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Board Information Technology Expertise and Digital Sustainability Reporting: A Study on Listed Banks of Bangladesh

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Abstract

Digital Sustainability Reporting (DSR) has become a valuable tool in improving transparency, accountability, and communication with stakeholders, driven by the growing adoption of digital technologies in the field of sustainability reporting. However, there is limited evidence on how board level information technology (IT) expertise contributes towards digital sustainability reporting in emerging economies like Bangladesh. The purpose of this paper is to examine the impact of Board Information Technology (IT) Expertise on Digital Sustainability Reporting (DSR) of the listed commercial banks in Bangladesh. The quantitative research design was used and secondary data were taken from the banks listed in Dhaka Stock Exchange (DSE) during 2020-2025. Descriptive statistics, Pearson correlation and multiple regression analysis were used for the data analysis. The results reveal that the IT competence of the boards has a positive correlation with digital sustainability reporting, although the relationship is relatively weak. The capital adequacy ratio has significant negative relationship while the other control variables, board independence, female directors and firm size, have significant positive effects. The study is an extension to the literature on corporate governance and sustainability reporting and focuses on board-level technological knowledge as an emerging governance capability that can be used to support digital reporting. The results also offer real-world guidance to regulators, policy makers and banks seeking to improve digital governance and disclosure of sustainability issues in Bangladesh.

Keywords: Board IT Expertise, Digital Sustainability Reporting, Corporate Governance, Digital Governance, Dhaka Stock Exchange, Bangladesh

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Introduction

The role of financing industrial activities, encouraging investments and supporting sustainable growth is high on the agenda of banking sector for economic development activities. In recent years, sustainability reporting has become a part of corporate governance, driven by the increasing demands for transparency from shareholders and other stakeholders regarding activities around environmental, social and governance (ESG). At the same time, digital sustainability reporting has proven to be a valuable method to share sustainability data via corporate websites, online sustainability reports, digital platforms and other electronic communication channels. In recent years, researchers have

documented substantial improvements in the accessibility, transparency, timeliness and credibility of sustainability reporting as a result of the use of digital technologies to communicate ESG information to a variety of stakeholders (Pizzi et al. 2023; Appiah-Kubi et al. 2024).

Green banking and sustainability reporting are gaining momentum as activities in emerging economies where banks are expected to take on an environment protection role and advance social development. Bangladesh Bank (BB) introduced various policy measures to promote sustainable finance, green banking and environmental risk management practices in banks and financial institutions. Such initiatives have prompted the commercial banks to implement sustainable banking practices, environmental risk management systems, refinance schemes, digital banking services, and sustainability disclosure practices (Khairunnessa, Vazquez-Brust & Yakovleva, 2021). However, newer studies also suggest that corporate governance, technological advancement, and environmental disclosure are gaining momentum as key factors to sustainable performance in the banking sector of Bangladesh (Lin & Qamruzzaman, 2023; Hossen et al., 2024).

These developments have hastened the growth of online banking infrastructure, digital financial services, online reporting, and technology-based sustainability reporting. With digital transformation ongoing with banks, boards of directors are now called upon to manage technological innovation, cyber-security, digital reporting systems and technology related strategic decisions. As such, the Board Information Technology (IT) expertise has become a valuable governance asset. These directors with educational background, experience, or expertise in information technology and digital systems are better equipped to contribute to digital governance, boost information systems, better manage cybersecurity and communicate with stakeholders via digital platforms. Studies on corporate governance in recent years highlight the need for directors to be technologically skilled in order to manage technological risks, as well as to successfully implement digital transformation and enhance the effectiveness of the governance system (Oehmichen et al., 2023; Abraham et al., 2024). In addition, good IT governance has been identified as one of the key factors for digital capability, innovation, and sustainable organisational development (Almaqtari et al., 2024). Thus, board IT expertise could be a force to enhance the quality, transparency, availability and timely delivery of digital sustainability reporting.

While sustainability information is now being increasingly shared digitally, the quality and impact of digital sustainability reporting has been found to be very uneven among banks. Some of these differences may be due to differences in corporate governance arrangements and the skills of individual board members. In the digital age, technological knowledge is growing in significance at board level, where organisations need expertise to enable them to manage digital reporting systems, sustainability data management, technological innovation and communication with the stakeholders. However, boards, especially in emerging markets, often lack technological expertise. The existing literature has primarily concentrated on sustainability reporting from an overall ESG disclosure perspective and on the traditional governance attributes, including board independence, board size, gender diversity, and financial expertise (Githaiga & Kosgei, 2023; Yahaya, 2025).

