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# WOMEN LEADERSHIP AND CORPORATE WATER INFORMATION DISCLOSURE: MODERATING EFFECT OF INTERNET VISIBILITY

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**Abstract**

Indonesia faces a critical clean water scarcity issue, with only 67% of the population's water demand satisfied in 2021. This study examines the role of women directors in enhancing water information disclosure, focusing on the moderating effect of internet visibility. A quantitative research design was employed, analyzing secondary data from 723 Indonesian companies listed on the Indonesia Stock Exchange (IDX) that published GRI Sustainability reports from 2019 to 2022. The unit of analysis is firm-year observations, with water disclosure measured through GRI 303 content analysis. Regression analysis tested the research hypotheses. Results show that women directors positively influence water disclosure, supporting the first hypothesis. Furthermore, the second hypothesis is also accepted, as internet visibility amplifies this relationship, fostering greater transparency. These findings highlight the novel role of internet visibility and gender diversity in enhancing water disclosure practices, offering insights into corporate governance for sustainable development in Indonesia.

## INTRODUCTION

The worldwide water shortage has emerged as a significant environmental issue, with forecasts suggesting that if current trends persist, water demand will surpass supply by 40% by 2030 (UNESCO, 2021). Effective water management and transparency in water use are essential for sustainable

development. Corporate water disclosure, therefore, has emerged as a critical area of interest for researchers and practitioners alike (Burritt et al., 2016). In Indonesia, water scarcity and pollution pose Severe challenges. Among various environmental challenges in Indonesia, water scarcity emerges as the most pressing concern, as forecasts indicate that water demand will surpass supply by 40% by 2030, threatening its 270 million population with inadequate access to clean water and poor sanitation facilities. (Water.org, 2024). Indonesia faces a critical water scarcity issue, with only 67% of the population's water demand satisfied in 2021, and in 2020, a significant decline in water availability to 1,200 $m^3$ per capita annually, highlighting the urgent need for clean water and effective management strategies; additionally, approximately 70% of rivers in Indonesia are heavily polluted by domestic waste (Kurniawan et al., 2024 ). Addressing these critical concerns, the Indonesian government, in partnership with the World Bank, has initiated a program to promote sustainable water management practices essential for Indonesia's economic and developmental ambitions, namely Indonesian Vision 2045: Towards Water Security (De Jong, 2022). However, despite these efforts, Indonesia needs more corporate transparency, particularly in water disclosure practices, which are critical for addressing the country's pressing water management challenges. Despite GRI 303 standards being internationally recognized, Adhariani (2021) found that many Indonesian companies fail to fully comply with these reporting requirements, with incomplete or missing disclosures of water management practices, water impact assessments, and stakeholder engagement processes. This inadequate disclosure practice undermines corporate accountability and hinders stakeholders' decision-making regarding environmental sustainability. Water disclosure presents information about a company's water use, including management strategies and impacts on water resources. The GRI 303 standards have great detail on the kind of information that should be disclosed about water, and they underline the issues of transparency and accountability (GRI, 2018). Studies have shown that satisfactory water disclosure can improve a company's reputation, mitigate operational risks, and strengthen stakeholder relations (Zeng et al., 2020).

In business processes, the stakeholders' decision processes and the stakeholders' decision aids have to be intertwined with the environmental management programs, which are becoming widespread in the business environment (Liao et al., 2015). In this regard, well-trained decision-makers need to tactically change their strategies in synchronization with the increasing needs of the stakeholders. The statement is also supported by stakeholder theory, and it can be reasoned that investing in water information helps water stakeholders to be more open and transparently increases public confidence, which makes investment decision-making easier for investors (Burritt et al., 2016; Zeng et al., 2020). Water information disclosure also allows businesses to satisfy their responsibilities towards stakeholders concerning caring for the environment and society. With this, more firms' water is disclosed that increasingly pursue strategic decision-making (Cantele et al., 2018). Consequently, businesses uphold moral standards and achieve greater long-term viability in the marketplace.

Previous studies stress the importance of women in leadership positions for improving corporate governance and decision-making. Evidence shows the positive effect of gender diversity on selected facets of firm performance and the quality of disclosures. Women in corporate leadership add new concepts and values in ethics into the boardrooms. Evidence shows that women directors are more stakeholder and environmentally responsible in their decisions and actions (Adams & Ferreira, 2009; Bear et al., 2010; Hafsi & Turgut, 2013). Bernardi et al. (2010) showed that firms with more women on their boards are more active in environmental sustainability. In the same spirit Liao et al. (2015) identified female directors on corporate boards as improvements in CSR (corporate social responsibilities) disclosures, especially concerning environmental reporting. Businesses with more women in board roles actively practice better governance and issue more complete sustainability reports (García-Sánchez et al., 2019; Hossain et al., 2017). Even though the majority of research about these associations has focused on general corporate governance and patterns of disclosures (Fabrício et al., 2022; Hou, 2019; Kassinis & Vafeas, 2002; Liao et al., 2015; Peng et al., 2023; Verma et al., 2021; Wicaksono et al., 2024) One novel argument by Ginglinger and Raskopf (2023) is that women directors are more likely to have relevant experience when they are appointed to the board, which explains their enhanced environmental and social performance.

