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ORIGINAL ARTICLE

An empirical analysis of SDG disclosure (SDGD) and board gender diversity: insights from the banking sector in an emerging economy

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Abstract
There has been a recent surge in interest in academic research and public discourse surrounding the Sustainable Development Goals (SDGs). This study examines the level of SDG disclosure (SDGD) in Bangladeshi banking companies and explores its relationship with board gender diversity. An automated keyword search is applied to measure SDGD in the annual reports of publicly traded commercial banks. Based on agency, resource dependence, and stakeholder theories, this study hypothesises that a higher presence of female directors on the board is associated with greater commitment and contribution to SDGs, as evident in SDGD. The findings reveal a consistent increase in SDGD from 2015 to 2020 and confirm a significant positive relationship between board gender diversity and SDGD. The results remain consistent following robustness tests, including one-step and two-step system (dynamic) GMM estimations. Also, the study provides evidence that a critical mass of at least three female directors is necessary to establish a significant positive relationship between board gender diversity and SDGD. The implications of this study are twofold: firstly, it provides preliminary insights into the state of SDGD in the banking industry, which can inform regulators in assessing corporate engagement to SDGs and issuing disclosure guidance for the interest of the stakeholders. Secondly, the study highlights the importance of gender diversity on boards, as more female representation is associated with increasing SDGD. Such empirical findings imply that banking companies should consider appointing more female directors to their boards to advance SDG initiatives. Policymakers can utilise these findings to formulate regulations, particularly regarding the minimum number of female directors on corporate boards. This research contributes to the limited SDGD literature in the emerging economy context, offering insights into how board gender diversity is associated with SDGD.

Keywords Sustainable Development Goals (SDGs) · SDG disclosure · Board gender diversity · Critical mass · Banking industry · Bangladesh

Introduction

Corporate SDG disclosure (hereafter referred to as 'SDGD') is a relatively recent voluntary disclosure practice aimed at enabling companies to showcase their commitment and contribution to SDGs (Adam et al., 2020). This practice equips stakeholders with transparent information, allowing them to evaluate companies' sustainability performance within the framework established by the United Nations (UN) in 2015. According to Rosati and Faria (2019, p. 588), 'business reporting on the SDGs can support organisations in planning, implementing, measuring, and communicating their SDG efforts'. In the global context, businesses are facing mounting pressure from a diverse range of stakeholders to demonstrate transparency in their sustainability practices and evaluate the social and environmental impact of their activities (Adam et al., 2020; Agarwal et al., 2017; Galeazzo et al., 2023; Hummel and Szekely 2022). Hence, SDGD plays a pivotal role in fostering stakeholders' trust by offering heightened transparency regarding a company's sustainability initiatives aligned with the global agenda, thereby empowering stakeholders to make well-informed decisions.

Reports from practitioners and global organisations indicate a growing involvement of business executives

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worldwide in SDG reporting.[1] For example, a KPMG International study reveals that approximately 40% of the largest corporations in the world incorporate this global agenda as a reference in their corporate reporting (KPMG 2018). Additionally, a survey conducted by the Global Reporting Initiative (GRI) on 200 sample companies worldwide shows that 80% of companies expressed a commitment to the SDGs in their sustainability reports, with 40% setting measurable targets to contribute towards fulfilling the goals (GRI 2020). While this emerging facet of corporate non-financial disclosures is steadily capturing the interest of accounting researchers (e.g. Erin et al. 2022; Gunawan et al. 2020; Haywood and Boihang 2021; Hummel and Szekely 2022; Lodhia et al. 2022), Bebbington and Unerman (2020) contend that the field of accounting research on SDGs is still in its nascent stage of development. The authors advocate for a more earnest commitment from accounting researchers to engage with SDG-related research. While the SDGs represent a global framework, their successful realisation hinges on localised implementation within each country. Lodhia et al. (2022) emphasise the need for more country-specific studies investigating corporate responses to the SDGs. Thus, this study aims to respond to these prior calls and explore the current level of corporate SDGD in the context of an emerging economy, Bangladesh.

In recent years, among the many governance issues, board gender diversity has been an extensively debated topic in the corporate governance literature (Birindelli et al. 2019; Bravo 2018). According to Deloitte (2022), the global average of females in the boardroom is only 19.7 per cent. To address such concern for the under-representation of females on corporate boards, some jurisdictions (e.g. Norway and India) have already mandated a minimum number or percentage of female directors on boards (Srinidhi et al. 2011; Terjesen et al. 2015). However, in most least-developed and developing countries, such representation remains alarmingly low. This disparity is not merely a statistical observation but a stark reflection of deeply entrenched systemic barriers that hinder women's full participation and contribution. It is argued that the inclusion of women in key decision-making roles, particularly at the board level, is not only a matter of social justice but also a strategic imperative for sustainable progress. Female directors tend to bring unique perspectives, empathy, and a heightened sense of responsibility towards the corporate sustainability agenda. Hence, the role played by female directors in driving sustainability initiatives stands out as a topic of paramount interest and significance (Ben-Amar et al. 2017; Galletta et al. 2022). As SDG reporting is a relatively new agenda, there is limited and mixed evidence on whether the presence of female directors really matters for a firm's SDG engagement and disclosure (see, for example, Arena et al. 2023; Cicchiello et al. 2021; García-Sánchez et al. 2020; Lau and Wong 2022; Pizzi et al. 2021; Rosati and Faria 2019; Zampone et al., 2022). Moreover, within the context of least-developed or emerging economies, there is a notable dearth of empirical evidence examining the relationship between gender diversity and SDGD. Against this backdrop, this study aims to examine the relationship between gender diversity and SDGD in the context of Bangladesh- an emerging economy.[2] This study's scope is focused on the banking sector in Bangladesh, where there is no precise regulatory requirement for minimum number of female representation in the corporate boards.[3] Although women constitute approximately 16 per cent of the banking workforce in Bangladesh, their representation in leadership positions remains disproportionately low (Dhaka Tribune 2022). Indeed, there are still banks that have not appointed any female directors to their boards. Prior studies (e.g. Mazumder and Hossain 2023; Hossain et al. 2021) also raise concerns about gender inequality within corporate settings in Bangladesh. Therefore, it would be intriguing to investigate whether the presence of female directors is associated with banks' SDG initiatives in Bangladesh, as measured by SDGD.

As an emerging economy, Bangladesh grapples with a range of development challenges, including gender inequality, environmental sustainability, and access to quality education and health care. Understanding how businesses in Bangladesh engage with and contribute to SDGs is crucial for addressing these challenges effectively. The banking sector plays a pivotal role in financing sustainable development and directly impacts the achievement of the SDGs (Avrampou et al. 2019; Weber 2019). Unlike other businesses, banking companies are highly regulated in most jurisdictions, and there are increasing expectations for banks to report on their environmental, social, and governance (ESG) performance, including their contributions to the SDGs. Moreover, banking companies have unique characteristics that may influence SDG reporting practices, such as their role in facilitating sustainable finance and engaging with diverse stakeholders.