From this point of view, prior study in the context of Bangladesh has been mainly concerned with the practice of Green Banking, environmental risk management, regulatory measures, and the disclosure of sustainability. For instance, Khairunnessa et al. (2021) explored the implementation of green banking practices in Bangladesh and introduced the activities of Bangladesh Bank for sustainable finance. Recently, Hossen et al. (2024) examined the impact of corporate governance on the sustainability practices of banks in Bangladesh. Furthermore, the existing literature focused on sustainability disclosure from a general perspective rather than on an in-depth analysis of sustainability reporting in the digital sphere. There has been less focus on the potential for board-level IT skills to help promote transparency, increase the quality of online disclosure, enhance the communication with stakeholders and strengthen digital reporting systems. Thus, there is a research gap about the linkage between board information technology (IT) experience and digital sustainability reporting in the banking industry of Bangladesh. In order to address this gap, the current study intends to delve into this issue and understand how IT experienced directors influence the digital sustainability reporting of listed banks in Bangladesh.

Literature Review

Digital Sustainability Reporting and Digital Transformation

Digital sustainability reporting is a part of organisations' digital transformation. The adoption of technologies like artificial intelligence, blockchain, cloud computing, digital platforms and the use of artificial intelligence and digital platforms can enhance the transparency, accessibility and credibility of ESG disclosures (Pizzi et al., 2023; Appiah - Kubi et al., 2024; Hyk et al., 2026). There is a strong relationship between this change and organisations' digital transformation in general. The use of digital technologies in organisations enables organisations to gather and analyse sustainability information more efficiently, enhance the quality of their reporting, boost internal controls and disseminate ESG information via websites, interactive reports, ESG dashboards and other digital channels. In this context, digital technologies today are a strategic asset for transparency and sustainable business activities (Abaker et al., 2026; Pizzi et al., 2023).

Recent research indicates that organisations with better digital skills are better at sustainability reporting. According to Abaker et al. (2026), sustainable computing and digital infrastructure can help to build more reliable ESG reporting systems. Likewise, Hyk et al. (2026) noted that technologies like artificial intelligence, machine learning, blockchain, cloud computing, and iXBRL enhance the gathering and tracking of sustainability data, as well as its transparency and accuracy. Similarly, Pizzi et al. (2023) demonstrated that Sustainable Enterprise Resource Planning (S-ERP) systems can enhance the quality of reporting by incorporating environmental data into business processes; and Alharasis (2026) identified that XBRL can increase the accuracy, completeness, comparability, transparency and timeliness of environmental, social and governance (ESG) reporting.

But technology is not sufficient to ensure better sustainability reporting. Appiah-Kubi et al. (2024) conclude that digitalisation for enhancing sustainability reporting is limited to organisations with high sustainability competence. They also demonstrated that the integration of green knowledge and pressure from stakeholders further strengthen this relationship. The results indicate that the use of digital technologies and the capacity for the appropriate managerial skills and governance are necessary for successful sustainability reporting. This is especially crucial in the banking industry where banking activities and customers' services are increasingly digitized. Banks need to make sustainability information available with transparency and in response to the increasing expectations of their stakeholders. Digital technology has enhanced the methods of communication of sustainability information, making it more interactive and accessible for banks (Almasri & Sunoco, 2023). Likewise, according to Volfová (2024), banks are increasingly adopting interactive reporting formats, visual presentations and integrated ESG indicators to enhance the digital sustainability communication.

Digital transformation also increases the benefits of sustainability reporting. Alroud (2025) revealed that the positive relationship between sustainability reporting and financial reporting quality in banks gets strengthened with the implementation of digital transformation. Similarly, Triyani (2024) found that sustainability reporting has a positive effect on the value of the firm in commercial banks. The results indicate that digital technologies can have positive impacts on the quality of reporting but they can also help to increase transparency and confidence in both organizations and stakeholders.

Board Information Technology Expertise and Digital Sustainability Reporting

The rising digital transformation puts more value in board IT expertise as a governance resource. There is a growing body of research indicating that IT-related directors are more likely to be able to manage and oversee digital strategy, the digital reporting system, IT investments and cybersecurity (Abraham et al., 2024; Oehmichen et al., 2023).

Board IT expertise is about board members with educational or professional background or a specific knowledge or experience in information technology, information systems, cybersecurity, software engineering, data analytics, digital innovation or related areas. These directors have a better ability to lead digital strategy, assess digital technology spending, oversee digital security threats and

enhance digital reporting systems. With more technology at the center of sustainability reporting, board IT skills are being drawn upon to build sustainability disclosures that are more quality, credible and transparent. According to Abraham et al. (2024), boards must have a director who possess technological and business skills to manage cyber risks, innovation and emerging technologies. Likewise, Oehmichen et al. (2023) found that boards are increasingly looking to fill seats with digital experts to help leverage their oversight of digital transformation and technology-enabled change in today's organizations.

