

Green Banking Practices, Social, Health, and Environmental Disclosures and Bank Financial Performance: The role of Innovations and Corporate Governance

Abstract

Regulators in the banking industry in Sub-Saharan Africa (SSA) region are progressively concentrating on corporate innovation and bank social, health and environmental disclosures (BSHED) as crucial corporate governance (CG) structures to improve bank financial performance (BFP). Nonetheless, it is unclear whether corporate innovation and BSHED can lead to an improvement in BFP. Understanding these crucial relationships can help regulators and banking practitioners to design and implement sustainable strategies that can enhance BFP. This paper seeks to bridge this gap by investigating the effects of corporate innovation and BSHED on BFP and examine whether corporate governance mechanisms moderate these relationships. Through the lens of a multi-theoretical perspectives, the study conducts fixed-effects, and a dynamic two-step system generalized method of moments models over a dataset of 2,785 observations (220 banks) from 16 Sub-Saharan Africa countries between 2007 and 2022. The findings show that corporate innovation has a positive effect on BSHED and BFP. The study detects that corporate innovation has a positive association with BFP. We find that BSHED is positively related to BFP. The study identifies and tests possible moderators of these associations. We observe that CG mechanisms positively moderate these relationships. Finally, we establish that the predicted associations vary across different operating periods. The findings help stakeholders including corporate boards, executives, and regulators to understand how innovation investments and internal governance structures such as CG mechanisms are associated with BSHED and BFP.

Keywords: Green banking; corporate governance; corporate innovation; social, health and environmental initiatives; bank financial performance

1 Introduction

The 2030 Agenda for Sustainable Development (UN, 2015) and the subsequent 2015 Paris Climate Agreement brought sustainability issues, among others, environmental degradation, deforestation, natural resource use, poverty, social equity, health and carbon emissions, to the fore of company activity (Lo & Sheu, 2007; Ioannou & Serafeim, 2015). Indeed, stakeholders have increasingly demanded that companies across sectors substantively invest in sustainability activities (Ioannou & Serafeim, 2015; Fink, 2020; 2022;) and improve the disclosure of sustainability related information (EU, 2021; Chithambo et al., 2022). Consequently, and given the competitive global environment, companies across sectors, including the banking sector, are undertaking a range of sustainability activities and publicly disclosing the information to meet stakeholder expectations (Jo et al., 2015; Cornett et al., 2016; KPMG, 2017; Grey et al., 2024; Nguyen et al., 2024) and enhance competitive advantage and firm performance (Eccles et al., 2014; Khan et al., 2016). The banking sector has an indispensable role in the sustainable development agenda, both through their green lending activities which influence clients' environmental impacts (Cowton & Thompson, 2000; Jo et al., 2015; Tian et al., 2023), their own green banking activities (Srouji et al., 2023), and investments in social equity and health within local communities (Stephens & Skinner, 2013). In this context, and over the last few decades, a key question that has been raised and debated, but remains unclearly answered, is whether engagement with sustainability activities enhances a firm's financial performance.

Numerous academics have aimed to understand the link between sustainability activities and firm performance in the corporate context (e.g., Ioannou & Serafeim, 2015; Du et al., 2011; Nizam et al., 2019). However, a recent literature by Rahi et al. (2024) shows that the results are not conclusive and are particularly elusive in capitalist economies. In the context of the banking sector, whilst the literature is not as extensive as in the corporate context, similar results are reported (Simpson & Kohers, 2002; Soana, 2011; Jo et al., 2015; Cornett et al., 2016; Nizam et al., 2019; Moufty et al., 2021). Whereas some studies report positive effects of sustainability activities on bank performance (e.g., Srouji et al., 2023, Bose et al., 2021; Weber, 2017, Cornett et al., 2016; Jo et al., 2015, Mallin et al., 2014), others find mixed results (e.g., Moufty et al., 2021) or no significant relationship between the two (Soana, 2011). Although some of these studies

focused on developing countries (Srouji et al., 2023, Bose et al., 2021), we lack sufficient evidence on the impact of sustainability activities on bank performance. Moreover, we lack understanding of how green banking innovation and sustainability disclosure, particularly social, health and environmental disclosure, influence bank performance.

In this study, we seek to contribute to research on bank sustainability initiatives and performance by focusing on the impact of banking innovation on bank social, health and environmental disclosure (BSHED) and bank performance in Africa. Following Bose et al. (2021: 163), we consider green banking innovation as the ‘bank’s focus on sustainability, resource efficiency, and environmental friendliness in both its internal operations and external engagement’. This involves the bank’s investments in new services and processes that are geared towards improved environmental and social sustainability, for example via green lending policies and easy accessibility by its customers and employees (Bose et al., 2021; Srouji et al., 2023). BSHED derives from the desire by the banks to demonstrate accountability towards sustainable development to gain legitimacy (Cowton & Thompson, 2000). We suggest that both green banking innovation and BSHED would affect bank performance via improvements in competitive advantage and improved efficiency (Aguilera-Caracuel & Ortiz-de-Mandojana, 2013; Ioannou & Serafeim, 2015; Resende et al., 2019), enhanced reputation and improved sales (Du et al., 2011; Ioannou & Serafeim, 2015) and reduced cost of capital (Lo & Sheu, 2007; Ng & Rezaee, 2015) and better employee productivity (Delmas & Pekovic, 2018). At the same time, we suggest that green banking innovation would influence BSHED, that is, innovative banks would engage in greater disclosure to differentiate themselves from counterparts enhancing their reputation and consequently financial performance. In this context, we examine the direct effects of green banking innovation on bank financial performance (BFP). We also investigate whether BSHED mediates the impact of green banking innovation on BFP. Finally, we explore the moderating role of corporate governance (CGI) on association among green banking innovation, BSHED and BFP. The literature has shown that CG structures affect organisational outcomes (e.g., Ntim, 2016; Areneke et al. 2023). To this extent, we expect that the impact of green banking innovation and BSHED on BFP will be dependent on the quality of bank CG.

Our motivation is underpinned by the rationale that the banking sector plays an indispensable role in the sustainable social and environmental development agenda, both through their lending activities (Cowton & Thompson, 2000; Tian et al., 2023), their own green banking activities and investments in social equity and health within local communities (Stephens & Skinner, 2013) and improvements in their internal operations (Srouji et al., 2023). While there is some research on how these bank sustainability activities affect performance in western countries (e.g., Weber, 2017) and in Asian countries (Bose et al., 2023; Srouji et al., 2023), we still lack understanding of the effects in Africa. Yet, there is evidence to suggest that banks in Africa invest in sustainability activities (e.g., Olekanma et al., 2024; Adu and Roni, 2024; Bhuiyan et al., 2025). Nonetheless, we lack evidence of the role of green banking innovation on both BSHED and bank performance. In a systematic literature review, Adjei-Mensah et al. (2024) reveals that there is neglect of this area of research in Africa, especially in areas such as BSHED. The existing studies have either focused on environmental disclosures only (Saa et al., 2025) or on the impact of corporate governance on corporate health accounting (Ntim, 2016). Additionally, these studies have tended to exclude banks from their samples. Moreover, Africa, particularly sub-Saharan Africa, is unique in terms of the socio-economic context — high social inequity, high poverty, low health outcomes, and experience environmental challenges, for example climate change, resource depletion and environmental degradation (Lwesya, 2025). The banking sector plays a substantial role in addressing these challenges by promoting sustainable development. This makes a focused analysis of the effects of green banking innovations and BSHED on bank performance important. The findings of the study reveal that corporate innovation positively influences both BSHED and bank financial performance (BFP). The study further detects a positive association between corporate innovation and BFP and finds that BSHED is also positively related to BFP. In addition, the study identifies and tests potential moderators of these relationships. The results show that corporate governance (CG) mechanisms positively moderate these associations. Finally, we establish that the predicted relationships vary across different operating periods.

Our study makes several contributions to existing literature. First, whereas previous studies examine the direct effects of green banking innovation on financial performance (Weber,

2017; Bose et al., 2021; Srouji et al., 2023), we extend this work by providing evidence, not only on the direct effects of green banking innovation, but also on how these effects are mediated by BSHED. That is, green banking innovation influences BFP via its effects on BSHED.

Second, distinct from prior work on CG mechanisms, corporate innovation and BSHED (Malhotra & Singh, 2009; Ntim, 2016, Kuzma et al., 2020; Khalifaturafi'ah, 2023; Adu & Roni, 2024), we examine the moderating impact of CG mechanisms on the green banking innovation-BSHED, green banking innovation-BFP and BSHED-BFP relationships. Research on the effect of CG structures on these relationships remains uncommon or non-existent.

Third, unlike prior work that examine country-level samples, our present cross-country analysis shows that the effects of green banking innovations and BSHED on firm performance are universal, not country-specific. This approach to the analysis aid in addressing the inconclusive evidence in some of the prior research (e.g., Weber, 2017; Moufty et al., 2021). Related to this, our work extends work relating to the social, health and environmental disclosure in Africa (Ntim 2016, etc.) by investigating the impacts of performance rather than their determinants thus providing additional insights into sustainability issues on Africa. Finally, in a set of additional analyses, we assess whether the predicted relationships differ in (i) pre-SDGs and post-SDGs periods. The results of these reveal that the impact of adoption of SDGs on these relationships differ. Together, the study further contributes to our understanding of an under-researched domain regarding the effect of CG mechanisms on these key relationships and guiding not only banking practitioners but also policy makers in the SSA region.

The rest of this paper is organised as follows. Section 2 discusses the theoretical framework, followed by a review of previous literature and hypotheses development in Section 3. Section 4 describes the research methodology. Section 5 presents the results, and Section 6 concludes the study.

2 Theoretical framework

Despite the growing interest of banks and scholars in innovation and social, health and environmental disclosures in the last two decades (Saa et al., 2025; Morrison et al., 2025c), no inclusive and unified theoretical framework has been developed to examine the motivation of

banks to engage in social, health and environmental activities (e.g., Olekanma et al., 2024; Adu and Roni, 2024; Bhuiyan et al., 2025). For example, a review of the literature indicates that earlier research has applied various social- and economic-oriented theoretical frameworks—such as neo-institutional, stakeholder, legitimacy, and resource dependence theories—to examine corporate engagement in social, health and environmental activities (Saa et al., 2025; Morrison et al., 2025b). Social- and economic-oriented theoretical frameworks have been employed to explain why banks commit more strongly to social, health and environmental activities and innovation ventures (Adu and Roni, 2024). However, these perspectives have proven limited in fully capturing the underlying drivers of social, health and environmental activities and innovation ventures (Morrison et al., 2025a; Bhuiyan et al., 2025), particularly in the context of emerging nations (Saa et al., 2025; Ntim, 2016).