[1] Throughout this paper, the terms 'SDGD' and 'SDG reporting' are used interchangeably.

[2] Bangladesh is yet classified as a least-developed country (LDC) by the UN. It is one of three countries (including Nepal and Laos) set to graduate to developing country status in 2026 because of consistent economic and social progress. However, the academic literature often addresses the country as an emerging economy or country.

[3] The Bangladesh Corporate Governance (CG) Code-2018 includes a clause for the Nomination and Remuneration Committee (NRC) to formulate a policy on Board diversity encompassing various factors, including age, gender, experience, ethnicity, educational background, and nationality. However, the code notably refrains from stipulating a requirement for minimum number of female representation or mandating the appointment of female directors on corporate boards.

The declaration of the UN Agenda-2030 for SDGs catalysed numerous banking institutions to assess their potential contributions towards achieving these global targets through their operations. A recent study jointly conducted by KPMG and the European Banking Federation (EBF) mentions, 'it is becoming increasingly common to include this [SDGs] information in the corporate reports… this reporting exercise is used as a tool for measuring progress in achieving the commitments acquired and as an accountability tool vis-à-vis stakeholders' (EBF, 2021, p.8). In the context of Bangladesh, earlier studies on social and environmental reporting also demonstrate that the banking industry is the forerunner in providing voluntary disclosures compared to other industries (Bose et al. 2018; Khan et al. 2021; Mazumder and Hossain 2023). Therefore, studying SDG reporting practices within the banking sector in Bangladesh can provide valuable insights into whether banks in Bangladesh embrace this global agenda and contribute to SDGs.

This study makes several contributions. First and foremost, this study provides crucial insights into SDGD trends in Bangladesh's banking sector. Notably, this study stands as an early endeavour within the context of Bangladesh and remains among the scant few within the arena of emerging economies. Lodhia et al. (2022) underscore the pressing necessity for an increased emphasis on country-specific studies on SDGD. There is also an urgency to give close attention to corporate practices related to SDGD in emerging economies where the issue of sustainable development requires serious consideration (Erin et al. 2022). Second, by adopting a multi-theoretical (i.e. agency theory, resource dependence theory and stakeholder theory) perspective that encompasses the various dimensions of the relationship between board gender diversity and SDGD, this study contends that female representation on boards is positively associated with SDGD. As SDGD is a contemporary practice, Zampone et al. (2022) point out that there is a scarcity of research exploring the relationship between board gender diversity and SDGD. Examining firms' internal drivers can provide insights into why businesses engage with sustainability. Board gender diversity, as one of these internal drivers, highlights the importance of exploring its relationship with SDGD. Given the scarcity of studies on SDGD and board gender diversity within the context of emerging economies, this research enriches the existing body of literature on corporate governance and voluntary sustainability disclosure. Third, the study also distinguishes itself by employing automatic content analysis to measure the SDGD. This approach contrasts previous research, which predominantly relied on manual content analysis—a method often criticised for subjectivity. Finally, as an additional analysis, this study sheds light on whether the relationship between board gender diversity and SDGD is subject to the critical mass of female directors in board governance. To the author's knowledge, no prior study addresses whether the critical mass of female directors is a determining factor for corporate sustainability disclosures in Bangladesh.

The article is structured as follows. First, the status and progress of the SDGs in Bangladesh, with a specific focus on the banking industry, are discussed in Sect. "Sustainable Development Goals: Bangladesh context and banking industry". Section "An overview of contemporary research on SDGD" provides an overview of previous research on SDGD. Section "Board gender diversity and SDGD: theoretical framework, literature and hypothesis" outlines the theoretical perspectives employed in this study, highlights relevant literature on board gender diversity and SDGD, and formulates the research hypothesis. Section "Research design" describes the research methodology. The findings and interpretations of the research are presented in Sect. "Empirical analysis and findings". Finally, Sect. "Conclusions and implications" provides the conclusions and implications of the study.

Sustainable Development Goals: Bangladesh context and banking industry

Bangladesh's journey since gaining independence in 1971 has been impressive. From being the second poorest country in the world in 1971, the country has achieved a remarkable transformation and is now regarded as a development miracle (Sawada et al. 2018; World Bank 2021). As soon as the UN announced the SDG agenda, Bangladesh's government (GoB) prioritised the SDGs in its 7th Five Year (2016–2020) national development plans and took several initiatives to implement these goals locally. In 2017, the GoB published the first Voluntary National Review (VNR), followed by SDG Progress Reports in 2018 and 2020. The latest adoption of the 8th Five Year Plan (2021–2025) in 2021 has further emphasised the importance of SDGs and their integration into the development process. Additionally, the establishment of the Apex SDG Implementation and Review Committee has been instrumental in overseeing the implementation of SDGs at the national level, which is supported by implementation committees at the division, district and sub-district levels (UNDP Bangladesh, 2020). So far, Bangladesh has made decent progress in ensuring quality education and responsible production and consumption. There is also moderate progress in reducing poverty and hunger, improving health and well-being, and providing access to clean water and sanitation, among other areas. Moreover, the country has taken significant steps towards developing infrastructure, renewable energy, and sustainable agriculture, which have been crucial in achieving its development goals. The launch of the country's first-ever satellite in 2021 is another indication of Bangladesh's commitment

to modernising its communication and disaster management systems. However, the country still faces challenges in gender equality, climate change, peace, justice, and the strength of institutions. Despite these challenges, Bangladesh's unwavering commitment to achieving the SDGs is evident. The country is making steady progress towards building a more sustainable and equitable future, which is a testament to its impressive journey since gaining independence.

Unlike government-led SDG initiatives, those undertaken by the private sector are less noticeable. However, the exception to this claim is the banking industry, which has been seemingly active and a frontrunner in promoting the sustainability agenda in the private sector. Under the guidance of Bangladesh Bank (hereafter, BB), the country's central bank, the banking sector has been playing a significant role in achieving the SDGs through various initiatives, such as promoting gender equality, investing in renewable energy, and reducing waste and carbon emissions. BB has a long tradition of guiding banks and financial institutions in participating and contributing to broader green banking and sustainability initiatives in conformity with the government's priorities. The journey perhaps began with the issuance of 'Policy Guidelines for Green Banking' in 2011 (BB, 2011). However, BB cited the SDG agenda through the 'Guidelines on Environmental & Social Risk Management (ESRM)' for Banks and Financial Institutions in Bangladesh in 2017 (BB, 2017). Moreover, in its 'Sustainable Finance Policy' issued in 2020, BB further affirmed its commitment to SDGs (BB, 2020).