Technological expertise also appears to enhance disclosure practices of organizations. Within the company, disclosure of financial information is expedited by firms that have IT-expert Chief Executive Officers, as well as by firms with boards that have technology committees. Haislip et al. (2020) suggest that technological expertise helps to facilitate disclosure processes and corporate transparency. While their study is based on financial reporting, the results indicate that digital sustainability reporting would be beneficial in the same way. This is further underscored by research that correlates technology governance and innovation with technology governance and sustainability. The findings by Almaqtari et al. (2024) highlight the importance of incorporating digital capabilities into the decision-making process at the board level, as this will be essential to the success of IT governance in driving innovation, supporting FinTech adoption, and reinforcing sustainability oriented strategies in banking.

In addition to IT experience, previous research also demonstrates the importance of specialized board knowledge for sustainability performance and reporting. Della Corte et al. (2024) demonstrate that industry experience enhances ESG strategies with environmental innovation and Iliev and Roth (2023) prove that sustainability expertise boosts environmental and social outcomes of the firms. Similarly, Fitriasisari and Soewarno (2024) provide evidence that board financial expertise positively affects the sustainability reporting, while Yahaya (2025) shows that characteristics of the board, including the size, independence and diversity of gender, affect the quality of sustainability reporting. In combination, these studies indicate that the expertise of board specialists enhances board effectiveness and decision making for sustainability issues.

This is also true for the banking industry. The study by Mehedi et al. (2024) indicates that board diversity, the presence of experienced Chief Executive Officers, accounting professionals and sustainability committees have a significant positive effect on the sustainability disclosure of commercial banks in Bangladesh. The study does not focus directly on IT expertise, but indicates that specific board expertise helps improve transparency of sustainability. Furthermore, the evidence from the emerging economies is still limited, especially in the context of Bangladesh. Based on this, the above discussion suggests the following hypotheses:

H₁: IT expertise on the board positively influences digital sustainability reporting in listed banks in Bangladesh.

H₂: Banks with higher levels of IT expertise on the board disclose higher-quality digital sustainability information.

Corporate Governance Characteristics and Digital Sustainability Reporting

It is generally accepted that corporate governance plays an important role in the sustainability reporting initiatives of the companies, as it affects transparency, accountability and disclosure practices of the companies (Alta'any et al., 2026; Yahaya, 2025). Board independence is one of the most studied characteristics of the board. Independent directors should enhance the quality and effectiveness of monitoring, limit managerial opportunism and enhance the quality of disclosure. This is supported by the findings of Githaiga and Kosgei (2023), Hossen et al. (2024) and Yahaya (2025) which indicate that board independence has a positive effect on sustainability reporting and sustainability practices. However, the evidence is not consistent. The impact of independent directors is either negative (Alta'any et al., 2026) or mixed (Sarkar, 2022) in Bangladesh, indicating that the effect of independent directors varies depending on the institutional and organizational environment.

Size of the board is another important aspect. However, larger boards can bring greater expertise, different perspectives and more stakeholders into the decision-making process that may

help to make better sustainability decisions. Alta'any et al. (2026), Hossen et al. (2024) and Farida and Purwanto (2021) show positive correlation between the board size and disclosure of sustainability or green banking. Githaiga and Kosgei (2023), on the other hand, suggest that smaller boards can work better as they can make decisions faster. Similarly, Sarkar (2022) and Citraningtyas et al. (2024) do not find any significant correlation, indicating that the effectiveness of boards is more related to board members' expertise in utilizing expertise than on the size of the board. There has been more focus on board gender diversity. It is believed that female directors have more stakeholder orientation and focus on environmental and social aspects. Yahaya (2025) and Hossen et al. (2024) have found that gender diversity enhances sustainability reporting and sustainability practices. But the finding of Alta'any et al. (2026) and Citraningtyas et al. (2024) does not show any significant relation, while Sarkar (2022) shows negative relation in Bangladesh. Given the mixed signals, it is not clear that the representation of women directors is enough to make a difference unless they have a say in making decisions on the boards.

Board characteristics are also included as control variables, as they have been found to influence an organization's capacity to invest in sustainability efforts and reporting systems, in addition to financial factors related to the firm. Larger companies tend to have more resources and have more expectations from stakeholders, so that the disclosure of sustainability information is better (Farida & Purwanto, 2021). There is also a relationship between financial strength of the organisation and their ability to support sustainability reporting. Citraningtyas et al. (2024) conclude that financial performance positively affects green banking disclosure and Triyani (2024) indicates that sustainability reporting improves the firm value. In the banking industry, Non-Performing Loans (NPL) and Capital Adequacy Ratio (CAR) are significant metrics for assessing the financial well-being of banks. The findings of Citraningtyas et al. (2024) indicate that banks with lower NPLs and higher capital adequacy share more green banking information, which indicates that financial stability banks have more capacities to invest in green banking programs and digital reporting systems.

