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Revealing the Green Leaders: Climate Change Disclosure based on TCFD's Recommendations

Widyana Rahma Cahyani[1], Sri Pujiningsih[2], Makaryanawati[3]

Abstract. *Climate change disclosure is gaining increasing global attention, driven by political momentum from the 2015 Paris Agreement and the efforts of environmental activists. Previous research suggests that the green experience, management skills, and gender of directors can influence corporate disclosure on climate change. This research evaluates how corporate climate change disclosure, aligned with Task Force on Climate-related Financial Disclosures (TCFD) guidelines, is impacted by three board characteristics: a critical mass of women, generalist abilities, and green experience. The research population comprises companies operating in four key sectors – energy, basic materials, primary consumer, and property and real estate – that are listed on the Indonesian Stock Exchange (IDX). The research period spans from 2019 to 2023. This five-year period encompasses significant regulatory developments, notably the enactment of OJK Regulation No. 51/POJK.03/2017 regarding Sustainable Finance, which serves as a critical foundation for promoting sustainability reporting in Indonesia, and the introduction of OJK's Sustainable Finance Roadmap Phase II (2021-2025), which promotes TCFD implementation. This research uses a quantitative analytical approach, testing theories through secondary data analysis and panel data regression analysis. The secondary data source is corporate sustainability reports. The content analysis is conducted by the framework and guidelines established by the TCFD. The study results show that the presence of a woman's critical mass, generalist abilities, and green experience among directors is insufficient to enhance climate change disclosure without the support of external factors. Factors such as a patriarchal culture, short-term economic interest dominance, weak regulatory enforcement, and insufficient stakeholder pressure are key barriers to enhancing climate change disclosure in Indonesia. These findings underscore that the effectiveness of the Critical Mass Theory and Upper Echelons Theory is highly dependent on the socio-cultural context and institutional environment. This study also has practical implications, encouraging companies to disclose climate-related information according to the TCFD guidelines.*

Keywords: *climate change disclosure, critical mass theory, generalist ability, green experience, TCFD guidelines.*

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[1] **Widyana Rahma Cahyani**, State University of Malang, Malang, Indonesia.
ORCID 0009-0008-2693-3411
E-mail: widyanarahma26@gmail.com (*Corresponding author*)

[2] **Sri Pujiningsih**, State University of Malang, Malang, Indonesia.
ORCID 0000-0002-7726-355X

[3] **Makaryanawati**, State University of Malang, Malang, Indonesia.
ORCID 0000-0002-6481-2636

Виявлення зелених лідерів: розкриття інформації про зміну клімату на основі TCFD рекомендацій

Відьяна Рахма Ках'яні[1], Срі Пуїнінгсіх[1], Макар'янаваті[1]
[1] *Державний університет Малангу, м. Маланг, Індонезія*

Анотація. *Розкриття інформації про зміну клімату привертає дедалі більшу увагу світової спільноти завдяки політичному імпульсу, спричиненому Паризькою кліматичною угодою 2015 року, та зусиллям екологічних активістів. Попередні дослідження показують, що досвід у сфері екологічної відповідальності, управлінські навички та стать директорів можуть впливати на корпоративне розкриття інформації про зміну клімату. Це дослідження оцінює, як на корпоративне розкриття інформації про зміну клімату, що відповідає рекомендаціям Робочої групи з розкриття фінансової інформації, пов'язаної з кліматом (TCFD), впливають три характеристики ради директорів: критична маса жінок, універсальні здібності та досвід у сфері екологічної відповідальності. Дослідження охоплює компанії у чотирьох ключових секторах – енергетика, основні матеріали, первинне споживання, а також нерухомість – акції, яких котируються на Індонезійській фондовій біржі (IDX). П'ятирічний період дослідження (2019-2023 рр.) охоплює значні регуляторні зміни, зокрема прийняття Положення OJK № 51/POJK.03/2017 щодо сталого фінансування, яке слугує критично важливою основою для просування звітності про сталий розвиток в Індонезії, та впровадження Дорожньої карти OJK зі сталого фінансування, фаза II (2021-2025), яка сприяє впровадженню рекомендацій TCFD. Дослідження використовує кількісний аналітичний підхід, перевіряючи теорії за допомогою аналізу вторинних даних та регресійного аналізу панельних даних. Джерелом вторинних даних є корпоративні звіти про сталий розвиток. Контент-аналіз проводиться відповідно до структури та рекомендацій, встановлених TCFD. Результати дослідження показують, що наявність критичної маси жінок, універсальних здібностей та досвіду у сфері екологічної відповідальності серед директорів є недостатніми для покращення розкриття інформації про зміну клімату без підтримки зовнішніх факторів. Такі фактори, як патріархальна культура, домінування короткострокових економічних інтересів, слабке регулювання та недостатній тиск зацікавлених сторін, є ключовими перешкодами для покращення розкриття інформації про зміну клімату в Індонезії. Ці висновки підкреслюють, що ефективність теорії критичної маси та теорії вищих ешелонів значною мірою залежить від соціально-культурного контексту та інституційного середовища. Це дослідження має практичні наслідки, заохочуючи компанії розкривати інформацію, пов'язану зі зміною клімату, відповідно до рекомендацій TCFD.*

Ключові слова: *розкриття інформації про зміну клімату, теорія критичної маси, універсальні здібності, досвід у сфері екологічної відповідальності, рекомендації TCFD.*

INTRODUCTION

Climate change has emerged as the foremost environmental challenge over the past two decades (Daradkeh et al., 2023), generating substantial threats to physical infrastructure, economic stability, and societal well-being (Battiston et al., 2021; Eleftheriadis et al., 2015). Industries that demonstrate particular susceptibility to climate-induced physical risks encompass agriculture, fisheries, forestry, insurance, real estate, and tourism sectors, primarily due to their intrinsic reliance on environmental conditions (Lash et al., 2007; Wellington et al., 2005). In contrast, the energy sector, being the primary source of greenhouse gas emissions, confronts heightened regulatory challenges associated with climate change mitigation and adaptation strategies (Busch et al., 2007). This evolving landscape has resulted in intensified stakeholder pressure on organizations to provide comprehensive disclosure regarding their climate-impacting activities. Establishing the Task Force on Climate-related Financial Disclosures (TCFD) exemplifies this trend, as it advocates for enhanced corporate transparency in climate-related information dissemination (Daradkeh et al., 2023).

Climate change disclosure is gaining increasing global attention, driven by political momentum from the 2015 Paris Agreement and activism led by prominent environmental groups and figures, such as Extinction Rebellion and Greta Thunberg (Clarke et al., 2021; BBC News, 2019). This trend has further heightened investor interest and awareness regarding the financial risks associated with climate change (Clarke et al., 2021). Several countries, including Singapore, Switzerland, and New Zealand, have enacted or are in the process of implementing laws that mandate climate change disclosure based on these recommendations (Maulida, 2023; OECD, 2022). However, adoption of these standards remains limited in developing countries, including Indonesia (Maji et al., 2022). According to PricewaterhouseCoopers' 2023 report (PwC), only 10% of Indonesian companies adopted the TCFD framework in 2022, while 80% continued to use the GRI standards for sustainability reporting related to environmental matters (pwc.com, 2023). These data indicate that Indonesia is still in the early stages of adopting TCFD standards. Countries in the initial phase of climate change disclosure have significant potential to undergo substantial shifts or transitions in environmental disclosure practices (Maji et al., 2022).