Internet visibility operates mainly as a contextual element that either supports or dampens the association between the mechanisms of corporate governance and disclosure practices rather than as a motive for disclosure. Chen et al. (2021) show that internet visibility functions as a moderating variable by intensifying stakeholder pressure and scrutiny, which affects how much corporate governance, such as board diversity, is realized in disclosure practices. Such moderation is further reinforced by Janney and Gove (2011), who showed that public attention does not cause progressive disclosure directly but is more effective with existing governance mechanisms. However, as important as it is, how internet visibility can moderate the relationship between board diversity and water disclosure has not received adequate attention. Today, the visibility of a company on the internet serves as an important sharping factor of its strategy as it allows constituents to have access to timely information and increases public attention, which in turn puts more pressure on corporations to be more responsible and transparent (Basuony et al., 2022; Flyverbom, 2016). Grabbing digital media attention increases the need for companies to make more disclosures, as doing so helps them meet the expectations of their stakeholders and enhances their reputation in a globalized world (Hou, 2019). This academic work takes into consideration a significant gap in the literature by discussing the interplay between digital exposure and board diversity in the determination of disclosure practices, which has been primarily considered about the internet presence of the company without considering its role as a moderator to the effectiveness of different corporate governance structures in place.

This study aims to explore the role of gender in the water disclosure practices of Indonesian firms and assess the degree to which internet visibility affects this relationship. In particular, the research objectives are: (1) to examine the role of gender on the water disclosure practices of corporations and (2) to determine the extent to which internet visibility influences women directors and water disclosure practices. This study brings forth key developments. Theoretically, it furthers the stakeholder framework by showing the interplay of gender leadership diversity and digital visibility in increasing corporate integrity in emerging nations. It also aids the expanding discourse on environmental disclosure by bringing in additional information on technology interaction with leaders of different genders. From a practical point of view, this research is helpful for (1) understanding how policymakers can enhance their regulation regarding board diversity and environmental disclosure, (2) firms appreciating the impact of organizational structure and cyber activities on their environmental reporting, and (3) different stakeholders measuring the degree of environmental openness during the digital era. Such insights are fundamentally important for tackling the global sustainability issues for emerging economies like Indonesia.

According to stakeholder theory, which emphasizes that businesses must address the diverse needs of all stakeholders beyond shareholders to sustain long-term operations (Freeman et al., 2004; Freeman & Reed, 1983), this research examines water disclosure through the lens of good governance. The theory recognizes corporations as moral entities with social and environmental responsibilities (Clarkson, 1995), where proper governance involves managing often conflicting stakeholder interests for long-term success (Donaldson & Preston, 1995). By ethically addressing stakeholder concerns, companies can enhance decision-making, strengthen their image, and increase firm value (Jones, 1995) while fostering adaptability in dynamic market conditions (Bendell & Huvaj, 2020; Ghassim & Bogers, 2019; Leonidou et al., 2020). This study extends stakeholder theory by introducing female leadership and internet visibility as pivotal factors driving transparency in water-related disclosures, offering insights into how the integration of governance mechanisms with digital exposure can shape sustainable business practices and enhance accountability

Boards with a diverse gender membership make superior decisions, which leads to improved corporate performance. Diverse perspectives and principles are encompassed by gender-diverse boards, which enhance the efficacy of governance. Augmenting this, Bernardi et al. (2010) established that companies that employed females were prone to implementing strategies for environmental protection. Leadership involvement by females has been shown to benefit the social outcome of the organizations, according to Bear et al. (2010) and Hafsi and Turgut (2013). Strong engagement with their communities and the environment is characteristic of boards that comprise most women. Liao et al. (2015) found a correlation between the number of women at the board level and the completeness of the available

Sustainability Reports. Also, they found out that women occupied board positions with power-influenced companies concerning environmental directives. The results illustrate how the status of women in leadership roles affects the orientation of corporations in matters of sustainable and transparent practices. In the study by Ginglinger and Raskopf (2023), more socially and environmentally responsible organizations have a female presence on the board.

