 1.
Research Sample.

Criteria	Number of Firms
Listed Companies with ESG Score in Refinitive Database	1208
Less: Financial companies	(89)
Less: Incomplete data	(51)
Total sample	1068

5.1. Dependent Variable

The study's theoretical mode is summarized as follows. The greenwashing score, which measures the extent of a company's ESG greenwashing, is the dependent variable. Bloomberg scores evaluated a company's ESG disclosure in accordance with earlier research [31, 32]. Without evaluating the company's actual ESG performance, disclosure scores on Bloomberg's ESG Pillars represent the information the company makes available. Companies with no disclosure to those that disclose all available information on all pillars are represented by the scores, which range from 0 to 100. Refinitiv scores were used to assess the companies' ESG performance [33]. Better ESG performance is indicated by higher scores on Refinitiv's ESG pillars, which likewise range from 0 to 100. Equation 1 displays the greenwashing score for each company and year, based on the methodology put forward by Yu and Chen [31] to measure the extent of a company's ESG greenwashing conduct.

$$GW_{it}=PB_{it} -PR_{it}$$

Where:

GW_{it}: *ESG greenwashing score relative to peers*

PB_{it}: *Bloomberg ESG standardized score relative to peers*

PR_{it}: *Refinitive ESG standardized score relative to peers*

Yu and Chen [31] claim that a corporation is sharing more ESG information than it is actually doing when its Bloomberg disclosure score is higher than its Refinitiv performance score. They engage in greenwashing as a result. In contrast, a corporation is not engaging in greenwashing when its Bloomberg Disclosure Score is less than or equal to its Refinitiv Performance Score. This implies that the company discloses as much ESG information as it does [31].

5.2. Independent Variable

Following earlier studies, the processes of governance oversight, firm size, and leverage were employed as explanatory variables to evaluate common traits of businesses that might lessen greenwashing conduct in order to test the hypothesis. By calculating the greenwashing score in relation to a company's peers (i) throughout a given year (t), the dependent variable measures a company's greenwashing activity. The supervisory procedures for assessing the decline in greenwashing behavior are included in the independent variables that assess the hypotheses. Measures known as control variables were employed in earlier studies on sustainability.

Therefore, the model equation proposed is below:

$$GW_{it}=\beta 0 + \beta_1 BOARDIVERSITY_{it} + \beta_2 CSR_{it} +\beta_3 FIRMSIZE_{it} + \beta_4 LEVERAGE_{it} + \varepsilon_{it} \text{ (Model 1)}$$

$$GW_{it}=\beta 0 + \beta_1 BOARDINDEP_{it} + \beta_2 CSR_{it}+\beta_3 FIRMSIZE_{it} + \beta_4 LEVERAGE_{it} + \varepsilon_{it} \text{ (Model 2)}$$

$$GW_{it}=\beta 0 + \beta_1 BOARDSIZE_{it} + \beta_2 CSR_{it}+\beta_3 FIRMSIZE_{it} + \beta_4 LEVERAGE_{it} + \varepsilon_{it} \text{ (Model 3)}$$

ISSN: 2576-8484
Vol. 9, No. 5: 1508-1521, 2025
DOI: 10.55214/25768484.v9i5.7187

$GW_{it}=\beta 0 + \beta_1 BOARDEXPERT_{it} + \beta_2 CSR_{it} + \beta_3 FIRMSIZE_{it} + \beta_4 LEVERAGE_{it} + \mathcal{E}_{it}$ *(Model 4)*

5.3. Moderating Models

$GW_{it}=\beta 0 + \beta_1 BOARDIVERSITY_{it} + \beta_2 CSR_{it} + \beta_3 BOARDIVERSITY{*}CSR_{it} + \beta_4 FIRMSIZE_{it} + \beta_5 LEVERAGE_{it} + \mathcal{E}_{it}$ *(Model 5)*

$GW_{it}=\beta 0 + \beta_1 BOARDINDEP_{it} + \beta_2 CSR_{it} + \beta_3 BOARDINDEP{*}CSR_{it} + \beta_4 FIRMSIZE_{it} + \beta_5 LEVERAGE_{it} + \mathcal{E}_{it}$ *(Model 6)*

$GW_{it}=\beta 0 + \beta_1 BOARDSIZE_{it} + \beta_2 CSR_{it} + \beta_3 BOARDSIZE{*}CSR_{it} + \beta_4 FIRMSIZE_{it} + \beta_5 LEVERAGE_{it} + \mathcal{E}_{it}$ *(Model 7)*

$GW_{it}=\beta 0 + \beta_1 BOARDEXPERT_{it} + \beta_2 CSR_{it} + \beta_3 BOARDEXPERT{*}CSR_{it} + \beta_4 FIRMSIZE_{it} + \beta_5 LEVERAGE_{it} + \mathcal{E}_{it}$ *(Model 8)*

Table 2.
Variable Measurement.