Hence, the banking companies in Bangladesh have been actively working towards sustainable development through financing green initiatives and reducing carbon emissions. Moreover, banks in Bangladesh have been promoting financial inclusion, which is a crucial enabler for achieving several SDGs, including poverty reduction and economic growth. Overall, the banking industry in Bangladesh is a critical player in the country's efforts to achieve the SDGs, and such efforts are expected to continue and intensify in the coming years.

An overview of contemporary research on SDGD

The emergence of SDGs provides companies an excellent opportunity to integrate sustainability issues into their corporate reports (Erin et al. 2022). To create value for their stakeholders, business organisations should report on SDGs in the twenty-first century (Bebbington and Unerman, 2018, 2020; Pizzi et al. 2022). Hopper (2019) emphasises the need for businesses to measure, monitor, and hold organisations accountable to support the achievement of SDGs. However, Adams et al. (2020) contend that the existing reporting frameworks like the International < IR > Framework, GRI Standards, and the recommendations of the Taskforce on Climate-related Financial Disclosures (TCFD) are not sufficient to report on organisational 'risks and opportunities resulting from sustainable development issues, the implications for value creation (and value destruction) and the implications for and impact on the achievement of the SDGs' (p. 6).

Several recent studies address the issue of corporate SDGD in the context of either developing or developed economies. Gunawan et al. (2020) conducted a content analysis of annual and sustainability reports of Indonesian companies for the year 2016, which revealed that companies primarily focused on SDG-related to sustainable cities and communities, good health and well-being, decent work and economic growth, responsible consumption and production, and quality education. In the South African context, Haywood and Boihang (2021) reviewed the early disclosure of SDGs in the annual reports of the top 100 listed companies for the 2016/2017 and 2017/2018 financial years. They found that a low proportion of companies integrated the SDGs into their business model and strategies. Lodhia et al. (2022) analysed SDGD by the top 50 Australian companies and found that SDGD is in its early stages, with only around half of the companies providing moderate levels of SDGD that lack substantive information. Similarly, Hummel and Szekely (2022) examined SDGD in annual reports for a sample of 600 European firms from of 2015 to 2018. The study, which utilised both automated textual and manual content analyses, showed that while the quantity and quality of SDGD increased during the sample period, there needed to be more quantitative and forward-looking information. Erin et al. (2022) provided empirical evidence of SDG reporting by the top fifty listed companies in Nigeria between 2016 and 2018, finding that Nigerian companies underperformed in SDG reporting. The study identified the lack of regulatory guidance and management apathy as key factors contributing to Nigerian firms' low level of SDG reporting. In the UK context, Botchway and Bradley (2023) conducted interviews and content analyses of SDGD data obtained from a sample of FTSE 350 corporations between the fiscal years 2018 and 2019. The authors claimed that while the current level of SDGD is low, it is gradually increasing. Another recent international study by Bose and Khan (2022) investigated SDG reporting based on the SDG reporting index, which revealed that SDG reporting varies based on individual countries' sustainability regulations and SDG performance ratings. The study evidenced that shareholder-oriented countries displayed higher levels of SDG reporting than stakeholder-oriented ones while developing countries exhibited greater company-level SDG reporting than their developed counterparts.

Most of the above studies are focused on the presence and extent of SDGD and are limited to descriptive analysis. Although the number of studies in this area is growing, further study is warranted, which could provide a more nuanced understanding of the factors that may impact SDGD practices in diverse settings, potentially identifying impetus for improving SDGD practices. Erin et al. (2022) advocate for prioritising research on SDGD in emerging economies, where sustainable development warrants particular attention. The present study heeds this call for further research, examining the extent of SDGD within banking companies in Bangladesh, an emerging economy.

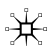
Board gender diversity and SDGD: theoretical framework, literature and hypothesis

Numerous prior studies have examined the role of female directors in corporate economic, social, and environmental performance and their disclosures, drawing on various theoretical frameworks. The most notable among these are agency theory, resource dependence theory, and stakeholder theory. While each of these theories individually offers valuable insights, there is a need to reflect on the multi-dimensionality of the relationship between female board representation and corporate performance. Hence, recent research argued for the multi-theoretical approach while portraying the expected relationship. For example, Gupta et al. (2019) applied a combined agency and resource dependence theory to investigate the impact of female directors on firm performance. Similarly, Kaur et al. (2021) utilised a stakeholder and resource dependence theory to explore the relationship between board diversity and environmental performance. Therefore, this study adopts a multi-theoretical approach that combines these perspectives, providing a more comprehensive and nuanced understanding of the relationship between board gender diversity and SDGD.

According to **agency theory**, the board of directors has a critical role in overseeing and regulating managerial actions on behalf of shareholders, thus reducing information asymmetry (Jensen and Meckling 1976). An effective board composition can minimise information asymmetry between management and investors by providing adequate and relevant disclosures (Mazumder and Hossain 2023). Previous research indicates that female board members exhibit more commitment, diligence, and independence than their male counterparts (Cabedo and Tirado 2004; Virtanen 2012). They are less self-interest-oriented (Coffey and Wang 1998) and more devoted to upholding higher ethical standards in their organisations (Baker et al. 2020; Campbell and Mínguez-Vera 2008). Hence, the increased presence of female board members can minimise information asymmetry and enhance the corporate information environment (Abad et al. 2017; Aribi et al. 2018; Loulou-Baklouti 2023; Temiz and Acar 2023). It is also argued that female directors adopt more trust-building leadership style and greater diligence in monitoring than male directors (Adams and Ferreira 2009; Srinidhi et al. 2011). Vitolla et al. (2020) suggest that women directors pay particular attention to sustainability aspects in their monitoring activities of managers. Cho and Park (2019) echo in the same way and argue that board gender diversity promotes more proactive and strategic approaches to sustainability, enhancing a firm's reputation, trust, and legitimacy. Thus, in line with agency theory, it can be argued that including more female directors on the corporate board can improve corporate accountability and transparency towards achieving SDGs.

Resource dependence theory posits that firms rely on external resources to survive and grow, and the board of directors plays a critical role in bringing and managing those resources (Hillman and Dalziel 2003; Pfeffer and Salancik 2003). Female board members bring unique human and social capital that can influence a company's economic, social, and environmental strategies and performance, enhancing efficiency, legitimacy, and competitive advantage (Haque and Jones 2020). Huse et al. (2009) contend that female board members can strengthen a firm's social capital and social networks by bringing new connections and relationships with stakeholders such as customers, employees, NGOs, and regulators. This may further facilitate acquiring information and resources necessary for contributing effectively to SDGs, such as feedback on stakeholder expectations, industry best practices, and emerging risks and opportunities. According to Ramon-Llorens et al. (2021), the social and human capital of a gender-diverse board has a favourable bearing on strategic business decisions, such as boosting CSR disclosures. Berrone et al. (2019) found that gender-diverse boards were associated with higher levels of engagement in sustainable business networks, which, in turn, enhanced the firms' sustainability practices and disclosures. Female directors possess different and superior personalities, experiences, expertise, innovativeness, leadership, and communication styles than their male counterparts (Radu and Smaili 2022; Tejedo-Romero et al. 2017). The inclusion of women on corporate boards not only promotes gender equality but also enhances the overall effectiveness and performance of the board (Lu and Herremans 2019). Therefore, based on the essence of the resource dependence theory, it can be argued that firms with more gender-diverse boards are likely to engage in sustainable practices and provide more SDGD.

