ผลกระทบของคุณลักษณะของประธานเจ้าหน้าที่บริหารต่อผลการดำเนินงานด้านสิ่งแวดล้อม สังคม และการกำกับดูแลกิจการในประเทศไทย

THE IMPACT OF CHIEF EXECUTIVE OFFICER (CEO) ATTRIBUTES ON ENVIRONMENTAL, SOCIAL, AND GOVERNANCE (ESG) PERFORMANCE IN THAILAND

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บทคัดย่อ

การศึกษานี้วิเคราะห์อิทธิพลของคุณลักษณะของประธานเจ้าหน้าที่บริหาร (CEO) ที่มีต่อผลการดำเนินงานด้านสิ่งแวดล้อม สังคม และการกำกับดูแลกิจการ (Environmental, Social, and Governance: ESG) ของบริษัทจดทะเบียนในตลาดหลักทรัพย์แห่งประเทศไทย ระหว่างปี พ.ศ. 2562 ถึง พ.ศ. 2566 โดยใช้ข้อมูลพาแนลจำนวน 610 ตัวอย่าง ซึ่งรวบรวมจากรายงานประจำปี เว็บไซต์ของบริษัท ฐานข้อมูล Refinitiv Workspace และ SETSMART การวิเคราะห์อาศัยกรอบแนวคิดจากทฤษฎีตัวแทน ทฤษฎีผู้มีส่วนได้ส่วนเสีย ทฤษฎีผู้บริหารระดับสูง และทฤษฎีมวลวิกฤต โดยศึกษาผลของคุณลักษณะของ CEO ได้แก่ เพศ อายุ ระยะเวลาการดำรงตำแหน่ง วุฒิการศึกษา และสาขาวิชาที่สำเร็จการศึกษาต่อผลการดำเนินงานด้าน ESG ทั้งในภาพรวม รายองค์ประกอบ และสถานะการได้รับคัดเลือกให้อยู่ในรายชื่อหุ้นยั่งยืน โดยใช้แบบจำลองถดถอยพาแนลทั้งแบบผลกระทบคงที่และผลกระทบสุ่ม รวมถึงการวิเคราะห์ถดถอยโลจิสติกเพื่อตรวจสอบปัจจัยที่ส่งผลต่อโอกาสการได้รับคัดเลือกให้อยู่ในรายชื่อดังกล่าวผลการวิเคราะห์พบว่า CEO เพศหญิงมีความสัมพันธ์เชิงบวกอย่างมีนัยสำคัญกับผลการดำเนินงานด้าน ESG ในทุกมิติ โดยคะแนน ESG โดยรวมเพิ่มขึ้นเฉลี่ย 2.81 คะแนน และคะแนนด้านการกำกับดูแลกิจการเพิ่มขึ้น 10.62 คะแนน สนับสนุนทฤษฎีมวลวิกฤตซึ่งชี้ว่าความหลากหลายทางเพศในผู้นำระดับสูงช่วยยกระดับธรรมาภิบาล และประสิทธิภาพองค์กร นอกจากนี้ อายุและวาระการดำรงตำแหน่งของ CEO มีความสัมพันธ์เชิงบวกกับคะแนน ESG ด้านสังคม การกำกับดูแลกิจการ และการได้รับคัดเลือกให้อยู่ในรายชื่อหุ้นยั่งยืน ในขณะที่การดำรงตำแหน่ง CEO ควบกับประธานกรรมการบริษัทสัมพันธ์เชิงลบอย่างมีนัยสำคัญกับคะแนน ESG โดยรวม ลดลงเฉลี่ย 2.32 คะแนน ส่วนการถือหุ้นของ CEO มีผลลัพธ์ที่หลากหลาย และ CEO ที่มีวุฒิการศึกษาระดับบัณฑิตศึกษาในสาขาบริหารธุรกิจหรือวิศวกรรมศาสตร์มีแนวโน้มได้คะแนนด้านสังคมสูงกว่ากลุ่มอื่น ผลการศึกษานี้ถือเป็นหลักฐานเชิงประจักษ์ครั้งแรกในบริบทของประเทศไทยที่ชี้ให้เห็นถึงความเชื่อมโยงระหว่างคุณลักษณะผู้นำองค์กรกับสมรรถนะด้าน ESG ซึ่งมีนัยสำคัญต่อการกำหนดนโยบายด้านการคัดเลือกผู้นำ การกำกับดูแลองค์กรและการส่งเสริมความยั่งยืนในตลาดทุนของประเทศกำลังพัฒนา

คำสำคัญ: คุณลักษณะของ CEO ผลการดำเนินงานด้าน ESG การกำกับดูแลกิจการ ความหลากหลายทางเพศ การปฏิบัติที่ยั่งยืน

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Abstract

This study investigates the influence of Chief Executive Officer (CEO) characteristics on the Environmental, Social, and Governance (ESG) performance of firms listed on the Stock Exchange of Thailand between 2019 and 2023, based on 610 panel observations. Drawing on agency theory, stakeholder theory, and upper echelons theory, alongside insights from critical mass theory, the research examines how CEO attributes, including gender, age, tenure, postgraduate education, and academic field, relate to ESG outcomes. The analysis employs both panel data regression, using fixed and random effects models, and logistic regression to assess the likelihood of firms being listed under SET's Thailand Sustainability Investment (THSI) or ESG Ratings. Secondary data were collected from annual reports, corporate websites, Refinitiv Workspace, and SETSMART databases. The results reveal that firms led by female CEOs exhibit significantly higher ESG performance, with an average increase of 2.81 points in overall ESG score and a 10.62-point increase in governance, affirming the critical mass theory that supports the positive impact of gender diversity in executive leadership. CEO age and tenure are positively associated with various ESG dimensions, indicating that experienced leadership enhances strategic integration of sustainability practices. In contrast, CEO duality is negatively associated with overall ESG performance, with a decline of 2.32 points, suggesting governance risks associated with power consolidation. CEO shareholding shows mixed effects across ESG dimensions. Furthermore, CEOs holding postgraduate degrees or business-related academic qualifications are linked to improved social performance. This study provides the first empirical evidence on the relationship between CEO characteristics and ESG performance in Thailand. The findings contribute to the literature on leadership and sustainability in emerging markets and offer practical implications for executive recruitment and corporate governance reform.