Recent research also highlights that governance mechanisms be considered as a network, not as single entities. Moses et al. (2020) identify a range of governance mechanisms that have the potential to enhance sustainability reporting, through increasing stakeholder responsiveness, monitoring and accountability. Likewise, Hossen et al. (2024) demonstrate that board independence, board size, gender diversity, audit committees and risk management committees are collectively significant for improving sustainability practices in Bangladeshi Banks. To this end, this study focuses on the impact of the following five board governance characteristics (Board size, Board independence, Board female directors, Firm size, Return on Assets, Non-performing loan ratio, and Capital adequacy ratio) on digital sustainability reporting in the case of listed banks in Bangladesh.

H₃: Board governance characteristics significantly influence digital sustainability reporting practices in listed banks in Bangladesh.

Research Gap

Previous research demonstrates that the fields of corporate governance and sustainability reporting are growing closer and closer to digital transformation. Although these progressions have been made, there are still a number of crucial research gaps.

First, the previous studies have primarily focused on digital sustainability reporting from a technological or organizational outlook, focusing mainly on digital reporting technologies, sustainable computing, XBRL and digital infrastructure (Pizzi et al., 2023; Alharasis, 2026; Abaker et al., 2026). In contrast, there is limited focus on the governance capability that underpins the sustainability reporting process in a digital era, especially the role of corporate boards.

Second, while board expertise has garnered more interest, previous research has primarily concentrated on the financial expertise, industry expertise, and sustainability expertise (Fitriasari & Soewarno, 2024; Della Corte et al., 2024; Iliev & Roth, 2023; Yahaya, 2025). The influence of research on board IT on digital sustainability reporting has been under-explored, with the majority of research focusing on cybersecurity, digital innovation, technology governance and reporting efficiency (Haislip et al., 2020; Abraham et al., 2024; Oehmichen et al., 2023).

Third, research on green banking, disclosures on environmental, social and governance (ESG), financial reporting quality or overall sustainability has been the primary focus of banking sector studies (Khairunnessa et al., 2021; Citraningtyas et al., 2024; Alroud, 2025; Suhardjo et al., 2024). Similarly, though there are studies that have investigated the link among the corporate governance attributes and sustainability reporting, the outcomes are inconclusive across different institutional environments (Githaiga & Kosgei, 2023; Hossen et al., 2024; Yahaya, 2025; Sarkar, 2022; Citraningtyas et al., 2024; Alta'any et al., 2026). The gaps identified suggest the necessity for additional research on digital sustainability reporting, especially in the banking industry.

Lastly, while Bangladesh has experienced substantial strides toward sustainable finance and green banking, prior research primarily has focused on green banking practices, sustainable performance and overall corporate governance (Khairunnessa et al., 2021; Lin & Qamruzzaman, 2023; Hossen et al., 2024; Mehedi et al., 2024). To the authors' best knowledge, there is currently no empirical study that concentrates on the linkage between Board Information Technology (IT) expertise and digital sustainability reporting in listed commercial banks in Bangladesh.

Research Methodology

Research Design

The research approach used in this study is quantitative research that focuses on the relationship between Board-level Information Technology Expertise (ITE) and Digital Sustainability Reporting (DSR) in listed banks of Bangladesh. A quantitative approach is suitable because the study seeks to statistically test the relationships between governance variables and sustainability reporting that are measurable. The use of similar quantitative methods has been prevalent in recent studies on sustainability reporting, corporate governance and banking performance (Githaiga & Kosgei, 2023; Hossen et al., 2024). The study is explanatory in nature as it aims to investigate the causal impact of board IT expertise on digital sustainability disclosure practices.

The panel data research design is used with observations for listed commercial banks during the period 2020–2025. Panel data are well suited to research that uses them to analyse variation in the performance of firms as well as over time, especially in corporate governance and sustainability reporting research. The recent studies that examined the characteristics of the board and sustainability reporting also used panel data designs to provide more solid empirical evidence (Githaiga & Kosgei, 2023; Citraningtyas et al., 2024; Yahaya, 2025).

Population and Sample

All the banks included in Dhaka Stock Exchange (DSE) of Bangladesh are considered as the population of the study. Since the study includes all listed banks, a census approach is adopted rather than a sampling technique. Based on the reasons mentioned above, similar methods of census based approach have been adopted in a few studies related to banking sector (Mehedi et al., 2024; Hossen et al., 2024). Banks included in the study were those that were traded on the DSE and had accessible annual reports, sustainability reports and corporate governance reports and made enough disclosures on board composition and sustainability related activities. The final dataset comprises 216 bank-year observations covering 36 banks over the 6-year period (from 2020 to 2025). The panel dataset is unbalanced because data availability varies across banks and years.

Data Sources

All the secondary data used in the study are from various reliable sources such as annual reports, corporate governance reports, official websites of listed banks and database of Dhaka Stock Exchange (DSE). This kind of secondary data sources has been widely adopted by the recent studies on sustainability reporting and corporate governance in banking sector (Mehedi et al., 2024; Hossen et al., 2024; Githaiga & Kosgei, 2023).