Nonetheless, prior studies suggest that employing a multi-theoretical approach offers deeper insights into variations in social, health and environmental activities and innovation ventures (Bhuiyan et al., 2025; Olekanma et al., 2024; Adu and Roni, 2024). In line with recent calls to adopt such an approach in exploring the relationship between CG mechanisms and social, health and environmental activities in the banking sector, this study adopts a multi-theoretical lens (e.g., Adu and Roni, 2024). This is particularly important because single theories may fall short in explaining the complex interrelationships among CG, corporate innovation, social, health and environmental activities, and BFP, and how these factors collectively shape corporate decisions and outcomes in the context of the banking sector. By integrating insights from multiple theoretical perspectives, it becomes possible to generate new interpretations and explanations of social, health and environmental disclosure activities and corporate innovation investments within unique institutional and regulatory environments, such as those found in the banking sector in SSA region (Adu and Roni, 2024).

Furthermore, a multi-theoretical perspective is valuable in clarifying the interconnectedness of social, health and environmental activities and corporate innovation investments, and BFP (Saa et al., 2025; Morrison et al., 2025c). As noted above, each theoretical perspective has its own limitations in fully explaining banks efforts to engage in social, health and environmental activities and corporate innovation investments. This study argues that a multi-theoretical

approach provides the most appropriate basis for understanding the diverse motivations behind banks' corporate innovation investments and social, health and environmental activities. Such an approach enables a comprehensive explanation of the complex and multifaceted—both direct and indirect—relationships among corporate innovation investments and social, health and environmental, and BFP within the context of banks in the SSA region. Examining these relationships inherently involves multiple institutions and stakeholders with potentially conflicting interests, all operating in distinctive institutional and regulatory environments. In addition to addressing the growing call for multi-theoretical perspectives (Morrison et al., 2025a; Adu and Ron, 2024; Bhuiyan et al., 2025), this study also overcomes the shortcomings of earlier research that relied on single theories or lacked a clear theoretical foundation (often being primarily descriptive) in their analyses (e.g., Jia & Zhang, 2011; McGuinness et al., 2017) by adopting a multi-theoretical lens.

Based on the discussions above and precisely, combined insights from the neo-institutional theory, agency theory, and resource-based view theoretical perspectives can help in enhancing the relevance of CG, corporate innovation, bank health and environmental disclosure (BSHED) and BFP in elucidating the diverse motivations of banks in participating in responsible banking. Together, the three theories are very useful in helping and supporting the research objectives and the problem statement of this study. This is particularly important given the regulatory and socio-demographic diversity present in emerging nations, where a multi-theoretical foundation can aid in clarifying findings on the relationships among CG, corporate innovation, BSHED, and BFP (Saa et al., 2025; Adu and Roni, 2024).

To start with, the neo-institutional theory predicts that a bank's response to institutional forces is typically motivated by efficiency ("economic/substantive view") and legitimization ("symbolic/social view") (Haque & Ntim, 2020; Okike & Adegbite, 2012). Based on a legitimization perspective of neo-institutional theory, banks may symbolically comply with institutional pressures by disclosing superior BSHED (superficial impressions) including social, health and environmental initiatives-principally to improve their BFP and protect the interest of their shareholders (Martikainen et al., 2022; Orazalin et al., 2024a). Noticeably, such symbolic superior BSHED may not result in an improvement and can potentially even worsen actual BSHED activities

(Saa et al., 2025; Adu & Ron, 2024). However, since the adoption of superficial impressions in BSHED requires substantial resources and investments, it is unlikely that the bank will engage in innovative investments and good governance mechanisms as credible means of enhancing their BSHED (Adu et al., 2023; Morrison et al., 2025b).

By contrast and from the efficiency perspective of neo-institutional theory, banks are more likely to engage in substantive economically efficient/cost-reducing BSHED that can improve the actual performance of BSHED (Saa et al., 2024; Olekanma et al., 2024). In this regard, banks that seek operational efficiency will engage in fundamental changes in their goals, practices and behaviour to meet the needs and expectation of their stakeholders (Ashforth & Gibbs, 1990). The efficiency perspective of neo-institutional theory underlines that banks may explore corporate innovation activities such as optimization in resource utilisation, efficient energy savings and improved access to resources that will offer strong legitimacy to the bank. Strong legitimacy helps banks to recruit and retain valuable staff, obtain good access to capital, compete more successfully in the market, and improve stakeholder relations (Bhuiyan et al., 2025; Adu et al., 2023).

From an agency theoretical viewpoint, weak CG mechanisms may lead to poor quality innovation due to concerns about uncertainty. Yet from the resource-based view perspective, good CG could encourage innovation with positive outcomes. To this extent, moderation derives from the fact that in well governed firms, there are likely to better innovative investments than in poorly governed firms. Thus, the impact of innovation is conditioned on CG.

Overall, the agency, neo-institutional, and resource-based view theoretical perspectives propose that banks exposed to diverse stakeholder forces and sustainability guidelines can adopt superficial impressions to (i) improve their BSHED to advance their reputation and maintain legitimacy on a symbolic/greenwashing level (Orazalin et al., 2024a; Martikainen et al., 2022), and/or (ii) substantively increase their actual BSHED through engagement in social activities, and innovation investments to reduce their operating costs and enhance efficiency (Haque & Ntim, 2020; Morrison et al., 2024).

3. Literature review and hypotheses development

3.1 Corporate innovation and social, health and environmental initiatives

To start with, green banking initiatives can produce resources to offset production variables, replace depreciated assets, and make innovation investments to stay competitive (Barbieri et al., 2010; Adu & Roni, 2024). In this case, banks may progressively develop tangible and intangible resources to promote innovation activities (Kuzma et al., 2020; Wang et al., 2023). This suggests that banks aiming to achieve green banking should focus on bringing innovations of all kinds as well as innovations that methodically address the various aspects of green banking and have a good impact on the environment and society (Barbieri et al., 2010). In support, the efficiency perspective of neo-institutional theory maintains that banks are more likely to engage in substantive economically efficient/cost-reducing through innovation investments and thereby protecting the environment (Orazalin et al., 2024a; Han et al., 2024).

In addition, the effect of innovation in the banking sector can be demonstrated through changes in actions and attitudes particularly when it pushes technology in the direction of collaborative consumption (Graessley et al., 2019). For example, innovations can help banks improve service delivery, reduce energy consumption and address health issues and challenges (e.g., diseases, epidemics and pandemics) (Adu & Roni, 2024). These suggest that innovative investments can help improve BSHED. More importantly, several SSA countries have, in the last decade, carried out significant CG and BSHED reforms in the hope that suitable innovative investments will foster stronger bank commitments to environmental sustainability and planetary protection (Saa et al., 2025; Morrison et al., 2025c; Zubairu et al., 2025). In this regard, the study addresses a gap in the literature by focusing on banks in SSA countries and incorporating both social and health accounting related measures into a unified empirical analysis, thereby offering new insights from a developing-country perspective. Consistent with the efficiency view of neo-institutional theory and arguments of prior empirical studies (Kuzma et al., 2020; Graessley et al., 2019; Barbieri et al., 2010), the study expects that corporate innovation will have a positive impact on BSHED, and thus the first hypothesis is:

Hypothesis 1: Bank innovation initiative is associated with bank social, health and environmental disclosure (BSHED) in the SSA banks.

3.2 Corporate innovation and bank financial performance

From the efficiency view of neo-institutional theory, banks may enhance their FP by actively exploring and engaging in innovation activities (Ashforth & Gibbs, 1990; Adu et al., 2023; Wang et al., 2025). Within this theoretical perspective, banks can generate income from innovation led services (Adu, 2022). For instance, financial innovation can help banks to minimise costs by gaining access to resources such as cheap deposit (Lerner, 2006). In particular, the application of financial innovation including internet banking, mobile banking, ATMs can improve operational efficiency and reduce cost of service which can lead to increase in BFP. In addition, banks can benefit financially from electronic banking innovation by charging fees (fee-based income) (Adu and Roni, 2024). A bank can generate revenue from other banks' clients who use their ATMs or from outside firms that collaborate with it if it joins an ATM network. According to Hasan et al. (2012), joining a particular ATM network will also increase customer awareness of that bank and have an impact on its market share.

The implementation of the internet as a distribution channel necessitated a progressive decrease in overhead costs (Hernando and Nieto, 2007). Other scholars report that innovation led services can improve accuracy, reliability and quality of service in the banking sector (Sana et al., 2011). In support, Simpson (2002) posits that the primary motivation for innovation led services in the banking sector is the potential to save operational expenses while optimising operating income. A bank with a strong innovation investments as a part of its core values achieves superior customer relevant outcomes, thus superior BFP (Davila et al., 2005). Among the core banking values in an enhanced innovation culture are the continuous thrive for enhancing “product quality” with an “intense customer focus” that contribute significantly to customer loyalty and sustained BFP (Mahonar and Pandit, 2014). Subsequently, customers consider an innovative bank as “committed” and decide to stay with the bank in good and bad times. In this case, it is also important to realise the link between bank innovation to help

“customers reach their full potentials” and bank capability of creating meaningful products (Knight & Cavusgil, 2004).

Prior studies have focused on investigating BFP from external factors (e.g., inflation, GDP growth, exchange rate and interest rate) (Khalifaturofi'ah, 2023; Adu, 2022), whereas others have mainly concentrated on internal factors (e.g., capital ratio, credit risk and capital ratio) (Messai et al., 2015; Sriyana, 2015). Few studies have focused on the impact of innovation on BFP, and they document that innovation has positive impact on BFP (e.g., Khalifaturofi'ah, 2023; Malhotra & Singh, 2009; de Azevedo et al., 2019). In the light of the theoretical prediction and the arguments, and consistent with the expectation of the green innovation reforms that have been pursued in these SSA countries, corporate innovation is expected to have a beneficial impact on BFP. We therefore formulate the following hypothesis:

H2: Corporate innovation has a positive effect on bank financial performance in the SSA countries.