Keywords: CEO Characteristics, ESG performance, Corporate governance, Gender diversity, Sustainability practices

Introduction

In recent years, environmental, social, and governance (ESG) performance has become a key indicator of sustainable business practices (Kocmanová et al., 2016). Stakeholders increasingly evaluate firms not only by financial metrics but also by their environmental responsibility, social contributions, and governance integrity. Within this shift, the Chief Executive Officer (CEO) plays a pivotal role in shaping corporate direction and values. Previous studies suggest that a CEO's characteristics, including values, leadership style, and decision-making preferences, can significantly influence ESG outcomes (Cha et al., 2019; Lopatta et al., 2022). In the Thai context, where ESG awareness is rising and regulatory frameworks are evolving (Chaloemvivatkit & Jaikengkit, 2020; The Stock Exchange of Thailand (SET), 2023) has introduced ESG-related indices such as the Thailand Sustainability Investment (THSI) and ESG Ratings to promote sustainable reporting practices among listed firms (SET, 2023). Therefore, examining how CEO attributes impact ESG performance is particularly timely and essential.

Thailand's ESG landscape has gained increasing attention in recent years, driven by both global sustainability movements and domestic regulatory efforts. For instance, The Stock Exchange of Thailand (SET), 2023 reported a rise in ESG investing, reflecting growing awareness among investors and the public (SET, 2023). Nevertheless, ESG integration across companies remains uneven, with disparities observed in governance standards, environmental initiatives, and social responsibility programs. The Thai government has introduced frameworks such as composite indices to assess the ethical and operational performance of state-owned enterprises (Chaloemvivatkit & Jaikengkit, 2020), but adoption in the private sector is still evolving. Given these dynamics, internal factors such as the leadership and personal attributes of the Chief Executive Officer (CEO) may play a pivotal role in driving ESG strategies. Understanding how CEO characteristics relate to ESG outcomes is therefore essential for informing both corporate practice and public policy in the Thai context.

Companies increasingly recognize that integrating ESG considerations into corporate strategy is essential not only for enhancing long-term sustainability but also for improving reputation and attracting investment (Hamdi et al., 2022). In Thailand, where ESG practices have gained momentum through policy support and market mechanisms, such as ESG ratings and sustainability disclosure initiatives led by the SET (SET, 2023), the role of leadership remains underexplored. This study addresses that gap by providing empirical evidence on how CEO attributes influence ESG performance in Thai listed firms. The findings are expected to offer meaningful implications for executive selection, support the development of context-specific governance policies, and strengthen ESG integration within the Thai business sector (Lopatta et al., 2022; SET, 2023).

Aims

The objectives of this study were

1. To examine the relationship between CEO characteristics, including gender, age, tenure, and educational background, and the environmental, social, and governance (ESG) performance of companies listed on the Stock Exchange of Thailand.

2. To analyze the influence of CEO power on ESG performance, with a focus on the dual role of CEO and board chairperson as well as the level of CEO shareholding.

3. To provide policy implications for executive selection and corporate governance practices that promote ESG performance in the Thai context.

Literature Review

Introduction to ESG Importance in Corporate Governance

The significance of environmental, social, and governance (ESG) factors has grown markedly in the global business landscape, driven by increasing awareness among investors, regulators, and the public of the broader impacts of corporate activities. ESG metrics are now key indicators of a company's sustainability and ethical performance. Academic research has increasingly examined the drivers and outcomes of ESG practices, identifying both internal factors, such as governance structures, organizational culture, and leadership traits, and external influences, including regulatory pressure, stakeholder expectations, and industry norms.

Influence of Internal and External Factors on ESG Performance

Research shows that both internal and external factors are vital in influencing a firm's ESG performance. Strong governance and a supportive culture promote accountability, transparency, and responsible practices. Externally, regulations enforce sustainability compliance, while stakeholder expectations drive firms to go beyond legal requirements to gain social legitimacy. Studies have shown that factors like the age of the company and earnings per share positively correlate with the extent and quality of sustainability reporting, suggesting that more established companies might have better resources and motivations to engage in ESG reporting (Ahmad et al., 2021).

CEO Attributes and Their Impact on Sustainability

The role of Chief Executive Officers (CEOs) in shaping a company's ESG performance is particularly notable. CEO attributes, including age, gender, education, and tenure, have been widely studied for their impact on corporate sustainability practices. CEOs personally committed to sustainability are often proactive in embedding these issues into corporate strategy. Although previous research has examined the broader effects of CEO characteristics on financial returns, innovation, and risk management, their specific influence on ESG performance, particularly in emerging markets like Thailand, remains underexplored (Han et al., 2019; Wagner & Fischer, 2024). This gap offers a valuable opportunity to explore how leadership traits inform effective ESG strategies.

Thai Context and Research Gap

While ESG-related studies have expanded globally, limited attention has been given to Thai-listed firms. Specifically, no empirical research has yet explored how CEO characteristics affect ESG performance in the Thai context. This study aims to address this gap by analyzing firms operating in Thailand.

Detailed Examination of CEO Characteristics on ESG Performance

Gender Influence on Strategic Thinking Research consistently shows that CEO gender significantly influences strategic decisions, particularly regarding ESG responsibilities. Female CEOs are more likely than male counterparts to prioritize ethics, sustainability, and stakeholder engagement, aligning with studies that link female leadership to improved ESG performance (Huang et al., 2023; Yahya, 2025; Al-Shaer et al., 2024; Jarboui et al., 2025). This tendency is often attributed to inclusive and empathetic leadership styles, which promote environments supportive of sustainable practices.

Age and Experience Informing ESG Strategy The age of a CEO often reflects a level of experience and maturity that influences corporate direction and strategy, particularly in the realm of ESG. Older CEOs are likely to promote better ESG outcomes, a phenomenon supported by several studies which suggest that with age comes a more comprehensive and sustainable approach to ESG issues (Huang et al., 2023; Jarboui et al., 2025). These CEOs' decisions tend to be more circumspect and sustainability-focused, driven by accumulated experience that informs a long-term view essential for effective ESG management. This is also supported by critical mass theory, which posits that a sufficient representation of leaders with sustainability orientation is necessary to drive meaningful change (Al-Shaer et al., 2024).

Tenure and Sustainability Initiatives CEO tenure is indicative of their familiarity with the company's operational, cultural, and strategic dynamics, which can significantly impact the sustainability of ESG policies and practices. Longer tenure allows CEOs to better understand and integrate ESG strategies that are congruent with the company's specific environmental and organizational contexts. Research by Huang et al. (2023) suggests that CEOs with longer tenures are capable of more effectively implementing ESG strategies tailored to their companies' needs. Similarly, studies by Yahya (2023) and Abdullah et al. (2024) have found that longer tenure correlates with more consistent and effective ESG reporting and management, underlining the role of experienced leadership in fostering sustainable corporate practices.

