THE ROLE OF WOMEN ON BOARD AND FIRM VALUE IN THE ASSOCIATION OF SOUTHEAST ASIAN NATIONS POLLUTING FIRMS

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OPEN ACCESS

How to cite this paper: Claudia, A., & Lindrianasari. (2024). The role of women on board and firm value in the Association of Southeast Asian Nations polluting firms. *Corporate Board: Role, Duties and Composition, 20*(3), 20–29.
https://doi.org/10.22495/cbv20i3art2

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ISSN Online: 2312-2722
ISSN Print: 1810-8601

Received: 27.12.2023
Accepted: 17.09.2024

JEL Classification: J16, O16, Q51
DOI: 10.22495/cbv20i3art2

Abstract

This study aims to investigate the impact of the presence of women on board, green accounting practices, and carbon emission disclosure on the firm value of heavily polluting companies in the Association of Southeast Asian Nations (ASEAN), with a focus on exploring the moderating effects of women on board. Employing an exploratory quantitative approach, secondary data including financial reports, sustainability reports, and environmental scores from the Bloomberg database were analyzed for 57 ASEAN companies over the period of 2017–2022. Tobin's Q was utilized as a measure of firm value (Kurnia et al., 2021). This study develops the previous literature on gender diversity (Simionescu et al., 2021) and environmental issues (Al-Dhaimesh, 2020; Choi et al., 2013). The findings reveal that green accounting practices and carbon emission disclosure do not significantly correlate with the firm value, while the presence of women on board does. Moreover, women on board play a significant moderating role in the relationship between green accounting practices, carbon emission disclosure, and firm value. The study also discusses the implications of environmental performance practices on firm valuation based on these findings.

Keywords: Green Accounting Practices, Carbon Emission Disclosure, Women on Board, Firm Value, ASEAN

Authors' individual contribution: Conceptualization — A.C. and L.; Methodology — A.C. and L.; Validation — A.C. and L.; Formal Analysis — A.C. and L.; Investigation — A.C. and L.; Resources — A.C.; Writing — Original Draft — A.C. and L.; Writing — Review & Editing — A.C. and L.; Visualization — A.C.; Supervision — L.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

Acknowledgements: The Authors would like to acknowledge that the data used in this study was obtained from the Bloomberg database. The research was supported by Bina Nusantara University and the financial support received from the Accounting Department, School of Accounting, Bina Nusantara University.

1. INTRODUCTION

Amid economic uncertainty and the economic recovery in the post-COVID-19 pandemic period, entities worldwide are making continuous efforts to sustain their business, enhance their performance, and maintain a competitive advantage among competitors. The firm value is a reflection of its

condition and carries a specific assessment from investors, providing an overview of the success of a company in conducting its business (Aryani et al., 2023; Astuti et al., 2022). Macroeconomic factors such as inflation, invasion, the increasing interest rate, and climate change pose challenges for companies, particularly concerning resource allocation (Cheong & Hoang, 2021; Chow et al., 2018). Over time, climate change impacts extreme weather, the transition of economies towards a low-carbon economy, and the emergence of new governance and technologies that can influence business models and corporate performance (Eversheds Sutherland, 2020). Climate change also become a focus of various countries worldwide.

Climate change impacts threaten the global ecosystem, leading to a decline in the gross domestic product (GDP) in various countries (Institute for Essential Services Reform [IESR], 2022). Transparency report reported that the loss of GDP in some countries in 2021 was recorded as India increase loss of 5.4%, Indonesia of 1.6%, Saudi Arabia of 0.9%, and Brazil also loss of 0.7% (IESR, 2022). The Association of Southeast Asian Nations (ASEAN) is a political and economic union of 11 states in Southeast Asia that include Indonesia, Malaysia, Singapore, the Philippines, Vietnam, Myanmar, Brunei Darussalam, Cambodia, Laos, Thailand, and East Timor. ASEAN has been impacted by the climate change issues. The ASEAN region is highly vulnerable to the impacts of climate change, as reported in the ASEAN State of Climate Change Report in 2021, Myanmar, the Philippines, Vietnam, and Thailand are among the top 10 countries most affected by extreme weather (ASEAN, 2021). Countries within ASEAN have declared their concern about climate change by stating a net zero emission target as an effort to keep carbon emissions below the established threshold of 1.5°C after temperatures increased by 1.1°C above the threshold in the last 7 years (ASEAN, 2021).

At the same time, ASEAN has faced some environmental issues such as the energy crisis, the clean water crisis, and increasing waste. The energy crisis resulting from the Russian invasion of Ukraine has had widespread financial and bilateral agreement impacts several ASEAN countries, like Singapore, Thailand, and Vietnam, have a relatively high dependence on oil supplies, while Malaysia, the Philippines, and Thailand also have higher coal requirements (ASEAN Centre for Energy [ACE], 2023). The clean water crisis has also become a significant concern as the scarcity of clean water has negative implications for the agriculture sector and food supply (ASEAN, 2021). In addition to these challenges, the rising population in ASEAN has led to an increase in the amount of waste generated. According to the United Nations Environment Programme (UNEP, 2017), the waste generated by ASEAN countries averages 1.14 kg per capita per day which is dominated by organic waste, plastic, paper, iron, and glass. ASEAN countries also need to implement green accounting practices as a mitigation of their environmental issues to keep the firm performance on track and improve.

Green accounting prioritizes the efficiency and effectiveness of resource usage in a company's production processes to support the company's environmental and social performance, as well as cost-effectiveness (Shah & Bhatt, 2022). Furthermore, disclosure of environmental issues and carbon emissions remains voluntary in the majority of ASEAN countries, although Singapore and Thailand have made sustainability reporting mandatory since 2021 (Global Reporting Initiative in Association of South East Asian Nations [GRI ASEAN], 2022).