Data about boards' characteristics, financial performance and sustainability disclosure practices is hand-collected and systematically coded. Digital sustainability reporting is measured through the creation of a disclosure index based on content analysis of the annual report,

sustainability report and digital platforms of the sample banks. Content analysis has been frequently used in studies on sustainability disclosure due to its ability to analyse and measure the level of corporate sustainability disclosure from publicly released information (Citraningtyas et al., 2024; Mehedi et al., 2024).

Model Specification

A panel regression model is estimated to investigate the effect of the board's IT expertise on digital sustainability reporting:

$$DSR_{it} = \beta_0 + \beta_1 ITE_{it} + \beta_2 BS_{it} + \beta_3 BI_{it} + \beta_4 FD_{it} + \beta_5 FS_{it} + \beta_6 ROA_{it} + \beta_7 NPL_{it} + \beta_8 CAR_{it} + \varepsilon_{it}$$

Panel regression is used as it provides the opportunity for simultaneous analysis of cross sectional and time-series variations and also controls for governance and firm specific factors that can affect sustainability reporting. Panel regression models are also used in previous studies that investigate the relationship between sustainability reporting and the corporate governance in banking industry (Githaiga & Kosgei, 2023; Hossen et al., 2024; Citraningtyas et al., 2024; Yahaya, 2025).

Table-1: Measurement of Variables

Variable	Symbol	Measurement
Digital Sustainability Reporting	DSR	Percentage of total disclosure score obtained
Board IT Expertise	ITE	Percentage of directors who have IT related qualifications or professional experience
Board Size	BS	Total number of directors on the board
Board Independence	BI	Percentage of independent directors
Female Directors	FD	Percentage of female directors on the board
Firm Size	FS	Natural logarithm of total assets
Return on Assets	ROA	Net profit divided by total assets
Non-Performing Loan Ratio	NPL	Bad loans divided by total loans
Capital Adequacy Ratio	CAR	Regulatory capital divided by risk-weighted assets

Digital Sustainability Reporting (DSR) is the dependent variable measured by a disclosure index that includes fifteen indicators, broken down into online sustainability reports available, interactive reports/PDFs, ESG dashboards or website disclosures, data visualization tools, green finance disclosure, carbon emission disclosure, energy consumption disclosure, waste management disclosure, employee welfare, training and development, community development, anti-corruption policy, sustainability committee, risk management disclosure and ESG policy. The value of each item disclosed is 1 and the value of each item not disclosed is 0. The final DSR index is the percentage of the total of the items disclosed to 15. The independent variable in this study is Board IT Expertise (ITE), which is defined as the percentage of the board of directors who have educational degrees or work experience in information technology, computer science, information systems, cyber security, data analytics or related areas. And the other variables such as Board Size (BS), Board Independence (BI), Female Directors (FD), Firm Size (FS), Non-Performing Loan Ratio (NPL) and Capital Adequacy Ratio (CAR) are control variables.

Table 2: List of Hypotheses

Hypothesis No.	Hypothesis Statement
H ₁	IT expertise on the board positively influences digital sustainability reporting in listed banks in Bangladesh.
H ₂	Banks with higher levels of IT expertise on the board disclose higher-quality digital sustainability information.
H ₃	Board governance characteristics significantly influence digital sustainability reporting practices in listed banks in Bangladesh.

Data Analysis Techniques

Data collected are analysed using Statistical Package for the Social Sciences (SPSS). The characteristics of the variables are summarized with descriptive statistics such as mean, standard deviation, minimum value and maximum value. Pearson correlation analysis is carried out to explore the relationships between variables and possible multicollinearity issues. Finally, a multiple linear regression using panel data is used to analyse the influence of Board IT Expertise on Digital Sustainability Reporting while accounting for governance and firm-specific factors.

Results and Analysis**Descriptive Statistics**

The study comprises of 216 Bank-Years observations (36 Banks × 6 years) for the selected listed banks for the study period. Descriptive statistics provide an overview of the distribution and central tendency of the study variables.

Table 3: Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
DSR Index	216	0.0667	1.0000	0.4253	0.3400
IT Experts on Board (%)	203	0.0000	5.0000	0.0682	0.3539
Board Size	203	5.0000	21.0000	13.7044	4.7357
Board Independence (%)	203	0.0526	1.0000	0.2199	0.1539
Female Directors (%)	203	0.0000	0.4286	0.1372	0.1072
Firm Size (Ln Assets)	208	22.9471	28.4311	26.4840	0.8750
Profitability (ROA)	207	-5.9900	1.7400	0.2559	0.6788
NPL Ratio	205	-0.0005	64.6400	4.1978	8.0758
Capital Adequacy Ratio	203	-1.7195	18.2300	6.3267	6.9010

Source: Constructed from gathered data (FY2020-2025)

Table 3 presents descriptive statistics for all variables which shows that there is significant variation across the sampled banks in terms of the level of sustainability disclosure. The average DSRI score of 0.4253 indicated that there is a moderate level of sustainability disclosure of commercial banks of Bangladesh which is 42.53%. There were substantial inter- and intra-year differences in disclosure practices, with minimum DSRI scores of 6.67% and maximum DSRI scores of 100%. The average percentage of IT experts was 6.82% on the board, indicating somewhat limited IT expertise at the board level in banks. The mean size of the board was 13.70 directors with independent directors representing 21.99% of the board size. On average, 13.72% of board directors were female. The mean size of the firm, in natural log total assets, was 26.48. The standard deviations for profitability, NPL ratio and Capital Adequacy Ratio(CAR) were relatively high, which means that there was a lot of variation between the banks sampled.