Educational Background and ESG Competence The educational background of a CEO plays a critical role in their ability to strategize and implement effective ESG measures. CEOs educated in fields related to sustainability, such as environmental science or social sciences, or those who have pursued advanced degrees like an MBA or engineering, are often better equipped to enhance ESG performance. For instance, Garcia-Blandon et al. (2019) found that CEOs with engineering backgrounds are particularly proactive in promoting ESG initiatives. Furthermore, Ulinnuha et al. (2024) observed that CEOs with degrees from prestigious universities exhibit a higher propensity for detailed ESG disclosure, suggesting that high-caliber education enhances a CEO's capability to manage complex ESG issues effectively.

Impact of CEO Shareholding and Corporate Governance on ESG the extent of CEO shareholding reflects their alignment and stake in the company's long-term outcomes, influencing their motivation to implement sustainable and responsible management practices. Research suggests that CEOs with substantial equity stakes are generally motivated to prioritize long-term sustainability over short-term financial gains. This alignment with long-term goals is presumed to enhance the company's overall ESG performance, as CEOs with significant stakes have a vested interest in the sustained success and reputation of the company (Abdullah et al., 2024). However, findings in prior studies are not entirely consistent. For example, Garcia-Blandon et al. (2019) report a positive association between CEO shareholding and ESG performance, while Abdullah et al. (2024) identify mixed or even negative effects in certain governance contexts. These conflicting findings suggest that the relationship between CEO shareholding and ESG performance may be contingent upon firm-specific or institutional factors, which warrants further empirical investigation. However, it is crucial to differentiate the effects of shareholding from the impacts of governance structures such as CEO duality.

CEO duality, where the CEO also holds the position of board chair, can impact ESG performance negatively by consolidating too much power in one individual's hands. This concentration of power can reduce the independence required in governance structures, potentially leading to conflicts of interest and diminishing ESG transparency and accountability. The dual role may hinder the board's ability to perform its supervisory functions effectively, leading to governance decisions that might not fully consider or prioritize ESG objectives (Romano et al., 2020; Aydoğmuş et al., 2022; Abdullah et al., 2024; Luo et al., 2024).

While CEO shareholding aligns leadership interests with long-term ESG goals, excessive power concentration through CEO duality can pose risks. These dynamics indicate that although shareholder-aligned CEOs may support positive ESG outcomes, the overall balance of executive power and governance structure is crucial in shaping ESG performance.

Theoretical Frameworks Supporting ESG Research

This study employs a robust multi-theoretical approach to dissect the relationship between CEO characteristics and ESG performance. Agency theory suggests that while CEOs are expected to act in shareholders' interests, their personal characteristics can sometimes lead to conflicts of interest. Here, the

CEO's risk preferences may differ from those of shareholders, affecting decision-making processes (Janggu et al., 2014). Upper echelons theory suggests that CEOs' values and cognition shape strategic choices and, consequently, organizational outcomes. CEOs oriented toward sustainability are more likely to integrate ESG into corporate strategy (Abatecola and Cristofaro, 2019). Critical mass theory further explains that when a sufficient number of individuals from underrepresented groups, such as female executives, are present in leadership, it can shift organizational behavior and foster more inclusive, ethical, and sustainability-oriented decision-making (Al-Shaer et al., 2024). Lastly, stakeholder theory emphasizes considering all stakeholders in decisions. This theory posits that CEOs who engage with and consider the broader impacts of their decisions on stakeholders, including employees, customers, suppliers, and the community at large, are more likely to pursue and uphold sustainable business practices, thus improving overall ESG performance (Wang, 2017; Wieczorek-Kosmala et al., 2021).

To address the theoretical alignment of each CEO characteristic, this study synthesizes relevant theories and links them systematically to the variables examined.

Table 1 Theoretical Alignment of CEO Characteristics and Supporting Theories

CEO Characteristic	Supporting Theory	Rationale
CEO duality	Agency theory	Concerns about power centralization and board independence
CEO shareholding	Agency theory	Reflects incentive alignment with shareholders
Gender, age, education, tenure	Upper echelons theory, Critical mass theory	Personal attributes shape strategic direction
All characteristics (as affecting ESG)	Stakeholder theory	Emphasizes accountability to all stakeholder groups

Implications of ESG on Corporate Performance and Strategy

As ESG factors gain prominence, they increasingly serve as a crucial component of corporate strategy, influencing reputation and investor relations. Companies that are perceived as responsible and sustainable often enjoy enhanced reputational benefits, which can translate into better financial performance due to increased investor confidence and consumer support. Additionally, companies that are listed on ESG indices are encouraged to continually improve their sustainability practices, which can further boost their market performance by aligning investor and stakeholder interests with corporate strategies focused on long-term value creation (Escrig-Olmedo et al., 2019; Zhan, 2023).

In summary, the literature on ESG performance underscores the significant role played by CEO characteristics in shaping a company's sustainability practices. However, despite the breadth of research, the nuanced ways in which specific CEO traits influence ESG outcomes, particularly in the context of emerging markets, require further investigation. This review sets the stage for a detailed exploration of these dynamics, providing a foundation for the hypotheses that follow in this study.

Hypothesis 1: Female CEOs are more likely to lead companies with higher ESG performance compared to male CEOs.

Hypothesis 2: CEO age is positively related to the ESG performance

Hypothesis 3: CEO tenure is positively related to the ESG performance

Hypothesis 4: CEO educational background is positively related to the ESG performance Hypotheses concerning CEO power

Hypothesis 5a: CEO shareholding is positively related to the ESG performance

Hypothesis 5b: CEO duality is negatively related to the ESG performance

Conceptual Framework

This study's conceptual framework is informed by three key theoretical perspectives, namely agency theory, stakeholder theory, and upper echelons theory, along with insights from critical mass theory. These theories provide a foundation for explaining how CEO characteristics may influence ESG performance. Agency theory states that CEOs may pursue goals that are not fully aligned with shareholders' interests due to personal incentives or attributes, such as risk preferences or tenure, which can shape strategic behavior. Upper echelons theory links observable characteristics of executives, including age and education, to organizational outcomes, based on the assumption that such characteristics affect how decisions are made. Stakeholder theory takes into account the broader set of parties affected by corporate actions and connects CEO decision-making to the degree of consideration given to non-shareholder groups. Critical mass theory focuses on demographic composition within top management, suggesting that when a sufficient number of women are present in leadership roles, their presence may influence boardroom dynamics and contribute to decisions that support ESG objectives. Building upon these theoretical foundations, the conceptual framework is developed to illustrate the hypothesized relationships among CEO characteristics, control variables, and ESG performance, as delineated in Figure 1.