A board of directors with environmental awareness is a key factor in initiating strategic changes by leveraging a

range of skills, experience, and knowledge to assess threats, evaluate alternatives, and make improved decisions (Pan et al., 2020). According to Elsayih et al. (2021), Kutlu Furtuna & Sönmez (2023), and Reeb & Zhao (2013), director characteristics can influence corporate climate change disclosure, including attributes such as expertise, experience, knowledge, and gender. Daradkeh et al. (2022) argue that the managerial capabilities of the board are a critical factor affecting a company's decisions regarding climate change disclosure.

More specific managerial skills, such as generalist ability, can provide a more holistic understanding in the context of corporate climate change disclosure. Chief Executive Officers (CEOs) with generalist abilities possess broad managerial expertise across various industries and companies, unlike specialist CEOs (Custódio et al., 2013). CEOs with generalist expertise demonstrate proficiency in managing multifaceted business operations, and exhibit heightened adaptability to intricate shifts in the business landscape. Furthermore, research by Xuan (2009) and Custódio et al. (2013) reveals that generalist CEOs enhance organizational capabilities by facilitating short-term market performance, undertaking complex initiatives, and promoting innovative practices. These comprehensive competencies make them highly valued and competitively remunerated within the executive labour market.

As a result, generalist CEOs frequently receive premium compensation or higher rewards in salary negotiations within the labour market (Hossain, Masum, et al., 2023). Research by Hossain et al. (2023) suggests that generalist CEOs demonstrate superior adaptability in addressing environmental policy requirements within corporate environmental governance. This allows generalist CEOs to better understand the complexities of corporate decisions concerning climate change and global warming (Hossain et al., 2023). This perspective aligns with the principles of upper-echelon theory, which establishes that organizational performance is substantially shaped by executive characteristics, particularly managerial competencies, including generalist capabilities (Hambrick, 2007; Hambrick et al., 1984).

According to Arya and Rathore (2020), managerial capabilities represent the experience and knowledge (background) directors acquire. Academic literature examining directors' backgrounds has predominantly concentrated on aspects such as international expertise (Bertrand et al., 2020; Quan et al., 2021), early-life exposure to disasters (O'Sullivan et al., 2021), educational qualifications (Wang et al., 2022), and professional transitions (Orij et al., 2021). Nevertheless, empirical investigations into the significance of CEOs' environmental or sustainability competencies remain scarce (Huang et al., 2023; Wang et al., 2023), specifically regarding climate change disclosure practices. Green experience influences climate disclosure decisions by increasing directors' awareness and understanding of environmental issues, encouraging prioritization of environmental sustainability in decision-making, and providing legitimacy to influence corporate environmental policies (Huang et al., 2023; Liu et al., 2024; Xin et al., 2024). This subsequently affects directors' decisions on corporate environmental policies and strategies, particularly in climate change disclosure.

In addition to managerial skills and experience (green experience), director characteristics such as gender have become a compelling topic in academic literature regarding their role in corporate environmental decision-making. The literature has highlighted differences in perspectives, values, and preferences between male and female leaders that may influence their approach to environmental issues, including climate change disclosure (e.g., Charumathi & Rahman, 2019; Gonenc & Krasnikova, 2022; Tingbani et al., 2020; Li et al., 2019; Ararat & Sayedy, 2019; Febrianto et al., 2022; Wirawan & Setijaningsih, 2022). Nevertheless, previous research demonstrates inconsistent findings, primarily attributed to the limited presence of women on boards of directors (Gong et al., 2021). According to Schwartz-Ziv (2017), a significant portion of research investigating board gender diversity examines environments where female directorship remains below the 10% threshold. This limited representation restricts the influence of female directors, as their numbers are too small to impact organizational decisions significantly. Jia and Zhang (2013) and Konrad et al. (2008) argue that when female representation on boards is low, women's perspectives are either not expressed or not heard in the decision-making process.

The empirical inconsistencies observed in previous research may be attributed to the insufficient representation of female directors on corporate boards. This limited presence potentially constrains women's perspectives and influences organizational decision-making processes, thereby contributing to heterogeneous research outcomes. Scholarly literature suggests that female directors' impact on corporate governance becomes more pronounced when their representation achieves a critical threshold – specifically, a minimum of three women (Kanter, 1977; Konrad et al., 2008; Torchia et al., 2011). A significant body of research, including works by Joecks et al. (2013), Konrad et al. (2008), Kramer et al. (2007), Shrader et al. (1997), and Torchia et al. (2011), emphasizes that this critical mass of three female directors is essential for meaningful influence on corporate decision-making. Joecks et al. (2013) and Konrad et al. (2008) explain that this numerical threshold represents a conventional demarcation point derived from typical board compositions of approximately ten members. Torchia et al. (2011) articulate this concept through their notable observation: "One woman is a token, two is a presence, and three is a voice." Within this framework, female board members' influence transcends mere symbolic representation of gender diversity; their perspectives and contributions are accorded substantive value in the decision-making framework (Torchia et al., 2011).

This research evaluates how corporate climate change disclosure, aligned with TCFD guidelines, is impacted by three board characteristics: female critical mass, generalist abilities, and environmental experience. This research differs methodologically from previous studies by employing content analysis techniques aligned with the TCFD's Recommendations to measure corporate climate change disclosure. Existing studies in this context

have measured climate change disclosure using dummy variables (e.g., Kutlu Furtuna & Sönmez, 2023) and CDP scores obtained from third-party databases (e.g., Daradkeh et al., 2023). Adopting TCFD guidelines presents an opportunity to enhance the theoretical comprehension of climate change disclosure practices within the Indonesian corporate context.

Furthermore, this research contributes to the financial accounting literature by examining the influence of board heterogeneity on climate change disclosure through critical mass theory and upper echelons theory. This study enriches critical mass theory by explaining the role of women's presence on corporate boards in decision-making regarding climate change disclosure. This exploration is essential, as research on gender diversity framed by critical mass theory has largely been neglected (Kutlu Furtuna et al., 2023; Toukabri et al., 2023). The findings of this study strengthen upper echelons theory through two main contributions. First, it expands upon Daradkeh et al.'s (2023) research by narrowing the focus to generalist capabilities. Second, it enriches the knowledge concerning directors' professional backgrounds by examining how environmental expertise shapes climate change disclosure decisions. This analysis is particularly relevant given the limited empirical evidence in existing literature regarding the relationship between environmental experience and corporate climate change disclosure practices (Huang et al., 2023; L. Wang et al., 2023). This study also has practical implications, as it may encourage companies to disclose climate-related information according to higher standards, namely, the TCFD guidelines. This can enhance corporate transparency and accountability, helping stakeholders make more informed and sustainable decisions.