In addition to grappling with environmental challenges in ASEAN, they must also confront the structural governance issues within organizations. There is a stereotype that distinguishes men and women in the workplace and leadership in organizations that have long prevailed, where although women's participation has increased in the workplace, their role in leadership remains relatively low (Fiske et al., 1991; Tyrowicz et al., 2020). The issue of gender equality in the composition of boards of commissioners and directors has also been a concern, especially in the Asian Corporate Governance Association (ACGA, 2022). According to the International Labor Organization (ILO, 2015), the role of women on board can enhance financial performance, resulting in better decision-making, improved consumer insights, enhanced corporate governance, and fostered talent development.

Regarding the presence of women on board influences the firm value in the earlier research conducted by Simionescu et al. (2021), Ahmad et al. (2020), and Abdelzaher and Abdelzaher (2019), then this study would test whether the moderating effect of women on board have a role to green accounting practices and carbon emission disclosure which effect to enhance the heavily polluter firm value.

Given these issues, research on environmental performance and carbon emission disclosure has been conducted. The research aims to find empirical evidence of green accounting practices and carbon emission disclosure on firm value, moderated by the presence of women on boards in heavily polluting companies in ASEAN. However, the green accounting indicators include energy, emissions, water, and waste management which use the Bloomberg score of each indicator as the measurement for green accounting practices and excluded biodiversity and materials due to most of the companies in the observation did not score at Bloomberg. Besides, environmental impact research, especially on ASEAN, is still rare. Also, a study examining the correlation between environmental performance and financial performance moderated by the presence of women on board has never been conducted by the previous research.

This paper's structure is as follows. In Section 2, we present the literature review related to the research and develop the hypotheses on green accounting practices, carbon emission disclosure, and the role of women on board direct relationships and moderating relationships to firm value. In Section 3, we explain our methodology and sample selection. In Section 4, we present the result of the study and explain the empirical evidence of our research. Finally, in Section 5, we outline the conclusion, limitations, and suggestions for future research.

2. LITERATURE REVIEW AND HYPOTHESES DESIGN

2.1. Theories related to the research

The concept of legitimacy theory plays a crucial role in analyzing the relationship between an organization and its environment (Dowling & Pfeffer, 1975).

Legitimacy is a common assumption or perception that the actions of an entity conform to norms, values, and beliefs (Crossley et al., 2021). The legitimacy theory arises from the awareness that public support is vital for a company's growth, image, and sustainability which can be obtained and maintained through voluntary disclosure with aims as tools for stakeholders and the public to accept the presence and company activities as legitimate, genuine, supportive, and appropriate (Maama et al., 2022). This theory emphasizes that green accounting practices should serve as legitimacy tools for companies to highlight their environmental performance with the aim of enhancing firm value.

The stakeholder theory was first introduced by Freeman in 1984, which is defined as a managerial concept in organizational strategy and ethics where the success of an organization depends on how well the company manages relationships with stakeholders, including consumers, employees, suppliers, communities, investors, and others, to achieve the company's objectives (Freeman & Phillips, 2002). In the stakeholder theory, improved accountability and transparency, along with a commitment to environmental practices, can help in developing a company's reputation or image by balancing the interests of various stakeholders (Nguyen et al., 2021). Besides the legitimacy theory and stakeholder theory make significant contributions to social and environmental research (Chen & Roberts, 2010). This theory is used to emphasize that company action related to carbon emission disclosure and its corporate governance have a good influence on the stakeholders and the company's performance.

2.2. Firm value

Financial performance measures the condition and capability of a company to generate profit (Budiharjo, 2019). Financial performance can be assessed through an analysis of the economic and financial impacts on decisions and considerations used in comparative measurement (Endiana et al., 2020). Traditional measurements such as return on assets (ROA), return on equity (ROE), and earnings per share (EPS) have been criticized because the assumptions and estimations used are considered incapable of accurately measuring the economic value of an entity (Kaur et al., 2019, as cited in Al-Dhaimesh, 2020). Measuring financial performance using the firm value encompasses investor's perceptions of the relationship between the company's financial performance and its stock price, where a higher firm value reflects greater investor confidence in the company, which leads to better financial performance and prospects (Keown, 2002, as cited in Kurnia et al., 2021). Tobin's Q can be used to measure firm value due to sustainability measurement impacts in the long-term firm value and can compare company performances across industries (Friske et al., 2023).

2.3. Green accounting

According to the International Federation of Accountants (IFAC), green accounting can be defined as the process of identifying, collecting, analyzing, and using information related to the utilization of energy, water, materials, and other resources to produce the information needed by both internal and external stakeholders (Debnath, 2014). Environmental performance benefits include environmentally friendly business solutions based on green technology investments in the production process, cost-saving calculations, income from waste product sales, creating a competitive advantage, and developing also publishing a comprehensive environmental management system (Al-Hamadeen, 2021). Green accounting is accounting that provides information about environmental and social benefits to support decision-making in the form of a report (Zakiy & Ramadhan, 2019). Environmental dimensions can be measured in several aspects, including materials, energy, water, biodiversity, emissions, waste, and environmental compliance (GRI, 2016).

2.4. Carbon emission disclosure

A sustainability report is a report prepared by a company or organization related to the economic, social, and environmental benefits associated with its business activities (Rudyanto, 2021). Sustainability disclosure is based on the concept of the triple bottom line, which is a business concept that positions companies to commit to measuring the impact of their actions on society and the environment as part of the company's financial performance. Rather than focusing solely on profit generation focus on three aspects: profit, people, and planet (Miller, 2020). In ASEAN, the countries report the impact of the environment based on the GRI and the Sustainability Development Goals (SDGs) in their sustainability reports, which the level of climate change disclosure in sustainability reports in the six ASEAN countries averaging around 46%, with Thailand contributing 57.7%, Malaysia and Singapore around 48%, Indonesia around 44%, the Philippines around 42%, and Vietnam around 24% (GRI ASEAN, 2022).

2.5. Women on board

The board of directors within a company is a body responsible for supervising, overseeing, and making decisions within a company (Dong et al., 2023). Gender diversity has been widely considered in various aspects of life and diversity in the backgrounds of the board of directors and commissioners enhances connections and networks that can be beneficial in developing business in areas that may often be overlooked (Khatib et al., 2020). Board diversity is also a focus of ACGA in 2022, with ACGA encouraging an increase in the representation of women on boards and in commissioner roles, aiming to reach a 30% target by 2030 (ACGA, 2022). Gender diversity has the potential to enhance financial performance, make companies more innovative, and lead to more effective decision-making (Sutedja, n.d.).