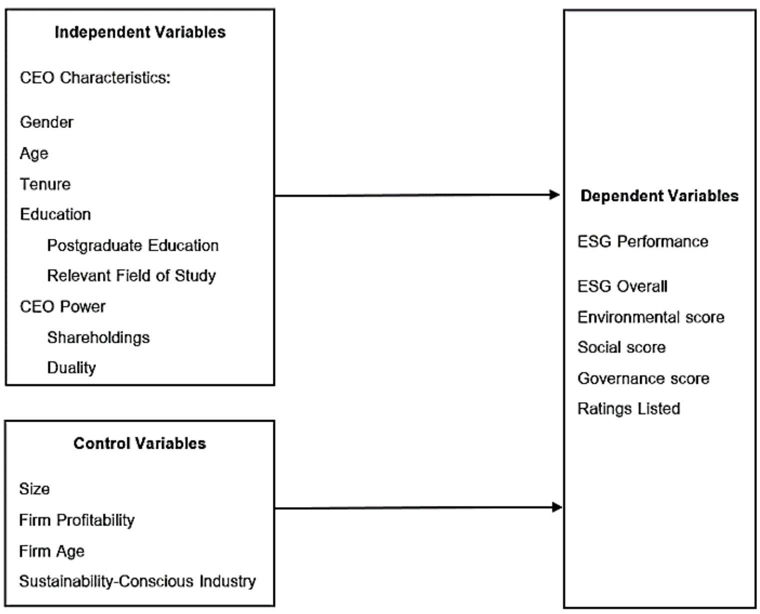

Figure 1 Research Conceptual Framework

Research Methodology

This study adopts a quantitative research design, utilizing panel data analysis to explore the influence of CEO characteristics on the Environmental, Social, and Governance (ESG) performance of companies listed on the Stock Exchange of Thailand (SET). The panel data methodology is selected for its capability to analyze variations across both cross-sectional and time-series data, thereby offering a more comprehensive analysis than purely cross-sectional studies.

Limitations of the Methodology

While the panel data approach offers advantages in controlling for unobserved heterogeneity across firms, it presents certain limitations regarding causal inference. In particular, concerns about endogeneity may arise due to omitted variable bias or reverse causality between CEO characteristics and ESG performance (Greene, 2012; Wooldridge, 2010). Although this study does not formally test for endogeneity, for example, through the use of lagged variables or instrumental variables, the researcher acknowledges these methodological constraints and suggests that future research should employ more advanced econometric techniques to strengthen causal interpretations.

Data Diagnostics

Prior to analysis, data quality was assessed by checking outliers (via standardized residuals), multicollinearity (VIF), and autocorrelation (Durbin-Watson). All tests confirmed the robustness and validity of the regression model. Multicollinearity was tested using VIF, where a value below 10 is generally acceptable (Gujarati & Porter, 2009). The Durbin-Watson statistic was used to check for autocorrelation, with values between 1.5 and 2.5 considered acceptable (Gujarati & Porter, 2009).

Sample Description

The sample includes all firms listed on the Stock Exchange of Thailand (SET) from 2019 to 2023, encompassing both financial and non-financial sectors. The study employs purposive sampling, including only firms that disclosed ESG data during the 2019 to 2023 period. This approach is consistent with the research objective, which aims to examine the impact of CEO characteristics on ESG performance. The final sample includes a total of 610 observations. Financial sector companies are included to provide a comprehensive analysis across different regulatory and accounting landscapes, reflecting a holistic view of the ESG trends and sustainability practices within the Thai corporate sector. This period is specifically chosen to capture the dynamics of recent shifts in ESG investing and the increasing emphasis on sustainable business practices across all sectors of the Thai economy.

Data Collection

ESG performance data will be sourced from the Refinitiv Workspace database, which provides extensive ESG ratings based on a range of environmental, social, and governance indicators. These ratings offer a holistic view of a company’s sustainability efforts. Data concerning CEO characteristics, specifically gender, age, tenure, educational background, and influence, will be collected from the annual reports and corporate websites of the companies. To ensure accuracy and comprehensiveness, this data will be cross validated with information from additional databases such as SETSMART. Firms with incomplete data, such as missing ESG scores or unavailable CEO profiles, were excluded from the final sample to maintain data consistency and reliability in the analysis.

Data Description

This study employs secondary data from credible sources. ESG scores are collected from Refinitiv Workspace (LSEG, 2023), based on 186 standardized indicators across environmental, social, and governance pillars, each scored from 0 to 100. CEO characteristics, such as gender, age, tenure, education, field of study, shareholding, and duality, are manually gathered from annual reports and official websites, and verified with SETSMART. Control variables, including firm size, ROA, and firm age, are obtained from SET financial databases. Industry classification follows Purwantini et al. (2023), reflecting ESG-related regulatory and societal pressures.

Control Variables

To account for potential confounders, control variables at the firm level, including size, profitability, age, and sustainability-conscious industry sector, will be included in the analysis. These controls help isolate the effect of CEO characteristics on ESG performance from other influencing factors. These variables reflect firm-specific characteristics that may influence the relationship between CEO attributes and ESG outcomes. Controlling for them helps reduce confounding bias and improves the precision of causal inference.

Data Analysis

Building on the conceptual framework, the analysis will proceed with panel data regression models to explore the hypothesized relationships. Both fixed effects and random effects models are considered to account for unobserved heterogeneity across firms and time. Given the structure of the data and the theoretical rationale, the fixed effects model is ultimately selected to control for firm-specific characteristics that are constant over time (Wooldridge, 2010; Baltagi, 2005), ensuring the reliability and validity of the estimated coefficients. In addition, logistic regression is employed to analyze the binary dependent variable (*RatingsListed*), which indicates whether a firm is included in the SET's Thailand Sustainability Investment (THSI) list (1 = listed, 0 = not listed). All statistical analyses are performed using IBM SPSS Statistics. The model choice is further supported by the results of the Hausman test, which compares the consistency of the fixed and random effects estimators. The test yields a chi-square statistic of 14.23 with a p-value of 0.046, indicating a statistically significant difference between the two estimators. Consequently, the fixed effects model is deemed more appropriate for this study.