Stakeholder theory suggests that firms address diverse stakeholders' interests beyond just shareholders, including social and ethical concerns (Freeman 1984). Including female directors on the board has been identified as



a potential means of enhancing the firm's sensitivity and responsiveness to stakeholders' needs and expectations by introducing diverse perspectives, values, and experiences into the boardroom (Adams and Ferreira 2009). Arayssi et al. (2016, p. 391) mention that 'participation of women on board is advantageous to the firm's societal conscience'. This may lead to more participatory and inclusive approaches to sustainable development, such as engaging stakeholders in SDG reporting, co-creating sustainability initiatives, and incorporating stakeholder feedback into decision-making processes (Cho and Park 2019). The diverse perspectives and experiences brought by gender diversity on the board may facilitate a more comprehensive and inclusive approach to sustainability, improving the identification and prioritisation of SDGs and stakeholder engagement to achieve them.

In summary, a triangulation of the above theories suggests that female board members minimise information asymmetry, bring new perspectives, skills, and social and human capital to access external resources, and deepen the boardroom concerns for stakeholders that can impact corporate engagement to SDGs and its transparency.

Based on the above theoretical discussion, the study posits the following hypothesis:

H1a Board gender diversity will be positively associated with firms' SDGD

Only a handful of studies have examined the connection between board gender diversity and SDGD. Zampone et al. (2022) conducted a comprehensive analysis using a sample of 526 companies from 39 countries and 10 industry sectors spanning 2017 to 2020. Their findings provide evidence that board gender diversity exerts a positive influence on SDGD. Similarly, Cicchiello et al. (2021) examined a sample of 366 large Asian and African companies that had incorporated the SDGs into their sustainability reports in 2017. Their research reveals a positive association between board gender diversity and SDGD. In contrast, there are other international studies (e.g. Arena et al. 2023; García-Sánchez et al. 2020; Pizzi et al. 2021; Rosati and Faria 2019) that found weak or no significant relationship between SDG reporting and having a higher percentage of women on the board. While the international study provides valuable insights into the relationship between board gender diversity and SDGD, examining such a relationship in an emerging country like Bangladesh is still relevant. The success of SDGs ultimately depends on local implementation and adaptation. Lodhia et al. (2022) emphasise the need for more country-specific studies investigating corporate responses to the SDGs. Moreover, the mixed empirical evidence regarding the relationship between board gender diversity and SDGD in prior research can be attributed to variations in contextual factors, including industry-specific dynamics, policies and cultural norms. Zampone et al. (2022) contend that there may be heterogeneity in SDGD behaviour across various industrial sectors. The mixed findings might also be influenced by the variation in the methodological approaches, such as the subjectivity in SDGD measurement, sample composition and estimation technique used in analysing the relationship between board gender diversity and SDGD. Therefore, an industry-focused longitudinal study with a sophisticated research design can provide objective and robust insight into the relationship between gender diversity and SDGD.

Research design

Sample and data

The sample of this study consists of all banking companies listed in the Dhaka Stock Exchange (DSE) from 2015 to 2020.[4] The chosen sample period commences in 2015, coinciding with the UN's SDGs announcement. In Bangladesh, there were 30 listed commercial banks until December 2020, thus resulting in a final sample size of 180 bank-year observations. All the data were sourced from the published annual reports, which are widely recognised as the primary and most valuable resource for accessing voluntary disclosures. According to Leuthesser and Kohli (1997, p.59), annual reports are the 'most widely available and visible' form of corporate communication with stakeholders. Annual reports provide an inclusive overview of a company's financial and non-financial performance, strategic objectives, as well as risks and opportunities (Gonidakis et al., 2020; Rowbottom and Lymer 2010).

Regression model

To examine the hypothesis formulated in the preceding section, this study employs a regression model for estimation, characterised by the following specifications:

$$\begin{aligned}\mathrm{SDGD}_{i,t} =& \alpha_0 + \beta_1 \mathrm{BGDIV}_{i,t} + \gamma_1 \mathrm{BGSIZE}_{i,t} + \gamma_2 \mathrm{BIND}_{i,t} \\ &+ \gamma_3 \mathrm{ISLAM}_{it} + \gamma_4 \mathrm{SIZE}_{i,t} + \gamma_5 \mathrm{GROWTH}_{i,t} \\ &+ \gamma_6 \mathrm{PROFIT}_{i,t} + \gamma_7 \mathrm{LEV}_{i,t} + \gamma_8 \mathrm{INST}_{i,t} \\ &+ \gamma_9 \mathrm{FOREIGN}_{i,t} + \sum_{j=1}^{5} \delta_j \mathrm{Year}_j + \varepsilon_{i,t}\end{aligned}$$

[4] As evidenced in earlier studies (e.g. Alkayed et al. 2023; Mintah and Gulko 2023), the practice of social and environmental reporting (including SDGD) might have influenced by the COVID-19 pandemic. To avoid any such potential confounding effects, this study limits the sample period up until 2020.

In the context of this analysis, the subscript *'i'* represents individual banks, while the subscript *'t'* corresponds to each respective year. The subsequent subsection furnishes a comprehensive account of the variables used in the above-mentioned model.

A description of variables

Dependent variable SDGD

To accurately quantify SDGD, this paper opted for related 'keywords' as the unit of measurement because it allows for a more focused and precise analysis of a specific topic or theme. Using keywords allows for computer-assisted content analysis techniques to quickly identify and extract keywords from large volumes of text, which is not feasible with sentence or paragraph counting. Moreover, using sentences as a unit of measurement may lead to differences due to grammar and sentence structure, even if the message conveyed is the same (Mazumder and Hossain 2023; Unerman 2000). In order to overcome the subjective nature of the work, this study employs an automatic content analysis technique using the 'Nvivo' software. This approach is preferred over manual content analysis due to its accuracy and reliability (Allini et al. 2016; Mazumder and Hossain 2023). To ensure accurate identification, a list of 21 relevant keywords is developed (see Appendix 1) in line with the UN Charter and prior research (e.g. Hummel and Szekely 2022). Furthermore, 10% of the sample reports is randomly checked to confirm that the content identified by keyword searches is valid SDGD. This rigorous approach ensures the high quality and reliability of the findings.