2.6. Hypotheses development

Green accounting has a function to assist companies in quantitatively assessing the cost and effectiveness of environmental protection to enhance their performance and sustainability (Anggita et al., 2022). The measurement of green accounting applies legitimacy theory, as stated by Dowling and Pfeffer

(1975), which encourages companies to engage in environmental activities as a form of concern and to enhance the company's reputation. Additionally, the assessment of green accounting provides a signal to stakeholders about whether the company's environmental initiatives can improve the company's performance in achieving its goals (Freeman & Phillips, 2002; Nguyen et al., 2021).

Based on the research conducted by Al-Dhaimesh (2020), the implementation of green accounting has a significant impact on financial performance. The implementation of green accounting also has a positive effect on financial performance, where an increase in the adoption of green accounting in a company can maximize revenue and cost efficiency (Endiana et al., 2020). Furthermore, Anggita et al. (2022) stated that the application of green accounting has a positive significant effect on firm value. These research findings contradict the result presented by Astuti et al. (2022), who claim that the application of green accounting does not have an impact on company value.

H1: The practices of green accounting have a significant and positive correlation with firm value.

Carbon emission disclosure assesses the level of carbon emissions of an organization and has the goal of reducing carbon emissions while providing information to stakeholders (Anggita et al., 2020; Sudibyo, 2018). This relates to the concept of stakeholders in the broadest view (Miller, 2020), where companies are not only focused on profit but also on other aspects like the social and environmental impact of the economy. The increase in public trust and the reduction of asymmetry information allow the company to devise appropriate strategies according to stakeholders' needs to enhance company performance which, in turn, increases the firm value (Friske et al., 2023).

Based on research conducted by Kuo et al. (2022), companies that link targets to business strategies are taking a step toward realizing the financial relevance of their environmental, social, and governance (ESG) measurement scale. Furthermore, the study conducted by Anggita et al. (2022) found that carbon emission disclosure does not have an impact on company value. Siddique et al. (2021) also revealed a significant negative relationship between carbon emission disclosure and short-term financial performance but a significant impact on long-term company performance. The carbon disclosure also increases the firm value in Indonesia but does not affect increasing firm value in Australia (Kurnia et al., 2021).

H2: Carbon emission disclosure has a significant and positive correlation with firm value.

Companies need to consider the presence of women leaders in the company because increased gender diversity on the board of directors and commissioners can enhance productivity, creativity, and innovation within the company (Simionescu et al., 2021). There are gender differences in characteristics, where women generally exhibit warmer, softer, more caring, and better personal communication qualities, while men tend to be more resilient, adaptable, influential, and goal-oriented (Burgess & Borgida, 1999). This can contribute to the company's reputation and performance, ultimately increasing the firm value.

Women on board can play a role in making better connections in the firms especially in the emerging market where there are more women than men (Solimene et al., 2017). Over the past year, women also strived to educate themselves and make them have sufficient skills in decision-making (Awad et al., 2023). A study related to women's leadership and company financial performance in Egypt found that women's leadership on the board of directors and commissioners has a positive influence on a company's financial performance (Abdelzaher & Abdelzaher, 2019). The presence of women leaders in the company also has a positive impact on company performance (Simionescu et al., 2021). However, according to research conducted by Ahmad et al. (2020), women on board have a significant negative impact on company performance. Based on these previous studies, the following hypothesis can be developed:

H3: Women on board have a significant and positive correlation with firm value.

The advantages of the presence of women on board can increase firm performance, support the decision-making process, and expand knowledge and governance (ILO, 2015). Thus, increasing the number of female directors offers boards varying viewpoints that might be beneficial in tackling both internal and external environmental issues (Arnardottir et al., 2023). The critical mass of women affects corporate decision making including financial performance (Laurens, 2022). Building on this point of view, this study would test whether the moderating effect of women on board presence in green accounting practices and carbon emission disclosure can strengthen or weaken each effect on firm value. The role of women on board has a significant relationship with financial performance (Arnardottir et al., 2023; Awad et al., 2023; Galavotti & D'Este, 2023; Khalaf, 2022). The hypotheses are built as follows:

H4: The presence of women on board, as a moderating variable, plays a role in strengthening the relationship between green accounting practices on firm value.

H5: The presence of women on board, as a moderating variable, plays a role in strengthening the relationship between carbon emission disclosure on firm value.

3. RESEARCH METHODOLOGY

3.1. Sample selection

The population that is used in this study consists of the heavily polluting companies in ASEAN that are categorized into electricity and gas supply, manufacturing, transportation, construction, mining, and quarrying, as well as agriculture, forestry, and fisheries sectors. The sources of six-year period data from 2017 to 2022. The source of data used is the Bloomberg database, an integrated report that consists of the annual report and sustainability report for the sample companies selected. The study selects 57 companies, which are mainly from Indonesia, Thailand, Malaysia, Singapore, and the Philippines based on purposive sampling with consideration of a few criteria as shown in the table below.

Table 1. Sample selection

No.	*Criteria*	*N*
1	Listed companies in their respective ASEAN countries.	5,261
2	The company is not categorized as a heavy polluter.	(3,364)
3	The environmental score is not available in the Bloomberg terminal.	(1,832)
4	The integrated report consists of the annual report and sustainability report but is not available on the company website.	(8)
Total sample		57
Total observation (6 years × 57)		342
Missing data elimination		(37)
Total observation after elimination		305

Source: Authors' elaboration.