3.3 Social, health and environmental disclosure and bank financial performance

The legitimization view of neo-institutional theory holds that banks might ostentatiously yield to institutional pressure by revealing their superior BSHED, primarily to enhance their BFP and safeguard the interests of their stockholders (Martikainen et al., 2022). Notably, such symbolic BSHED may not result in an improvement and can potentially even worsen actual BSHED (Adu & Roni, 2024), although this can potentially improve BFP in the short-term. On the other hand, banks are more likely to implement significant cost-cutting and economically efficient BSHED, which can enhance BSHED with beneficial impact on BFP (Orazalin et al., 2024a; Morrison et al., 2025c). This is according to the neo-institutional theory's efficiency perspective. Within this context, BSHED enhances FP through improved resource accessibility, efficient energy savings, and increased operational efficiency (Hart & Dowell, 2011). However, such BSHED demand substantial efforts, and may be exposed to greater risks and costs, which can potentially reduce BFP at least in the short-term (He et al., 2022; Adu & Roni, 2024).

Prior empirical studies have examined the effect of CSR/environmental initiatives on BFP and have provided mixed results (e.g., Platonova et al., 2018; Maqbool & Zameer, 2018; Adu & Roni, 2024; Bhuiyan et al., 2020). For example, Adu and Roni (2024) and Platonova et al. (2018)

document a positive link between CSR and BFP. By contrast, Mukhibad et al. (2020) find no relationship between CSR and BFP. Noticeably, the above studies did not focus on banks in the SSA countries. Meanwhile, several countries in the SSA region have undertaken considerable BSHED reforms over the past decade with the expectation that appropriate BSHED can have positive effect on BFP of firms (Adu and Roni, 2024). Based on the efficiency view of neo-institutional theory, and the foregoing, the study proposes the following hypothesis:

H2: Banks with better social, health and environmental disclosure (higher BSHED) are more likely to have greater financial performance.

3.4 Corporate innovation and social, health and environmental initiatives: Moderating effect of corporate governance

There is ample evidence that quality CG mechanisms can have beneficial effect on BSHED (e.g., Ntim, 2016) and can be considered as strong dimension or pillar of BSHED (Adu & Roni, 2024; Ntim, 2016). Given that the decision for banks to engage in corporate innovation originates from CG structures, the study infers that CG disclosure mechanisms will have moderating effect on the corporate innovation-BSHED nexus. In this case, in better-governed banks, senior managers (agency theory) through innovation channels that seek to improve their operational efficiency (efficiency view of neo-institutional theory) may focus on BSHED decisions as a win-win strategy, demonstrating that CG disclosure mechanisms may have moderating impact on the corporate innovation-BSHED relationship.

Thus, the probable beneficial effect of corporate innovation on BSHED can be as result of the positive impact of CG mechanisms on BSHED, and thus, the increase in BSHED may be driven by CG mechanisms rather than corporate innovation. That notwithstanding, the extant literature has paid very limited attention to how CG mechanisms may impact the relationship between corporate innovation and BSHED. For instance, prior studies have not yet explored the potential moderating effect of CG disclosure mechanisms on the relationship between corporate innovation and BSHED. Hence, we propose the following hypothesis:

H4: CG mechanisms moderate the relationship between corporate innovation and BSHED in the SSA banks.

3.5 Corporate innovation and bank financial performance: Moderating effect of corporate governance

The efficiency view of NIT offers a vital pathway through which CG mechanisms can influence the relationship between BIs and BFP. It proposes that CG mechanisms can potentially strengthen the impact of innovation activities on BFP (Khalifaturafi'ah, 2023; Adu et al., 2023; Barbieri et al., 2010). Within this context, in better-governed banks, senior managers may leverage on innovation activities to pursue sustainable value creation as a credible way of minimizing conflict with bank owners and influential stakeholders (Ntim & Soobaroyen, 2013; Adu et al., 2023). This approach lessens issues with agency conflicts (agency theory) (Dam & Scholtens, 2012).

In addition, and based on agency theory, the adoption of innovation activities can serve as an effective CG mechanism that may satisfy the interests of stakeholders who may be keen on the long-term sustainable value creation of businesses (Adu et al., 2023; Ntim & Soobaroyen, 2013), thereby improving BFP. From an agency viewpoint, weak CG mechanisms may lead to poor quality innovation due to concerns about uncertainty. Yet from the resource-based view, good CG could encourage innovation with positive outcomes. To this extent, the moderation derives from the fact that in well governed banks, there is likely to better innovative investments than in poorly governed banks. Thus, the impact of innovation is conditioned on CG. In this context, the benefits of engaging in innovation activities may accrue to the bank in the form of a flow of critical resources such as deposits, contracts, human capital, corporate image, and reputation (efficiency view of neo-institutional theory) (Ntim et al., 2013), as well as a cheaper cost of capital and deposit (Mallin, 2002), with beneficial impact on BFP. Yet, prior research argues that innovation activities may impact on BFP (e.g., Khalifaturafi'ah, 2023; Adu et al., 2023; Barbieri et al., 2010), without taking into consideration the potential moderating role of CG mechanisms. Accordingly, we propose the hypothesis below:

H5a: CG mechanisms moderate the association between corporate innovation and BFP in the SSA countries.

3.6 Social, health and environmental initiatives and bank financial performance: Moderating effect of corporate governance

According to the neo-institutional theoretical perspective, effective CG mechanisms including the establishment of BSHED governance mechanisms (e.g., sustainability committees and sustainability-based incentives) demonstrate a bank's commitment to climate change-related issues as a means of building stronger connection with stakeholders including shareholders (agency theory) (Haque & Ntim, 2020; Orazalin et al., 2024a). For example, the implementation of good CG mechanisms can play a key role in the adoption of BSHED strategies and the mitigation of climate change risks (Ntim & Soobaroyen, 2013), as well as increasing BFP (Adu & Roni, 2024; Saa et al., 2025). Furthermore, enhanced management monitoring resulting from effective CG mechanisms can be vital conduits for banks to commit more to enhancing energy and resource utilisation (efficiency view of neo-institutional theory) and improving products and services which can translate into increased BFP (Ntim, 2016; Adu and Roni, 2024).

Prior studies maintain that CG mechanisms can impact on the relationship between environmental initiatives and BFP (Choi & Luo, 2021; Orazalin et al., 2024a). However, these studies do not consider the probable moderating effect of CG mechanisms. For instance, Haque and Ntim (2020) show that pay incentive CG mechanisms improve the link between carbon performance and market value. Further, Choi and Luo (2021) report that CG mechanisms reduce the detrimental effects of carbon emission on market value. However, these studies do not explore whether CG disclosure can moderate the BSHED and BFP nexus. Based on the importance of CG disclosure mechanisms in promoting BSHED (Orazalin et al., 2024a; Shaukat et al., 2016) and creating shareholder value (Singh et al., 2018), the study expects CG disclosure to influence the BSHED-BFP nexus. Accordingly, we construct the last hypothesis of our study as follows:

H5b: CG mechanisms moderate the relationship between BSHED and BFP in the SSA countries.

[Insert figure 1 about here]

Figure 1 presents the conceptual framework, outlining the predicted connections among CGDI, corporate innovation, BSHED, and BFP. It shows the direct effects of corporate innovation and BSHED on BFP, the direct effect of corporate innovation on BSHED, and the moderating effects of CGDI on these associations.

4 Data and methodology

4.1. Sample selection

Our sample is based on banks in 16 Sub-Saharan Africa (SSA) countries (refer to Table 1). The decision on the countries was influenced by the similar CG reforms carried out in each country over the past ten years. In particular, a large number of SSA nations, including South Africa, Nigeria, Botswana, Ghana and Kenya, have undertaken CG reforms by issuing CG codes. To strengthen financial reporting, for instance, the King Report on CG (1994) of South Africa, as well as those pertaining to Kenya (2002), Nigeria (2003), and Ghana (2010), were all published. In order to remedy the shortcomings of the initial codes and include global best practices, revised CG codes have been issued in the SSA countries. For example, the emphasis on fostering corporate BSHED efforts can be found throughout the revised King Reports for South Africa (2002, 2010, and 2016), Nigeria (2011 and 2018), Kenya (2002 and 2014), and Ghana (2018 and 2022).

In addition, the 16 SSA countries have the most matured banking and capital markets in the region. For instance, the total GDP of the selected countries stood at US\$1,326 billion as of 2022 as compared to the GDP of the entire SSA of US\$2,011 billion, thus accounting for over 66% of the total GDP in the region. We also chose these countries because they all share English as their official language. Due to the hand-collection nature of the CGDI, and BSHED variables, this helped data collection by removing language barrier (e.g., Ntim, & Soobaroyen, 2013). The sampled banks' annual reports, obtained from the institutions' websites, were used to compile the CGDI and BSHED. Bank financial information including BFP was gathered from BankScope and supplemented with information from annual reports where necessary. The country-level data,

including GDP, was collected from the website of the World Bank, while inflation came from the International Monetary Fund's website.

The study sample period starts in 2007 and ends in 2022, spanning the pre- and post-SDGs periods, and post-CG reforms in the SSA countries. This helps assess whether the SDGs and the CG reforms have helped advance CG standards, particularly regarding influencing corporate innovation, BSHED and BFP in the SSA countries. Table 1 provides the final dataset, which includes 220 banks with 2,785 bank-year observations.

[Insert table 1 about here]

We excluded banks with missing data or whose annual reports were not published in line with prior banking literature (Adu & Roni, 2024). Next, consistent with existing studies, we removed foreign-owned banks that released their annual reports as consolidated financial statements globally (Adu & Roni, 2024). Additionally, specialized financial institutions with characteristics and practices comparable to those of commercial banks were included in the study's sample. As in earlier research in the SSA countries, this was done to establish uniformity in the sampled banks (Adu & Roni, 2024).