This study extends stakeholder theory by introducing female leadership and internet visibility as pivotal factors driving transparency in water-related disclosures, offering insights into how integrating governance mechanisms with digital exposure can shape sustainable business practices and enhance the accountability of such information, placing significant importance on principles of openness and responsibility. The present study evaluates the Company Water Disclosure by analyzing five water-related disclosures obtained from GRI 303 (GRI, 2018). Burritt et al. (2016) looked at the variables that affect Japanese multinational firms' disclosure of water-related information. Their results suggest that companies that perform well in terms of the environment are more likely to divulge information on water. Zeng et al. (2020) looked at Chinese industries that use water and are highly sensitive to it. Their studies have shown a demand for clarification concerning the Water Disclosure policy of companies with lower-than-average net returns. At the same time, there is a clear tendency for organizations with a low level of openness to be more sensitive to water.

As an increasing number of people or organizations become aware of the organization, such awareness creates a level of accountability. It exposes the organization to scrutiny, which changes its corporate behavior. The increased visibility anticipated in this case is vital that women participating in the decision-making boards affect the corporation's disclosures as companies become more responsive to their essential stakeholders. Janney and Gove (2011) argue with their empirical research that publicly visible companies engage in social responsibility more because they need to defend their image. According to Chen et al. (2021), prominent companies engage in more purposeful and complete corporate social responsibility (CSR) communication. These findings suggest that they can significantly enhance the effectiveness of board diversity or any other corporate governance mechanism in fostering accountability and transparency. Internet visibility and the sudden and intensive spread of information have resulted in the enhancement of public awareness and involvement and, consequently, the desire by corporations to be accountable and transparent.

This study examines the relationship between women's leadership towards top management boards and corporate water disclosure. The philosophy of stakeholders supports this, which focuses on the equilibrium of diverse interests in a manner that would benefit the business sustainably. Earlier studies indicate that when women are incorporated into the top management of any organization, the extent of accountability on the part of that organization increases. In particular, Bear et al. (2010) investigations found that women board directors generally exercise a more positive influence upon a firm's CSR ratings and are more responsive towards a variety of social as well as environmental concerns. Additionally, Kassinis and Vafeas (2002) undertook empirical studies. They found evidence of a relationship between the percentage of women on boards and the extent of the environmental policies and practices adopted by the firms. More recent publications on the improvement of sustainability reports and their third-party assurance argue that female board members were linked to the gender diversity of the companies in Africa and Asia, as pointed out by Cicchiello et al. (2021). As Majid and Jaaffar (2023) researched, for instance, firms whose boards of directors consist of women would disclose information on carbon dioxide emissions and other greenhouse gases.

Fabrício et al. (2022) emphasized the positive relationship between higher female directors' share and firm engagement in environmental initiatives. Peng et al. (2023) empirically concentrated on multinational companies operating in China, Japan, the UK, and the US and revealed that female board members increased the level of water-related information disclosure of the companies. As such, this suggests that women should occupy higher managerial positions because the findings emphasize the shortcomings in organizational aspects that require greater transparency in business practices, such as environmental policies on water management. This research offers a novel perspective on corporate governance, rooted in stakeholder theory, focusing on female leaders at the highest management levels. It posits that female leadership introduces diverse perspectives and a heightened commitment to ethical

governance, fostering transparency in water reporting to meet growing stakeholder demands for environmental accountability. According to stakeholder theory, female leadership in the top management team will likely have a more diverse range of perspectives and a stronger propensity for ethical governance; this should positively correlate with growing stakeholder pressure to improve the firm's engagement in thorough, transparent water reporting, which in turn aligns firm practices with stakeholder expectations for environmental sustainability.

This study further revealed that the company's visibility on the internet is a moderating factor in this case because it enhances the women's leadership on the water reporting's ability to gain public and media attention, which maximizes the benefit to a firm. Increased visibility provides heightened scrutiny and enhances accountability, compelling companies to be more responsive to stakeholder pressures for transparency and sustainable practices (Li et al., 2019; Saqib & Zhang, 2021; Yu et al., 2017); this relates to stakeholder theory, which has a strong focus on ethical behavior and improved performance as a result of stakeholder involvement. This examination is situated within the context of female board members and their role in corporate water reporting, contributing to the broader sustainable development agenda. There is a greater probability that firms that actively seek to control and report on their contribution to environmental issues will be sustainable for the benefit of shareholders and stakeholders, including the coming generations. Visibility on the internet can escalate the level of influence women board members have through the need for increased accountability and sustainable practices. More dominant companies address more stakeholder's demands on environmental reporting (Janney & Gove, 2011). Other studies have also used Google Trends as an alternative to measuring the attention of investors. Ding et al. (2020) analyzed online search trends to gauge market sentiment during the COVID-19 pandemic. Similarly, France et al. (2021) and Huang et al. (2020) leveraged Google Trends to forecast liquidity levels and corporate transparency.