Variables	Acronym	Measurement
Greenwashing Score	GW	ESG greenwashing score relative to peers
Board Diversity	BOARDIVERSITY	The percentage of women on the board
Board Independence	BOARDINDEP	The percentage of board being independence
Board Size	BOARDSIZE	The total number of board of directors
Board Expert	BOARDEXPERT	The percentage of financial expert on the boards
CSR committee	CSRCOMM	The percentage of CSR committee on the board
Firm Size	FIRMSIZE	The log of total assets
Leverage	LEVERAGE	Total debt to total assets

6. Analysis and Discussion

Table 3 presents the descriptive of the studied variables. Greenwashing in the companies is 0.04%, with a standard deviation of 1.393. The maximum level is 3.045 which suggests a significant disparity among the Malaysian companies. The mean for board diversity is 43.2% with a maximum of 90% women are sitting on the board. Board independence average is 55% with a minimum of 20% of board being independence. While for board expert showing 52% of the members have accounting or finance qualification which suggests the companies operate within the control of the experts. Regarding the CSR committee, the mean is 45% which suggest that the elements of CSR have been prioritize within the companies operation.

Table 3.
Descriptive Analyses.

Variable	N	Mean	SD	Minimum	Maximum
GW	1068	0.004	1.393	-1.675	3.045
BOARDIVERSITY	1068	43.208	19.091	8.140	90.300
BOARDINDEP	1068	55.056	13.407	20.870	85.900
BOARDSIZE	1068	7.045	2.345	2	17
BOARD EXPERT	1068	52.038	12.402	15.789	80.67
CSRCOMM	1068	45.01	23.235	0	67.34
FIRMSIZE	1068	11.534	1.723	9.120	16.237
LEVERAGE	1068	0.537	0.744	0.0035	9.558

Table 4 presents the correlation results. No multicollinearity was observed among the studies variables. The results show the board diversity (-0.34), board expert (-0.15) and CSR committee (-0.19) have a negative relationship with the greenwashing which confirming the stakeholder's view.

Table 4.
Correlation Analyses.

	GW	BDIVER	BINDEP	BSIZE	BEXPERT	CSR	FIRMSIZE	LEV
GW	1	-0.34	0.25	0.42	-0.15	-0.19	-0.26	-0.10
BOARDIVERSITY		1	0.08	0.35	0.47	0.32	-0.17	-0.23
BOARDINDEP			1	-0.12	0.36	-0.23	0.67	0.89
BOARDSIZE				1	0.11	0.23	0.11	0.71
BOARDEXPERT					1	-0.41	-0.35	0.45
CSRCOMM						1	-0.27	-0.46
FIRMSIZE							1	-0.35
LEVERAGE								1

Meanwhile, Table 5 presents the regression results. The hypothesis 1 until hypothesis 4 testing the direct relationships between board diversity, board independence, board expertise and board size with the greenwashing. The fixed effects or random model is employed to the hypothesis via the Hausman test. The significance values in the Hausman test for board diversity (0.035), board independence (0.041), board expertise (0.034) and board size (0.028) favor fixed effects.

For Model 1, the coefficient of board diversity (-0.012***) resulted to board gender diversity negatively influences the greenwashing. This is consistent with prior studies that highlighted that the present of female on the board limit the tendency of the greenwashing. These outcomes are confirmed with the empirical findings of previous studies [9, 34, 35] which highlight that female directors are less likely to engage in opportunistic behaviors that could lead to greenwashing (Perryman et al. 2016) and are more accurate and transparent in terms of environmental reporting [36]. These results are supported by the empirical findings of earlier research [9, 34, 35] which show that female directors are more truthful and open about their environmental reporting [36] and are less likely to engage in opportunistic behaviors that could result in greenwashing [37].

While for Model 2, the model was significant (0.000) at the 1% significance level. The Hausman value supported the fixed effects and coefficient of board independence (-0.025**) showed that the higher proportion of board independence, it was negatively associated with the greenwashing.