4.2 Definition of variables and model specification

We classify the variables into five main types, with full definitions provided in Table 2. First, consistent with Esteban-Sanchez et al. (2017) and Adu and Roni (2024), we employ return on assets (ROA) and net interest margin (NIM) as the measures of BFP. We exclude market-based measures of BFP including Tobin's Q and Price-to-Earnings (PE) ratio because most of the banks in the SSA countries are not publicly listed. Second, in accordance with earlier studies, we use disclosures from the banks' annual reports to create the BSHED index (Ntim, 2016; Adu and Roni, 2024). This is because rating agencies only cover a small portion of the banks in the SSA region. We examine three major areas that are outlined in the SSA countries' Combined Integrated Green Banking Guidelines. It is especially important to note that, the identification and selection procedure adopted in this study is also consistent with well-established line of scoring of sustainability-related disclosures (Orazalin et al., 2024; Giannarakis et al., 2017; Eleftheriadis & Anagnostopoulou, 2015; Ntim and Soobaroyen, 2013; Morrison et al., 2025a). Furthermore, the

BSHED metrics were selected in compliance with the 2016 Global Reporting Initiatives and the SDGs guidelines. More specifically, 88 BSHED are included in the three comprehensive BSHED parameters including bank social disclosure (BSD) (27), bank environmental disclosure (BED) (21) and bank health disclosure (BHD) (40) (*Supporting information 6 contains the BSHED including how they were categorised and coded*).

Third, we follow prior studies (Zhou et al., 2021; Ntim and Soobaroyen, 2013; Adu and Roni, 2024) and compute CGDI. We employ a binary CG disclosure index covering 100 CG provisions, which were selected based on the Combined Code, existing literature, and the banks' annual reports. Specifically, the provisions cover four extensive areas: (a) directors and board disclosures (43); (b) accounting, auditing, and transparency disclosures (22); (c) risk management, internal audit, and control disclosures (13); and (d) compliance, shareholder rights, and enforcement disclosures (22). We apply a dichotomous approach where a bank is awarded a score of '1' if a CG item is disclosed; otherwise, '0' is assigned. This is in line with prior studies that employ either national or international codes of CG in computing the broad CG indices (e.g., Ntim and Soobaroyen, 2013; Adu and Roni, 2024; Zhou et al., 2021; Beiner et al., 2006). The total score is then expressed as a percentage, ranging from a minimum (0%) to a maximum (100%) (*Supporting information 7 contains examples of CG disclosures and how they were categorised, and coded*). Fourth, we employ R&D investment to measure corporate innovation.

Fifth, we added several variables to control for possible omitted variables bias. Following well-established literature (Chen et al., 2022; Ntim & Soobaroyen, 2013; Adu and Roni, 2024; Saa et al., 2025), we control for board size (BSIZE), board gender diversity (BGEN), percentage of institutional ownership (PCT_INST), percentage of government ownership (PCT_GOV), percentage of foreign ownership (PCT_FOR), firm size (FSIZE), leverage (LEV), bank age (BAGE), capitalization (CAP), audit firm size (BIG4), and bank type (BTYP). Finally, consistent with previous studies (Ali, Adegbite and Nguyen, 2023; Mangena and Taurigana, 2007; Saa et al. (2025), we also control country-level variables such as GDP, and inflation (INFL). We also include country dummies for the sixteen countries and year dummies for the financial years from 2007 to 2022. Table 2 presents the abbreviations and definitions of the variables.

[Insert table 2 about here]

4.3 Empirical models

The association among CGDI, BIs, BSHED and BFP is jointly and dynamically determined (Guest, 2009). Thus, several endogenous issues may arise due to potential omitted variables that could simultaneously influence CGDI, BIs, BSHED, and BFP. (Adams & Ferreira, 2009; Sarhan et al., 2019). Additionally, endogeneity concerns may also stem from firm-specific characteristics—such as managerial skills, challenges, opportunities, and leverage—that evolve over time (Sarhan et al., 2019; Adams and Ferreira, 2009; Guest, 2009). Hence, given the panel nature of the data and in line with well-established literature (e.g., Adams & Ferreira, 2009; Gyapong et al., 2016; Adu and Roni, 2024; Sarhan et al., 2019; Zhu et al., 2021), we employ a firm fixed-effects regression to address potential endogeneity concerns. Specifically, we estimate a firm fixed-effects regression model to account for potentially omitted variables and unobserved firm-specific heterogeneities. The Hausman-test is employed to determine which model, the fixed effects model or with the random effects model, best explains our data (Raharjo et al., 2014). The Hausman test result suggests that a fixed-effects model is suitable for our unbalanced panel dataset. First, to assess the direct effects of corporate innovation on BSHED, we employ the model specified as follows:

$$BSHED_{it} = \alpha_0 + \beta_1 BIs_{it} + \beta_2 CONTROL_{it} + \varepsilon_t \quad (1)$$

Where BSHED denotes the bank social, health and environmental disclosure measures. BIs represents bank innovation initiatives. All other variables are defined/measured in Table 2. Second, to examine the direct effects of BIs on BFP, we employ model specified as follows:

$$BFP_{it} = \alpha_0 + \beta_1 BIs_{it} + \beta_2 CONTROL_{it} + \varepsilon_t \quad (2)$$

Where BFP denotes the bank financial performance measures depending on the specification, which is either ROA or NIM. All other variables remain the same as specified in equation (1). Third, to examine the direct effects of BSHED on BFP, we employ model specified below:

$$BFP_{it} = \alpha_0 + \beta_1 BSHED_{it} + \beta_2 CONTROL_{it} + \varepsilon_t \quad (3)$$

All other variables remain the same as specified in equation (1). Fourth, in order to assess the direct moderating effect of CGDI on the BII_s-BSHED relationship, we employ the following model:

$$BSHED_{it} = \alpha_0 + \beta_1 BII_{sit} + \beta_2 BII_{sit} * CGDI_{it} + \beta_3 CGDI_{it} + \beta_4 CONTROL_{it} + \varepsilon_t \quad (4)$$

Where $BII_{sit} * CGDI_{it}$ is the interaction variable between BII_s and CGDI. All other variables remain the same as specified in equation (1). Fifth, to assess the direct moderating effect of CGDI on the BII_s-BFP relationship, we use the following model:

$$BFP_{it} = \alpha_0 + \beta_1 BII_{sit} + \beta_2 BII_{sit} * CGDI_{it} + \beta_3 CGDI_{it} + \beta_4 CONTROL_{it} + \varepsilon_t \quad (5)$$

Where $BII_{sit} * CGDI_{it}$ is the interaction variable between BII_s and CGDI. All other variables remain the same as specified in equation (1). Finally, in order to assess the direct moderating effect of CGDI on the BSHED-BFP relationship, we employ the following model:

$$BFP_{it} = \alpha_0 + \beta_1 BSHED_{it} + \beta_2 BSHED_{it} * CGDI_{it} + \beta_3 CGDI_{it} + \beta_4 CONTROL_{it} + \varepsilon_t \quad (6)$$

Where $BSHED_{it} * CGDI_{it}$ is the interaction variable between BSHED and CGDI. All other variables remain the same as specified in equation (1).

5. Empirical results and discussion

5.1 Descriptive statistics and univariate analysis

Table 3 summarises descriptive statistics of the variables included in our analysis. The mean of ROA is 3.52 with a minimum of 6.46 and maximum of 92.52, while NIM with a mean of 0.095 ranges from 0.03 to 0.68. The BSHED variable has a mean score of 38.51% and varies between 6.08% and 64.50%. The disclosure is relatively low compared to those documented in non-financial sector in developed countries. For example, Orazalin et al. (2024a) report climate change initiatives of 50% in an international sample. Finally, Table 3 presents an overview of the CGDI. The CGDI score is an indicator of how well banks are governed. The average CGDI score is 66.73%, which indicates that most of the banks have high CGDI scores, implying good CG

mechanisms in several banks. This evidence is lower than the evidence of Ntim and Soobaroyen (2013).

[Insert Table 3 about here]

The correlation matrix for the variables used in the regression analysis is shown in Table 4. The correlation coefficients in Table 4 reveal that CGDI, bank innovation initiatives (BIs) and BSHED are positively correlated with FP. Multicollinearity issues arise if correlation coefficients among predictors are above 0.80 (Gujarati, 2004). The matrix shows that none of the coefficients exceeds 0.80, suggesting the absence of any serious multicollinearity.

[Insert Table 4 about here]

5.2 Multivariate analyses

Table 5 presents the estimated regression results of BSHED and the individual dimensions of BSHED on corporate innovation and the control variables. In Model (1), CI is positively associated with BSHED ($p < 0.05$), suggesting that innovative activities lead to an increase in BSHED practices consistent with H1. The results in Models (2) and (4) reveal that bank innovation initiatives (BIs) are positively associated with bank social disclosure (BSD) ($p < 0.1$) and bank environmental disclosure (BED) ($p < 0.01$), thereby offering strong empirical support to H1. We find a positive but insignificant relationship between BIs and BHD in Model (3). Collectively, these findings suggest that banks with high innovation investments exhibit greater social and environmental related accounting disclosures as predicted by efficiency perspective of neo-institutional theory and resource-based view theory. The findings corroborate prior studies (Kuzma et al., 2020; Graessley et al., 2019; Barbieri et al., 2010; Aslam et al., 2025; Adu and Roni, 2024), which reveal a positive association between innovation activities of firms and environmental outcomes. Overall, the evidence suggests that innovative investments in banks contribute to enhanced BSHED performance.

[Insert Table 5 about here]

Table 6 reports the regression results for BIs and BFP. The results in Models (1) and (2) show that BIs are positively associated with ROA ($p < 0.01$) and NIM ($p < 0.05$), respectively, consistent

with H2 wherein innovation investments improve the BFP of the banks. The evidence offers empirical support to efficiency view of neo-institutional and resource-based view theoretical perspectives, that predict that banks may enhance their BFP by actively exploring and engaging in innovation activities (Ashforth & Gibbs, 1990; Adu et al., 2023). Our results are in line with the suggestion that BIIIs can improve scalability, reduce IT infrastructure costs, and enable faster product deployment with beneficial impact on BFP. In addition, the result of the study lends support the notion that BIIIs can positively impact on performance outcomes of banks by offering customers 24/7 access, improving customer satisfaction and their loyalty to the bank (Adu and Roni, 2024; Khalifaturafi'ah, 2023). Further, tailored innovation initiatives can help banks to detect fraud, predict defaults, and assess risks more accurately with beneficial impact on BFP. This evidence is consistent with previous studies (e.g., Khalifaturafi'ah, 2023; Malhotra & Singh, 2009) that observe that the transition to innovation led services in the banking sector can help banks to improve their operational efficiency through cost reduction and enhanced BFP.