Correlation Analysis

Pearson correlation analysis was performed to check for any possible multicollinearity issues and to investigate relationships between variables.

Table 4: Correlation Matrix

Variables	DSRI	BITE	BS	BI	FD	FS	ROA	NPL	CAR
DSRI	1.00								
ITE	0.105	1.00							
BS	-0.226*	0.072	1.00						
BI	0.321*	0.018	-0.490*	1.00					
FD	0.230*	0.037	-0.210*	0.026	1.00				
FS	0.376*	0.049	-0.059	0.122	-0.057	1.00			
ROA	-0.232*	0.088	0.263*	-0.316*	-0.178*	-0.108	1.00		
NPL	-0.096	-0.037	-0.131	0.108	-0.137	0.073	-0.255*	1.00	
CAR	-0.448*	0.061	0.235*	-0.254*	-0.241*	-0.034	0.489*	0.416*	1.00

Source: Constructed from gathered data (FY2020-2025)

Table 4 reports the Pearson correlation matrix. There was a positive correlation between DSRI and IT expertise(ITE) at the board level ($r = 0.105$) but the association was not statistically significant ($p = 0.136$). However, the relationship between having more IT experts and reporting more sustainability information is relatively weak, suggesting that banks with more IT experts are more likely to report sustainability information. There is a positive and statistically significant correlation between the board independence and the DSRI ($r = 0.321$, $p < 0.001$), meaning that the greater the independence of the board, the higher the degree of sustainability disclosure.

Likewise, the presence of female directors is associated positively with DSRI ($r = 0.230$, $p < 0.001$), implying gender diversity has a positive impact on the sustainability reporting practices. Banks with larger size are more likely to provide DSRI, with the strongest positive correlation being found between firm size and DSRI ($r = 0.376$, $p < 0.001$). On the contrary, profitability shows a significantly negative correlation with DSRI ($r = -0.232$, $p < 0.001$) and the capital adequacy ratio too shows a negative correlation with DSRI ($r = -0.448$, $p < 0.001$). The correlation between NPL ratio and DSRI is negative, but not statistically significant ($r = -0.096$). As for multicollinearity, the correlation coefficients do not exceed the accepted value of 0.80. So, multicollinearity does not seem to be a problem.

Regression Analysis

To test the effect of Board IT Expertise on sustainability disclosure, multiple linear regression analysis was performed, taking into account the variables related to the board and bank-specific variables.

Table 5 Model Summary and ANOVA Results

Statistic	Value
R	0.647
R Square	0.419
Adjusted R Square	0.394
Std. Error of Estimate	26.845
ANOVA	
F Statistic	Significance
17.103	$p < 0.001$

Source: Constructed from gathered data (FY2020-2025)

Table 5 summaries the model and ANOVA results. The model produced an R^2 value of 0.419, indicating that approximately 41.9% of the variation in sustainability disclosure reporting is explained by the independent and control variables included in the model. The Adjusted R^2 value of 0.394 suggests that the model retains substantial explanatory power after adjusting for the number of predictors. The ANOVA results demonstrate that the regression model is statistically significant ($F = 17.103$, $p < 0.001$). Therefore, the independent variables collectively explain a significant proportion of variation in sustainability disclosure reporting.

Table 6 Regression Coefficient Results

Variable	Beta	t-value	Sig.	Result
IT Experts on Board (%)	0.101	1.808	0.072	Weak Support
Board Size	0.006	0.085	0.932	Not Supported
Board Independence (%)	0.164	2.468	0.014	Supported
Female Directors (%)	0.167	2.841	0.005	Supported
Firm Size	0.369	6.532	<0.001	Supported
Profitability (ROA)	0.114	1.130	0.260	Not Supported
NPL Ratio	0.120	1.409	0.161	Not Supported
Capital Adequacy Ratio	-0.478	-4.301	<0.001	Supported (Negative)

Source: Constructed from gathered data from (FY2020-2025)

Table 6 reveals the findings that Board IT Expertise has a positive coefficient ($\beta = 0.101$), which means that an increase in IT expertise on the board helps to positively affect sustainability disclosure. The relationship is not statistically significant at 5% ($p = 0.072$), however. However, the result is statistically significant at the 10% level, meaning that there is weak evidence to support the proposed relationship. Board independence is a significant determinant of sustainability disclosure ($\beta = 0.164$, $p = 0.014$) and has a positive sign. The discovery implies that independent directors improve transparency and accountability and promote sustainability reporting.