Regression Model Specification

The regression model is specified as follows:

$$ESG_{i,t} = \alpha_i + \beta_1 Gender_{i,t} + \beta_2 Age_{i,t} + \beta_3 Tenure_{i,t} + \beta_4 PostgradEdu_{i,t} + \beta_5 RelevantField_{i,t} + \beta_6 Shareholding_{i,t} + \beta_7 Duality_{i,t} + \beta_8 Size_{i,t} + \beta_9 ROA_{i,t} + \beta_{10} FirmAge_{i,t} + \beta_{11} SustIndustry_{i,t} + \varepsilon_{i,t}$$

Where:

α_i is the constant specific to company i and does not change over time,

$ESG_{i,t}$ represents the ESG performance of company i at time t. The ESG performance includes: The ESG overall score (*ESGOverall*), ranging from 0 to 100, provides a comprehensive assessment of the company's sustainability practices. The E score (*E*), focusing on environmental aspects, scored from 0 to 100. The S score (*S*), detailing social responsibility, also scored from 0 to 100. The G score (*G*), reflecting governance practices, scored from 0 to 100. The THSI/ESG Ratings Listed

(*RatingsListed*), a binary indicator where ‘0’ signifies not listed and ‘1’ indicates a listing based on SET Thailand Sustainability Investment criteria from 2019 to 2022 and on SET ESG Ratings in 2023,

$Gender_{i,t}$ is the gender of the CEO (1 = Female, 0 = Male) of company *i* at time *t*,

$Age_{i,t}$ is the age of the CEO in years of company *i* at time *t*,

$Tenure_{i,t}$ is the duration in years that the CEO has held their position of company *i* at time *t*,

$PostgradEdu_{i,t}$ indicates if the CEO has a postgraduate degree (1 = Yes, 0 = No) of company *i* at time *t*,

$RelevantField_{i,t}$ indicates if the CEO studied in a relevant field (1 = Business Administration/ Engineering, 0 = Other) of company *i* at time *t*,

$Shareholding_{i,t}$ is the percentage of company shares held by the CEO of company *i* at time *t*,

$Duality_{i,t}$ indicates if the CEO also holds the position of the board chair (1 = Yes, 0 = No) of company *i* at time *t*,

$Size_{i,t}$ is the natural logarithm of total assets of company *i* at time *t*,

$ROA_{i,t}$ (Return on Assets) is calculated as net income divided by total assets of company *i* at time *t*,

$FirmAge_{i,t}$ is the number of years since the company was established of company *i* at time *t*,

$SustIndustry_{i,t}$ is a binary variable indicating if the firm is in a sustainability-conscious industry (1 = Yes, 0 = No) of company *i* at time *t*, and

ε_{it} is the error term.

This model structure allows for a detailed analysis of how various CEO characteristics and other firm-specific factors influence ESG performance across different time periods and industry contexts.

Results

Table 2 outlines the descriptive statistics for the variables used in our regression analysis, illustrating a range of ESG performances across Thai listed firms. The overall Environmental, Social, and Governance (*ESGOverall)* score averages 56.15, with a standard deviation of 13.74, suggesting moderate but varied engagement in sustainability practices. The governance score (*G*) is notably the lowest at 48.68, indicating diverse governance practices. In contrast, the social score (*S*) is higher at 62.28, reflecting more consistent outcomes in workforce management and community engagement. The environmental score (*E*) averages 50.31, showing significant disparities in environmental management. These results highlight variability, particularly in environmental and governance scores, pointing to the need for targeted improvements. A significant proportion of observations, with an average of 0.84 for *RatingsListed*, meet the SET Thailand Sustainability Investment criteria, signaling a robust engagement with sustainability standards. The dataset also includes demographic details on leadership, with the presence of female CEOs noted, alongside data on CEO *Tenure* and *Age*, which provide insights into the range of leadership experience and generational diversity. Information on firm *Size* and *FirmAge* shows a mix of both large, established companies and smaller, newer entities. Additionally, the average return on assets (*ROA*) offers a perspective on financial performance, complementing the sustainability data. This comprehensive set of statistics provides a vital baseline for understanding how various leadership and corporate attributes impact sustainability practices among firms in Thailand.

Table 2 Descriptive Statistics

Variables	N	Minimum	Maximum	Mean	Std. Deviation
ESGOverall (0-100)	610	21.22	90.89	56.15	13.74
E (0-100)	610	3.06	94.18	50.31	20.89
S (0-100)	610	18.92	96.03	62.28	17.02
G (0-100)	610	10.99	85.38	48.68	17.49
RatingsListed (1 = Yes, 0 = No)	610	0.00	1.00	0.84	0.37
Gender (1 = Female, 0 = Male)	610	0.00	1.00	0.13	0.34
Age (years)	610	31.00	84.00	56.74	8.77
Tenure (years)	610	0.001	46.33	10.90	10.06
PostgradEdu (1 = Yes, 0 = No)	610	0.00	1.00	0.80	0.40
RelevantField (1 = Yes, 0 = No)	610	0.00	1.00	0.78	0.41
Shareholding (%)	610	0.00	0.60	0.05	0.10
Duality (1 = Yes, 0 = No)	610	0.00	1.00	0.33	0.47
Size (log of total assets)	610	7.18	15.32	10.82	1.80
ROA (%)	610	-0.20	0.37	0.05	0.06
FirmAge (years)	610	1.00	111.00	36.64	17.84
SustIndustry (1 = Yes, 0 = No)	610	0.00	1.00	0.58	0.49

Table 2 presents the results of regression analyses. Models 1 through 4 apply multiple linear regression analysis, as their dependent variables, *ESGOverall*, *E*, *S*, and *G* scores, are continuous in nature, and Model 5 employs logistic regression since its dependent variable, *RatingsListed*, is binary (1 = listed, 0 = not listed).

The regression analysis undertaken provides critical insights into the effects of CEO characteristics on the ESG performance of firms listed on the Stock Exchange of Thailand from 2019 to 2023. This analysis not only tested the proposed hypotheses but also offered a deeper understanding of how different aspects of CEO leadership influence ESG practices across the corporate landscape. As presented in Table 3, the analysis reveals that female CEOs are significantly associated with higher ESG performance across all dependent variables, providing strong support for Hypothesis 1. The positive and statistically significant relationship extends to overall ESG (*ESGOverall)* scores, environmental (*E*), social (*S*), governance (*G*) components, as well as the THSI/ESG Ratings Listed (*RatingsListed*). These findings indicate that gender diversity in top executive roles plays a pivotal role in advancing sustainability across multiple dimensions. The consistent strength of this association underscores the influential role of female leadership in promoting comprehensive ESG initiatives and enhancing adherence to recognized sustainability standards, thereby reinforcing the importance of inclusivity in corporate governance and strategic decision-making.