Research variable: gender diversity

Gender diversity is operationalised as the percentage of female directors on the board and symbolised as 'BGDIV'.

Control variables

Following prior studies on voluntary corporate disclosures (e.g. Bueno et al. 2018; Hossain and Reaz 2007; Lim et al. 2007; Mazumder and Hossain 2023; Pizzi et al. 2021), this study controls for other board characteristics, which include board's size and independence. In addition, in the context of the banking sector in Bangladesh, there are also a good number of Islamic banks which are known to be operated following Islamic Shariah and governed by a Shariah board along with the corporate board of directors (Belal et al. 2019; Mazumder and Sobhan 2021). Hence, this study controls for any possible divergence of SDGD due to the Shariah-based governance style. Control variables are also included to consider the impact of bank size, degree of leverage, growth opportunity, and profitability. The significance of size as a key factor influencing corporate SDGD has been supported in previous studies (e.g. Pizzi et al. 2021; Rosati and Faria 2019). Larger listed banks are anticipated to face more pressure from stakeholders to adhere to SDGs and possess the necessary resources to bear the associated costs of SDG initiatives and disclosures. Subsequently, this study incorporates another essential control variable, namely bank profitability. It is expected that there exists a positive correlation between SDGD and profitability (Pizzi et al. 2021; Rosati and Faria 2019), as banks with higher levels of profitability are inclined to meet stakeholder expectations and maintain trust by engaging in more significant information provision concerning SDGs. Furthermore, such an enhanced level of disclosure may contribute to the retention of competitive advantage and the acquisition of increased legitimacy for the banks. The level of leverage is also included as a controlling variable since banks that have higher levels of leverage are expected to offer higher (lower) levels of voluntary disclosures, such as SDGD, driven by the increased (reduced) pressure from financing (debt) stakeholders (Mazumder 2016, 2017; Mazumder and Hossain 2023). Moreover, in this study, the market-to-book ratio measures a bank's growth opportunity (Elshandidy and Neri 2015). When firms experience growth, they often encounter higher levels of information asymmetry and agency costs (Gaver and Gaver 1993). Consequently, banks with substantial growth potential may address the information asymmetry between internal and external stakeholders by providing extensive voluntary disclosures (Ben-Amar et al. 2017; Elshandidy et al. 2018; Radu and Smaili 2022). On the contrary, an opposing viewpoint suggests that firms with more growth potential might refrain from disclosing voluntary information to avoid higher proprietary costs and protect their business confidentiality (Chen et al. 2014; Liu 2015).

This study includes two ownership-related control variables, institutional and foreign share ownership, for the sampled banks. Previous research (García-Sánchez et al., 2020; McCahery et al. 2016) suggests that institutional investors actively contribute to the demand for SDGD due to their extensive business and CSR awareness, technical knowledge and bargaining power. The contrary argument is that institutional investors may negotiate for direct access to private information, thereby reducing firms' urgency to disclose voluntary information to the public (Laidroo 2009). The literature also extensively documents the influence of foreign institutional investors on the companies' voluntary disclosure (García-Sánchez et al., 2020). Foreign investors generally demonstrate a higher level of concern and demand for transparency from investee firms (Choi et al. 2013; García-Sánchez et al., 2020). García-Sánchez et al. (2020) find a positive association between foreign ownership and SDGD. A summary of all variables with their measurement basis is provided in Table 1**.**

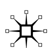


Table 1 Variables' description

Variable	Measure	Description
SDGD	Sustainable development goals disclosure	Number of SDGD keyword in the annual report narratives counted using automated content analysis tool (i.e. Nvivo 12 Software)
BGDIV	Board gender diversity	Percentage of female directors in the board
BSIZE	Board size	Total number of directors in the board
BIND	Board independence	Percentage of independent directors in the board
ISLAM	Islamic Shariah governance	Dummy variable which takes '1' if the bank is operated following Islamic Shariah principle, otherwise '0'
SIZE	firm size	Size of the bank measured by natural logarithm of the total number of employees
GROWTH	Growth opportunity	Ratio of market to book value of equity
PROFIT	Profitability	Percentage of net profit after tax to total assets
LEV	Leverage	Percentage of total debts to total assets
INST	Institutional shareholdings	Percentage of total institutional shareholdings
FOREIGN	Foreign shareholdings	Percentage of total foreign shareholdings

Table 2 SDGD from 2015 to 2020

Year	Obs	Mean	Median	SD	Min	Max
2015	30	0.733	0.000	1.574	0	7
2016	30	2.067	0.000	2.900	0	9
2017	30	3.800	2.000	4.795	0	17
2018	30	7.100	3.000	11.164	0	47
2019	30	12.500	4.000	17.234	0	59
2020	30	16.433	5.000	24.314	0	108
2015–2020	180	7.106	2.000	14.210	0	108

Empirical analysis and findings

Descriptive statistics and correlation matrix

Table 2 presents the SDGD over the sample period (2015–2020) among listed banks in Bangladesh. The results indicate a consistent upward trend in the mean SDGD over the years, albeit starting from a relatively low level of disclosures in the earlier years. Recent studies on SDGD in both developed and developing contexts also observe similar findings (see Botchway and Bradley 2023; Erin et al. 2022; Haywood and Boihang 2021; Lodhia et al. 2022). As mentioned earlier, BB briefly referenced its commitment to the Sustainable Development Goals (SDGs) in 2017 in the 'Guidelines on Environmental & Social Risk Management (ESRM)' for Banks and Financial Institutions in Bangladesh (Bangladesh Bank 2017), which perhaps pushed the banks to become more committed to SDGs and their disclosure in the recent years. The gradual increase in SDGD can also be attributed to the emerging nature of the concept and its recognition among companies worldwide. There is no widely accepted framework for SDGD yet, nor are there any legal obligations compelling businesses to provide information related to the SDGs. Hence, companies have exercised voluntary discretion in disclosing their SDG-related activities and progress. In the context of an emerging economy, Erin et al. (2022) argue that a lack of commitment from management and an absence of regulatory enforcement contribute to the limited scale of SDGD.

Table 3 presents the descriptive statistics for the main variables (both research and control variables) explored in this study. The average percentage of female members on the board (referred to as 'BGDIV') is 11.47%, implying that, on average, one out of every ten board members is female. This finding is consistent with previous research (Mazumder and Hossain 2023; Hossain et al., 2021), highlighting concerns about gender inequality within corporate settings in Bangladesh. The board of directors, denoted as 'BSIZE', represents the number of directors in each bank. On average, a board consists of approximately 14 directors, with a minimum of 6 and a maximum of 21. Around 20% of the board members are classified as independent directors ('BIND'). Furthermore, 23% of the banks operate under the Islamic-shariah system (represented by the dummy variable 'ISLAM').