[Insert Table 6 about here]

Table 7 reports the results of the regression estimation of the impact of BSHED, and the individual dimensions of BSHED on BFP. Models (1) and (5) show that BSHED has positive effect on ROA and NIM ($p < 0.05$), respectively, implying that H3 is empirically supported. Moving on, the estimated results in Models (2) and (6) reveal that BSD is positively associated with ROA ($p < 0.01$) and NIM ($p < 0.05$), respectively, consistent with H3. Together, our results support efficiency perspective of neo-institutional theory that BSHED enhances BFP through improved resource accessibility, efficient energy savings, and increased operational efficiency (Hart & Dowell, 2011). This is in line with research that finds that a higher social and environmental activities can enhance their accounting-based BFP (Adu, 2022; Sarhan et al., 2019; Zoghalmi, 2021; Adu and Roni, 2024). However, the positive association between BED and both measures of BFP, ROA and NIM in Models (4) and (8), respectively, are found to be insignificant. The results in Models (3) and (7) display negative relationship between HI and (i) ROA ($p < 0.05$) and (ii) NIM ($p < 0.01$), respectively, contrary to expectations of H3. The results demonstrate that actual cash investment in health related disclosures is associated with reduced BFP. Our evidence offers empirical support to scholars who argue against CSR investments and contend that banks incur higher costs

as a result of implementing health-related projects (e.g., Simpson & Kohers, 2002). Our findings appear to show that banks that are health accounting conscious and undertake health accounting related investments might be costly (Barnett & Salomon, 2006) to the bank at least in the short-term (Adu & Roni, 2024).

[Insert Table 7 about here]

Table 8 provides the results of the moderating impact of CGDI on BIIs, BSHED and BFP associations. We first focus on investigating the potential moderating effect of CGDI on the BIIs-BSHED relationship. Models (1), (2) and (4) show that the coefficient for the interaction term (BIIs*CGDI) is positively associated with BSHED ($p < 0.01$), and BSD ($p < 0.05$), and BED ($p < 0.05$), respectively. The results offer strong empirical support to H4. Our evidence implies that the link between BIIs and BSHED is contingent on the quality of the CG structures. This is consistent with the agency theoretical argument that quality CG structures can be considered strong driver of BSHED (Adu & Roni, 2024). In better-governed banks, senior managers may pursue BSHED as a reliable strategy to minimise conflicts with the bank's owners, who are often focused on the long-term sustainable value creation of their investments (Ntim, 2016). Our findings align with prior research that documents CG mechanisms have beneficial effect on sustainable banking initiatives (Adu, Abedin, & Hasan, 2023; Adu and Ron, 2024). However, Models (3) shows that the coefficient for the interaction term (BIIs*BHD) is insignificant, indicating that CGDI has no moderating role on the BIIs-BHD nexus.

In addition, the study explores the potential moderating effect of CGDI on the BIIs-BFP nexus. The estimated results in Models (5) and (6) reveal that the interaction term (BIIs*CGDI) has a positive effect on ROA ($p < 0.01$) and NIM ($p < 0.01$), respectively, suggesting that H5a is empirically supported. Taken together, these results support the view that innovation investments can function as effective corporate governance mechanisms, as suggested by agency theory, by aligning with the interests of stakeholders (Kılıç et al., 2021; Adu, Abedin, & Hasan, 2023) who may be keen on the long-term sustainable value creation of businesses (Ntim & Soobaroyen, 2013; Morrison et al., 2025c), with beneficial impact on BFP. Theoretically, the results also support the prediction of neo-institutional theory and resource-based view that in

better-governed banks, corporate executives through innovation activities may focus on improving BFP of banks as a win-win strategy (Abedin, & Hasan, 2023).

[Insert Table 8 about here]

Finally, Table 9 reports the results of the moderating effect of CGDI on the relationship between BSHED and BFP. The results in Models (1) and (5) show that the interaction term (BSHED*CGDI) is positively associated with ROA ($p < 0.01$) and NIM ($p < 0.01$), respectively. These findings offer empirical support to H5b. In a similar vein, the results in Models (2) and (6) reveal that the interaction variable (BSD*CGDI) is positively associated with ROA ($p < 0.01$) and NIM ($p < 0.01$), respectively. These findings support H5b. Furthermore, the results in Models (4) and (8) reveal that the interaction term (BED*CGDI) is positively associated with ROA ($p < 0.01$) and NIM ($p < 0.05$), respectively, implying H5b is supported. Collectively, these results suggest that CGDI positively moderates the link between BSHED and BFP. Our findings are also consistent with the theoretical arguments of neo-institutional theoretical perspective that propose that effective social and environmental CG mechanisms demonstrate a bank's commitment to green banking-related issues as a means of building stronger connection with stakeholders including shareholders (agency theory) (Haque & Ntim, 2020; Orazalin et al., 2024a; Adu, Abedin, & Hasan, 2023). Our results also corroborate the suggestion by scholars who maintain that CG mechanisms can impact on the link between environmental initiatives and FP (Choi & Luo, 2021; Orazalin et al., 2024a; Adu and Roni, 2024; Adu, Abedin, & Hasan, 2023). However, Models (3) and 7 show that the coefficient for the interaction term (BHD*CGDI) is insignificant, indicating that CGDI has no moderating role on the HI-BFP relationship.

[Insert Table 9 about here]

5.3 Additional analyses

The study estimates Equation (1) to (3) for two subsample, namely SDGs (2015-2022) and pre-SDGs (2007-2014), to ascertain the impact of global social and environmental initiatives/reforms such as the SDGs. The results in Table 10 show that the predicted relationships are more pronounced in the SDGs subsamples than the pre-SDGs subsamples. These results demonstrate the importance of global reforms/initiatives in raising awareness in the banking

system concerning the detrimental effect environmental/climate change threat (Orazalin et al., 2024a).

[Insert Table 10 about here]

5.4 Robustness tests

We conduct additional investigations to address endogeneity concerns in the results. We follow prior studies and use an instrumental variable regression approach to account for endogeneity (Orazalin et al., 2024a; Orazalin, 2020). However, it is problematic to identify variables that can serve as valid instruments in our setting for the independent variables as the relevant theory is scant (Zhou et al., 2019). To confirm the absence of endogeneity, the study employs a dynamic two-step system generalized method of moments (GMM), developed by Arellano and Bond (1991) and Blundell and Bond (1998)¹.

The validity of the instruments is tested using Arellano-Bond test of the absence of serial autocorrelation and Hansen test of overidentifying restrictions (Haque & Ntim, 2020). In all our GMM models, the values of AR and Hansen tests imply that all the model specifications pass the autocorrelation test for the validity of the instruments. The results from the GMM estimations (in supporting information 1 to 5) are also similar to those reported in Tables 5 to 9, indicating the robustness of the main results to sample selection bias and endogeneity. Overall, the results of these robust analyses show that our results do not appear to be driven by any potential endogenous sample selection problems.

6 Summary and conclusion

Over the past few decades, academics, banking practitioners, and regulators have become increasingly concerned about environmental issues due to the rising levels of carbon emissions and their negative effects on the planet, and ultimately human lives. For instance, a UN report at COP 28 in Dubai in 2023 pronounces that aggressive action must be taken to avoid catastrophic global warming by as much as 3 °C before 2100. Regrettably, there is limited research regarding

¹ The first lag of the explanatory variables are used as instruments, whereas year dummies and country specific variables are classified as exogenous variables, consistent with Orazalin et al. (2024a) and Wintoki et al. (2012).

the role of CG structures such as CG disclosure mechanisms and BSHED in addressing social and environmental challenges especially in the banking sector. This study has attempted to bridge this gap in literature by investigating the associations among CGDI, BIs, BSHED and BFP based on a data of 220 banks operating in 16 SSA countries from 2007 to 2022.

To summarise our results, we find that BIs are associated with more BSHED. These findings are consistent with the various dimensions of BSHED. We document that BIs is positively associated with BFP, indicating that innovation investments lead to improved BFP. We find that BSHED is positively related to BFP, consistent with banks with high BSHED practices operating more efficiently by reducing their cost. Distinct from prior research that examines the direct relationships, we identify and test possible moderators of these relationships. We observe that CGDI positively moderates these relationships. The results of the study also show that the predicted associations vary across different operating periods.

Our study provides important theoretical, empirical, and policy-related implications. Firstly, we make a few theoretical contributions. Precisely, our study contributes to neo-institutional, agency, and resource-based view theories by investigating how CGDI and BIs impact BSHED and BFP. Previous studies suggest that CG mechanisms and BIs may impact on BSHED decisions (e.g., Ntim, 2016; Adjei-Mensah et al., 2024) and can influence the BFP of firms (Ntim & Soobaroyen, 2013; Morrison et al., 2025c; Adu, Abedin, & Hasan, 2023). Despite this, the existing literature has yet to employ the above multi-theoretical framework to explore the ways in which CGDI and BIs may affect BSHED and BFP. In this regard, the study contributes theoretically by integrating neo-institutional, agency, and resource-based view theories to test and interpret the relationships among CGDI, BIs, BSHED and BFP. The findings align with multi-theoretical expectations, indicating that robust CG structures can interact with BIs characteristics to strengthen BSHED and BFP within the SSA banking sector.

Second, beyond the theoretical and empirical contributions, our findings also yield important practical policy implications. Specifically, the evidence from this study have important practical regulatory implications, particularly in relation to governance reforms on CG disclosures. We recommend that banks adopt and implement robust governance disclosure

practices, as such mechanisms have been shown to enhance BSHED and BFP. To that effect, when revising and implementing CG reforms, policymakers in SSA have strong incentives to integrate CG disclosure requirements, as this can enhance corporate monitoring. Increasing the mandated level of CG disclosure within the banking sector would represent a step in the right direction. Moreover, our findings suggest that, to achieve greater effectiveness, policy reforms in SSA banks should jointly address monitoring mechanisms (CG) and the alignment of shareholders' interests including BSHED and BFP. Ensuring high-quality CG disclosure is one practical way to improve decision-making, particularly in setting and evaluating BSHED.

Third, banking practitioners and regulators should embrace innovation investments as credible channels to improve their BSHED and BFP. Finally, by identifying new factors and channels that influence BSHED, this study contributes to understanding how bank executives and regulators can strategically manage climate change, social and health investments, thereby promoting ethical and responsible banking behaviour. Given our evidence that CGDI positively moderates the relationship between BSHED and BFP banking executives should be motivated to adopt strong CG mechanisms and recognise BIs as key catalysts for advancing BSHED. This is consistent with global commitments, such as those reaffirmed by world leaders at COP26 in Glasgow, UK, to take decisive action against global warming and avoid 2° scenarios.