The H3 was tested for Model 3. The similar correlation was found between the random and fixed regressions, confirming that board size had a detrimental impact on greenwashing. This is in line with Ghitti, et al. [38] who found a link between an organization's greenwashing effectiveness and the size of its board of directors. This suggests that leaders can lessen the incidence of greenwashing by improving oversight. Like H4, model 4 has validated the hypothesis that the presence of a board expert lowers the probability that the companies will participate in greenwashing. More board members will decrease the practice of "greenwashing" since they offer greater knowledge and oversight of environmental performance. According to the resource dependence hypothesis, this result indicates that companies with larger boards have better environmental performance [39, 40].

On the other hand, for CSR committee coefficient showed that the existence of CSR committee able to reduce the greenwashing based on the negative coefficient for all the models. Ma and Ahmad [10] provide compelling evidence from Chinese listed firms between 2014 and 2023, demonstrating that firms with an active CSR committee are less likely to engage in greenwashing behavior. The authors argue that CSR committees enhance internal oversight and strategic alignment between CSR policies and actual environmental performance, thus discouraging superficial environmental disclosures. All control variables firm size and leverage suggested a negative relationship with the greenwashing activities. This is consistent with study by Chen and Hao [41] that bigger firms have all the resources and are effective in managing the CSR activities.

Table 5.
Regression Results.

	Model 1		**Model 2**		**Model 3**		**Model 4**	
	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM
Model Sign		0.000		0.000		0.000		0.000
Constant	0.013**	0.714**	0.034***	0.340**	0.270**	0.310**	0.020**	0.310**
DIVERSITY	-0.012***	-0.034						
BINDEP			-0.025***	-0.087**				
BSIZE					-0.034**	0.042***		
BEXPERT							-0.312***	-0.270***
CSRCOMM	-0.023**	-0.042**	-0.038**	-0.027**	-0.018**	-0.024**	-0.021**	-0.045**
FIRMSIZE	-0.006**	-0.007**	-0.051**	-0.023**	-0.091**	-0.054**	-0.025**	-0.032**
LEVERAGE	-0.035**	-0.027**	-0.021**	-0.054**	-0.067**	-0.042**	-0.071**	-0.054**
Hausman	0.035		0.041		0.034		0.028	
M2		0.417		0.423		0.456		0.419
AR(2)		0.423		0.438		0.410		0.424
Sargan Test		0.380		0.410		0.390		0.418
N	1068			1068		1068		1068

Note: ***1 %, **5 %, *1 % level of significance.

Table 6 displays the outcome for the CSR moderating results. The outcomes of Model 1 demonstrate how the CSR committee acts as a moderator between board diversity and greenwashing. The CSR committee fulfilled its function in ensuring the decrease of greenwashing activities in the companies, according to the Hausman test recommended using the fixed effect results and the coefficient of CSR moderation (0.216**). This is in line with Ahmad, et al. [42] who used the commonly used generalized technique to overcome heterogeneity, autocorrelation, and heteroscedasticity.

The moderating effect of the CSR committee on board independence and greenwashing was examined in Model 2. The significance of the Hausman test indicated that the outcome must adhere to fixed effect regression. The presence of a CSR committee considerably moderates the association between board independence and greenwashing, according to the BINDEP*CSR coefficient (-0.015**).

Model 3 investigated the connection between greenwashing and the moderating influence of the CSR committee on board size. As with Model 4, the results demonstrate the connection between greenwashing and the moderating role of the CSR committee on board expertise. Erin, et al. [43] also examined how board committees affected the caliber of sustainability reporting. According to their findings, CSR committees are essential for raising the legitimacy of sustainability reporting and lowering the possibility of greenwashing. They underlined that more accurate, verifiable, and thorough disclosures are a result of independent and active CSR committees.

Taken together, the results supports the argument that CSR committees are effective governance tools in curbing greenwashing. By embedding sustainability into board-level oversight, these committees ensure that companies' environmental claims are aligned with their actual practices, reducing the potential for reputational damage and regulatory sanctions.

Table 6.
CSR Committee as Moderator regression results.