The bank size, indicated by 'SIZE', reflects the average number of employees in each bank, which equals 3,599

Table 3 Descriptive statistics

Variable	Obs	Mean	Median	Std. Dev	Min	Max
BGDIV	180	11.473	8.712	10.697	0.000	42.857
BSIZE	180	13.611	14.000	4.081	6.000	21.000
BIND	180	19.579	16.667	8.536	6.667	55.556
ISLAM	180	0.233	0.000	0.424	0.000	1.000
SIZE	180	7.983	7.866	0.620	6.122	9.832
GROWTH	180	1.050	0.797	1.199	-0.339	9.532
PROFIT	180	0.722	0.785	0. 788	-4.250	2.080
LEV	180	95.990	92.741	17.927	88.082	203.544
INST	180	19.254	19.542	9.992	0.000	57.060
FOREIGN	180	5.406	0.375	13.286	0.000	63.176

(log-transformed mean 7.983). The mean profitability value, denoted as 'PROFIT', reveals an average profitability rate of only 0.72%. The mean value of 'LEV', which measures the percentage of debt to total assets, is approximately 96%. This high value is expected, given that banks heavily rely on deposits to finance their operations. The mean value of 'GROWTH', representing the ratio of market to book value of equity, is 1.050, suggesting minimal growth opportunities within the banking sector in Bangladesh. Institutional investors hold an average ownership percentage (referred to as 'INST') of 19.25% in banks, while foreign ownership (denoted as 'FOREIGN') averages at 5.41%, with a relatively high standard deviation of 13.29, indicating substantial variation in foreign ownership across banks. The means and standard deviations of all the aforementioned explanatory variables closely align with the statistics reported in recent studies conducted on banking companies in Bangladesh (see, for example, Mazumder and Hossain 2023).

Table 4 presents Pearson's correlation matrix, illustrating the pairwise correlation coefficients between the variables. In line with hypothesis *H1a*, a statistically significant positive correlation is observed between 'SDGD' and 'BGDIV' at the 1% level ($r=0.221$, $p<0.01$). Notably, none of the correlation coefficients among the explanatory variables exceeds the threshold of 0.90. This typically indicates the absence of multi-collinearity concerns, which is crucial for the subsequent regression analysis discussed in Sect. "Regression analysis".

Regression analysis

The regression results are reported in Table 5. The regression model exhibits a satisfactory fit with an adjusted R-squared of 20.0%. Additionally, the F-statistics are significant. All t-statistics are accounted for heteroskedasticity, and year-fixed effects are controlled using dummy variables.

The results reveal a significant positive relationship ($b=0.407$, $p<0.01$) between 'SDGD' and 'BGDIV', indicating that banks with a higher proportion of female directors tend to exhibit greater SDGD. This finding supports hypothesis *H1a* and aligns with the theoretical underpinnings of agency, resource dependence, and stakeholder theories, as discussed in Sect. "Board gender diversity and SDGD: theoretical framework, literature and hypothesis". Hence, it can be contended that the effective monitoring, heightened stakeholder concerns, and valuable resources (including social and human capital) brought by female directors, such as contemporary ideas, expertise, and knowledge, significantly contribute to the awareness and commitment to SDGs.

Regarding the control variables, three variables ('BSIZE', 'GROWTH' and 'INST') exhibit a statistically significant relationship with SDGD. The reasonably significant positive relationship between board size (as indicated by 'BSIZE') and SDGD ($b=0.446$, $p<0.10$) indicates banks with larger board sizes engage with more SDGD. Also, based on the negatively significant relationship between a bank's growth opportunity (as indicated by 'GROWTH') and SDGD ($b=-1.441$, $p<0.05$), it can be argued that growing banks tend to provide comparatively lower levels of SDGD to avoid higher proprietary costs and protect their business confidentiality (Chen et al. 2014; Liu 2015). Finally, the analysis shows that banks with greater institutional ownership (as indicated by 'INST') disclose significantly less information regarding SDGs in the context of the banking industry in Bangladesh, which supports the argument that institutional investors in banking companies may negotiate for direct access to private information, thereby increasing information asymmetry and reducing firms' willingness to communicate on SDGD. It is also possible that institutional investors in the context of the emerging economy may prioritise short-term financial returns and profitability over long-term sustainability and social responsibility, which leads to a negative relationship with SDGD.

Further robustness checks

The validity and reliability of research findings hinge upon accurate and robust statistical analysis. Adopting appropriate

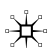


Table 4 Pearson's correlation matrix

	SDGD	BGDIV	BSIZE	BIND	ISLAM	SIZE	GROWTH	PROFIT	LEV	INST	FOREIGN
SDGD	1										
BGDIV	0.221***	1									
BSIZE	0.0524	− 0.270***	1								
BIND	0.0963	0.300***	− 0.364***	1							
ISLAM	− 0.0569	0.0370	0.2238***	0.0124	1						
SIZE	0.0974	-0.127*	0.192***	0.277***	− 0.0219	1					
GROWTH	− 0.00113	0.245***	− 0.0280	0.253***	0.2604***	0.209***	1				
PROFIT	0.0460	− 0.207***	0.245***	0.156**	− 0.2881***	0.386***	0.112	1			
LEV	− 0.0849	0.271***	− 0.301***	− 0.0708	0.3607***	− 0.522***	− 0.165**	− 0.850***	1		
INST	− 0.0910	0.182**	0.0629	− 0.152**	0.0996	− 0.249***	− 0.136*	− 0.0520	− 0.0200	1	
FOREIGN	− 0.0844	0.0573	− 0.164**	0.142*	0.4232***	0.0438	− 0.0942	− 0.573***	0.673***	− 0.210***	1

***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively

Table 5 Results of regression analysis

Variable	Model coef	*t*-stat
Dependent variable SDGD		
BGDIV	0.407***	2.98
BSIZE	0.446*	1.74
BIND	0.126	0.90
ISLAM	1.373	0.48
SIZE	− 2.126	− 0.97
GROWTH	− 1.441**	− 2.14
PROFIT	− 1.381	− 0.68
LEV	− 0.223	− 1.55
INST	− 0.329***	− 3.05
FOREIGN	− 0.017	− 0.16
Constant	34.549	1.15
Year-fixed effect	Included	
N	180	
adj. R-sq	0.200	
Prob > F	0.000***	