LITERATURE REVIEW

Upper Echelons Theory

According to upper echelons theory, organizational outcomes and strategic decisions are significantly shaped by top management team members' personal attributes and characteristics (Hambrick et al., 1984). This theory also emphasizes the importance of individual traits in shaping corporate decision-making. Leaders' characteristics can determine how a company responds to various situations, especially under stakeholder pressure. Chithambo et al. (2020) provide insight into how specific leader characteristics can shape diverse responses to business challenges, particularly stakeholder pressure. The heterogeneous organizational responses to stakeholder demands can be attributed to the distinct interpretative frameworks employed by individual leaders in assessing specific circumstances (Chithambo et al., 2020; Hambrick, 2007; Hambrick et al., 1984). A leader's approach to responding to different types of stakeholder pressures is a product of individual characteristics, including attitudes and perspectives on specific situations (Elmagrhi et al., 2019; Haque et al., 2018; Shahab et al., 2018; Tauringana et al., 2015).

Critical Masses Theory

Critical mass theory, introduced by Kanter (1977), suggests that women's ability to impact organizational decision-making processes emerges only when they constitute a substantial minority within the institutional framework. This theory complements the perspective of upper echelons theory by highlighting that adequate representation of women is required for the tangible effects of gender diversity to be realized. Sufficient representation allows women's voices within a group to be more readily heard (Torchia et al., 2011). When the number of women in the group reaches a certain threshold, they can influence group culture, shift conversation focus, and participate more actively in group activities (Kanter, 1977). Kanter's (1977) perspective laid the foundation for subsequent researchers to develop the concept of female presence in groups, summarized as "one woman," "two women," and "three women."

Torchia et al. (2011: 308–311) assert, "One woman is a token, two is a presence, and three is a voice." If a board of directors includes only one woman, her limited opportunity to express herself often results in her voice being overlooked (You, 2019). In this context, a single woman on the board is often seen as a "token" or exception, not taken seriously by other board members. Consequently, male directors (the majority) frequently fail to support or even disregard the abilities and contributions of the lone female director. When two women are present, they may be perceived as co-conspirators, potentially colluding, which can engender distrust from others on the board (Konrad et al., 2008). They may also compete with each other within a male-dominated environment (Ely, 1994).

Several scholars (Joecks et al., 2013; Konrad et al., 2008; Shrader et al., 1997; Torchia et al., 2011) contend that achieving a critical mass – specifically, a minimum of three women on corporate boards – can fundamentally transform board dynamics, enhance decision-making processes, and improve overall governance quality. This influence operates through two distinct mechanisms. Initially, the presence of a critical mass enhances female directors' confidence, enabling more assertive participation and reducing constraints imposed by male-centric organizational norms (Torchia et al., 2011). Thus, female interactions are more active, and their influence increases as they achieve critical mass. Subsequently, male board members demonstrate increased receptivity to their female colleagues' perspectives, transcending gender-based prejudices and viewing women as integral contributors rather than a minority faction. (Schwartz-Ziv, 2017). Konrad et al. (2008) reinforce this understanding, demonstrating that the presence of three or more female directors establishes a collective voice that transcends individual gender perspectives, commanding meaningful attention in board deliberations. These dual mechanisms suggest that achieving a critical mass of women on corporate boards substantially amplifies their impact on organizational decision-making processes.

Voluntary Climate Change Disclosure

Climate Change Disclosure encompasses the systematic process through which organizations communicate to stakeholders how climate change impacts their operational activities (Schaltegger et al., 2016). In a more precise definition, Iriyadi and Antonio (2021) characterize climate change disclosure as the culmination of climate change accounting practices. This means that the information disclosed by a company regarding the impact of climate change on its business is derived from a specific accounting process that collects, analyzes, and reports climate-related data (Schaltegger et al., 2016). Climate change accounting disclosure should include risks and opportunities relevant to the challenges faced by the business entity. The TCFD (2017) has classified the various risks and opportunities companies may encounter. Organizations must carefully evaluate these climate-related risks and opportunities, as they potentially influence multiple financial dimensions: revenue and expense profiles in income statements, alongside assets, liabilities, equity positions, and financing structures in balance sheets (TCFD, 2017).

In 2017, the Financial Stability Board (FSB) introduced the TCFD recommendations to enhance the quality of non-financial reporting regarding climate-related risks and opportunities, thereby addressing evolving stakeholder information requirements. Furthermore, the TCFD recommendations clarify corporate information (Cosma et al., 2022). The TCFD framework offers more comprehensive corporate climate risk integration guidance than frameworks like GRI. These recommendations encompass four fundamental components: (1) governance, (2) strategy, (3) risk management, and (4) metrics and targets. Governance-related disclosures specifically address how boards and management teams exercise oversight of climate-related risks and opportunities (Iriyadi & Antonio, 2021).

Strategic disclosures encompass material information regarding both realized and potential impacts of climate-related risks and opportunities on organizational operations, strategies, and financial planning processes (Cosma et al., 2022). The risk management component delineates organizational approaches to identifying, evaluating, and managing climate-related risks (Iriyadi & Antonio, 2021). Metrics and targets comprise specific measurement tools and objectives employed in assessing and managing material climate-related risks and opportunities (TCFD, 2017). These four interconnected elements collectively establish a comprehensive framework enabling organizations to communicate climate-related information and risk management strategies effectively.

Critical Mass of Women on the Board of Directors

The disadvantaged minority status of female directors can shift when their representation exceeds a specific threshold or critical point (You, 2019). Critical Mass Theory illuminates how enhanced representation is a fundamental catalyst in diminishing power disparities between majority and minority group members (Kanter, 1977). The fundamental premise of this theoretical framework suggests that when minority group representation surpasses a defined threshold, it significantly enhances the group's influence and authority (Torchia et al., 2011). You (2019) conceptualizes the notion of 'critical mass' as a transformative threshold, although scholarly consensus on its precise definition remains elusive. Grodzins (1957) and Schelling (1971) conceptualize this phenomenon as a transformative moment in evolving systems that precipitates substantial change. Gladwell (2022) expands on this concept in his work 'The Tipping Point: How Little Things Can Make a Big Difference,' characterizing it as a transformative moment when ideas or social phenomena rapidly proliferate once minority representation achieves a specific threshold.

In corporate governance, female board members traditionally constitute a minority faction. Research by Konrad et al. (2008) indicates that female directors' strategic influence becomes meaningful upon achieving critical mass, specifically defined as a minimum of three representatives. As elaborated by Joecks et al. (2013) and Konrad et al. (2008), this numerical threshold corresponds to the typical composition of corporate boards, which generally comprise approximately ten members. The theoretical foundations established by Kanter (1977), Konrad et al. (2008), and Kramer et al. (2007) find empirical support in Torchia et al.'s (2011) research, which demonstrates that minority influence intensifies with the presence of three or more female directors. In this configuration, female directors transcend symbolic diversity representation, as their insights and contributions acquire substantive weight in board deliberations (Torchia et al., 2011).

Generalist Ability of the President Director

Becker (1962) classifies directors' abilities into two general categories: generalist and specialist. Specialist ability refers to expertise that is focused and limited to a specific field (Custódio et al., 2013). Conversely, generalist ability refers to broad, versatile/multitalented skills that can be effectively applied across various contexts or situations (Custódio et al., 2019; Custódio et al., 2013). This refers to an individual's ability to understand and handle various aspects of business without focusing too heavily on one particular field or function. Research by Custodio et al. (2013) has provided a further understanding of generalist versus specialist ability by considering CEOs' experience and previous positions. When viewed from the context of corporate decision-making, generalist directors tend to have the ability to handle diverse and complex tasks. Meanwhile, specialist directors possess very deep expertise in specific fields.