Similarly, Drake et al. (2012) utilized online search data to predict interest in company earnings announcements, highlighting the value of internet visibility in shaping corporate communication strategies. They use Google Trends Score to measure internet visibility, using the company name as the search term. As Google Trends scores increase, reflecting heightened online visibility, companies face greater public scrutiny and pressure to disclose environmental information. This effect is particularly relevant for female board members, whose presence is associated with higher levels of transparency in disclosure practices. Hou (2019) examined the moderating role of internet visibility using Google Trends data, finding that increased online visibility strengthened the relationship between CSR efforts and financial performance in Taiwan's electronics industry. This study proposes that internet visibility can similarly moderate the relationship between female leadership and water disclosure. Specifically, higher online visibility is expected to amplify the positive influence of women leaders on water disclosure, encouraging companies to adopt more robust reporting practices.

This study proposes two interconnected hypotheses regarding the influence of women's leadership on water disclosure practices in Indonesia. This study's first hypothesis **(H1)** is that Women's leadership positively impacts water disclosure practices in Indonesia. The second hypothesis **(H2)** is that the positive impact of Women Leaders on water disclosure practices in Indonesia is strengthened by internet visibility.

Figure 1 presents the research's conceptual framework of the study, which is derived from the prior proposed hypotheses.

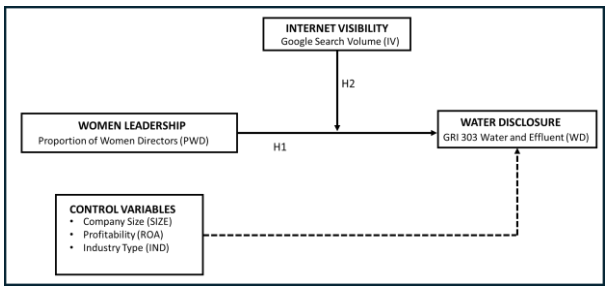


Figure 1. Conceptual Framework

## METHOD

This study examines the role of women on the board of directors in influencing water reporting practices in Indonesia. It explores how internet visibility acts as a moderating role in this relationship. The research relies on secondary data from publicly available sources, including annual reports, sustainability reports, and Google Trends. The sample comprises 723 firm-year observations from publicly traded companies on the Indonesia Stock Exchange (IDX) across various industries, excluding the finance sector due to its distinct regulatory environment and different nature of water usage compared to non-financial sectors (as financial services primarily consume water for office operations rather than production processes). Companies included in the study meet criteria such as publishing standalone GRI sustainability reports and providing sufficient data on board composition and water disclosure. The data collection spans from 2019 to 2022 and includes the COVID-19 pandemic period to capture trends during this significant time. This study employs an unbalanced panel data framework, with moderated regression analysis used to examine relationships and test hypotheses. Further information regarding the sample can be found in Table 1.

Table 1. Sample Data by Industry Type

| Type Industry | 2019 | 2020 | 2021 | 2022 | Total |
|---|---|---|---|---|---|
| Energy | 10 | 17 | 44 | 48 | 119 |
| Basic Material | 10 | 14 | 27 | 63 | 114 |
| Industrials | 3 | 7 | 12 | 31 | 53 |
| Consumer Non-Cyclicals | 6 | 21 | 36 | 80 | 143 |
| Consumer Cyclicals | 3 | 6 | 17 | 69 | 95 |
| Healthcare | 5 | 9 | 12 | 21 | 47 |
| Properties And Real Estate | 3 | 6 | 5 | 18 | 32 |
| Technology | 0 | 0 | 2 | 21 | 23 |
| Infrastructure | 8 | 15 | 20 | 35 | 78 |
| Transportation And Logistics | 1 | 1 | 2 | 15 | 19 |
| **Total Sample** | | | | | **723** |

The primary focus of this research is to assess water disclosure (WD) by employing content analysis within the framework of the Global Reporting Initiative (GRI) 303 criteria. This analysis will encompass five crucial elements. This work used a measurement methodology comparable to the one used by Wicaksono et al. (2024). We have employed a dichotomous approach to allocate a value of '1' for revealing a water item and a value of '0' for leaving a water item undisclosed (A total of five items). This evaluation encompasses five fundamental water disclosure elements outlined in the GRI 303 standard. This approach facilitates the evaluation of the extent to which valuable information about water management techniques, policies, and performance data is revealed. The approach employed for the content analysis of corporate reports methodically evaluates the number and quality of water-related information to determine the business's dedication to sustainable water management and adherence to set reporting standards.