Statistics are robust to heteroskedasticity-corrected standard errors

***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively

methods to handle common challenges encountered in statistical analysis, such as heteroskedasticity and serial correlation, is crucial. While heteroskedasticity-corrected standard errors have become ubiquitous in linear regression models (Baum et al. 2010; Petersen 2009), more is needed to ensure the accuracy and robustness of the findings (Baum et al. 2010). Hence, this study further incorporates clustering effects in regression analysis using one-way clustering (based on banks) and two-way clustering (based on banks and years). Utilising the cluster-robust covariance matrix considers arbitrary correlations among errors within clusters of observations, thereby ensuring the accuracy of the statistical analysis (Baum et al. 2010). According to Cameron and Miller (2015), negligence to control for clustering in regression estimation can result in underestimated standard errors and inflated statistical significance. First, one-way clustering (based on banks) is employed to address this issue to adjust the standard errors, mainly to account for potential serial correlation in the longitudinal panel dataset. The results presented in Table 6 demonstrate that the positive relationship between 'BGDIV' and 'SDGD' remains statistically significant. Among the control variables, institutional shareholdings still have a significant negative relationship with SDGD. To further strengthen the robustness of the analysis, this study conducts regression analyses using two-way (bank-wise and year-wise) clustering. This approach considers the possibility of serial correlation within banks and cross-sectional correlation across banks during the same period. As

Table 6 Robustness test: one-way and two-way clustering effect(s)

Variable	One-way clustering		Two-way clustering	
	Coef	*t*-stat	Coef	*t*-stat
Dependent variable SDGD				
BGDIV	0.407***	2.66	0.407*	1.91
BSIZE	0.446	1.33	0.446	1.49
BIND	0.126	0.81	0.126	1.36
ISLAM	1.373	0.33	1.373	0.40
SIZE	− 2.126	− 0.74	− 2.126	-0.79
GROWTH	− 1.441	− 1.50	− 1.441	− 1.31
PROFIT	− 1.381	− 0.70	− 1.381	− 0.54
LEV	− 0.223	− 1.38	− 0.223	− 1.06
INST	− 0.329***	− 2.65	− 0.329**	− 2.39
FOREIGN	− 0.017	− 0.14	− 0.017	− 0.18
Constant	34.549	0.91	34.549	0.84
Bank-wise clustering	Yes		Yes	
Year-wise clustering	No		Yes	
Year-fixed effect	Included		Included	
N	180		180	
adj. R-sq	0.200		0.200	
Prob > F	0.000***		0.000**	

Statistics are robust to heteroskedasticity-corrected standard errors and clustering effect(s)

***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively

accounting and finance research often deals with panel data structures that exhibit both cross-sectional and serial correlation, prior studies (e.g. Petersen 2009; Sun et al. 2018) recommend using two-way cluster-robust standard errors to handle such data. As reported in Table 6, the results remain primarily consistent with the initial findings and support this study's hypothesis (*H1a*).

Endogeneity concern and system GMM

One potential concern in regression analysis (Moussa et al. 2023; Okoyeuzu et al. 2021) is the endogeneity of the relationship between board gender diversity and voluntary sustainability disclosures. For instance, a bank's organisational culture and values may influence both board-gender diversity and its commitment to SDGD. Furthermore, pursuing a specific SDG, such as SDG 5 (gender equality), can introduce a reverse causality scenario. In such a context, a bank that places a strong emphasis on SDG 5 may proactively seek to diversify its board with a gender-inclusive approach, recognising that a diverse board can contribute significantly to achieving gender equality within the organisation. This dynamic underscores the potential reverse causality between 'BGDIV' and 'SDGD'. A test based on the Durbin–Wu–Hausman estimate is conducted to check the endogeneity. The test fails to reject ($p = 0.5588$) the null hypothesis, which means variables are exogenous. Nevertheless, to ensure further robustness, this study re-estimates the empirical model using an alternative estimation method, commonly known as the system (dynamic) generalised method of moments (GMM). The system GMM estimator is a powerful econometric tool that can produce unbiased and efficient estimates in the presence of endogeneity, heteroscedasticity, and unobserved heterogeneity (Ramon-Llorens et al., 2021; Roodman 2009). For panel data, Ullah et al. (2018) evidenced that the GMM model better controls for unobserved heterogeneity, simultaneity and dynamic endogeneity. A vital element of this estimation is that it relies on a collection of internal instruments within the panel (Wintoki et al. 2012).

In order to assess the validity of the instruments, two specification tests are conducted: the Arellano–Bond (AR) test for serial correlation of the error term and the Hansen J test for over-identification restrictions. As reported in Table 7, the null hypothesis for AR(1) is rejected, implying the presence of first-order autocorrelation. In contrast, the null hypothesis for AR(2) is not rejected, indicating the absence of second-order correlation. Furthermore, Hansen's J test for over-identification restrictions does not yield statistically significant results, suggesting that the instruments are valid. Regarding the relationship between 'BGDIV' and 'SDGD', the main findings still hold in terms of the significance and direction of the relationship.

Additional analysis: a critical mass of female directors on the board

A critical mass of female directors refers to the minimum number of female representatives on a board of directors to significantly impact the business decision-making processes and outcomes. This concept has gained considerable attention recently, particularly in promoting gender diversity and inclusion in corporate boards. Erhardt et al. (2003) mention that a critical mass of female directors is required to overcome the marginalisation and tokenism that can occur when women are under-represented on corporate boards. The male-dominant culture exerts pressure on women in these positions, and when their numbers rise, decision-making may be influenced by coalitions and alliances (Kanter 1977). A critical mass of women on a board of directors can lead to improvements in board dynamics, such as increased communication, greater collaboration, and enhanced monitoring and oversight (Adams and Ferreira 2009; Campbell and Mínguez-Vera 2008; Terjesen et al. 2009). Most studies suggest that a minimum of three female directors is necessary to change board behaviour, decision-making, and communication significantly (Konrad et al. 2008; Moussa et al. 2023; Radu and Smaili 2022; Torchia et al. 2011). This number is based on the idea that

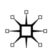


Table 7 Robustness test: one-step and two-step system GMM

Variable	One-step		Two-step	
	Coef	*t*-stat	Coef	*t*-stat
Dependent variable SDGD				
$SDGD_{_lagged}$	1.141***	4.47	1.060***	4.37
BGDIV	0.196***	3.17	0.174**	2.16
Control variables	Included		Included	
Year-fixed effect	Included		Included	
No. of group/observations	30/150		30/150	
No. of instruments	20		20	
Prob > *F*	0.000***		0.000***	
AR (1) *p-value*	0.028**		0.053*	
AR (2) *p-value*	0.350		0.401	
Hansen *p-value*	0.491		0.491	