Generalist ability is often associated with the capacity to lead organizations effectively, address complex challenges, and drive innovation. Previous research, such as Xuan (2009) and Custodio et al. (2013, 2017, 2019), highlights that generalist CEOs can help companies improve short-term market performance, take on challenging tasks, and drive innovation due to their broad capabilities. Therefore, this enables generalist CEOs to have extensive knowledge about various aspects of

company operations, including strategy, finance, marketing, human resources, and others. Generalist CEOs also have the ability to think holistically, integrate information from various sources, and make strategic decisions about transformative change (Custodio et al., 2017). Thus, generalist ability reflects the importance of leaders with broad and multitalented skills to address complex and dynamic business challenges. This includes the generalist ability of the chief executive officer as the leader of the board of directors.

Green Experience

A President Director with green experience refers to a director's past involvement in environmental-related education or work, such as obtaining an academic degree relevant to the environment or holding a position in an environmental department (Xin et al., 2024). President director with green experience possess a set of specific experiences and cognitive abilities, enabling them to manage and integrate sustainability into the company's strategy effectively. This is supported by literature that suggests the green experience of directors shapes organizational environmental conduct and ethical practices (Homroy et al., 2019), facilitates ecological transformation initiatives (Ding et al., 2023), and strengthens environmental stewardship (Y. Li et al., 2023). Furthermore, Bombiak and Marciniuk-Kluska (2018) state that a CEO's green experience is part of Green Intellectual Capital (GIC), or intangible assets, that can aid organizations in pursuing sustainability strategies. Thus, directors with green experience are crucial in guiding companies toward sustainability, integrating green practices, and leveraging green intellectual assets to achieve strategic goals. This is reflected in the president director's behaviour related to corporate environmental disclosures, particularly concerning climate change.

HYPOTHESIS DEVELOPMENT

The Influence of Critical Mass of Women on Climate Change Disclosure

Women exhibit different attitudes and characteristics compared to men, particularly regarding decision-making related to environmental actions (Cook et al., 2018; Eagly, 2005). Research indicates that female directors shape Corporate Environmental Actions (CEA) through three distinct mechanisms: heightened ethical awareness, gender-specific functional capabilities, and responses to gender-based discrimination (Cook et al., 2018; Cumming et al., 2015). This is aligned with the Upper Echelons Theory, which explains how individual characteristics (such as gender) at the top level of an organization influence decision-making (Hambrick & Mason, 1984). Female gender characteristics are often positioned as a minority group, particularly within corporate boards. Bear et al. (2010) highlight the changing dynamics between majority and minority groups in a social context. Their study suggests that group dynamics are only affected when the minority group becomes sufficiently large, thus moving beyond a symbolic presence. This aligns with Latané (1981), who states that the level of influence a minority group has in a setting depends on the strength and significance of its membership size.

Research on female board membership reveals a significant difference between the presence of one and two women. Torchia et al. (2011) note that one woman is often perceived as a "token," leading to limited opportunities and a lack of influence, as her presence tends to be overlooked (You, 2019). In contrast, having two women on the board may generate mixed perceptions, including the potential for collusion or competition between them (Konrad et al., 2008; Ely, 1994). While the presence of two women increases representation, it may still be viewed merely as a formal response to external pressure without significantly influencing strategic decision-making (Chang et al., 2018; You, 2019). Consequently, the proportion of female representation on corporate boards significantly influences board dynamics and the efficacy of their governance contributions.

The efficacy of female directors' influence on board decisions necessitates adequate numerical representation. This consideration prompts an examination of the optimal threshold required for meaningful participation in decision-making processes. The theoretical foundation Kanter (1977) established through Critical Mass Theory posits that women's ability to shape organizational decisions emerges only upon reaching a specific numerical threshold within institutional structures. Building upon Kanter's (1977) theoretical framework, subsequent scholars (Joecks et al., 2013; Kramer et al., 2007; Shrader et al., 1997; Torchia et al., 2011) assert that a minimum presence of three women on corporate boards is essential to effectuate meaningful change in decision-making processes. This theoretical proposition extends to environmental governance decisions regarding climate change disclosure practices.

The Critical Mass Theory has important implications for corporate leadership and decision-making, particularly in the area of environmental responsibility, such as climate change disclosure. A strong representation of women on the board brings diverse perspectives, fosters company innovation, and ensures their voices are heard (Jia & Zhang, 2013; Kutlu Furtuna & Sönmez, 2023; Torchia et al., 2011). Consequently, the critical mass allows female directors to advocate for environmental issues more vocally. This, in turn, encourages companies to pay closer attention to environmental impacts, take proactive steps, and transparently disclose information related to managing climate-related risks and opportunities.

Empirical research substantiates this theoretical position, demonstrating that the presence of at least three female directors significantly influences organizational approaches to environmental disclosure (Charumathi & Rahman, 2019; Gong et al., 2021; Jia & Zhang, 2013). Specifically, Gong et al. (2021) document enhanced environmental strategic quality in organizations maintaining this critical mass of female board representation. Further empirical validation comes from Charumathi and Rahman (2019), who establish a positive correlation between achieving this critical mass and

enhanced climate change disclosure practices at the board level. Drawing upon this convergence of theoretical frameworks and empirical evidence, this study advances the following hypotheses:

H1: Boards with one female director do not significantly affect climate change disclosure.

H2: Boards with two female directors do not significantly affect climate change disclosure.

H3: Boards with at least three female directors positively affect climate change disclosure.

The Influence of Generalist Ability on Climate Change Disclosure

According to upper echelons theory, organizational outcomes are significantly influenced by various characteristics of corporate management, including managerial ability (Hambrick, 2007). Managerial ability encompasses an understanding of technology, industry trends, and capabilities developed throughout the career experience of management, particularly directors. Therefore, managerial ability greatly depends on directors' understanding of market dynamics, implemented strategies, competent understanding of company products, faced competition, and ability to adapt to modern technological advancements (Demerjian et al., 2012; Minggu, 2017). According to Daradkeh et al. (2023), high managerial ability positively impacts investments in climate change risk management projects and climate change information disclosure. This is because managerial ability helps reduce short-term attitudes that arise from career concerns and encourages directors to focus on the company's long-term interests (Daradkeh et al., 2023). Thus, directors with superior managerial ability will be more proactive in supporting climate change disclosure to increase the company's long-term value.

According to Custodio et al. (2017), high levels of managerial ability often require good generalist ability. This is because a chief executive must comprehensively understand various aspects of business and organizational functions to make appropriate decisions and manage change effectively. Directors with generalist ability possess adaptability and a broad understanding of various aspects of company operations (Ma, 2021; Xu, 2024). Directors with high generalist abilities can manage uncertainties related to climate change projects more effectively (Daradkeh et al., 2023). Directors with these abilities also have greater potential in planning long-term strategies involving investments in strategic projects to manage climate change risks (Hossain et al., 2023). This can be reflected, among other things, through climate change disclosure. Additionally, according to Xuan (2009), generalist directors are considered more aware of the company's reputational impacts related to environmental issues. With increasing public awareness and pressure from various stakeholders regarding environmental sustainability, generalist directors have greater awareness to disclose risks and opportunities related to climate change. This is done as a step to maintain the company's reputation and gain trust from investors, consumers, and society in general. Therefore, a high generalist ability will encourage transparency in climate change disclosure information as part of a strategy to increase company value and build stakeholder trust.