	Model 1		Model 2		Model 3		Model 4	
	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM	Fixed Effects	GMM
Model Sign		0.000		0.000		0.000		0.000
Constant	0.216**	0.120**	0.078**	0.017**	0.310**	0.119**	0.190**	0.213**
DIVERSITY	-0.006***	-0.007*						
CSRCOMM	-0.005**	-0.010*						
DIVER*CSR	-0.010**	-0.015*						
BINDEP			-0.034**	-0.015**				
CSR			-0.015**	-0.278**				
BINDEP*CSR			-0.015**	-0.035**				
BSIZE					-0.110	-0.030		
CSR					-0.027**	-0.081**		
BSIZE*CSR					-0.510*	-0.234**		
BEXPERT							-0.312**	-0.270**
CSR							-0.450**	-0.120**
EXPERT*CSR							-0.270**	-0.410**
FIRMSIZE	0.019	0.007***	0.0410**	0.016***	0.080***	0.180**	0.083**	0.040**
LEVERAGE	-0.320	-0.068**	-0.032**	-0.080**	-0.057**	-0.090**	-0.049**	-0.080**
Hausman	0.031		0.056		0.68		0.090	
M2		0.320		0.389		0.361		0.320
AR(2)		0.339		0.380		0.340		0.330
Sargan Test		0.376		0.370		0.310		0.370
N	1068			1068		1068		1068

Note: ***1 %, **5 % and *10 % level of significance.

7. Conclusion

The effectiveness of the board, the role of the CSR committee as a moderator, and greenwashing for Malaysian-listed firms were all examined in this article. As corporate ESG elements receive more attention, the phenomenon of "greenwashing" has gained a lot of attention, particularly in the context of sustainability reporting and ESG disclosure, which has increased market vigilance and worry. Finding the internal corporate governance framework that could lessen greenwashing efforts is the aim of this study.

According to the results, the more independent and larger the board is, the less greenwashing behavior may be done by the company with an efficient board structure that includes women. The presence of a CSR committee and increased board experience are other important factors in lowering greenwashing. The results offer some empirical support with theoretical and practical ramifications. This study helps ESG officials, managers, and investors decrease greenwashing behavior in order to drive the sustainable development of Malaysian enterprises, taking into account the country's political, economic, and social context. The limitations of this report, however, may open the door to additional empirical research. Since the study only looked at Malaysia, additional cross-country investigations, particularly in the ASEAN region, should be conducted to corroborate the results. Second, this study solely examined specific board attributes that serve as a benchmark for evaluating internal corporate governance. The qualities of ownership, the existence of internal control, and assurance should all be further investigated.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Acknowledgement:

We would like to thank Universiti Sains Islam Malaysia and Universitas Padjajaran, Bandung, Indonesia for their helpful feedback and support.

References

[1] I. Kateb and W. M. Alahdal, "Tracing the path to sustainable governance: CSR committees as mediators of board impact on ESG performance in the MENA region," *Corporate Governance: The International Journal of Business in Society*, 2024. https://doi.org/10.1108/CG-05-2023-0221

[2] J. Dempere, E. Alamash, and P. Mattos, "Unveiling the truth: greenwashing in sustainable finance," *Frontiers in Sustainability*, vol. 5, p. 1362051, 2024. https://doi.org/10.3389/fsusy.2024.1362051

[3] G. Marcatajo, "Green claims, green washing and consumer protection in the European Union," *Journal of Financial Crime*, vol. 30, no. 1, pp. 143-153, 2023.

[4] J. R. Kurpierz and K. Smith, "The greenwashing triangle: adapting tools from fraud to improve CSR reporting," *Sustainability Accounting, Management and Policy Journal*, vol. 11, no. 6, pp. 1075-1093, 2020.

[5] J. Hollindale, P. Kent, J. Routledge, and L. Chapple, "Women on boards and greenhouse gas emission disclosures," *Accounting & Finance*, vol. 59, no. 1, pp. 277-308, 2019.

[6] P. Velte, "Women on management board and ESG performance," *Journal of Global Responsibility*, vol. 7, no. 1, pp. 98-109, 2016. https://doi.org/10.1108/JGR-06-2015-0022

[7] R. Manita, M. G. Bruna, R. Dang, and L. H. Houanti, "Board gender diversity and ESG disclosure: Evidence from the USA," *Journal of Applied Accounting Research*, vol. 19, no. 2, pp. 206-224, 2018.

[8] M. R. Rabbani, M. Kiran, A. B. Bhuiyan, and A. Al-Hiyari, "Does diversity in top management and boards affect ESG performance? Evidence from Islamic and conventional banks in the MENA region," *International Journal of Islamic and Middle Eastern Finance and Management*, vol. 17, no. 6, pp. 1244-1266, 2024. https://doi.org/10.1108/IMEFM-10-2023-0580

[9] P. Chen and A. A. Dagestani, "Greenwashing behavior and firm value–From the perspective of board characteristics," *Corporate Social Responsibility and Environmental Management*, vol. 30, no. 5, pp. 2330-2343, 2023.