3.2. Data analysis

This study utilized content analysis and tested by Spearman-rho correlation test in Statistical Package for the Social Sciences (SPSS) to propose hypotheses. The dependent variable of this study is the firm value which is represented by Tobin's Q (*TBQ*) which is considered a superior indicator for explaining a company's activities in a cross-sectoral context; it is particularly useful for making investment and diversification decisions and understanding the relationship between ownership, performance, acquisitions, dividend policies, and compensation policies (Tobin, 1969). The measurement used in calculating firm value is as follows (Kurnia et al., 2021):

$$TBQ = \frac{Market\ value\ of\ equity + Book\ value\ of\ debt}{Total\ assets} \quad (1)$$

The independent variables in this study are green accounting practices (*GAP*) and carbon emission disclosure (*CED*). The green accounting practices are measured by four indicators that consist of energy, emission, water, and waste management; each of these indicators contains environmental scores which are collected from the Bloomberg database. The score of each indicator ranges from 1 to 10, which are then converted into a percentage and summed together to get the cumulative score, representing green accounting practices as follows (Al-Dhaimesh, 2020).

Table 2. Green accounting indicator score

Dimension	*Measurement*
Energy	Energy management score
Water	Water management score
Emissions	Emission management score
Waste	Waste management score

Source: Authors' elaboration using the Bloomberg database.

Table 3. Test the extent of green accounting practices

Energy	*Water*	*Emission*	*Waste*
25%	25%	25%	25%

Source: Al-Dhaimesh (2020).

Table 4. Scoring criteria

Excellent	*Good*	*Intermediate*	*Weak*
76%–100%	51%–75%	26%–50%	0%–25%

Source: Al-Dhaimesh (2020).

The carbon emission disclosure will be assessed from the integrated report published by the company from 2017 to 2022. The measurement of carbon emission disclosure will follow an index checklist based on the research conducted by Choi et al. (2013). Each item on the checklist that meets the criteria will receive a score of 1. The index is divided into five categories as follows: the risks and opportunities of climate change, greenhouse gas emissions, energy consumption, the reduction of greenhouse gases and cost, and the accountability of carbon emission. The highest possible score for carbon emission disclosure is 18, and the lowest is 0. The sum of these scores will serve as the data analyzed in this study.

The third independent variable and moderating variable in this study will use the composition of women on board in the company's annual report. Gender diversity is considered one of the factors that enhance company performance, boost the company's initiatives in ESG activities, and provide a competitive advantage (Dong et al., 2023). The measurement of women on board (*WOB*) refers to the study by Simionescu et al. (2021) and is measured as follows:

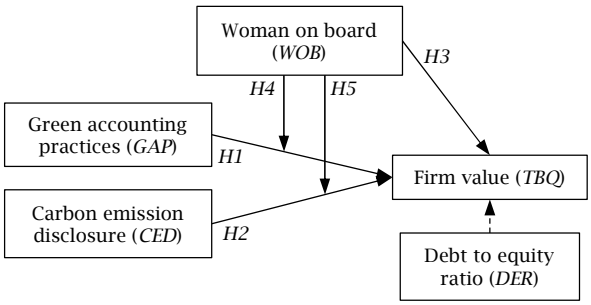
$$WOB = \frac{Total\ women\ on\ board\ and\ comissioners}{Total\ board\ and\ commissioners} \quad (2)$$

The control variable used in this study is the debt-to-equity ratio (*DER*), which is measured as follows:

$$DER = \frac{Total\ debt}{Total\ equity} \quad (3)$$

The conceptual framework for this study is presented in Figure 1.

Figure 1. Conceptual framework



4. RESEARCH RESULTS AND DISCUSSION

4.1. Descriptive statistics

Table 4 shows that the number of observations for this study sample was 305 during the last six years (2017–2022). This study shows that the minimum value of *TBQ* is 0.79 and the maximum value is 23.29. The mean value of the variable is 2.15, and the standard deviation is 2.74. Variable *GAP* shows a minimum value of 0.04 and a value maximum of 67.00. The average value of these variables is 27.10, and the standard deviation of 17.35. The *CED* variable indicates that the minimum value is 5.56 and the maximum value is 94.44. The variable average value is 51.53, and the standard deviation is 21.85. The *WOB* variable indicates that the minimum value is 1.00 and the maximum value is 44.44.

The variable average value is 15.58, and the standard deviation is 12.44. The variable control of the total debt-to-equity ratio (*DER*) indicates that the minimum value is 0.04 and the maximum value is 308.01. The variable average value is 71.40, and the standard deviation is 58.90.

Table 5. Descriptive statistics

Variable	*Min*	*Max*	*Mean*	*Std. dev.*
TBQ	0.79	23.29	2.15	2.74
GAP	0.04	67.00	27.10	17.35
CED	5.56	94.44	51.53	21.85
WOB	1.00	44.44	15.58	12.44
DER	0.04	308.01	71.40	58.90

Source: Authors' elaboration using SPSS software.

4.2. Testing of Spearman correlation

The analysis of variance (ANOVA) test of this study result is significant with an F-value of 0.000. Based on the result, *GAP* has a correlation value of -0.050 with a significance of 0.191 > 0.05.

The study also conducted the Spearman correlation to check the correlation of dependent, independent, and moderation variables. The Pearson correlation matrix shows the correlation and significance of the interaction among variables as shown in Table 6.