This argument is supported by upper echelons theory, which states that top executives' characteristics and backgrounds significantly influence organizational strategy and performance (Hambrick, 2007; Hambrick et al., 1984). In this context, managerial ability, especially the generalist ability of directors, can be seen as a key factor influencing strategic corporate decision-making, including climate change disclosure. Therefore, high generalist ability as part of top executive characteristics can shape organizational perceptions, interpretations, and responses to environmental challenges. Based on this explanation, generalist ability can drive corporate decisions to disclose climate change more transparently and proactively. Therefore, this research proposes the following hypothesis:

H4: President directors with generalist ability positively influence climate change disclosure.

The Influence of Directors' Green Experience on Climate Change Disclosure

As the primary decision-making entity responsible for ensuring the legality and credibility of a company's management activities, the board of directors can shape environmental disclosure practices through their underlying values and cognitive frameworks (Hambrick, 2007; Hambrick et al., 1984). While the values and cognitive models of directors are not directly observable, they can be inferred from various managerial attributes, such as age (Fabrizi et al., 2014), gender (Tingbani et al., 2020), educational background (Bertrand et al., 2020; Quan et al., 2021; C. Wang & Qi, 2022), and religiosity (Iguchi et al., 2022), among others. Prior research has highlighted that the diverse experiences of directors significantly influence corporate decisions and environmental strategies (e.g., Bertrand et al., 2020; Huang & Wei, 2023; Liu et al., 2024; O'Sullivan et al., 2021; Shahab et al., 2020). Existing literature underscores the importance of directors' work experience and educational background as critical determinants in shaping strategic decisions related to corporate environmental responsibility and performance (Bertrand et al., 2020; Huang et al., 2023; Quan et al., 2021). One particularly relevant type of experience for understanding decision-making in corporate environmental practices is a green experience (Huang et al., 2023; Liu et al., 2024; Wang et al., 2022; Xin et al., 2024; Zhu et al., 2023), which encompasses decisions concerning climate change disclosure as part of broader Corporate Environmental Actions (CEA).

Directors' green experience plays a pivotal role in influencing climate change disclosure through various intricate mechanisms. Directors with a background in environmental education tend to develop values, beliefs, knowledge, and skills cultivated during their academic and professional journeys, equipping them to advocate for responsible environmental practices. Liu et al. (2024) highlight that higher education serves as a formative stage during which individuals shape their worldviews,

values, and beliefs –foundations that frequently persist throughout their careers and personal lives. Similarly, directors' work experience reflects a critical transition from education to employment, during which they may experience anxiety and uncertainty that encourages adopting new cognitive models and norms (Azoulay et al., 2017; Higgins, 2005; McEvily et al., 2012). Therefore, directors with green experience – whether in education or work – can influence environmental strategies such as climate change disclosure through their value orientations and cognitive patterns (Liu et al., 2024). Moreover, directors with green experience can significantly influence a company's ethical and environmental conduct (Homroy & Slechten, 2019), facilitate green transformation initiatives (Ding et al., 2023), and contribute to fulfilling environmental responsibilities (Li et al., 2022). Research by X. Li et al. (2016) and Li and Shi (2016) suggests that directors with green experience often exhibit elevated ethical standards and a strong sense of social responsibility, making them more attuned to corporate environmental information. This leads directors to consider long-term perspectives and encourage the company to engage in environmental information disclosure. As a result, directors with green experience are likely to be more concerned about environmental issues, recognize the importance of environmental sustainability, and be motivated to promote climate change disclosure within the company.

The above arguments align with the Upper Echelons Theory, which posits that characteristics such as the backgrounds of top executives influence organizational strategy and performance (Hambrick & Mason, 1984). In line with this theory, directors' green experience can be seen as a critical characteristic influencing a company's environmental orientation. This theory predicts that executives' backgrounds and experiences will be reflected in the organization's decision-making and actions. Empirical research by Liu et al. (2024) further supports this argument, demonstrating the positive influence of directors' green experiences on corporate environmental behaviour. Climate change disclosure is included in these behaviours as a component of corporate environmental information disclosure. Based on the above explanation, this study proposes the following hypothesis:

H5: Directors with green experience positively influence corporate climate change disclosure.

RESEARCH METHOD

Research Data Sources

This study utilizes secondary data sources by performing a content analysis of climate change disclosures presented in corporate sustainability reports. The content analysis is conducted by the framework and guidelines established by the Task Force on Climate-related Financial Disclosures (TCFD). Binary coding is applied in the content analysis to minimize subjective bias. Additionally, the study performs intercoder reliability testing to ensure the collected and coded data are reliable.

Population and Sample of the Research

The research population comprises firms operating in four key sectors – energy, basic materials, primary consumer, and property and real estate – that are listed on the Indonesian Stock Exchange (IDX). The energy sector was selected due to its status as the highest producer of greenhouse gas emissions, thus significantly impacting the environment (Rüttinger et al., 2020). The substantial environmental impact necessitates a high level of transparency in sustainability reporting related to climate change disclosures in this sector. Additionally, the basic materials, primary consumer, and property and real estate sectors were chosen for the study population due to their vulnerability to climate change (Lash et al., 2007; Schaeffer et al., 2012; Pelligra, 2023). This research population encompasses 415 firms from various listed sectors on the Indonesian Stock Exchange (IDX) between 2019 and 2023. A total of 294 companies were excluded for not issuing sustainability reports. The final research sample comprised 121 companies, yielding 605 firm-year observations.

Research Period

The research period spans from 2019 to 2023. This period was selected for several reasons. The starting year 2019 aligns with the enactment of OJK Regulation No. 51/POJK.03/2017 regarding Sustainable Finance, which serves as a critical foundation for promoting sustainability reporting in Indonesia. This five-year period encompasses significant regulatory developments, notably the 2020 introduction of OJK's Sustainable Finance Roadmap Phase II (2021-2025), which promotes TCFD implementation.

Method of the Data Analysis

This research uses a quantitative analytical approach, testing theories through secondary data analysis and panel data regression analysis. According to Ghozali (2018), panel data combines cross-sectional and time-series data into an integrated dataset. The analysis uses EViews 12 software to analyze relationships between variables using panel data regression, which encompasses three commonly used models: Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). According to Widarjono (2007), there are three tests for selecting a panel data estimation technique. The first is the F-test or Chow test, used to choose between the CEM and FEM methods. The second is the Hausman test, used to decide between FEM and REM. The third is the Lagrange Multiplier test, which determines the choice between CEM and REM.

Hair et al. (2019) note that the classical assumption test is applied to assess model fit, ensuring it is free from potential inaccuracies and bias. The classical assumption testing comprises multicollinearity and heteroscedasticity analyses, while the coefficient of determination test evaluates how well the model explains dependent variable variations (Ghozali, 2018; Hair et al., 2019). This test is denoted by R-squares, which indicates the quality of the estimated regression model. The coefficient of determination (R^2) values range from 0 to 1

(0 < x < 1). Values closer to 1 indicate a stronger predictive power of the regression equation and a better model fit of the dependent variable, and vice versa (Ghozali, 2018).