The independent variable is the PWD, defined by the proportion of women serving as directors. This measurement Proxy is well adopted in the literature, such as in the works of Ginglinger and Raskopf (2023), Fabrício et al. (2022), and Peng et al. (2023). The necessary information will be obtained from the annual reports. Also, to test the robustness of the research model, FCEO will be added as a binary variable represented by 1 for a female CEO and 0 for a male CEO. According to Shin and Park (2023), investors prefer firms with female CEOs, especially when the uncertainty is very high; this will offer a dual methodology that gives a comprehensive viewpoint on women in corporate leadership and its possible impact on water disclosure.

In this study, firm internet visibility would be the moderating variable, measured on a weekly average over one year from Google Trends scores. The search frequency of the company name brings out the crucial component of this data collection. A higher Google Trends score means greater online disclosure of corporate reputation and, therefore, impacts the board's actions, particularly female board

members, in disclosing environmental information (Drake et al., 2012; Huang et al., 2020; Perlin et al., 2017). In this case, what is essential to disclose is water-related information in the company. Google Trends data can be in real-time, allowing the tracking of a trend. Google Trends' geo-insights permit an analysis of brand traction across different regions, and comparability features enable benchmarking against competitors.

Further, Google Trends allows historical data to compare the changes in visibility over time; hence, it is a robust and inexpensive tool for advanced visibility analysis. Eichenauer et al. (2022) and Shin et al. (2022). The tool shows how the attention and interest in a topic shift with time to indicate evolving trends. While it does not directly measure behavior, search volume can still offer insights into social patterns, like the rising frequency of specific searches, which may reflect how people engage with specific subjects (Perlin et al., 2017).

This research employed three control variables. Company size (SIZE), commonly assessed using the natural logarithm of total assets, serves as a typical measure where more substantial firms generally possess more significant resources to execute and report on sustainability practices (Burritt et al., 2016; Nguyen et al., 2021). Return on Assets (ROA) represents profitability, influencing a company's ability to fund and disclose sustainability efforts (Verma et al., 2021). Industry type (IND), classified according to the Indonesia Stock Exchange system, also matters, as industries like manufacturing or mining often face more significant pressure to disclose their sustainability practices due to their significant environmental impact compared to other sectors, Morris et al. (2023) found that energy, materials and consumer staples sector outperformed other sector in disclosing water. This methodology ensures that our analysis is based on dynamic and detailed data, supporting informed decision-making to enhance the company's online presence. Table 2 presents a comprehensive summary of the notation and variables employed in this study.

Table 2. Variable and Measurement of Variables

| No | Notation | Variable | Measurement of variables | Data source |
|---|---|---|---|---|
| 1 | WD | Water Disclosure | The total number of water disclosure items included in the standalone GRI report is 0-5 based on GRI 303—Water and Effluent.<br>1. Interactions with water as a shared resource<br>2. Management of water discharge-related impacts<br>3. Water withdrawal<br>4. Water discharge<br>5. Water consumption | GRI Standalone Report |
| 2 | PWD | Woman in Leadership | The ratio of female directors to the total number of directors. (Proportion of Women Directors) | Annual Report |
| 3 | IV | Internet Visibility | Average annual Google Trends score for company name | Google Trend |
| 4 | Size | Company Size | natural logarithm of total Asset | Osiris Data Base |
| 5 | ROA | Profitability | Return on Asset | Osiris Data Base |
| 6 | IND | Industry Type | IDX-IC Clustering | www.idx.co.id |
| 7 | FCEO | Female CEO | Measurement using Dummy, If the company has Female CEO = 0 Male CEO = 1 (in place of PWD variable for robust test) | Annual Report |

**Research Model:**

$$CWD_t = \beta_0 + \beta_1 PWD_{t-1} + \beta_2 SIZE_{t-1} + \beta_3 ROA_{t-1} + \beta_4 IND_{t-1} + \epsilon_1 \quad (1)$$

$$CWD_t = \beta_5 + \beta_6 PWD_{t-1} + \beta_7 IV_{t-1} + \beta_8 SIZE_{t-1} + \beta_9 ROA_{t-1} + \beta_{10} IND_{t-1} + \epsilon_2 \quad (2)$$

$$CWD_t = \beta_{11} + \beta_{12} PWD_{t-1} + \beta_{13} IV_{t-1} + \beta_{14} (PWD \times IV)_{t-1} + \beta_{15} SIZE_{t-1} + \beta_{16} ROA_{t-1} + \beta_{17} IND_{t-1} + \epsilon \quad (3)$$