Table 6. Spearman correlation matrix

Variable		*TBQ*	*GAP*	*CED*	*WOB*	*DER*	*GAP_WOB*	*CED_WOB*
TBQ	Correlation coefficient	1.000	-0.050	-0.032	0.241**	-0.304**	0.098*	0.175**
	Sig. (1-tailed)		0.191	0.287	0.000	0.000	0.043	0.001
	N	305	305	305	305	305	305	305
GAP	Correlation coefficient	-0.050	1.000	0.484**	-0.244**	-0.215**	0.451**	0.013
	Sig. (1-tailed)	0.191		0.000	0.000	0.000	0.000	0.412
	N	305	305	305	305	305	305	305
CED	Correlation coefficient	-0.032	0.484**	1.000	-0.064	0.071	0.319**	0.436**
	Sig. (1-tailed)	0.287	0.000		0.132	0.107	0.000	0.000
	N	305	305	305	305	305	305	305
WOB	Correlation coefficient	0.241**	-0.244**	-0.064	1.000	0.036	0.679**	0.820**
	Sig. (1-tailed)	0.000	0.000	0.132		0.265	0.000	0.000
	N	305	305	305	305	305	305	305
DTE	Correlation coefficient	-0.304**	-0.215**	0.071	0.036	1.000	-0.067	0.095*
	Sig. (1-tailed)	0.000	0.000	0.107	0.265		0.121	0.050
	N	305	305	305	305	305	305	305
GAP_WOB	Correlation coefficient	0.098*	0.451**	0.319**	0.679**	-0.067	1.000	0.753**
	Sig. (1-tailed)	0.043	0.000	0.000	0.000	0.121		0.000
	N	305	305	305	305	305	305	305
CED_WOB	Correlation coefficient	0.175**	0.013	0.436**	0.820**	0.095*	0.753**	1.000
	Sig. (1-tailed)	0.001	0.412	0.000	0.000	0.050	0.000	
	N	305	305	305	305	305	305	305

*Note: **, * Correlation is significant at the 0.01 and 0.05 levels (1-tailed), respectively.*
Source: Authors' elaboration using SPSS software.

4.3. Discussion

The result indicates that green accounting practices have no effect on firm value, so *H1* is not supported. This means that green accounting practices do not affect improving firm value. The green accounting practices made by the company have become a part of the company's environmental responsibility in the sustainability report, so it does not have any correlation with the firm value and is not considered a tool for assessing the company's performance (Astuti et al., 2022). The implementation of green accounting in ASEAN is still intermediate and needs more improvement as shown in Table 7 below.

Table 7. Green accounting practices per country

Country	*Mean (%)*	*GAP quality*
Thailand	33.46	Intermediate
Indonesia	30.11	Intermediate
Singapore	24.90	Weak
Philippine	20.12	Weak
Malaysia	19.06	Weak
Overall	27.10	Intermediate

Source: Authors' elaboration.

The highest application of green accounting practices by sector comes from basic materials with 54.4% of companies using green accounting practices, mining at 48.57%, energy at 34.32%, chemical industry at 31.87%, manufacturing at 26.39%, and the remaining sectors in the sample have averaged below 25%. This result is consistent with Astuti et al. (2022) and Budiharjo (2019) but contrary to the study conducted by Al-Dhaimesh (2020) and Murdiawati (2019).

Besides, the result of hypothesis testing for carbon emission disclosure has no effect on firm value where the correlation value is -0.032 and a significance of 0.287 > 0.05. The result indicates that *H2* is not supported. There is no correlation effect of carbon emission disclosure on firm value. The carbon emission disclosure has no impact on firm value due to not every country in ASEAN has applied carbon emission disclosure as mandatory. There are still many companies that do not have any complete disclosure related to carbon emissions. The carbon emission disclosure by country is stated below.

Table 8. Carbon emission disclosure per country

Country	*Mean (%)*
Thailand	60.64
Singapore	56.61
Malaysia	48.58
Philippine	46.91
Indonesia	46.20
Overall	51.53

Source: Authors' elaboration.

Thailand and Singapore have been supported by the government to disclose carbon emissions disclosure in sustainability reports, but the other countries have not applied it properly and need improvements. On the other hand, the process of providing the carbon emission disclosure is costly and needs higher expenses and cash outflow which can disturb the firm value improvement (Kurnia et al., 2021). Besides, the lack of awareness and socialization about carbon emission disclosure also impacts the company that applies the carbon emission disclosure and has environmentally friendly behavior have not been able to create a competitive advantage to attract the stakeholders (Rachmawati, 2021). The result is consistent with the study conducted by Anggita et al. (2022), Kurnia et al. (2021), Rachmawati (2021), and Firmansyah et al. (2021), but also contrary to Murdiawati (2019) and Siddique et al. (2021).

This study also tested the potential effect of women on board (*WOB*) as independent variable. The result of hypothesis testing for *WOB* has a positive significance relationship on firm value where the correlation value is 0.241 and a significance of 0.000 < 0.05. The result supports the formulated *H3*. Women on board contribute to allying, increasing good corporate governance, increasing talent, and improving financial performance (ILO, 2015). The average of the presence of women on board in ASEAN is stated below.

Table 9. Women on board per country

Country	*Mean (%)*
Malaysia	26.05
Singapore	15.01
Philippine	14.86
Thailand	13.84
Indonesia	8.77
Overall	15.58

Source: Authors' elaboration.

Despite this, the average of women on board in ASEAN is still below 30%, but the testing result proves that the presence of women on board can independently enhance firm value in the heavily polluting companies in ASEAN. The presence of women on board can boost the company's performance, be more innovative in improving the operation of a company, have effective decision-making, and improve a firm value and reputation (Sutedja, n.d.). This result is consistent with Abdelzaher and Abdelzaher (2019), Simionescu et al. (2021), and Ahmad et al. (2020).

The result of moderating effect testing for green accounting with women on board has successfully boosted firm value. The correlation value of 0.098 and a significance of 0.043 < 0.05. The result supports the formulated *H4*. Women on board are more gentle, caring, and better communicators about their environmental effect than men (Burgess & Borgida, 1999), so they can do a lot of initiatives to focus on the effect of the environmental effect and increase green accounting practices to improve the company's firm value. Women on board also can help to connect the company with the environmental institution due to a significant portion of women on board are considered in the workplace (Tingbani et al., 2020). The result is consistent with the study conducted by Anggita et al. (2022), Al-Dhaimesh (2020), and Endiana et al. (2020), but also contrary to the previous studies by Astuti et al. (2022) and Budiharjo (2019).

Additionally, this study also tested the potential effect of women on board as a moderating variable to boost the carbon emission disclosure on firm value. The result of moderating effect testing for carbon emission disclosure with women on board successfully boosts the firm value. The correlation value is 0.175 with the significance of 0.001 < 0.05. The result indicates that the result supports *H5*. The role of women on board can successfully create value in supporting the carbon emission disclosure which has a good influence in building a positive sentiment among stakeholders. Currently, the Sustainability Accounting Standards Board (SASB) is still in the process of creating the standard to rule about carbon emission disclosure. The role of women on board to moderate carbon emission disclosure is to support government regulations to create positive value for the environment. This study supports the results of studies conducted by Kurnia et al. (2021) and Siddique et al. (2021) but is contrary to Firmansyah et al. (2021) and Rachmawati (2021).