The individual parameter significance test (t-test) assesses how effectively individual independent variables (X) individually explain the variation in the dependent variable (Ghozali, 2018; Hair et al., 2019). According to Ghozali (2018), the individual parameter significance test can be conducted by comparing the significance values of each independent variable with a 5% confidence level. If the significance level is < 5%, Results with significance levels below 5% lead to the acceptance of the alternative hypothesis (Ha) and rejection of the null hypothesis (Ho).

RESULTS

Descriptive Statistics

This study utilized a sample of 565 observations (N=565). The dependent variable, Climate Change Disclosure (CCD), exhibited a mean value of 0.184 with a standard deviation of 0.22116, indicating relatively low variation in the data. The presence of women on boards of directors was represented by the variables ONE WOMAN, TWO WOMAN, and THREE+WOMAN, with mean values of 0.34, 0.06, and 0.03, respectively. These values indicate that the majority of companies have one woman on their board, while the presence of two or three or more women on boards of directors is relatively limited.

The generalist ability variable (GA_DUM) demonstrated a mean of 0.25 with a standard deviation of 0.433. This value indicates that 25% of the total 565 directors in the sample possessed generalist abilities. The mean of 25% reflects that one-quarter of the directors in the sample have generalist capabilities, while the remaining 75% possess more specific or specialized expertise. The standard deviation of 0.433 suggests considerable variability in the distribution of GA_DUM among directors. Meanwhile, green experience (GREEN_EXP) revealed that directors possess an average of 0.16 or 16% environmental-related experience. The standard deviation of 0.226 indicates moderate variation in the level of green experience among directors.

Table 1. Descriptive Statistics

Variables	Min	Max	Mean	Std. Deviation	N
CCD	0	1	0,184	0,22116	565
ONEWOMAN	0	1	0,34	0,475	565
TWOWOMAN	0	2	0,06	0,276	565
THREE^{+}WOMAN	0	1	0,03	0,170	565
GA_DUM	0	1	0,25	0,433	565
GREEN_EXP	0	1	0,16	0,226	565
BOARD SIZE	0	15	4,61	2,274	565
COMPANY SIZE	0	32,86	28,1909	3,171	565
AGE	0	46	15,23	11,590	565
CAPIN	0	0,89	0,32	0,239	565
ROA	0	2,99	0,0518	0,170	565
MTB	-119	117,44	2,2818	8,567	565
LEV	-21	158,23	1,2435	2,191	565

Selection of Data Panel Regression Model

The test results indicate that the F-statistic value (cross-section F) is 6.935218 with degrees of freedom (d.f.) of (112,447) and a probability of 0.0000. The Chi-square value (Cross-section Chi-square) is 569.018275 with degrees of freedom (d.f.) of 112 and a probability of 0.0000. Both probability values are less than the significance level of 0.05 (5%). This indicates that the null hypothesis (H_0) is rejected. Consequently, it can be concluded that the Fixed Effect Model is more appropriate than the Common Effect Model (CEM) for panel data analysis in this study. This result also reflects the presence of significant individual and/or temporal characteristic differences in the analyzed panel data, necessitating the use of the Fixed Effect Model to accommodate such heterogeneity.

Table 2. Chow Test

Effect Test	Statistic	d.f.	Prob.
Cross-section F	10,867626	(112,440)	0,0000
Cross-section Chi-square	749,243298	112	0,0000

Although the Chow test results suggest that the Fixed Effect Model is more suitable than the Common Effect Model, the next step is to perform the Hausman test. This test is necessary to compare the Fixed Effect Model with the Random Effect Model. The results of the Hausman test are presented in the table below.

Table 3. Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq d.f.	Prob.
Cross-section random	250,003324	12	0,0000

The Hausman test shows a probability value of 0.0000 < 0.05, thus confirming that the Fixed Effects Model (FEM) is more appropriate to use. Therefore, there is no need to perform a Lagrange Multiplier Test since both previous tests have yielded consistent conclusions.

Data Panel Regression Model and Testing of Hypothesis

The panel data regression equation is as follows:

CCD= -3,271 + 0,047 ONEWOMAN + 0,024 TWOWOMAN + 0,052 THREE^{+}WOMAN - 0,002 GA_DUM + 0,061 GREEN_EXP - 0,007 BOARD SIZE + 0,086 COMPANY SIZE + 0,062 AGE – 0,026 CAPIN + 0,054 ROA + 0,0001 MTB + 0,0002 LEV

Table 4. Fixed Effect Panel Data Regression

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3,271128	0,958345	-3,413311	0,0007
ONEWOMAN	0,046979	0,025496	1,842614	0,0661
TWOWOMAN	0,023993	0,043500	0,551559	0,5815
THREE^{+}WOMAN	0,052146	0,085765	0,608005	0,5435
GA_DUM	-0,002026	0,036623	-0,055320	0,9559
GREEN_EXP	0,060518	0,061007	0,991981	0,3218
BOARD SIZE	-0,006614	0,007583	-0,872140	0,3836
COMPANY SIZE	0,086278	0,033630	2,565490	0,0106
AGE	0,061480	0,004200	14,63976	0,0000
CAPIN	-0,025753	0,086244	-0,298605	0,7654
ROA	0,053965	0,042645	1,265462	0,2064
MTB	0,000454	0,000761	0,596644	0,5511
LEV	0,000214	0,004095	0,052340	0,9583

The estimation results of panel data regression using the Fixed Effect Model (FEM) show that the model is overall significant in explaining the variation of the dependent variable (CCD) as indicated by the F-statistic value of 12.5 (p-value 0.0000). The coefficient of determination (R-squared) of 0.7776 indicates that the independent variables in the model can explain 77.76% of the variation in Y. Meanwhile, the Adjusted R-squared of 0.7154 reflects the consistency of the model after adjusting for degrees of freedom. Furthermore, using fixed effects (cross-section fixed effects) controls for unobserved heterogeneity between individuals, reinforced by the Durbin-Watson value of 1.73. This indicates that there is no serious autocorrelation.

Based on the hypothesis test results, the main independent variables of this research, namely ONE WOMAN, TWO WOMAN, THREE+WOMAN, GA_DUM, and GREEN_EXP, show that there is not enough evidence to confirm an influence on the dependent variable. Meanwhile, among the control variables used, only company size (COMPANY SIZE) and company age (AGE) are statistically significant at the 5% confidence level. The probability values of these two variables are less than 0.05; thus, the alternative hypothesis (Ha) is accepted.

Test of Classic Assumption

According to Basuki & Yuliadi (2014:183) and Napitupulu et al. (2021:120), the classical assumption tests employed in the fixed effect model include tests for multicollinearity and heteroscedasticity. This study reveals no multicollinearity issues among the independent variables, as shown by the correlation values, all falling below the critical threshold of 0.85. The highest correlation observed is between Board Size and Company Size, with a value of 0.285, which remains well below the multicollinearity threshold. This aligns with the criteria of Napitupulu et al. (2021:143), which state that if the correlation between variables is less than 0.85, the regression equation is considered free from multicollinearity. Consequently, the parameter estimates produced can be regarded as accurate and reliable.