[10] Y. Ma and M. I. Ahmad, "Do board characteristics impact greenwashing? Moderating role of CSR committee," *Heliyon*, vol. 10, no. 20, p. e12696, 2024. https://doi.org/10.1016/j.heliyon.2024.e12696

[11] F. Haque and C. G. Ntim, "Corporate board committees and corporate outcomes: A review," *Journal of Business Ethics*, vol. 163, no. 3, pp. 1-25, 2020.

[12] T. Jain and D. Jamali, "Looking inside the black box: The effect of corporate governance on corporate social responsibility," *Corporate Governance: An International Review*, vol. 24, no. 3, pp. 253-273, 2016.

[13] M. F. Amorelli and I. M. García-Sánchez, "Critical mass of female directors, human capital, and greenwashing," *Business Strategy and the Environment*, vol. 30, no. 4, pp. 2031–2044, 2021. https://doi.org/10.1002/bse.2711

[14] O. Boiral, "Accounting for the unaccountable: Biodiversity reporting and impression management," *Journal of Business Ethics*, vol. 135, no. 4, pp. 751-768, 2016. https://doi.org/10.1007/s10551-014-2489-3

[15] M. A. Delmas and V. C. Burbano, "The drivers of greenwashing," *California Management Review*, vol. 54, no. 1, pp. 64-87, 2011. https://doi.org/10.1525/cmr.2011.54.1.64

[16] L. S. Mahoney, L. Thorne, L. Cecil, and W. LaGore, "A research note on standalone corporate social responsibility reports: Signaling or greenwashing?," *Critical Perspectives on Accounting*, vol. 24, no. 4-5, pp. 350-359, 2013. https://doi.org/10.1016/j.cpa.2013.01.003

[17] W. Ben-Amar, M. Chang, and P. McIlkenny, "Board gender diversity and corporate response to sustainability initiatives: Evidence from the carbon disclosure project," *Journal of Business Ethics*, vol. 142, no. 2, pp. 369-383, 2017. https://doi.org/10.1007/s10551-016-3103-9

[18] L. Liao, L. Luo, and Q. Tang, "Gender diversity, board independence, environmental committee and greenhouse gas disclosure," *The British Accounting Review*, vol. 47, no. 4, pp. 409-424, 2015. https://doi.org/10.1007/s10551-014-2196-4

[19] G. Michelon and A. Parbonetti, "The effect of corporate governance on sustainability disclosure," *Journal of Management & Governance*, vol. 16, pp. 477-509, 2012. https://doi.org/10.1007/s10997-010-9131-9

[20] V. C. Burbano, M. A. Delmas, and M. J. Cobo, "The past and future of corporate sustainability research," *Organization & Environment*, vol. 37, no. 2, pp. 133-158, 2024. https://doi.org/10.1177/10860266221130010

[21] S. Bose, "Environmental sustainability and information disclosure: Evidence from India," *Social Responsibility Journal*, vol. 16, no. 5, pp. 629–646, 2020. https://doi.org/10.1108/SRJ-05-2018-0126