This study is subject to certain limitations that future research should seek to address. First, this study focuses on banks in an emerging market context, and therefore the findings may not be fully generalizable to small- and medium-sized enterprises (SMEs). Future research could extend this line of inquiry by examining whether these associations also hold in the SME sector. Second, the research focused on internal CG mechanisms due to data restrictions. Future studies may enhance their analysis by examining how external CG mechanisms, like regulation and media, influence BSHED. In terms of improvement in the BIs-BFP and BSHED-BFP link investigation, we encourage future studies to examine other BFP measures such as market-based indicators as and when data become available in the banking sector in the region. Third, this study relies on reported data concerning corporate governance, BIs, and BSHED from the sampled banks, without accounting for other information that might better capture actual practices. Future research could address this limitation by conducting in-depth case studies and

interviews with senior managers, board directors, investors, and other stakeholders to generate richer insights into BSHED. The final limitation of the study is that the data is limited to SSA banks and hence, the findings should be interpreted within this context. For instance, the findings may or may not compare with that of developed economies with different BSHED policies and institutional settings.

References

- Adjei-Mensah, G., Ntim, C., Zhang, Q. M., & Boateng, F. (2024). Accounting and social health: a systematic literature review and agenda for future research. *Journal of Accounting Literature*, Available at doi:10.1108/JAL-05-2023-0079.
- Adomako, S., & Nguyen, N. P. (2023). Green creativity, responsible innovation, and product innovation performance: A study of entrepreneurial firms in an emerging economy. *Business Strategy and the Environment*, 32(7), 4413-4425
- Adu, D. A., Chen, X. H., Hasan, M., Zhu, X., & Jellason, N. (2023). The relationship between entrepreneurial energy efficiency orientation and carbon footprint reduction: The mediating role of green networking and identification of barriers to green practices. *Journal of Environmental Management*, 347, 119256.
- Adu, D. A., & Roni, N. N. (2024). Bank climate change initiatives, ownership structures, and corporate governance mechanisms: Evidence from emerging economies. *Business Strategy and the Environment*, 33(4), 3039-3077.
- Adu, D. A., Abedin, M. Z., & Hasan, M. (2023). Bank ownership structures and sustainable banking initiatives: The moderating effect of governance mechanism. *International Review of Financial Analysis*, 89, 102736.
- Aguilera-Caracuel, J. & Ortiz-de-Mandojana, N. (2013). Green innovation and financial performance: an institutional approach. *Organization & Environment*, 26, 365-385.
- Akhter, F., Hossain, M. R., Elrehail, H., Rehman, S. U., & Almansour, B. (2023). Environmental disclosures and corporate attributes, from the lens of legitimacy theory: a longitudinal analysis on a developing country. *European Journal of Management and Business Economics*, 32(3), 342-369.
- Ali, H., Adegbite, E., & Nguyen, T. H. (2023). Corporate governance and corporate political responsibility. *Business & Society*, 62(7), 1496-1540.
- Areneke, G., Adegbite, E., Tunyi, A. and Hussain, T. (2023). Female directorship and ethical corporate governance disclosure practices in highly patriarchal contexts. *Journal of Business Research*, 164, 114028. pp. 1-16.
- Ashforth, B. E., & Gibbs, B. W. (1990). The double-edge of organizational legitimation. *Organization Science*, 1(2), 177-194.

- Barbieri, J. C., Vasconcelos, I. F. G. D., Andreassi, T., & Vasconcelos, F. C. D. (2010). Innovation and sustainability: new models and propositions. *Revista de Administração de Empresas*, 50, 146-154.
- Ben Ali, A., & Chouaibi, J. (2024). Mediating effect of ESG performance on executive incentive compensation-financial performance relationship: evidence from MENA banking sector. *Corporate Governance: The International Journal of Business in Society*, 24(2), 439-461.
- Beretta, V., Demartini, M. C., & Sotti, F. (2023). Board composition and textual attributes of non-financial disclosure in the banking sector: Evidence from the Italian setting after directive 2014/95/EU. *Journal of Cleaner Production*, 385, 135561.
- Bose, S., Khan, H. Z., Rashid, A., & Islam, S. (2018). What drives green banking disclosure? An institutional and corporate governance perspective. *Asia Pacific Journal of Management*, 35(2), 501–527.
- Bose, S., Khan, H. Z., Rashid, A., & Monem, R.M. (2021). Does green banking performance pay off? Evidence from a unique regulatory setting in Bangladesh. *Corporate Governance: An International Review*, 29, 162-187.
- Bouteska, A., Sharif, T., & Abedin, M. Z. (2024). Dynamic interlinkages between carbon risk and volatility of green and renewable energy: A TVP-VAR analysis. *Research in International Business and Finance*, 69, 102278.
- Bozec, R., & Bozec, Y. (2012). The use of governance indexes in the governance-performance relationship literature: International evidence. *Canadian Journal of Administrative Sciences/Revue canadienne des sciences de l'administration*, 29(1), 79-98.
- Bhuiyan, F., Adu, D. A., Ullah, H., & Islam, N. (2025). Employee organisational commitment and corporate environmental sustainability practices: mediating role of organisation innovation culture. *Business Strategy and the Environment*, 34(4), 4485-4506.
- Bhuiyan, F., Baird, K., & Munir, R. (2020). The association between organisational culture, CSR practices and organisational performance in an emerging economy. *Meditari Accountancy Research*, 28(6), 977-1011.
- Cai, Y., Jo, H., & Pan, C. (2012). Doing well while doing bad? CSR in controversial industry sectors. *Journal of Business Ethics*, 108(4), 467-480.
- Caby, J., Ziane, Y., & Lamarque, E. (2020). The determinants of voluntary climate change disclosure commitment and quality in the banking industry. *Technological Forecasting and Social Change*, 161, 120282.
- Chen, X. H., Tee, K., & Chang, V. (2022). Accelerating innovation efficiency through agile leadership: The CEO network effects in China. *Technological Forecasting and Social Change*, 179, 121602.
- Chithambo, L., Taurigana, V., Tingbani, I., & Achiro, L. (2022). Stakeholder pressure and greenhouses gas voluntary disclosures. *Business Strategy and the Environment*, 31(1), 159-172.
- Choi, B., & Luo, L. (2021). Does the market value greenhouse gas emissions? Evidence from multi-country firm data. *The British Accounting Review*, 53(1), 100909.

- Cornett, M., Erhemjamts, O. & Tehranian, H. (2016). Greed or good deeds: An examination of the relation between corporate social responsibility and the financial performance of U.S. commercial banks around the financial crisis. *Journal of Banking and Finance*, 70, 137–159.
- Cowton, C.J. & Thompson, P. (2000). Do codes make a difference? The case of bank lending and the environment. *Journal of Business Ethics*, 24(2), 165-178
- Dam, L., & Scholtens, B. (2012). Does ownership type matter for corporate social responsibility? *Corporate Governance: An International Review*, 20(3), 233-252.
- Davila, T., Epstein, M. J., & Shelton, R. (2005). *Making innovation work: How to manage it, measure it, and profit from it*. Upper Saddle River, NJ: Pearson Prentice Hall.
- Delmas, M.A. & Pekovic, S. (2018). Organizational Configurations for Sustainability and Employee Productivity: A Qualitative Comparative Analysis Approach, *Business & Society*, 57(1), 216-251.
- de Azevedo Rezende, L., Bansi, A. C., Alves, M. F. R., & Galina, S. V. R. (2019). Take your time: Examining when green innovation affects financial performance in multinationals. *Journal of Cleaner Production*, 233, 993-1003.
- Du, S., Bhattacharya, C.B. & Sen, S. (2011). Corporate social responsibility and competitive advantage: Overcoming the trust barrier. *Management Science*, 57(9), 1528–1545.
- Eccles, R.G., Ioannou, I. & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science*, 60(11), 2835–2857.
- El Ghouli, S., Guedhami, O., Kwok, C. & Mishra, D. (2011). Does corporate social responsibility affect the cost of capital? *Journal of Banking & Finance* 35, 2388–2408.
- Erdoğan, S., Yıldırım, S., Yıldırım, D. Ç., & Gedikli, A. (2020). The effects of innovation on sectoral carbon emissions: Evidence from G20 countries. *Journal of Environmental Management*, 267, 110637.
- Esteban-Sanchez, P., de la Cuesta-Gonzalez, M., & Paredes-Gazquez, J. D. (2017). Corporate social performance and its relation with corporate financial performance: International evidence in the banking industry. *Journal of Cleaner Production*, 162, 1102–1110.
- European Union (EU, 2021). Communication: ‘Fit for 55’ —Delivering the EU's 2030 climate target on the way to climate neutrality. <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX%3A52021DC0550> (accessed 1 October 2025)
- Fifka, M. S. (2013). Corporate responsibility reporting and its determinants in comparative perspective—a review of the empirical literature and a meta-analysis. *Business strategy and the environment*, 22(1), 1-35.
- Fink, L. (2022). Larry Fink’s letter to CEOs-The power of capitalism. <https://www.blackrock.com/corporate/investor-relations/larry-fink-ceo-letter> (Accessed 1 October 2025).
- Fink, L. (2020). Larry Fink’s letter to CEOs-A fundamental reshaping of finance. <https://www.blackrock.com/corporate/investor-relations/2020-larry-fink-ceo-letter> (Accessed 1 October 2025).