Consistent with Hypotheses 2 and 3, the analysis indicates that both the age and tenure of CEOs exhibit strong correlations with different components of ESG performance. Specifically, CEO age is positively correlated with the social (*S*) and governance (*G*) scores, as well as with the THSI/ESG Ratings Listed (*RatingsListed*), suggesting that more experienced leaders are particularly effective in managing aspects of social responsibility and governance. Notably, no significant effect of CEO age on the environmental (*E*) scores was observed, indicating that the influence of age might be more constrained to social and governance aspects.

This finding may suggest that environmental initiatives require technical expertise, scientific knowledge, or cross-functional strategies that are not necessarily linked to a CEO's age or experience, but rather depend on an organization’s structural capacity and operational capabilities. Similarly, CEO tenure shows a strong positive relationship with overall ESG (*ESGOverall)* scores, governance (*G*) scores, and the THSI/ESG Ratings Listed (*RatingsListed*), underlining the critical role of long-standing leadership in advancing comprehensive ESG practices and adherence to recognized sustainability standards. However, like age, tenure does not significantly impact the environmental (*E*) scores, which may suggest that other factors beyond the scope of CEO tenure might play more pivotal roles in influencing environmental management practices within these organizations. These findings support the theory that exzperienced leaders, equipped with a deep understanding of long-term sustainability strategies, are instrumental in integrating and advancing effective ESG practices within their organizations. The positive coefficients for age and tenure across these key areas highlight the importance of maturity and extended leadership tenure in driving robust sustainability agendas, although their influence appears less direct in environmental initiatives.

Hypothesis 4 received mixed support, as evidenced by the regression results. While CEOs with postgraduate education and those who have studied in relevant fields demonstrated significant positive impacts on specific ESG components, these effects varied. Particularly, their education background significantly influenced the overall ESG (*ESGOverall)* scores and the social (*S*) scores, highlighting the importance of specialized academic training and relevant professional experience in these areas. However, the effects were less pronounced or not significant in the environmental (*E*) and governance (*G*) scores, suggesting that the impact of educational background may be more substantial in certain aspects of ESG performance than others. This outcome underscores the nuanced role that specialized academic training and relevant professional experience play in enhancing a leader’s ability to effectively manage and implement ESG initiatives.

The mixed results observed for CEO shareholding align partially with Hypothesis 5a, which suggested that shareholding would be positively related to ESG performance. While the data indicated a positive impact on the social and governance scores, the overall influence on ESG performance was less pronounced than expected. This suggests a complex relationship between financial stake and sustainability outcomes, highlighting that while shareholding can motivate CEOs towards ESG improvements, other factors may moderate this effect. Conversely, Hypothesis 5b concerning CEO duality was clearly supported, with significant negative impacts observed on overall ESG (*ESGOverall)* scores, the social (*S*) scores, and the THSI/ESG Ratings Listed (*RatingsListed*), but not explicitly on governance (*G*) scores as initially anticipated. This finding refines governance theory advocating separation of powers, showing that CEO duality primarily harms broader ESG performance (*ESGOverall)* and social aspects, not just governance, thus supporting the hypothesis that excessive power consolidation undermines sustainability outcomes.

The statistical robustness of the models is evidenced by R-squared values, which range from 14% to 60%, illustrating the considerable variance in ESG scores explained by CEO characteristics. This robustness underscores the significant impact of leadership traits on corporate sustainability. Diagnostic tests further validate the models, with low multicollinearity and minimal autocorrelation among the variables, reinforcing the reliability of the findings.

Table 3 Results of Multiple Linear Regression Analysis

Variables	Model 1 *ESGOverall*	Model 2 *E*	Model 3 *S*	Model 4 *G*	Model 5 *RatingsListed*		
	β	β	β	β	β	S.E.	Odds Ratio (95: % CI)
Intercept	2.45	-41.12	-12.83	33.12	-9.76	-	-
Gender	2.81**	5.56***	3.18**	10.62***	1.86**	0.736	6.422 (1.518 - 27.163)
Age	0.01	0.05	0.18**	0.36***	0.06***	0.015	1.057 (1.026 - 1.089)
Tenure	0.10**	0.07	0.09	0.27***	0.1***	0.028	0.906 (0.858 – 0.957)
PostgradEdu	4.30***	1.96	5.48***	4.51**	2.49***	0.364	12.011 (5.880 - 24.535)
RelevantField	1.76	0.33	5.01***	0.2	2.03***	0.507	7.620 (2.822 - 20.576)
Shareholding	0.09*	0.06	0.25***	0.21**	0.03	0.021	1.028 (0.986 - 1.071)
Duality	-2.32**	-0.37	-3.32**	-1.52	-1.23***	0.380	0.291 (0.138 – 0.614)
Size	4.47***	7.44***	5.06***	0.55	0.49***	0.123	1.630 (1.280 – 2.075)
ROA	0.02	0.3**	0.25**	0.28**	0.14***	0.023	1.146 (1.097 – 1.198)
FirmAge	0.01	0.11***	0.1***	0.05	0.02**	0.008	1.019 (1.004 – 1.035)
SustIndustry	5.01***	9.78***	3.93***	8.55***	3.83***	0.469	46.028 (18.357 – 115.412)
R-squared	0.358	0.496	0.479	0.14	0.602	-	-
VIF	< 2	< 2	< 2	< 2	< 2	-	-
Durbin-Watson	1.874	1.868	1.868	1.976	-	-	-
Cook's Distance	0.002	0.002	0.002	0.002	-	-	-
Hosmer & Lemeshow	-	-	-	-	0.927	-	-
Std. Residual - Mean	0	0	0	0	0	0	0
N	610	610	610	610	610	-	-
Fixed Effect	Included						

*** , ** , and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

The results of this study provide strong support for the proposed hypotheses, affirming the critical role of CEO characteristics in shaping ESG performance. Notably, the analyses reveal the positive influences of gender diversity, age, tenure, and educational background on various ESG outcomes, emphasizing how strategic leadership can enhance corporate sustainability efforts. Additionally, the findings highlight the importance of establishing robust governance frameworks to address the challenges posed by CEO duality, which could undermine ESG performance. This comprehensive understanding enriches the discourse in corporate governance, pointing to the essential structures and leadership qualities necessary for fostering sustainable business practices. In conclusion, the study delineates the pivotal influence of distinct CEO attributes on enhancing ESG outcomes, contributing valuable insights into the dynamics of effective leadership and governance in advancing sustainability within the corporate sector.