The test of the debt-to-equity ratio (*DER*) as a control variable has a negative significant effect in controlling the firm value with the Pearson correlation value of -0.304 and significance of 0.000. The debt-to-equity ratio represents a leverage measurement of a company. A lower debt-to-equity ratio indicates that the company has enough resources in equity to cover its debts. A higher debt-to-equity ratio indicates that the company has more risk of losing the market share, which can decrease the profitability, performance, and value of a company (Wang et al., 2020). The company should monitor its debt-to-equity ratio to focus on improving its firm value.

5. CONCLUSION

This study aims to find empirical evidence of how green accounting practices and carbon emission disclosure influence the firm value in companies that are operating in ASEAN countries and to test the effect of the moderating variable: women on board. The sample of this study is the companies categorized as heavily polluting companies listed in the respective ASEAN countries during 2017–2022 using purposive sampling. This study shows that green accounting practices do not influence the firm value of the companies before moderating with women on board. On one hand, carbon emission disclosure also does not affect the firm value.

On the other hand, women on board have a positive and significant effect on firm value. The test of the effect of women on board also did to green accounting and carbon emission disclosure. The test of the moderating effect of women on board to check whether green accounting and carbon emission disclosure after moderating women on board can boost the firm value was done. The study finds that women on board successfully moderate the green accounting practices and carbon emission disclosure to boost firm value. Women on board can boost reputation and company performance Abdelzaher and Abdelzaher (2019). Huse and Solberg (2006, as cited in Ahmad et al., 2020), also find that women on board have a higher

commitment to providing tasks before the meeting, which has a positive influence on improving the company's performance. Based on the characteristics of women on board, green accounting practices are more manageable and can improve the company's firm value, also the role of women on board in moderating the carbon emission disclosure can support the government action and policies. Besides, the carbon emission disclosure in ASEAN still needs massive socialization to improve stakeholder awareness, so it can create a competitive advantage that improves the firm value (Rachmawati, 2021).

The practical implication based on the empirical findings of this research is to encourage companies in ASEAN to increase the presence of women in leadership positions in accordance with the recommendation from ACGA stating that a minimum of 30% of total directors and commissioners in companies should be women. Empirically, women have proven their ability to leverage their roles in driving improvement in reporting and green accounting practices within the companies they lead. Based on this fact, over time, stereotypes regarding discrimination against women can gradually be addressed.

There are some limitations in this study. First, the sample for this study is only 57 companies a year, and the total observation is only 305 data, the data generalization of the findings in this study may not be robust. Future studies may increase the number of samples to increase the data robustness. Secondly, the study only tested two independent variables with one moderating variable. Future studies should increase the number of independent variables. Last, future research should use the other dependents that can give a better contribution related to environmental performance and women on board.

In conclusion, this study provides empirical evidence to the interested parties about how green accounting practices and the women on board affect the firm value. In addition, this study contributes to giving a further understanding of green accounting, carbon emission disclosure, and women on board's effect on the firm value of the company.

REFERENCES

Abdelzaher, A., & Abdelzaher, D. (2019). Women on boards and firm performance in Egypt: Post the Arab Spring. *The Journal of Developing Areas*, *53*(1). https://doi.org/10.1353/jda.2019.0013

Ahmad, M., Kamaruzaman, R. N. S. R., Hamdan, H., & Annuar, H. A. (2020). Women directors and firm performance: Malaysian evidence post policy announcement. *Journal of Economic and Administrative Sciences*, *36*(2), 97–110. https://doi.org/10.1108/JEAS-04-2017-0022

Al-Dhaimesh, O. H. (2020). Green accounting practices and economic value added: An applied study on companies listed on the Qatar Stock Exchange. *International Journal of Energy Economics and Policy*, *10*(6), 164–168. https://doi.org/10.32479/ijeep.10199

Al-Hamadeen, R. (2021). Environmental accounting and reporting: Evidence from the MENA region. In J. Bebbington, C. Larrinaga, B. O'Dwyer, & I. Thomson (Eds.), *Routledge handbook of environmental accounting*. Routledge. https://doi.org/10.4324/9780367152369-26

Anggita, W., Nugroho, A. A., & Suhaidar. (2022). Carbon emission disclosure and green accounting practices on the firm value. *Jurnal Akuntansi*, *26*(3), 464–481. https://doi.org/10.24912/ja.v26i3.1052

Arnardottir, A. A., Sigurjonsson, T. O., & Gabaldon, P. (2023). Gender diversity on corporate boards: Directors' perceptions of board functioning and gender quotas. *Journal of Governance & Regulation, 12*(2), 92–103. https://doi.org/10.22495/jgrv12i2art9

Aryani, L., Hizazi, A., & Herawaty, N. (2023). The effect of green accounting, financial performance on company value with profitability as an intervening variable (Study on mining sector companies listed on IDX for the period 2018–2021). *American International Journal of Business Management, 6*(5), 51–61. https://www.aijbm.com/wp-content/uploads/2023/05/G655161.pdf

ASEAN Centre for Energy (ACE). (2023). *Outlook on ASEAN Energy 2023: Key insight about ASEAN energy landscape and trends in 2023*. https://shorturl.at/9Q3MN

Asian Corporate Governance Association (ACGA). (2022). *ACGA open letter: Gender diversity in TSE prime market boards*. https://www.acga-asia.org/advocacy-detail.php?id=461&sk=&sa=

Association of Southeast Asian Nations (ASEAN). (2021). *ASEAN state of climate change report: Current status and outlook of the ASEAN region toward the ASEAN climate vision 2050*. https://shorturl.at/3ptj4