The results also reveal that the impact of female directors on sustainability disclosure is positive and significant with the coefficient of 0.167 and p-value of 0.005, suggesting that the presence of female directors has a positive effect on disclosure practices.

The size of the firm has a significant positive relationship with sustainability disclosure ($\beta = 0.369$, $p < 0.001$). These findings indicate that the size of the bank is related to the resources available to the bank and to expectations that are higher from stakeholders, which leads to more comprehensive sustainability reporting. The results indicate that neither profitability nor NPL ratio have significant impact on sustainability disclosure because their p-values are greater than the commonly accepted cut-off for significance. The capital adequacy ratio has a significant negative correlation with sustainability disclosure ($\beta = -0.478$, $p < 0.001$). This suggests that the banks with higher capital adequacy ratios were less likely to provide sustainability information in the study period.

Table 7: Summary of Findings

Hypothesis No.	Hypothesis Statement	Statistics	Decision
H ₁	IT expertise on the board positively influences digital sustainability reporting in listed banks in Bangladesh.	$\beta = 0.101$, $p = 0.072$	Partially supported
H ₂	Banks with higher levels of IT expertise on the board disclose higher-quality sustainability information.	Positive correlation between ITE & DSR ($r > 0$)	Partially supported
H ₃	Board governance characteristics significantly influence digital sustainability reporting practices in listed banks in Bangladesh.	BI: $p = 0.014$ (+), FD: $p = 0.005$ (+), BS: Insignificant	Supported

Discussion

The study examined whether the board's IT competence has any effect on the digital sustainability disclosure reporting or not. The descriptive statistics showed that the mean score for the Digital Sustainability Reporting Index (DSRI) was around 42.53 percent. This means that the level of sustainable disclosure practices of the listed banks in Bangladesh is moderate. There was substantial variation between banks indicating that disclosure quality, disclosure practices, governance mechanisms and the institutional commitment to sustainability reporting varies. The results indicate that there are relatively few directors that are knowledgeable about information technology in the banking industry. This result is in line with the results of Hyk et al. (2026) and Volfová (2024), which state that organisations have different levels of maturity in digital transformation and reporting. Likewise, Diener and Špaček (2020) noted that there is still a lot of variability in the digital sustainability reporting of banks.

The regression analysis also revealed that the board's IT competence has a positive effect on the sustainability disclosure reporting. The coefficient of the IT expertise of board directors was positive ($\beta = 0.101$), indicating a positive association between having more IT-skilled board members and providing more sustainability information. But this correlation was not significant at the usual 5 percent level ($p = 0.072$). However, the result was just slightly past the 10 percent threshold for significance, suggesting a weak indication of the proposed relationship. This discovery aligns with that of Abraham et al. (2024), who claim that the directors who have technological knowledge improve board supervision and assist digital transformation. It also provides backing for Haislip et al. (2020), who reported that firms with IT-expert executives and required IT committees on their boards are more likely to make timely disclosures. Similarly, Pizzi et al. (2023) state that digital technologies enhance the quality of sustainability reporting by making the reporting process more effective. The result suggests that the presence of technological knowledge on the corporate boardroom can help to create better sustainability reporting, though to a lesser extent than the other governance and organizational factors.

The results also indicate that having an independent board is positively associated with digital sustainability reporting. This finding aligns with Githaiga and Kosgei (2023), Hossen et al. (2024), and Yahaya (2025) who found that independent directors contribute to strengthening monitoring, enhance the quality of governance and foster transparent sustainability disclosure. Likewise, female directors have a positive and statistically significant impact on digital sustainability reporting. This corroborates the results of Githaiga and Kosgei (2023), and Yahaya (2025) which show a positive correlation between gender diversities and sustainability reporting. It is not the same as Alta'ny et al. (2026) which did not observe any significant association. The difference may reflect variations in institutional environments, governance structures and regulatory frameworks across countries.

In contrast, digital sustainability reporting is not significantly affected by board size. This result is consistent with Citraningtyas et al. (2024) which found a positive correlation, but is contrary to the findings of Farida and Purwanto (2021) and Alta'any et al. (2026) who obtained positive correlation, as well as Githaiga and Kosgei (2023) who obtained negative correlation. These mixed results indicate that the effectiveness of the board is more dependent on the ability of the individual directors and quality of the board's governance than on the size of the board.