[22] C. Arena, S. Bozzolan, and G. Michelon, "Environmental reporting: Transparency to stakeholders or stakeholder manipulation? An analysis of disclosure tone and the role of the board of directors," *Corporate Social Responsibility and Environmental Management*, vol. 22, no. 6, pp. 346–361, 2015. https://doi.org/10.1002/csr.1350
[23] R. B. Freeman, "Longitudinal analyses of the effects of trade unions," *Journal of Labor Economics*, vol. 2, no. 1, pp. 1-26, 1984.
[24] T. Donaldson and L. E. Preston, "The stakeholder theory of the corporation: Concepts, evidence, and implications," *Academy of management Review*, vol. 20, no. 1, pp. 65-91, 1995.
[25] D. Jamali, A. M. Safieddine, and M. Rabbath, "Corporate governance and corporate social responsibility synergies and interrelationships," *Corporate Governance: An International Review*, vol. 16, no. 5, pp. 443–459, 2008. https://doi.org/10.1111/j.1467-8683.2008.00702.x
[26] C. J. Kock, J. Santalo, and L. Diestre, "Corporate governance and the environment: What type of governance creates greener companies?," *Journal of Management Studies*, vol. 49, no. 3, pp. 492–514, 2012. https://doi.org/10.1111/j.1467-6486.2010.00988.x
[27] N. Cucari, S. Esposito De Falco, and B. Orlando, "Diversity of board of directors and environmental social governance: Evidence from Italian listed companies," *Corporate Social Responsibility and Environmental Management*, vol. 25, no. 3, pp. 250–266, 2018. https://doi.org/10.1002/csr.1452
[28] S. Bear, N. Rahman, and C. Post, "The impact of board diversity and gender composition on corporate social responsibility and firm reputation," *Journal of Business Ethics*, vol. 97, no. 2, pp. 207–221, 2010. https://doi.org/10.1007/s10551-010-0505-2
[29] E. F. Fama and M. C. Jensen, "Separation of ownership and control," *The Journal of Law and Economics*, vol. 26, no. 2, pp. 301-325, 1983. https://doi.org/10.1086/467037
[30] M. I. Jizi, A. Salama, R. Dixon, and R. Stratling, "Corporate governance and corporate social responsibility disclosure: Evidence from the US banking sector," *Journal of Business Ethics*, vol. 125, pp. 601-615, 2014. https://doi.org/10.1007/s10551-013-1929-2
[31] X. Yu and Y. Chen, "Does ESG advantage promote total factor productivity (TFP)? Empirical evidence from China's listed enterprises," *Applied Economics*, pp. 1-17, 2024. https://doi.org/10.1080/00036846.2024.1234567
[32] E. P. Y. Yu, C. Q. Guo, and B. V. Luu, "Environmental, social and governance transparency and firm value," *Business Strategy and the Environment*, vol. 27, no. 7, pp. 987-1004, 2018. https://doi.org/10.1002/bse.2041
[33] B. Del Bosco and N. Misani, "The effect of cross-listing on the environmental, social, and governance performance of firms," *Journal of World Business*, vol. 51, no. 6, pp. 977-990, 2016. https://doi.org/10.1016/j.jwb.2016.07.004
[34] S. Nielsen and M. Huse, "The contribution of women on boards of directors: Going beyond the surface," *Corporate Governance: An International Review*, vol. 18, no. 2, pp. 136-148, 2010. https://doi.org/10.1111/j.1467-8683.2010.00787.x
[35] R. A. Zahid, U. S. Maqsood, S. Irshad, and M. K. Khan, "The role of women on board in combatting greenwashing: A new perspective on environmental performance," *Business Ethics, the Environment & Responsibility*, vol. 34, no. 1, pp. 121-136, 2025.
[36] H. Al-Shaer and M. Zaman, "Board gender diversity and sustainability reporting quality," *Journal of Contemporary Accounting & Economics*, vol. 12, no. 3, pp. 210-222, 2016. https://doi.org/10.1016/j.jcae.2016.09.003
[37] A. A. Perryman, G. D. Fernando, and A. Tripathy, "Do gender differences persist? An examination of gender diversity on firm performance, risk, and executive compensation," *Journal of Business Research*, vol. 69, no. 2, pp. 579-586, 2016. https://doi.org/10.1016/j.jbusres.2015.06.033
[38] M. Ghitti, G. Gianfrate, and L. Palma, "The agency of greenwashing," *Journal of Management and Governance*, vol. 28, no. 3, pp. 905-941, 2024. https://doi.org/10.1007/s10997-024-09680-0
[39] A. J. Hillman, A. A. Cannella, and R. L. Paetzold, "The resource dependence role of corporate directors: Strategic adaptation of board composition in response to environmental change," *Journal of Management Studies*, vol. 37, no. 2, pp. 235-256, 2000. https://doi.org/10.1111/1467-6486.00184
[40] L.-T. Nguyen and C.-L. Thanh, "The influence of board characteristics on environmental performance: Evidence from East Asian manufacturing industries," *International Journal of Emerging Markets*, vol. 17, no. 10, pp. 2702-2720, 2022. https://doi.org/10.1108/IJOEM-12-2020-1274
[41] P. Chen and Y. Hao, "Digital transformation and corporate environmental performance: The moderating role of board characteristics," *Corporate Social Responsibility and Environmental Management*, vol. 29, no. 5, pp. 1757-1767, 2022. https://doi.org/10.1002/csr.2392
[42] I. Ahmad, D. R. Jamali, and M. N. Khattak, "Can organizations get away with greenwashing? CSR attributions and counterproductive sustainability behaviors," *Business Ethics, the Environment & Responsibility*, vol. 34, no. 1, pp. 103-120, 2025. https://doi.org/10.1111/beer.12345
[43] O. Erin, A. Adegboye, and O. A. Bamigboye, "Corporate governance and sustainability reporting quality: evidence from Nigeria," *Sustainability Accounting, Management and Policy Journal*, vol. 13, no. 3, pp. 680-707, 2022.