## RESULTS

Table 3. Descriptive Statistics and Correlation of the Variables in Regression Analysis.

| Variables | Mean | SD. | WD | PWD | IV | SIZE | ROA | IND |
|---|---|---|---|---|---|---|---|---|
| WD | 2.021 | 1.729 | 1 | | | | | |
| PWD | 0.209 | 0.204 | 0.069* | 1 | | | | |
| IV | 20.762 | 19.61 | 0.302*** | 0.035 | 1 | | | |
| SIZE | 20.437 | 3.623 | -0.122*** | 0.039* | 0.058 | 1 | | |
| ROA | 4.283 | 3.611 | 0.157*** | 0.028* | 0.26*** | 0.239*** | 1 | |
| IND | 4.546 | 2.994 | 0.141*** | 0.085** | 0.074** | -0.066* | 0.037* | 1 |

*Significant at 10%. **Significant at 5%. ***Significant at 1%.

Table 3 provides an overview of the descriptive statistics and the correlation analysis for the variables used in the regression. The mean Water Disclosure (WD) score of 2.021 (40.4% of GRI 303 standards) indicates moderate transparency, with room for improvement. The mean Proportion of Women Directors (PWD) of 0.209 indicates that women make up 20.9% of board members, underscoring the underrepresentation in corporate leadership. The mean Internet Visibility (IV) score of 20.762 reflects varying public scrutiny, emphasizing the role of digital exposure in shaping disclosure practices. Control variables show a mean Company Size (log of total assets) of 20.437, indicating larger firms are more likely to disclose, and a mean Profitability (ROA) of 4.283, reflecting modest returns that may influence disclosure behaviors. The findings suggest a statistically significant correlation between the independent and dependent variables, Water Disclosure (WD). Notably, Internet Visibility (IV) shows a strong positive correlation with WD at the 1% significance level, implying that a more significant online presence is linked to improved water disclosure. Additionally, the proportion of women directors (PWD) exhibits positive correlations with WD at the 10% significance level, suggesting that women in leadership have a modest but favorable influence on water disclosure. The analysis further reveals significant correlations between company size (SIZE) and return on assets (ROA) with WD, where SIZE has a negative association, and ROA demonstrates a positive one.

Additionally, Industry Type (IND) positively correlates with WD, highlighting its role as a significant control variable. Notably, the correlation coefficients are relatively low, with no values exceeding the threshold that would indicate multicollinearity issues, ensuring the reliability of the regression analysis results. Despite these correlations, it is essential to note that water disclosure in Indonesia, on average, is still quite limited, indicating that there is still considerable room for improvement in corporate transparency regarding water management practices. Tests for normality, autocorrelation (Durbin-Watson), multicollinearity (VIF < 10), and heteroscedasticity (Breusch-Pagan) confirmed the model's robustness, supporting the validity of regression results.

Table 4. Estimated Coefficient of Regression

| Variable | M1 | M2 | M3 | M4 |
|---|---|---|---|---|
| PWD | | 0.010* | 0.011* | 0.007 |
| IV | | | 0.007 | 0.008 |
| PWD*IV | | | | 0.022** |
| FCEO (Robust) | | | | |
| FCEO*IV (Robust) | | | | |
| Size | 0.090*** | 0.090*** | 0.088*** | 0.056*** |
| ROA | 0.017* | 0.016* | 0.018** | 0.014* |
| IND | -0.085*** | -0.087*** | -0.085*** | -0.084*** |
| $R^2$ | 6.50% | 6.80% | 7.70% | 14.10% |
| Adjusted $R^2$ | 6.10% | 6.30% | 7.10% | 13.40% |

*Significant at 10%. **Significant at 5%. ***Significant at 1%.

The regression analysis presented in Table 4 employs five models (including two for robust tests) to assess how women leaders (PWD) impact a company's water disclosure, considering various control variables and moderation factors. The initial model (M1) exclusively incorporates three control

variables: firm size (Size), profitability (ROA), and industry type (IND). The results indicated that all control variables had statistical significance at a significance level of 1%, accompanied by their respective coefficients. Its size and profitability positively influence a firm's water disclosure (CWD) but are negatively influenced by its industrial type. The findings indicated that the chosen control variables are both viable and crucial to incorporate into the model since they substantially impact the outcome of the dependent variables. Including control variables (Size, ROA, and IND) significantly improves the explanatory power of the models, as seen in Table 4. The adjusted $R^2$ increases from 6.1% in the baseline model (M1) to 7.1% in M3 and 13.4% in M4 when control variables and interaction terms are included. Size shows a positive and significant effect ($p < 0.01$), indicating that larger firms are more likely to disclose water-related information. ROA also contributes positively ($p < 0.10$), while IND demonstrates a negative effect ($p < 0.01$). The second model (M2) introduces the primary variable of interest, Women in Leadership (PWD), and three preexisting control variables. The study finds that PWD exerts a small but statistically significant effect, including a positive impact on CWD at 10% significance. The control variables retain their statistical significance, as observed from the results obtained from M1. These findings indicate that the presence of women in leadership is likely associated with increased transparency about the company's water-related disclosures.