Astuti, T., Amyulianthy, R., & Kaniati, R. (2022). Green accounting, financial performance toward firm value. *Asian Journal of Accounting and Finance*, *4*(1). https://myjms.mohe.gov.my/index.php/ajafin/article/view/17839

Awad, A. B., Khalaf, B. A., & Afzal, A. (2023). The power of board size and gender diversity on the value of companies listed on emerging markets. *Corporate Law & Governance Review, 5*(2), 128–139. https://doi.org/10.22495/clgrv5i2p14

Budiharjo, R. (2019). Effect of environmental performance and corporate governance structure on financial performance. *International Journal of Academic Research in Accounting, Finance, and Management Sciences*, *9*(2), 11–22. https://shorturl.at/6iTnB

Burgess, D., & Borgida, E. (1999). Who women are, who women should be: Descriptive and prescriptive gender stereotyping in sex discrimination. *Psychology, Public Policy, and Law*, *5*(3), 665–692. https://doi.org/10.1037/1076-8971.5.3.665

Chen, J. C., & Roberts, R. W. (2010). Toward a more coherent understanding of the organization-society relationship: A theoretical consideration for social and environmental accounting research. *Journal of Business Ethics*, *97*, 651–665. https://doi.org/10.1007/s10551-010-0531-0

Cheong, C., & Hoang, H. V. (2021). Macroeconomic factors or firm-specific factors? An examination of the impact on corporate profitability before, during and after the global financial crisis. *Cogent Economics & Finance*, *9*(1), Article 1959703. https://doi.org/10.1080/23322039.2021.1959703

Choi, B. B., Lee, D., & Psaros, J. (2013). An analysis of Australian company carbon emission disclosures. *Pacific Accounting Review*, *25*(1), 58–79. https://doi.org/10.1108/01140581311318968

Chow, Y. P., Muhammad, J., Bany-Ariffin, A. N., & Cheng, F. F. (2018). Macroeconomic uncertainty, corporate governance and corporate capital structure. *International Journal of Managerial Finance*, *14*(3), 301–321. https://doi.org/10.1108/IJMF-08-2017-0156

Crossley, R. M., Elmagrhi, M. H., & Ntim, C. G. (2021). Sustainability and legitimacy theory: The case of sustainable social and environmental practices of small and medium-sized enterprises. *Business Strategy and the Environment*, *30*(8), 3740–3762. https://doi.org/10.1002/bse.2837

Debnath, S. (2014). *Green management accountancy. Improving eco-efficiency* (Doctoral dissertation). GRIN Verlag. https://www.researchgate.net/publication/294645709

Dong, Y., Liang, C., & Wanyin, Z. (2023). Board diversity and firm performance: Impact of ESG activities in China. *Economic Research-Ekonomska Istraživanja*, *36*(1), 1592–1609. https://doi.org/10.1080/1331677X.2022.2090406

Dowling, J., & Pfeffer, J. (1975). Organizational legitimacy: Social values and organizational behavior. *Pacific Sociological Review, 18*(1), 122–136. https://doi.org/10.2307/1388226

Endiana, I. D. M., Dicriyani, N. L. G. M., Adiyadnya, M. S. P., & Putra, I. P. M. J. S. (2020). The effect of green accounting on corporate sustainability and financial performance. *The Journal of Asian Finance, Economics and Business*, *7*(12), 731–738. https://doi.org/10.13106/jafeb.2020.vol7.no12.731

Eversheds Sutherland. (2020). *Climate change and corporate value*. Eversheds Sutherland & KPMG. https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2021/03/climate-change-and-corporate-value.pdf

Firmansyah, A., Husna, M. C., & Putri, M. A. (2021). Corporate social responsibility disclosure, corporate governance disclosures, and firm value in Indonesia chemical, plastic, and packaging sub-sector companies. *Accounting Analysis Journal*, *10*(1), 9–17. https://doi.org/10.15294/aaj.v10i1.42102

Fiske, S. T., Bersoff, D. N., Borgida, E., Deaux, K., & Heilman, M. E. (1991). Social science research on trial: Use of sex stereotyping research in Price Waterhouse v. Hopkins. *American Psychologist*, *46*(10), 1049–1060. https://doi.org/10.1037/0003-066X.46.10.1049

Freeman, R. E., & Phillips, R. A. (2002). Stakeholder theory: A libertarian defense. *Business Ethics Quarterly, 12*(3), 331–349. https://doi.org/10.2307/3858020

Friske, W., Hoelscher, S. A., & Nikolov, A. N. (2023). The impact of voluntary sustainability reporting on firm value: Insights from signaling theory. *Journal of the Academy of Marketing Science*, *51*, 372–392. https://doi.org/10.1007/s11747-022-00879-2

Galavotti, I., & D'Este, C. (2023). Female CEO and board composition: A gender rivalry approach to family firms. *Corporate Board: Role, Duties and Composition, 19*(1), 8–19. https://doi.org/10.22495/cbv19i1art1

Global Reporting Initiative (GRI). (2016). *GRI 101: Foundation 2016*. https://reportadviser.com/wp-content/uploads/2021/05/GRI-101-foundation-2016.pdf

Global Reporting Initiative in Association of South East Asian Nations (GRI ASEAN). (2022). *Climate reporting in ASEAN: State of corporate practices*. https://shorturl.at/MBmjh

Institute for Essential Services Reform (IESR). (2022). Indonesia. Climate transparency report: Comparing G20 climate action. In *Climate transparency report 2022. G20 Response to the energy crisis: Critical for 1.5 Celsius degree*. Climate Transparency. https://www.climate-transparency.org/wp-content/uploads/2022/10/CT2022-Indonesia-Web.pdf

International Labor Organization (ILO). (2015). *Women on boards: Building the female talent pipeline* [Issue brief]. ILO/IFC/CBI Conference on Women in Business and Management, London, the United Kingdom. https://webapps.ilo.org/public/libdoc/ilo/2015/115B09_157_engl.pdf

Khalaf, B. A. (2022). The impact of board diversity on the performance of banks [Special issue]. *Corporate Governance and Organizational Behavior Review, 6*(4), 275–283. https://doi.org/10.22495/cgobrv6i4sip8