- Garcia-Castro, R., Arino, M.A. & Canela, M.A. (2010). Does social performance really lead to financial performance? Accounting for endogeneity. *Journal of Business Ethics*, 92 (1), 107–126.
- Graessley, S., Horak, J., Kovacova, M., Valaskova, K., & Poliak, M. (2019). Consumer attitudes and behaviors in the technology-driven sharing economy: Motivations for participating in collaborative consumption. *Journal of Self-Governance and Management Economics*, 7(1), 25-30.
- Grey, C., Flynn, A., & Adu, D. A. (2024). An examination of how executive remuneration and firm performance are influenced by Chair-CEO diversity attributes. *International Review of Financial Analysis*, 103290.
- Guest, P. M. (2009). The impact of board size on firm performance: evidence from the UK. *The European Journal of Finance*, 15 (4), 385-404.
- Han, L., Abedin, M. Z., Wang, X., Alharbi, S. S., & Wang, Y. (2024). Will fighting climate change affect commercial banks? A carbon tax policy simulation. *International Review of Financial Analysis*, 96, 103787.
- Hart, S. L. & Dowell, G. (2011). 'A natural-resource-based view of the firm: Fifteen years after', *Journal of Management*, 37, 1464–1479.
- Hasan, I., Schmiedel, H., & Song, L. (2012). Returns to retail banking and payments. *Journal of Financial Services Research*, 41, 163-195.
- He, R., Luo, L., Shamsuddin, A., & Tang, Q. (2022). The value relevance of corporate investment in carbon abatement: The influence of national climate policy. *European Accounting Review*, 31(5), 1233-1261.
- Hernando, I., & Nieto, M. J. (2007). Is the Internet delivery channel changing banks' performance? The case of Spanish banks. *Journal of Banking & Finance*, 31(4), 1083-1099.
- Ioannou, I. & Serafeim, G. (2015). The impact of corporate social responsibility on investment recommendations: Analysts' perceptions and shifting institutional logics. *Strategic Management Journal*, 36(7), 1053–1081.
- Ivanov, I. T., Kruttli, M. S., & Watugala, S. W. (2024). Banking on carbon: Corporate lending and cap-and-trade policy. *The Review of Financial Studies*, 37(5), 1640-1684.
- Jizi, M. I., Salama, A., Dixon, R., & Stratling, R. (2014). Corporate governance and corporate social responsibility disclosure: Evidence from the US banking sector. *Journal of Business Ethics*, 125(4), 601–615.
- Jo, H., Kim, H. & Park, K. (2015). Corporate environmental responsibility and firm performance in the financial services sector. *Journal of Business Ethics*, 131(2), 257–284
- Khalifatufofi'ah, S. O. (2023). Cost efficiency, innovation and financial performance of banks in Indonesia. *Journal of Economic and Administrative Sciences*, 39(1), 100-116.
- Khan, M., Serafeim, G. & Yoon, A. (2016). Corporate sustainability: First evidence on materiality. *The Accounting Review*, 91(6), 1697–1724.
- Knight, G. A., & Cavusgil, S. T. (2004). Innovation, organizational capabilities, and the born-global firm. *Journal of International Business Studies*, 35, 124–141.

- KPMG (2017). The KPMG Survey of Corporate Responsibility Reporting 2017. Available at: <https://home.kpmg/xx/en/home/insights/2017/10/the-kpmg-survey-of-corporate-responsibility-reporting-2017.html> (Accessed 1 October 2025)
- Kuzma, E., Padilha, L. S., Sehnem, S., Julkovski, D. J., & Roman, D. J. (2020). The relationship between innovation and sustainability: A meta-analytic study. *Journal of Cleaner Production*, 259, 120745.
- Lerner, J. (2006). The new financial thing: The origins of financial innovations. *Journal of Financial Economics*, 79(2), 223-255.
- Linares-Rodríguez, M. C., Gambetta, N., & García-Benau, M. A. (2022). Carbon management strategy effects on the disclosure and efficiency of carbon emissions: A study of Colombian companies' context and inherent characteristics. *Journal of Cleaner Production*, 365, 132850.
- Lo, S. & Sheu, H. (2007). Is Corporate Sustainability a Value-Increasing Strategy for Business? *Corporate Governance: An International Review*, 15 (2), 345-358
- Lwesya, F. (2015). Green finance in Africa: mapping progress, challenges and prospects, *Future Business Journal*, 11(195), 1-23.
- Majeed, A., & Rasheed, A. (2025). Environmental Responsibility, Environmental Concerns, and Green Banking Adoption in Pakistan: Using the Unified Theory of Acceptance and Use of Technology. *Human Behavior and Emerging Technologies*, 2025(1), 7268813.
- Mahoney, L., & Roberts, R. W. (2007). Corporate social performance, financial performance and institutional ownership in Canadian firms. *Accounting Forum* (31): 3, 233-253.
- Malhotra, P., & Singh, B. (2009). The impact of internet banking on bank performance and risk: The Indian experience. *Eurasian Journal of Business and Economics*, 2(4), 43-62.
- Mallin, C., Farag, H. & Ow-Yong, K. (2014). Corporate social responsibility and financial performance in Islamic banks. *Journal of Economic Behavior & Organization*, 103(Supplement), S21–S38.
- Mallin, C. (2002). The relationship between corporate governance, transparency and financial disclosure. *Corporate Governance: An International Review*, 10, 253-255.
- Manohar, S. S., & Pandit, S. R. (2014). Core values and beliefs: A study of leading innovative organizations. *Journal of Business Ethics*, 125(4), 667-680.
- Maqbool, S., & Zameer, M. N. (2018). Corporate social responsibility and financial performance: An empirical analysis of Indian banks. *Future Business Journal*, 4(1), 84-93.
- Mangena, M., & Taurigana, V. (2007). Disclosure, corporate governance and foreign share ownership on the Zimbabwe stock exchange. *Journal of International Financial Management & Accounting*, 18(2), 53-85.
- Martikainen, M., Miihkinen, A., & Watson, L. (2022). Board characteristics and negative disclosure tone. *Journal of Accounting Literature*, 45(1), 100-129.

- Matuszak, Ł., Róžańska, E., & Macuda, M. (2019). The impact of corporate governance characteristics on banks' corporate social responsibility disclosure: Evidence from Poland. *Journal of Accounting in Emerging Economies*, 9(1), 75-102.
- Mésonnier, J. S. (2022). Banks' climate commitments and credit to carbon-intensive industries: New evidence for France. *Climate Policy*, 22(3), 389-400.
- Messai, A. S., Gallali, M. I., & Jouini, F. (2015). Determinants of bank profitability in Western European Countries evidence from system GMM estimates. *International Business Research*, 8(7), 30.
- Michelon, G., & Parbonetti, A. (2012). The effect of corporate governance on sustainability disclosure. *Journal of Management & Governance*, 16(3), 477-509.
- Morrison, E. A., Adu, D. A., & Guo, Y. (2024). Executive compensation, sustainable business practices and firm performance: a systematic literature review and future research agenda. *Journal of Accounting Literature*.
- Morrison, E. A., Adu, D. A., Yongsheng, G., Kimani, D., & Saa, V. Y. (2025a). Assessing the impact of board sustainability committees on greenhouse gas performance: Evidence from industrialised European countries. *Business Strategy and the Environment*, 34(2), 2529-2555.
- Morrison, E. A., Adegbite, E., Mangena, M., Kimani, D., & Adu, D. A. (2025b). The Benefits of Being Greener: Unravelling the Association Between Carbon Performance and Market Value. *Business Strategy and the Environment*.
- Morrison, E. A., Chen, X. H., Kimani, D., & Adu, D. A. (2025c). International cooperation and corporate strategies: accelerating corporate energy transitions in emerging economies. *Business Strategy and the Environment*.
- Moufty, S., Clark, E. & Al-Najjar, B. (2021). The different dimensions of sustainability and bank performance: Evidence from the EU and the USA, *Journal of International Accounting, Auditing and Taxation*, 43, 100381.
- Mukhibad, H., Muthmainah, M., & Andraeny, D. (2020). The role of corporate social responsibility disclosure in improving financial performance (case study in Indonesian Islamic Bank). *al-Uqud: Journal of Islamic Economics*, 4(2), 162–173.
- Nizam, E., Ng, A., Dewandaru, G., Nagayev, R., & Nkoba, M. A. (2019). The impact of social and environmental sustainability on financial performance: A global analysis of the banking sector. *Journal of Multinational Financial Management*, 49, 35-53.
- Nelling, E., & Webb, E. (2009). Corporate social responsibility and financial performance: The “virtuous circle” revisited. *Review of Quantitative finance and accounting*, 32(2), 197-209.
- Ng, A.C. & Rezaee, Z. (2015). Business sustainability performance and cost of equity capital, *Journal of Corporate Finance*, 34, 128-149
- Nguyen, T. H., Trinh, V. Q., & Chen, W. (2024). Ownership structure and climate-related corporate reporting. In *Accounting Forum* (pp. 1-33). Routledge.

- Ntim, C. G. (2016). Corporate governance, corporate health accounting, and firm value: The case of HIV/AIDS disclosures in Sub-Saharan Africa. *The International Journal of Accounting*, 51(2), 155-216.
- Ntim, C. G., & Soobaroyen, T. (2013). Corporate governance and performance in socially responsible corporations: New empirical insights from a Neo-Institutional framework. *Corporate Governance: An International Review*, 21(5), 468-494.
- Ntim, C. G., Lindop, S., & Thomas, D. A. (2013). Corporate governance and risk reporting in South Africa: A study of corporate risk disclosures in the pre-and post-2007/2008 global financial crisis periods. *International Review of Financial Analysis*, 30, 363-383.
- Okike, E. and Adegbite, E. (2012) The code of corporate governance in Nigeria: efficiency gains or social legitimation. *Corporate Ownership and Control*, 9 (3). pp. 262-275.
- Olekanma, O., Rodrigo, L. S., Adu, D. A., & Gahir, B. (2024). Small-and medium-sized enterprises' carbon footprint reduction initiatives as a catalyst for green jobs: A systematic review and comprehensive business strategy agenda. *Business Strategy and the Environment*, 33(7), 6911-6939.
- Orazalin, N. S., Ntim, C. G., & Malagila, J. K. (2024b). Board sustainability committees, climate change initiatives, carbon performance, and market value. *British Journal of Management*, 35(1), 295-320.
- Orazalin, N., Ntim, C., & Malagila, J. (2024a). Corporate governance, national governance quality, and biodiversity reporting: Global evidence. *Journal of International Accounting, Auditing and Taxation*.
- Orlitzky, M., Siegel, D. S., & Waldman, D. A. (2011). Strategic corporate social responsibility and environmental sustainability. *Business & society*, 50(1), 6-27.
- Platonova, E., Asutay, M., Dixon, R., & Mohammad, S. (2018). The impact of corporate social responsibility disclosure on financial performance: Evidence from the GCC Islamic banking sector. *Journal of Business Ethics*, 151(2), 451-471.
- Rahi, A.F., Johansson, J., Blomkvist, M. & Hartwig, F. (2024). Corporate sustainability and financial performance: A hybrid literature review. *Corporate Social Responsibility and environmental Management*, 31, 801-815
- Renders, A., Gaeremynck, A., & Sercu, P. (2010). Corporate-governance ratings and company performance: A cross-European study. *Corporate Governance*, 18(2), 87-106.
- Rezende, L.A., Bansi, A.C., Rodrigues Alves, M.F. & Ribeiro Galina, S.V. (2019). Take your time: Examining when green innovation affects financial performance in multinationals, *Journal of Cleaner Production*, 233, 993-1003.
- Saa, V. Y., Morrison, E. A., Adu, D. A., & Joseph, D. (2025). Unravelling the relationship among corporate sustainability initiatives, executive compensation and corporate carbon performance: new insights from African countries. *Journal of Accounting Literature*.
- Sarhan, A. A., Ntim, C. G., & Al-Najjar, B. (2019). Board diversity, corporate governance, corporate performance, and executive pay. *International Journal of Finance and Economics*, 24(2), 761-786.
- Scholtens, B. (2007). Financial and social performance of socially responsible investments in the Netherlands. *Corporate Governance: An International Review*, 15(6), 1090-1105.