Moreover, M3 and M4 introduce moderating variables IV (M3) and the interaction between PWD and IV (M4). Results showed that while internet visibility alone (IV) did not significantly affect water disclosure (M3), its interaction with women's presence on the board (PWD) in M4 enhanced transparency. IV is the pure moderator and strengthens the influence of PWD and WD (Sharma et al., 1981). This analysis shows that internet visibility strengthens the positive influence of PWD on the company's water disclosure, as proved by the significance of the interaction coefficient. A firm with significant internet visibility will increase transparency in its water disclosure, especially when women are involved in leadership.

Table 5. Robust Test

| Variable | Robustness Test | | |
|---|---|---|---|
| | M5 | M6 | M7 |
| PWD | | | |
| IV | | 0.010* | 0.008 |
| PWD*IV | | | |
| FCEO (Robust) | 0.005 | 0.009 | 0.006 |
| FCEO*IV (Robust) | | | 0.019** |
| Size | 0.089*** | 0.089*** | 0.054*** |
| ROA | 0.017* | 0.017* | 0.016* |
| IND | -0.082*** | -0.082*** | -0.081*** |
| $R^2$ | 6.60% | 8.20% | 14% |
| Adjusted $R^2$ | 6.20% | 7.80% | 13.30% |

*Significant at 10%. **Significant at 5%. ***Significant at 1%.

For a robust test (Table 5), we replaced PWD with FCEO as an independent variable to test whether the results found in the primary model remain applicable if we use alternative proxies for the representation of women in leadership. Table 4 conducts robust tests to examine whether the findings of this research would remain the same if the measurement or definition of the leading independent variables were changed.

To test robustness, the fifth model (M5) replaced the PWD variable with a female CEO (FCEO) as an independent variable, where the results were that FCEO did not influence water disclosure practices in Indonesia. In contrast, the sixth and seventh models (M6 and M7) added the interaction between FCEO and IV, where the interaction between FCEO and IV influences water disclosure practices. The results of these models align with prior findings, indicating that the presence of female CEOs can increase a company's water exposure, especially when the internet visibility factor is considered. These results confirm our hypothesis that prominent positions of women and visibility on the online platform would improve corporate environmental disclosure.

## DISCUSSION

The first Hypothesis is supported by the evidence that women's leadership influences the level of water-related information that firms reveal. Under the M2 regression model without moderation variables, including women in leadership had a statistically significant beneficial effect on water disclosure, with a significance level of 10%. Firms participate in corporate social responsibility (CSR) initiatives, such as water disclosure, to complete their moral, ethical, and social obligations and to satisfy stakeholder expectations, especially achieving excellent financial performance, as per stakeholder theory (Wicaksono et al., 2024). In particular, female directors' varied backgrounds and viewpoints enhance the organization's value. According to (Eagly et al., 2003), female leaders possess distinct experiences and knowledge compared to their male counterparts. This viewpoint is supported by Beji et al. (2021), which revealed a positive correlation between the inclusion of women in leadership and several dimensions of corporate social responsibility (CSR). Furthermore, Davidson and Freudenburg (1996) and Liu (2018) provide conclusive evidence that female decision-makers were significantly more engaged in social activism and health and environmental risk issues than male decision-makers. Additionally, studies suggest that female board members exhibit greater proactivity towards environmental concerns and are more inclined to improve the effectiveness of environmental legislation (Shin and Park, 2023), therefore providing further evidence in favor of the stakeholder theory as outlined in Hypothesis 1.

Studies from Lestiananda et al. (2023) and Dillak and Hapsari (2024) demonstrate that the presence of women on boards of directors has a positive influence on environmental information disclosure because women possess characteristics that show more significant concern for welfare, exhibit higher levels of sympathy, and are more cooperative in decision-making processes. Furthermore, women provide various viewpoints and principles to the boardroom, strengthening a company's emphasis on environmental issues (Hafsi & Turgut, 2013). Bernardi et al. (2010) discovered that women-led companies are more inclined to engage in environmental sustainability initiatives. Similarly, Liao et al. (2015) discovered that boards with substantial gender diversity generate CSR disclosures of superior quality about environmental information. Ginglinger and Raskopf (2023) demonstrate enhanced environmental and social performance by companies with women on their boards. Women directors typically had more pertinent expertise in these domains than men before their board memberships. In line with prior research conducted by Peng et al. (2023), which investigated multinational firms in Japan, China, England, and the United States, found that a higher representation of women on corporate leadership benefits water transparency.