(1) Statistics are based on robust standard errors with Windemeijer's finite sample correction (2) ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively

a minority presence of one or two females may be perceived as tokenism or symbolic representation. In contrast, more women can provide a more diverse and representative perspective to enhance the board's decision-making processes (Kramer et al. 2006). In the context of SDGD, a critical mass of women directors can be particularly significant in promoting sustainability and social responsibility in corporate decision-making and relevant disclosures. In the context of an emerging economy like Bangladesh, which is historically characterised by gender disparities in corporate leadership, attaining a critical mass of female directors might be instrumental in driving positive societal change and enhancing corporate social accountability. Hence, this study further examines whether a critical mass of female directors is required to find a significant association between 'BGDIV' and 'SDGD' in the banking companies in Bangladesh. In line with prior studies, the following hypothesis is framed:

H1b A critical mass of at least three female directors will be positively associated with SDGD

As reported in Table 8 (column 1), SDGD is negatively associated with the presence of a maximum of one female on the board ($b = -6.289$, $p < 0.05$). Interestingly, there is no significant association between this representation and SDGD for two females on the board (column 2). However, as reported in column (3), the finding changes when at least three females are on the board. In such a case, there is a significant positive relationship ($b = 10.886$, $p < 0.05$) between female presence on board and SDGD. The results support the above hypothesis (*H1b)* and are consistent with the same in prior studies (Cabeza-García et al., 2018; Radu and Smaili 2022; Torchia et al. 2011). Therefore, it can be concluded that a critical mass of three or more female directors enhances a company's commitment to sustainable practices and SDGD in the context of banking companies in Bangladesh.

Conclusions and implications

This study examined the level of SDGD in Bangladeshi banking companies and explored its relationship with board gender diversity. Based on the theoretical proposition of agency, resource dependence, and stakeholder theories, the study hypothesised a positive relationship between gender-diversified boards and SDGD.

Analysing longitudinal data (2015–2020), this research shows a consistent increase in SDGD among the sample banks. The study evidences a significant positive relationship between board gender diversity and SDGD. The results remain consistent after conducting robustness tests, including one-step and two-step system (dynamic) GMM estimations. Such finding supports the idea that a greater presence of female directors, with their effective monitoring, stakeholder concern, accountability, and provision of social and human capital (including expertise, contemporary knowledge, and networks), is linked to a higher likelihood of SDG initiatives and disclosures. Previous studies on the relationship between board gender diversity and SDG reporting yield mixed evidence. While some studies (e.g. Cicchiello et al. 2021; Zampone et al., 2022) find a compelling positive relationship, others (Arena et al. 2023; García-Sánchez et al. 2020; Pizzi et al. 2021; Rosati and Faria 2019) report weak or no relationship. Therefore, employing automated content analysis and robust statistical techniques, this study contributes to the ongoing SDG reporting discourse by providing additional insights from the banking industry in Bangladesh. Furthermore, this study finds that a critical mass of three female directors is necessary to observe a significant positive association between board gender diversity and SDGD.

The study has several academic, managerial and policy implications. First, the study encourages further research in this intriguing area of SDGD in the context of emerging economies like Bangladesh. Research on narrative SDGD not only presents inherent challenges but also offers broader opportunities, primarily stemming from its qualitative nature. Conventional manual content analysis proves less efficient in handling extensive sets of voluminous annual reports and is susceptible to the researcher's subjectivity. This study overcomes such limitations by using automated content analysis. Second, the positive relationship between board gender diversity and SDGD within the banking sector in Bangladesh has broader implications for promoting

Table 8 Additional analysis: SDGD and critical mass of female directors

Variable	(1)		(2)		(3)	
	Coef	*t*-stat	Coef	*t*-stat	Coef	t-stat
Dependent variable SDGD						
One female	− 6.289**	− 2.00				
Two female			− 0.901	− 0.25		
Three female					10.886**	2.46
Control variables	Included		Included		Included	
Year-fixed effect	Included		Included		Included	
Bank-wise clustering	Yes		Yes		Yes	
N	180		180		180	
adj. *R*-sq	0.176		0.139		0.211	
Prob > *F*	0.000***		0.000***		0.000***	

Statistics are robust to heteroskedasticity-corrected standard errors and bank-wise clustering effect

***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively

In line with previous research (Ben-Amar et al., 2017; Radu and Smaili, 2022), the presence of a sufficient number of female on the board is assessed through the utilisation of three dummy variables. The variable 'One female' is assigned a value of '1' when there is a maximum of one female on the board and '0' otherwise. Similarly, the variable 'Two female' is assigned a value of '1' when there are two female on the board and '0' otherwise. Lastly, the variable 'Three female' is assigned a value of '1' when there are at least three female on the board and '0' otherwise

gender diversity as a means to enhance sustainability efforts. Banks should prioritise efforts to increase female representation on boards, recognising it as a key driver for advancing sustainable practices. Third, the early evidence on the level of SDGD may also offer stimuli for BB and the Bangladesh Securities and Exchange Commission (BSEC) to consider issuing specific guidance to streamline SDGD in the interest of stakeholders. Bangladesh's corporate governance code 2018 does not set any requirement for the minimum number of female board representatives. Hence, the findings of this study provide compelling evidence for the BB and BSEC to consider mandating the inclusion of females (at least three) on the board of directors. This move would not only align with the global push for gender diversity but also serve as a strategic step towards enhancing sustainable practices within the banking sector.

This study does have limitations. First and foremost, the analysis is limited to publicly traded commercial banks. As a result, the findings may cautiously be generalised to organisations in non-financial sectors. Second, as an early exploratory study, this research examines SDG-related keywords in annual reports as a proxy for business commitment and contribution to SDGs, which is subject to the relevant SDG information available through annual reports. While the study has limitations, it opens up avenues for future research. Extending the analysis beyond listed commercial banks to include non-financial industries would provide a broader picture of corporate engagement with SDGD. Additionally, future research should focus on a more meaning-oriented analysis of SDGD, going beyond keyword counts to explore the quality of SDG reporting, such as discourse analysis. Field research, such as interviews with bank officials responsible for SDG initiatives, could also offer valuable insights into understanding the motivations and challenges of engaging with the SDGs. Last but not least, investigating the social and economic consequences of SDGD, such as its impact on the cost of capital and firm value, would be fruitful areas for future research.

Appendix

"SDG" "SDGs" "Sustainable-Development-Goal" "Sustainable-Development-Goals" "No-Poverty" "Zero-Hunger" "Good-Health-and-Well-being" "Quality-Education" "Gender-Equality" "Clean-Water-and-Sanitation" "Affordable-and-Clean-Energy" "Decent-Work-and-Economic-Growth" "Industry-Innovation-and-Infrastructure" "Reduced-Inequality" "Sustainable-Cities-and-Communities" "Responsible-Consumption-and-Production" "Climate-Action" "Life-Below-Water" "Life-On-Land" "Peace-Justice-and-Strong-Institutions" "Partnerships-for-the-Goals"

Declarations

Conflict of interest The author declares no conflict of interest regarding this research.

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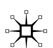

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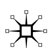

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