Conclusions and Discussion

Summary of Key Findings

This study examines the influence of Chief Executive Officer (CEO) characteristics on the Environmental, Social, and Governance (ESG) performance of firms listed on the Stock Exchange of Thailand between 2019 and 2023, using 610 observations. Based on a panel data analysis with fixed effects, the study finds that CEO gender, age, tenure, postgraduate education, and academic field are significantly associated with ESG outcomes. Notably, female CEOs tend to be associated with higher ESG performance overall, particularly in the governance dimension. CEO age and tenure also show positive relationships with ESG performance, while CEO duality is linked to lower ESG outcomes. Additionally, CEOs with postgraduate degrees and business-related academic backgrounds are associated with better environmental and social performance. Unlike prior studies that primarily focused on Western markets, this study provides empirical evidence from an emerging economy, Thailand, offering new insights into how CEO attributes influence ESG outcomes within a distinct institutional and governance landscape.

Interpretation in Theoretical Context

These findings provide empirical support for both agency theory and stakeholder theory. Consistent with agency theory, older and long-tenured CEOs may possess greater firm-specific knowledge and a stronger alignment with long-term sustainability goals (Jensen & Meckling, 1976; Bhagat et al., 2020). The positive association between female CEOs and ESG performance aligns with stakeholder theory and critical mass theory, which emphasize that gender diversity in leadership enhances responsiveness to diverse stakeholder interests (Freeman, 1984; Konrad et al., 2008). This is further supported by Chen Fu et al. (2024), whose systematic review confirms that female executives tend to promote stronger ESG practices. In contrast, the adverse impact of CEO duality underscores concerns over power consolidation and weakened board oversight, reinforcing findings from previous literature (Romano et al., 2020; Chen Fu et al., 2024). While postgraduate education shows a significant association with social outcomes, its effect on the environmental dimension remains limited, suggesting the influence of additional contextual or organizational factors not captured in the current model. This aligns with the proposition of upper echelons theory, which posits that executives' educational backgrounds influence how strategic decisions are made and shape overall organizational outcomes (Hambrick & Mason, 1984).

These theoretical interpretations, particularly in the context of an emerging economy, contribute to the extension of existing frameworks by highlighting how CEO attributes affect ESG outcomes in non-Western settings, where institutional and governance structures may differ from those in developed markets.

In summary, this study makes three key contributions. First, it provides the first empirical evidence linking CEO characteristics to ESG performance in the context of Thailand, thereby filling a notable gap in the literature. Second, it reveals context-specific patterns that are distinctive to emerging markets. Third, it integrates multiple theoretical perspectives including agency theory, stakeholder theory, upper echelons theory and critical mass theory to offer a multi-dimensional explanation of the CEO and ESG relationship.

Limitations of the Study

This study relies solely on ESG scores from Refinitiv Workspace, which may not fully capture the breadth and depth of firm sustainability practices. The exclusive use of secondary data, primarily from Thai sources, may also limit the generalizability of the findings to other contexts. Furthermore, not all CEO characteristics show uniform effects across the three ESG dimensions. For example, CEO age and education showed no significant impact on the environmental aspect, suggesting the influence of unobserved mechanisms or industry-specific dynamics.

Although CEO shareholding was not statistically significant in the logistic regression model, its theoretical importance remains. Under agency theory, executive ownership is expected to align managerial incentives with shareholder interests. However, in firms with concentrated ownership structures, such as many Thai listed companies, the effect of CEO shareholding may be limited. This suggests a need for further investigation in future research.

Recommendations for Future Research

Future research should investigate the mechanisms through which CEO traits influence ESG outcomes. For instance, the relationship between female CEOs and higher ESG performance may be mediated by enhanced board diversity or stakeholder engagement processes. Mixed-method studies, incorporating qualitative data such as interviews, could provide deeper insights into organizational dynamics. Expanding the range of ESG data sources or employing composite indicators may improve measurement robustness. Additionally, cross-industry or regional comparisons may reveal contextual factors that influence the CEO-ESG relationship, thereby strengthening theoretical understanding and practical relevance for corporate governance in emerging markets.

Moreover, future studies may adopt advanced econometric techniques such as Two-stage Least Squares (2 SLS) to address potential endogeneity concerns inherent in observational data. Additionally, developing new conceptual frameworks that incorporate moderating variables such as industry characteristics could further enrich the understanding of how CEO traits interact with organizational and contextual factors in shaping ESG outcomes.

Suggestions

To strengthen the practical relevance and clarity of the study's implications, the recommendations are categorized into three areas: policy-level, organizational-level, and research-oriented, with clear links to empirical findings and relevance to the Thai context.

Academic Implications

1. Promote gender diversity in executive leadership through corporate governance codes, supported by the empirical finding that female CEOs are positively associated with ESG performance, especially in the governance dimension.

2. Mandate separation of CEO and board chair positions, particularly in listed firms, to mitigate the risks of power concentration, consistent with the finding that CEO duality has negative associations with ESG outcomes.

3. Encourage regulators (e.g., SEC Thailand) to integrate ESG-specific structures in corporate governance frameworks, such as requiring a designated ESG committee, especially when the CEO holds dual roles.

Practical or Policy Recommendations

1. Link executive compensation schemes to ESG performance, addressing the limited effect of CEO shareholding in concentrated ownership structures.

2. Strengthen board independence and diversity to improve ESG oversight, in line with the governance benefits observed under female leadership.

3. Enhance ESG data transparency and comparability by incorporating multiple indicators beyond Refinitiv Workspace, including Thai-specific ESG metrics such as THSI ratings.

4. Foster an ESG-driven organizational culture, particularly in family-owned or traditional firms, to bridge the implementation gap.

Suggestions for Future Research

1. Investigate moderating effects such as organizational culture or ethical climate that may explain why CEO tenure or education level shows no significant effect on the environmental (E) dimension.

2. Explore stakeholder engagement mechanisms under female leadership that could drive improvements in ESG, especially in emerging markets like Thailand.

3. Conduct comparative studies on family ownership, industry effects, and cultural norms to expand the contextual understanding of CEO traits and ESG relationships in the Thai context.