The results of the heteroscedasticity test further indicate that the panel data regression model is free from heteroscedasticity issues. This is evidenced by the probability values of all independent variables, which exceed the 0.05 significance level. Additionally, the results of the heteroscedasticity test indicate that the residual variance in the model is homoscedastic, meaning that the distribution of residuals does not exhibit any specific pattern and remains constant. Therefore, the estimators in the regression model are BLUE (Best Linear Unbiased Estimator), and the hypothesis testing results are reliable.

Good Fit of Model (R-Squared)

The results of the goodness-of-fit analysis in the panel data regression model indicate a difference in R-squared values between the two equations. The R-squared value suggests that the independent variables explain 78% of the variation in the dependent variable, while the remaining 22% is attributed to variables outside the model. This figure demonstrates that the second model is better at explaining the variation in the dependent variable, with a contribution of 78%. In contrast, the rest is accounted for by external variables not included in the model.

Table 5. Good Fit of Model (R-Squared)

R-squared	0,794517	*Mean dependent var*	0,210460
Adjusted *R-squared*	0,736608	*S.D dependent var*	0,237633

DISCUSSION

Critical Mass of Women and Climate Change Disclosure

The results of this study indicate that the presence of one, two, or even at least three women (ONE WOMAN, TWO WOMAN, THREE+ WOMAN) on the board of directors does not have a significant effect on corporate climate change disclosure in Indonesia. The findings related to the lack of influence from the presence of one woman (ONE WOMAN) and two women (TWO WOMAN) on the board are consistent with Critical Mass Theory (Kanter, 1977) and several previous studies (Charumathi et al., 2019; Gong et al., 2021; Gahramanova & Kutlu Furtuna, 2023; Torchia et al., 2011). These results further reinforce Kanter's (1977) argument regarding the dynamics of tokenism. Kanter (1977) explains that women tend to be positioned as tokens, facing performance pressure, social isolation, and role entrapment when representing only a small minority. This is particularly relevant in the Indonesian context, where one or two women on the board may not be sufficient to alter the prevailing norms of a male-dominated group. Women in token positions are often excluded from strategic decision-making processes concerning complex issues such as climate change, especially when boards remain primarily focused on the short-term interests of shareholders (Ararat et al., 2019).

Although the findings regarding the presence of one and two women align with Critical Mass Theory (Kanter, 1977), this study also reveals that the presence of a critical mass – at least three women (THREE+ WOMAN) – does not significantly influence climate change disclosure. This finding contradicts the Critical Mass Theory proposed by Kanter (1977) and previous empirical research, such as Gong et al. (2021), which asserts that the presence of at least three women can shift board decision-making dynamics, including on issues related to corporate sustainability.

This inconsistency can be explained by the specific context of Indonesia, such as patriarchal culture, family-owned corporate structures, and weak environmental regulatory pressure. The deeply rooted patriarchal norms embedded in Indonesia's social, political, and economic structures create systemic barriers for women (Widiastuti et al., 2025), including in strategic decision-making processes within boards related to climate change disclosure. According to reports, approximately 60% of publicly listed companies in Indonesia are family-controlled (PwC, 2014), and women's positions on boards are often symbolic (Gong et al., 2021; Kanadlı et al., 2017; Kanter, 1977; Kramer et al., 2007). Women are frequently appointed as family representatives or to fulfil gender diversity formalities without holding substantial authority. This aligns with the findings of Furtuna & Sonmez (2023) in Türkiye, where half of the women on boards were family members of controlling shareholders. Such conditions lead to a lack of independence among female directors to advocate for sustainability agendas that could potentially challenge the status quo. Ararat et al. (2019), in a study with contextual similarities to Indonesia, found that women from family backgrounds tend to avoid conflicts with dominant shareholders, thereby failing to promote sustainability issues that might disrupt existing power structures. Moreover, Indonesia's strong patriarchal culture tends not to position women as strategic leaders but rather as domestic caregivers, resulting in their voices on environmental matters often being perceived as secondary (WEF, 2023). In addition, environmental reporting in Indonesia remains largely voluntary and is not well integrated into national governance frameworks. This contrasts with developed countries such as Canada or the United Kingdom, where institutional investor pressure and stringent regulations significantly drive climate transparency (Ben-Amar et al., 2017). This argument is further supported by Mateo-Márquez et al. (2021), who found that in weak institutional environments, factors such as stakeholder pressure and social legitimacy have a greater impact than gender diversity.

Hierarchical corporate governance and a lack of transparency are also indicated to reinforce gender inequality. The top-down decision-making culture typical of Indonesian family-owned firms tends to marginalize women, even when they are present in critical mass. Fernández-Temprano et al. (2020) found that gender diversity is only effective when accompanied by an inclusive culture that values minority perspectives.

However, such conditions remain rare in Indonesia, where patriarchal family structures often retain ultimate authority.

This specific context potentially creates structural barriers that prevent women from influencing strategic policies, even when their number reaches a critical mass. The findings of this study do not entirely reject Critical Mass Theory but rather emphasize that its effectiveness is highly dependent on sociocultural context. Institutionalized patriarchy within family ownership structures, gender stereotypes, and opaque governance practices are suggested to neutralize the potential impact of female critical mass in Indonesia. Thus, the implementation of Critical Mass Theory is heavily influenced by contextual factors such as board independence, the quality of women's participation, and a supportive institutional environment. Moreover, meaningful progress toward climate-related disclosure in Indonesia requires not only achieving a critical mass of women but also the systemic deconstruction of patriarchal norms that constrain women's voices.

In addition, the absence of a significant effect of critical mass on climate change disclosure may also be explained by the empirical data of this study. Out of 605 company samples, only 18 (3%) had a critical mass of women (at least three women) on their boards. This very small proportion is key to understanding the lack of significant impact from critical mass on climate disclosure. A limited sample size (3% critical mass) weakens the statistical power to detect potential effects. Cohen (1988) notes that small samples (<20) often fail to achieve statistical significance, even when a real effect exists. In this context, the absence of a detected relationship may reflect methodological limitations rather than the actual absence of an effect. A comparable study in China by Gong et al. (2021) found evidence for the impact of critical mass only after analyzing 1,200 firms, 30% of which had three or more women on their boards. Based on the above discussion, it can be concluded that the lack of a critical mass effect on climate change disclosure in this study does not necessarily undermine the relevance of the theory but rather highlights both contextual and methodological limitations.

Generalist Ability and Climate Change Disclosure

The findings of this study indicate that generalist ability does not have a significant effect on climate change disclosure. This result is not consistent with the findings of Daradkeh et al. (2023) and the Upper Echelons Theory. However, this discrepancy can be explained by theoretical limitations and the complexity of market dynamics in emerging economies, which have not been fully captured in previous research.

The Upper Echelons Theory posits that managerial characteristics (such as experience and capability) influence strategic decisions (Hambrick et al., 1984). However, the theory does not explicitly state that all types of managerial abilities will influence all types of decisions. In this study, generalist ability is measured by the diversity of career experiences but does not encompass specific competencies in climate risk management or other expertise related to environmental sustainability. This distinction is important, as climate disclosure requires technical expertise (e.g., understanding of carbon reporting standards) and awareness of environmental urgency – capabilities that generalist directors may not necessarily possess. Therefore, this study's lack of influence from generalist ability is not entirely contradictory to the Upper Echelons Theory. Instead, it emphasizes that the type of managerial ability must align with the complexity of the decision being made.