Nevertheless, the research's 10% significant threshold implies that the impact of women on the board may be amplified in more robust governance settings. The relatively modest influence observed here may stem from weaker corporate governance practices in emerging markets and insufficient legal and regulatory enforcement by national institutions (Adhariani, 2021; Jacoby et al., 2019; Salsabila & Adhariani, 2023). Consequently, the impact of women leadership on water disclosure remains marginally significant, likely because of the absence of relevant legislation that supports such disclosure.

The second Hypothesis in this research is supported. In the model with moderation variable (M3 and M4), the interaction of PWD with IV as pure moderator (Sharma et al., 1981) shows that Internet Visibility strengthens the influence of PWD on WD with an alpha rate of 5%. In this case, H2 is supported, suggesting that Google Trends data reflecting a company's public reputation and visibility can motivate boards, particularly women in leadership roles, to push for greater transparency in water-related disclosures; this aligns with Hou’s (2019) findings, which showed that Google Trends positively influences the relationship between CSR and financial performance in Taiwan's electronics industry. Since water disclosure is relatively new for Indonesian companies, the current level of transparency still falls short of global standards (Adhariani, 2021; Salsabila & Adhariani, 2023), highlighting the need for thoughtful decision-making within companies (Morris et al., 2023). Internet visibility is crucial in strengthening women's councils' influence in water disclosure. High visibility on the internet, as reflected through Google Trends, reflects the company's reputation and increases public exposure. For

women's councils, who are generally more concerned with public reputation and perception, this visibility adds to the accountability pressures they face. In this context, internet visibility encourages women's councils to be more proactive in ensuring their companies meet public expectations regarding sustainability practices, including water management; with this pressure in place, they will push companies to disclose information related to water management, as all markets or nations are trying to maintain public trust in the company. Recent studies favor this view; for example, Chen et al. (2021) demonstrated that women in leadership tend to advocate for increased environmental disclosure, even when it Is modulated by media involvement. Gong et al. (2020) and Al-Khatib (2023) contended that the degree of internet visibility, which is relevant to corporate sustainability, dramatically affects the board's behavior. Therefore, web citations serve as a measure of the reputation of water management. It can help increase the scrutiny on their movements to disclose all relevant information concerning permissions and contracts, thereby boosting encouragement for women boards at leading companies (and other settings) across transparent revelation.

The findings confirm that water disclosure (WD) aligns with stakeholder theory. The positive relationship between women directors (PWD) and WD supports stakeholder theory, showing that diverse leadership addresses broader stakeholder needs and enhances transparency. The moderating role of internet visibility (IV) amplifies this effect, aligning with sound governance principles by fostering accountability through public scrutiny. WD reflects stakeholder theory as it meets the informational demands of sustainability-conscious stakeholders while serving as a governance mechanism to ensure transparency and compliance with global standards. These results highlight the importance of diverse leadership and digital visibility in driving sustainable corporate practices.

## CONCLUSION

This study aims to analyze how women's leadership increased the level of water-related disclosure within Indonesian firms. The results show a positive relationship between the presence of women directors and the extent of water-related disclosures, and this relationship is even stronger in firms with higher internet visibility. Firms with higher internet visibility tend to have a higher level of water reporting, demonstrating the firm's accountability and transparency on water management practices.

These findings possess multiple significant implications. For one, regarding policymakers, this study highlights the need for a corporate governance code that embraces gender diversity and greater environmental disclosure levels and policies. For practitioners, the findings suggest that companies must pay attention to board diversity as an important factor in managing their environmental reputation and online presence. For investors and the public, this study proposes assessing a firm's environmental engagement to the composition of the board and the firm's presence on the Internet.

Even though important conclusions can be drawn from this research, the study has important gaps. First, only listed companies from a specific country, Indonesia were considered in the research sample. Thus, the study may not be generalizable within other emerging markets. Second, the study's time frame (2019-2022) was during the COVID-19 pandemic, which could have changed the pattern of disclosure within firms. Third, the research may miss important aspects of corporate water management because it follows the GRI water disclosure index. Further research Future studies can broaden the objectives of this work by examining the corporate culture, organizational structures, and how these factors affect environmental disclosure practices, as well as assessing the regulatory regimes in various jurisdictions and focusing on the need for cross-country analyses for emerging economies to identify barriers that exist in different socio-economic contexts between board diversity, web exposure, and environmental reporting.

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