References

Abatecola, G., & Cristofaro, M. (2019). Ingredients of sustainable CEO behaviour: Theory and practice. *Sustainability, 11*(7), 1950. https://doi.org/10.3390/su11071950

Abdullah, Zhu, N., Hashmi, M. A., & Shah, M. H. (2024). CEO power, board features and ESG performance: An extensive novel moderation analysis. *Corporate Social Responsibility and Environmental Management, 31*(6), 5627–5655. https://doi.org/10.1002/csr.2886

Ahmad, R. A. R., Ayob, A. A., Zainon, S., & Probohudono, A. N. (2021). The influence of environmental, social and governance reporting on firm value: Malaysian evidence. *International Journal of Academic Research in Business and Social Sciences, 11*(9), 1058–1080. DOI:10.6007/IJARBSS/v11-i9/10877

Al-Shaer, H., Zaman, M., & Albitar, K. (2024). CEO gender, critical mass of board gender diversity and ESG performance: UK evidence. *Journal of Accounting Literature.* doi: 10.1108/JAL-10-2023-0181

Aydoğmuş, M., Gülay, G., & Ergun, K. (2022). Impact of ESG performance on firm value and profitability. *Borsa Istanbul Review, 22,* S119–S127. https://doi.org/10.1016/j.bir.2022.11.006

Baltagi, B. H. (2005). *Econometric analysis of panel data* (3rd ed.). John Wiley & Sons.

Bhagat, S., Bolton, B., & Romano, R. (2020). Corporate governance and ESG: A review. *Journal of Financial Economics, 135*(2), 251–277.

Chaloemvivatkit, N., & Jaikengkit, A.-O. (2020). Applying ISO26000 and the sufficiency economy philosophy to measure the sustainability of state owned enterprises in Thailand. *International Journal of Innovation and Sustainable Development*, *14*(3), 330-350. https://doi.org/10.1504/IJISD.2020.108055

Chen Fu, L. I., & Kohar, U. H. A. (2024). CEO power and Environmental, Social, Governance (ESG): A systematic review. *International Journal of Academic Research in Business and Social Sciences, 14*(3), 597–615. http://dx.doi.org/10.46886/IJARBSS/v14-i3/9820

Escrig-Olmedo, E., Fernández-Izquierdo, M. Á., Ferrero-Ferrero, I., Rivera-Lirio, J. M., & Muñoz-Torres, M. J. (2019). *Rating the raters: Evaluating how ESG rating agencies integrate sustainability principles. Sustainability*, 11(3), 915. https://doi.org/10.3390/su11030915

Freeman, R. E. (1984). *Strategic management: A stakeholder approach.* Pitman.

Greene, W. H. (2012). *Econometric analysis* (7th ed.). Pearson Education.

Gujarati, D. N., & Porter, D. C. (2009). *Basic econometrics* (5th ed.). McGraw-Hill.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review, 9*(2), 193–206. https://doi.org/10.5465/amr.1984.4277628

Hamdi, K., Guenich, H., & Ben Saada, M. (2022). Does corporate financial performance promote ESG: Evidence from US firms. *Cogent Business & Management, 9*(1), 2154053. https://doi.org/10.1080/23311975.2022.2154053

Huang, M., Li, M., & Li, X. (2023). Do non-local CEOs affect environmental, social and governance performance? *Management Decision, 61*(8), 2354–2373. https://doi.org/10.1108/MD-07-2022-1004

Janggu, T., Darus, F., Zain, M. M., & Sawani, Y. (2014). Does good corporate governance lead to better sustainability reporting? An analysis using structural equation modeling. *Procedia-Social and Behavioral Sciences, 145,* 138–145. https://doi.org/10.1016/j.sbspro.2014.06.020

Jarboui, A., & Bouzouitina, A. (2025). How do the CEO demographic characteristics affect CSR commitment in European firms? *Society and Business Review, 20*(2), 347–368. https://doi.org/10.1108/SBR-02-2024-0050

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360. https://doi.org/10.1016/0304-405X(76)90026-X

Kocmanová, A., Pavláková Dočekalová, M., Škapa, S., & Širáňová, L. (2016). Measuring corporate sustainability and environmental, social, and corporate governance value added. *Sustainability, 8*(9), 945. https://doi.org/10.3390/su8090945

Konrad, A. M., Kramer, V., & Erkut, S. (2008). Critical mass: The impact of three or more women on corporate boards. *Organizational Dynamics, 37*(2), 145–164. https://doi.org/10.1016/j.orgdyn.2008.02.005

Lopatta, K., Kaspereit, T., Tideman, S. A., & Rudolf, A. R. (2022). The moderating role of CEO sustainability reporting style in the relationship between sustainability performance, sustainability reporting, and cost of equity. *Journal of Business Economics, 92*(3), 429–465. https://doi.org/10.1007/s11573-022-01082-z

LSEG. (2023). *ESG scores methodology.* Internal document from Refinitiv Workspace.

Luo, Z., Li, Y., Nguyen, L. T., Jo, I., & Zhao, J. (2024). The moderating role of country governance in the link between ESG and financial performance: A study of listed companies in 58 countries. *Sustainability, 16*(13), 5410. https://doi.org/10.3390/su16135410

Purwantini, C., Faisal, F., Joseph, C., & Januarti, I. (2023). Industry classifications and environmental, social, and governance disclosure: The moderating role of CEO power. *Journal of Governance and Regulation, 12*(1). https://doi.org/10.22495/jgrv12i1siart4

Romano, M., Cirillo, A., Favino, C., & Netti, A. (2020). *ESG (Environmental, social and governance) performance and board gender diversity: The moderating role of CEO duality. Sustainability*, 12(21), 9298. https://doi.org/10.3390/su12219298

The Stock Exchange of Thailand (SET). (2023). *Sustainability report 2023.*

Ulinnuha, K., Harymawan, I., & Aini, S. (2024). CEO Education from Reputable University and ESG Disclosure: Evidence from Indonesia. *Jurnal Dinamika Akuntansi dan Bisnis*, *11*, 1-14. https://doi.org/10.24815/jdab.v11i1.33305

Wagner, A., & Fischer-Kreer, D. (2024). The role of CEO regulatory focus in increasing or reducing corporate carbon emissions. *Business Strategy and the Environment, 33*(2), 1051–1065. DOI: 10.1002/bse.3517

Wang, M. C. (2017). The relationship between firm characteristics and the disclosure of sustainability reporting. *Sustainability, 9*(4), 624. https://doi.org/10.3390/su9040624

Wieczorek-Kosmala, M., Marquardt, D., & Kurpanik, J. (2021). Drivers of sustainable performance in European energy sector. *Energies, 14*(21), 7055. https://doi.org/10.3390/en14217055

Wooldridge, J. M. (2010). *Econometric analysis of cross section and panel data* (2nd ed.). MIT Press.

Yahya, H. (2023). Female leadership and ESG performance of firms: Nordic evidence. *Corporate Governance*, *25*(1), 109-127. https://doi.org/10.1108/cg-03-2023-0129

Zhan, S. (2023). ESG and corporate performance: A review. In *SHS Web of Conferences* (Vol. 169, p. 01064). EDP Sciences. https://doi.org/10.1051/shsconf/202316901064