Furthermore, the dominance of short-term economic interests is also suggested to be a significant factor. This study does not account for directors' potential conflict of priorities in a competitive business environment. Economic growth and operational stability remain top priorities in Indonesia (Satriana et al., 2024). As a result, directors, even those with generalist capabilities, may be inclined to disregard climate-related disclosures if they are perceived to hinder short-term profitability. This is supported by Hossain et al. (2023), who found that generalist CEOs tend to sacrifice environmental initiatives for short-term profitability in high-emission industries. A similar phenomenon may be occurring in Indonesia, particularly in the mining and plantation sectors, which significantly contribute to GDP but exhibit low levels of environmental transparency. This situation may be exacerbated by the lack of economic incentives (such as tax breaks) and minimal reputational risk associated with environmental violations.

Overall, the findings of this study are not entirely inconsistent with those of Daradkeh et al. (2023) or the Upper Echelons Theory. This is because the study reveals that the relationship between managerial ability (generalist ability) and climate change disclosure is contingent. Factors such as governance structures, the dominance of short-term economic interests, and the complexity of environmental issues must be considered, as they are suggested to create conditions under which generalist ability alone is insufficient to promote transparency. Thus, generalist ability will only influence climate change disclosure if an adequate institutional environment, strong stakeholder pressure, and clear economic incentives support it.

Green Experience and Climate Change Disclosure

This study finds that directors' green experience does not significantly influence climate change disclosure, leading to the acceptance of the null hypothesis (H_0). This result contrasts with Liu et al. (2024), who found that green experience positively affects corporate environmental disclosure in China. The absence of influence from green experience on climate change disclosure among Indonesian firms can be explained by several contextual factors. First, Indonesia's economic and cultural context differs significantly from China's, potentially affecting corporate priorities related to environmental information disclosure. Directors with green experience may play only a symbolic role without exerting practical influence, particularly in regions or countries with limited economic growth and stakeholder

pressure (Cui & Liu, 2021). Under such conditions, directors may refrain from promoting enhanced disclosure, instead prioritizing corporate economic growth over sustainability (Liu et al., 2024).

Differences in the intensity of stakeholder pressure may also lead to varying levels of external incentives for directors to leverage their environmental experience. Environmental considerations in countries with low stakeholder pressure are often overlooked in corporate investment and operational decision-making. As a result, directors may lack sufficient motivation to transform their environmental experience into substantive disclosure policies. The second factor relates to the regulatory environment. Environmental regulations and policies in Indonesia may not be as robust as those in China, reducing the incentive for companies to disclose environmental information transparently. China has implemented a regulatory framework combining mandatory and voluntary environmental disclosure (Liu et al., 2024), thereby creating a complex institutional setting promoting environmental transparency. In contrast, Indonesia's regulatory approach to environmental disclosure remains entirely voluntary, which weakens corporate accountability in this area.

In addition, internal factors such as environmental culture (green culture) may also explain why the green experience fails to influence corporate climate change disclosure in Indonesia. Directors with green experience may not have a significant impact on the transparency of climate change disclosures without the support of an adequate sustainability-oriented organizational culture. This aligns with the concept of green culture, which refers to organizational members' collective values and behaviours that emphasize the importance of environmental awareness and action for sustainability (Garcia-Machado & Martinez-Avila, 2019). Companies with a weak green culture imply the ineffectiveness of directors' green experience due to the absence of behavioural standards and control mechanisms that support the development of environmentally responsible organizational behaviour (Cook & Rousseau, 1988). This situation becomes even more unfavourable in organizations with low levels of Confucian value adoption, leading to a lack of sensitivity toward sustainability-oriented values and behaviours (Liu et al., 2016). As a result, directors may face difficulties transforming their green experience into climate change disclosure practices due to the lack of strong support for green culture. Therefore, the existence of directors' green experience alone is insufficient to drive climate change disclosure efforts without the support of external factors such as regulations and stakeholder pressure, as well as internal factors such as a sustainability-oriented organizational culture.

CONCLUSIONS

The objective of this study is to analyze the influence of the critical mass of women on the board of directors, the generalist ability of the CEO, and the CEO's green experience on corporate climate change disclosure based on the recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) in Indonesia. The findings reveal that the presence of one, two, or even at least three women on the board of directors does not significantly influence climate change disclosure. This result does not fully support the Critical Mass Theory, which posits that women can influence strategic corporate decisions once a certain threshold is reached. The strong patriarchal culture in Indonesia can explain this, the dominance of family ownership in corporations and the lack of regulatory and stakeholder pressure regarding environmental issues.

Furthermore, the generalist ability of the CEO also does not influence climate change disclosure. This finding indicates that generalist capabilities are insufficient to promote environmental transparency without being supported by economic incentives, stakeholder pressure, and an adequate institutional environment. Therefore, the results of this study do not align with the Upper Echelons Theory, which asserts that managerial characteristics affect strategic corporate decisions. Similarly, the CEO's green experience does not significantly influence climate change disclosure. This can be attributed to the weak environmental culture within organizations, the lack of external pressure from stakeholders, and the absence of regulations encouraging environmental transparency.

This study indicates that factors such as a patriarchal culture, short-term economic interest dominance, weak regulatory enforcement, and insufficient stakeholder pressure are key barriers to enhancing climate change disclosure in Indonesia. These findings highlight that efforts to improve environmental transparency require managerial characteristics, systemic changes in corporate governance, and a supportive institutional environment.

The theoretical implication of this study is the enrichment of the literature by demonstrating that the presence of a critical mass, generalist ability, and green experience among directors is insufficient to enhance climate change disclosure without the support of external factors. These findings underscore that the effectiveness of the Critical Mass Theory and Upper Echelons Theory is highly dependent on the socio-cultural context and institutional environment. The practical implication is the recommendation to strengthen regulatory frameworks and governmental incentives to promote adopting environmental reporting standards such as TCFD. Companies should foster a sustainability-oriented culture, provide space for women, and enable directors with generalist capabilities and green experience to contribute to strategic decision-making.

Research Limitations

This study acknowledges several limitations.

First, the measurement of independent variables such as generalist ability and green experience is based on data available in director profiles, which may not fully capture the actual competencies and experiences of the directors.

Second, the proportion of companies in the sample with a critical mass of women (at least three women) on the board is very small – only 3% of the total sample.

This limitation may reduce the statistical power to detect existing effects.

Third, this study's measurement of climate change disclosure focuses only on the quantitative aspect, which does not provide a comprehensive understanding of the context and meaning of such disclosures. Future research is recommended to examine climate change disclosure with a qualitative approach, referring to the work of Raar (2002), to provide deeper insights into how companies communicate environmental information.

Fourth, this study does not account for the organizational environmental culture, which may influence the understanding and implementation of green experience in climate change disclosure. This limitation may lead to an incomplete understanding of how organizational culture contributes to CEO decision-making related to environmental issues.

Fifth, this study does not include female CEOs as a control variable. Future studies are encouraged to include the presence of a female CEO as a control variable, as a single woman in the CEO position may significantly influence decision-making. Hence, future research is expected to contribute more significantly to understanding the dynamics of climate change disclosure by considering these aspects.

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