Digital sustainability reporting is significantly positively correlated with firm size, which is in line with Farida and Purwanto's (2021) and Citraningtyas et al. (2024) studies. Sustainability disclosures are more likely to be provided by larger banks, which typically have larger resources, more sophisticated reporting systems and more pressure from stakeholders. This compares favourably with profit and non-performing loan (NPL) ratios which do not significantly affect digital sustainability reporting, indicating that disclosure practices may be more related to governance rather than to immediate financial outcomes. It is interesting to note that there is a reverse relationship between the capital adequacy ratio (CAR) and the digital sustainability reporting, compared to Citraningtyas et al. (2024). One potential reason is that financial stability and regulatory compliance

could be the top priorities for banks that have larger regulatory capital, potentially driving a preference away from voluntary digital sustainability reporting.

The current study makes a novel contribution to the literature in a number of significant respects. First, it explores digital sustainability reporting which is a specific field of sustainability reporting, which has been studied less than other types of reporting, such as general sustainability reporting, green banking reporting and ESG reporting generally, and especially in emerging economies. Second, it adds Board IT Expertise as the prime explanatory factor and takes into account the traditional traits of boards of governance. Third, it creates a new angle on the linkage between board IT expertise and digital sustainability reporting among the listed commercial banks in Bangladesh. The results indicate that the impact of board IT competence remains to be seen, but technology competence in the board of directors can contribute to a more robust sustainability reporting in the digital domain, as well as technology-related corporate governance.

Implications

Theoretical Implications

This study builds on the existing literature on corporate governance and digital sustainability reporting to show that board level technological competence is a key governance capability in the digital era. Although the Board IT expertise is not a strong driver, the results indicate that it could reinforce the digital sustainability reporting beyond the effects of traditional governance traits. This reflects the increasing significance of the role of digital skills in the governance research as organisations become more dependent on technology-based reporting systems.

The results also highlight that digital sustainability reporting is influenced not only by technological infrastructure but also by governance capabilities. Instead, good digital reporting requires arrangements to ensure that the boards are properly informed on digital transformation, digital risk and disclosure on sustainability matters of digital. This study provides empirical evidence on the possibility of expanding governance and sustainability reporting research to the non-developed markets and offers a starting point for further research into the digital capabilities of boards in other institutional environments.

Practical Implications

The results have several implications for practice: for banks, regulators, investors and other stakeholders. First, banks need to improve their board's technological capabilities by recruiting directors who have experience in IT, digital transformation, cyber security or data analytics. This kind of expertise can help in digital governance, digital technology risk management and the digital sustainability reporting process.

Second, Bangladesh Bank and other regulatory bodies could consider introducing a dimension of digital competence in the upcoming corporate governance guidelines, criteria for appointing directors and training sessions for effective digital governance and reporting. The favourable effect of board independence and female directors further indicates that enhancing the governance processes can enhance transparency and sustainability reporting.

Third, bank management should not consider digital sustainability reporting as a compliance issue. Quality digital reporting can be used to better communicate with stakeholders, create greater transparency and accountability, boost the bank's reputation and build investor trust in the bank's sustainability pledges. Last but not least, investors, shareholders and other stakeholders are advised to take IT expertise on the board together with other governance attributes into account when assessing a bank's digital readiness, governance quality, transparency and sustainability performance over the long-term.

Research Limitation and Future Research Direction

Limitations

There are a number of limitations to this study. Firstly, it uses only secondary data from annual and sustainability reports that can be subject to reporting bias and incomplete reporting. And the assessment of IT skills for boards is derived from publicly available profiles which may not necessarily capture real IT skills. The study also considers only listed commercial banks in Bangladesh and so results cannot be generalized to the other financial institutions in the country or to the financial sector. The Digital Sustainability Reporting Index assesses disclosure quantity instead of sustainability performance. Finally, the study adopts the pooled regression analysis method in SPSS, without the use of advanced panel data techniques (such as Fixed Effects, Random Effects and GMM) which may have restricted the control of unobserved heterogeneity.

Future Research Directions

Future research could extend this study in several directions. Such as, researchers could examine a larger sample covering other financial institutions and non-financial sectors to determine whether the relationship between board IT expertise and digital sustainability reporting varies across industries. Also future studies could use a longer observation period and more advanced panel-data techniques like Fixed Effects, Random Effects or dynamic panel models. Other governance variables which could be included in the future studies are audit committees, ESG committees, ownership structure and CEO duality. Furthermore, Researchers could employ primary data through surveys or interviews with directors and senior managers to obtain a more comprehensive assessment of actual IT expertise and digital governance practices.

Conclusions

This study investigates how IT expertise in the board of listed banks relates to digital sustainability reporting in the context of Bangladesh. The results reveal a moderate level of sustainability disclosure which has a high degree of variation between banks. The effect of board expertise on digital sustainability reporting is positive, but relatively weak, whereas board independence, female directors and firm size have more impact on disclosure quality. Other financial characteristics (like profitability and NPL ratio) are not important factors. The study overall points to the potential of enhancing board governance (in particular digital skills, independence and gender representation) to foster transparent and sustainable reporting in the banking sector. This indicates the need for greater attention on digital governance capabilities to boost long-term sustainability and accountability by regulatory bodies and banks.

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