Khatib, S. F. A., Abdullah, D. F., Elamer, A. A., & Abueid, R. (2020). Nudging toward diversity in the boardroom: A systematic literature review of board diversity of financial institutions. *Business Strategy and the Environment*, *30*(2), 985–1002. https://doi.org/10.1002/bse.2665

Kuo, Y.-K., Khan, T. I., Islam, S. U., Abdullah, F. Z., Pradana, M., & Kaewsaeng-on, R. (2022). Impact of green HRM practices on environmental performance: The mediating role of green innovation. *Frontiers in Psychology*, *13*, Article 916723. https://doi.org/10.3389/fpsyg.2022.916723

Kurnia, P., Nur, D. E., & Putra, A. A. (2021). Carbon emission disclosure and firm value: A study of manufacturing firms in Indonesia and Australia. *International Journal of Energy Economics and Policy*, *11*(2), 83–87. https://doi.org/10.32479/ijeep.10730

Laurens, S. (2022). Gender diversity and the stock price [Special issue]. *Corporate & Business Strategy Review, 3*(2), 273–280. https://doi.org/10.22495/cbsrv3i2siart8

Maama, H., Appiah, K. O., & Doorasamy, M. (2022). Materiality of environmental and social reporting: Insights from minority stakeholders. *Social and Environmental Accountability Journal*, *42*(3), 184–207. https://doi.org/10.1080/0969160X.2021.2006074

Mahoney, J. T., Huff, A. S., & Huff, J. O. (1994). Toward a new social contract, theory in organization science. *Journal of Management Inquiry, 3*(2), 153–168. https://josephmahoney.web.illinois.edu/Publications/Huff,%20Huff%20and%20Mahoney%20(1994a).pdf

Miller, K. (2020, December 8). *The triple bottom line: What it is & why it's important*. Harvard Business School. https://online.hbs.edu/blog/post/what-is-the-triple-bottom-line

Murdiawati, D. (2019). Effect of greenhouse gas emission disclosure, environmental performance, and disclosure of corporate social responsibility report on financial performance. In *Proceedings of the Social and Humaniora Research Symposium (SoRes 2018)* (pp. 154–158). Atlantis Press. https://doi.org/10.2991/sores-18.2019.35

Nguyen, T. H. H., Elmagrhi, M. H., Ntim, C. G., & Wu, Y. (2021). Environmental performance, sustainability, governance and financial performance: Evidence from heavily polluting industries in China. *Business Strategy and the Environment*, *30*(5), 2313–2331. https://doi.org/10.1002/bse.2748

Rachmawati, S. (2021). Green strategy moderate the effect of carbon emission disclosure and environmental performance on firm value. *International Journal of Contemporary Accounting*, *3*(2), 133–152. https://doi.org/10.25105/ijca.v3i2.12439

Rudyanto, A. (2021). Is mandatory sustainability report still beneficial? *Jurnal Akuntansi Dan Keuangan Indonesia*, *18*(2), 148–167. https://doi.org/10.21002/jaki.2021.08

Shah, D., & Bhatt, V. (2022). Examine the mediating role of environmental concern and perceived benefit on adoption of green accounting with the emerging economy perspective. *International Journal of Special Education*, *37*(3), 5243–5259. http://doi.org/10.5281/zenodo.6140499

Siddique, M. A., Akhtaruzzaman, M., Rashid, A., & Hammami, H. (2021). Carbon disclosure, carbon performance and financial performance: International evidence. *International Review of Financial Analysis*, *75*, Article 101734. https://doi.org/10.1016/j.irfa.2021.101734

Simionescu, L. N., Gherghina, Ş. C., Tawil, H., & Sheikha, Z. (2021). Does board gender diversity affect firm performance? Empirical evidence from Standard & Poor's 500 information technology sector. *Financial Innovation*, *7*, Article 52. https://doi.org/10.1186/s40854-021-00265-x

Solimene, S., Coluccia, D., & Fontana, S. (2017). Gender diversity on corporate boards: An empirical investigation of Italian listed companies. *Palgrave Communications*, *3*, Article 16109. https://doi.org/10.1057/palcomms.2016.109

Sudibyo, Y. A. (2018). Carbon emission disclosure: Does it matter. *IOP Conference Series: Earth and Environmental Science*, *106*, Article 012036. https://doi.org/10.1088/1755-1315/106/1/012036

Sutedja, S. (n.d.). *Mengenal board diversity* (Keberagaman dewan) [Getting to know board diversity]. ESG Intelligence. https://www.esgi.ai/mengenal-board-diversity-keberagaman-dewan/

Tingbani, I., Chithambo, L., Tauringana, V., & Papanikolaou, N. (2020). Board gender diversity, environmental committee and greenhouse gas voluntary disclosures. *Business Strategy and the Environment*, *29*(6), 2194–2210. https://doi.org/10.1002/bse.2495

Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of Money, Credit and Banking, 1*(1), 15–29. https://doi.org/10.2307/1991374

Tyrowicz, J., Terjesen, S., & Mazurek, J. (2020). *All on board? New evidence on board gender diversity from a large panel of European firms* (IZA Discussion Paper No. 12883). Institute of Labor Economics (IZA). http://doi.org/10.2139/ssrn.3521701

United Nations Environment Programme (UNEP). (2017). *Summary report: Waste management in ASEAN countries*. United Nations (UN). https://www.unep.org/ietc/resources/publication/waste-management-asean-countries-summary-report

Wang, S., Wang, H., Wang, J., & Yang, F. (2020). Does environmental information disclosure contribute to improve firm financial performance? An examination of the underlying mechanism. *Science of The Total Environment, 714*, Article 136855. https://doi.org/10.1016/j.scitotenv.2020.136855

Zakiy, F. S., & Ramadhan, D. S. (2019). Socialize the Ilahiyah doctrine on corporate social responsibility in the modern business. *KHATULISTIWA: Journal of Islamic Studies*, *9*(2), 112–125. https://doi.org/10.24260/khatulistiwa.v9i2.1364