- Scholtens, B. (2008). A note on the interaction between corporate social responsibility and financial performance. *Ecological economics*, 68(1-2), 46-55.
- Shaukat, A., Qiu, Y., & Trojanowski, G. (2016). Board attributes, corporate social responsibility strategy, and corporate environmental and social performance. *Journal of Business Ethics*, 135, 569-585.
- Simpson, W. & Kohers, T. (2002). The link between corporate social and financial performance: Evidence from the banking industry. *Journal of Business Ethics*, 35(2), 97–109.
- Simpson, J. (2002). The impact of the Internet in banking: observations and evidence from developed and emerging markets. *Telematics and Informatics*, 19(4), 315-330.
- Soana, M. (2011). The relationship between corporate social performance and corporate financial performance in the banking sector. *Journal of Business Ethics*, 104(1), 133–148.
- Sriyana, J. (2015). Islamic banks' profitability amid the competitive financing in Indonesia. *International Journal of Applied Business and Economic Research*, 13(4), 1695-1710.
- Srouji, A.F., Hamdallah, M.E., Al-Hamadeen, R., Al-Okaily, M. & Elamer, A.A. (2023). The impact of green innovation on sustainability and financial performance: Evidence from the Jordanian financial sector, *Business Strategy and Development*, 6, 1037-1052
- Stephens, C. & Skinner, C. (2013). Banks for a better planet? The challenge of sustainable social and environmental development and the emerging response of the banking sector, *Environmental Development*, 5, 175-179.
- Sumra, S. H., Manzoor, M. K., Sumra, H. H., & Abbas, M. (2011). The impact of e-banking on the profitability of banks: A study of Pakistani banks. *Journal of Public Administration and Governance*, 1(1), 31-38.
- Wang, Q., Hang, Y., Sun, L., & Zhao, Z. (2016). Two-stage innovation efficiency of new energy enterprises in China: A non-radial DEA approach. *Technological Forecasting and Social Change*, 112, 254-261.
- Wang, X., Zhang, T., Luo, S., & Abedin, M. Z. (2023). Pathways to improve energy efficiency under carbon emission constraints in iron and steel industry: Using EBM, NCA and QCA approaches. *Journal of Environmental Management*, 348, 119206.
- Weber, O. (2017). Corporate sustainability and financial performance of Chinese banks. *Sustainability Accounting, Management and Policy Journal*, 8(3), 358–385.
- Wu, M. & Shen, C. (2013). Corporate social responsibility in the banking industry: Motives and financial performance. *Journal of Banking and Finance*, 37(9), 3529–3547.
- Zhen, Z., & Lu, B. (2024). The impact of green finance on corporate carbon disclosure: Financial regulation as a moderator. *Finance Research Letters*, 63, 105273.
- Zhou, M., Li, K., & Chen, Z. (2021). Corporate governance quality and financial leverage: Evidence from China. *International Review of Financial Analysis*, 73, 101652.

Zubairu, I., Atiawin, P. A., & Amanquah, B. A. (2025). Examining the Impact of Spillover Effects on the Relationship Between Green Banking Practices and Pro-Environmental Behaviours Among Bankers in Ghana's Greater Accra Region. *International Journal of Accounting*, 10(1), 1-22.

Table 1. Composition of the sample by countries

Country	Sample
Botswana	10
Gambia	8
Ghana	24
Kenya	30
Lesotho	4
Liberia	6
Malawi	5
Mauritius	15
Namibia	5
Nigeria	19
Sierra Leone	4
South Africa	20
Tanzania	25
Uganda	20
Zambia	13
Zimbabwe	12
Total	220

Table 2. Variables definitions

Variable	Symbols	Operationalization	Source
<i>Bank financial performance measures</i>			
	BFP		
Return on assets	ROA	Percentage of operating profit to total assets	Bankscope/Annual report
Net interest margin	NIM	The net interest income scaled by the total earning assets of the bank	Bankscope/Annual report
Bank Social, health and environmental initiatives	BSHED	BSHED index covering three broad areas as set out by 2016 GRI's reporting guidance on BSHED; bank environmental disclosure (BED) 21 disclosures; bank social disclosure (BSD) 27 disclosures; and bank health disclosure (BHD) 40 disclosures. Each disclosure ranges from 0 to 4 (where 0-no disclosure; 1-general or rhetorical disclosures; 2-narrative of what has been achieved; 3-quantitative or monetary data disclosure; 4-quantitative or monetary disclosure supported by explicit assessment of performance or events. The results are scaled to a value between 0 and 100%.	Annual report
Bank innovation initiatives	BIIs	Total amount of spending on research and innovation	Bankscope/Annual report
<i>Corporate governance variables</i>			
CG disclosure index	CGDI	CG index containing 100 provisions derived from the commonwealth CG code, individual country CG codes and annual report of the sampled banks. The CG provision take a value of 1 if is disclosed in the annual report, otherwise 0 and scaled to a value between 0% and 100%.	Annual report
<i>Bank control variables</i>			
Board size	BSIZE	The natural logarithm of the number of board directors	Annual report
Board gender diversity	BGEN	The percentage of female directors on the board	Annual report
Institutional ownership	PCT_INST	The percentage of shares owned by institutions in the banks	Annual report
Foreign ownership	PCT_FOR	The percentage of shares held by foreign investors	Annual report
Government ownership	PCT_GOV	The percentage of shares held by government	Annual report
Firm size	FSIZE	Natural logarithm of total assets of the bank	Bankscope/Annual report
Leverage	LEV	Ratio of total debt to total assets	Bankscope/Annual report

Bank age	BAGE	Natural logarithm of the number of years since inception	Annual report
Capitalization	CAP	Equity capital divided by total assets	Bankscope/Annual report
Audit firm size	BIG4	1 if a bank is audited by the big four audit firm (PricewaterCoopers, Deloitte & Touche, Ernest & Young and KPMG), 0 otherwise.	Annual report
Bank type	BTTYPE	1 if a bank is publicly listed, 0 otherwise.	Stock Exchange in the SSA countries
<i>Country Control variables</i>			
Gross domestic product	GDP	Natural log of GDP relates to changes in national income	World Bank
Inflation	INFL	Natural log of annual rate of inflation as a percentage of GDP	IMF

Notes: This table provides the definitions of the main variables employed in the analysis

Table 3. Descriptive Statistics of all variables for all the 2,785 bank years

Variable	Mean	Median	Std. Dev.	Minimum	Maximum
ROA	3.52	2.07	0.22	6.46	92.52
NIM	0.095	0.087	0.84	0.03	0.68
BSHED (%)	38.51	34.43	11.09	6.08	64.50
BSD	37.42	36.51	15.81	3.70	78.30
BED	40.54	34.77	18.50	2.38	85.62
BHD	27.83	23.40	10.87	1.67	55.07
BIIs (in \$ million)	2.67	1.75	2.73	4.75	15.76
CGDI (%)	66.73	67.23	15.11	23.00	92.26
BSIZE	9.80	9.00	3.20	4.00	24.00
BGEN	26.74	25.00	14.45	0.00	84.34
PCT_INST	77.57	89.63	23.84	10.47	100.00
PCT_GOV	6.13	36.55	21.32	0.00	100.00
PCT_FOR	22.76	21.52	8.97	0.00	42.37
FSIZE (\$million)	15.66	10.48	4.32	2.32	45.49
CAP	0.27	0.19	0.46	0.05	0.98
LEV	0.86	0.87	0.26	0.07	0.97
BAGE	39.00	29.24	32.47	2.00	182
BIG4	0.95	1.00	0.26	0.00	1.00
BTYPE	0.38	1.00	0.46	0.00	1.00
GDP	8.65	7.08	3.62	-16.42	37.54
INFL	9.78	10.67	19.43	3.08	78.56

Notes: This tables provides the summary statistics of all the variables used in the regression analysis. Please see Table 2 for variable definitions.

Table 4. Pearson's correlation matrix

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
ROA (1)	1.00																				
NIM (2)	0.03	1.00																			
BSHED (3)	0.02**	0.05*	1.00																		
BSD (4)	0.06*	0.02**	0.05*	1.00																	
BED (5)	0.01	0.03	0.08*	0.05*	1.00																
BHD (6)	-0.04*	-0.03*	0.07*	0.09*	0.05	1.00															
BII _s (7)	0.08***	0.09*	0.02*	0.06*	0.07*	0.03	1.00														
CGDI (8)	0.02***	0.03***	0.22**	0.04**	0.13*	0.18*	0.03**	1.00													
BSIZE (9)	-0.05**	-0.02**	0.09**	0.07**	0.02*	-0.05*	0.08*	0.08*	1.00												
BGEN (10)	0.07**	0.05**	0.02**	0.05**	0.16	-0.04	-0.01	0.08*	0.17	1.00											
PCT_INST (11)	0.02**	0.04**	0.05**	0.06**	0.02**	0.04**	0.05**	0.05**	0.08*	-0.01	1.00										
PCT_GOV (12)	-0.05	-0.02	-0.04	-0.08	-0.03*	-0.02	0.18*	0.18*	-0.05	0.04	0.06	1.00									
PCT_FOR (13)	0.08**	0.04**	0.06**	0.02**	0.08*	0.01**	0.08*	0.05	-0.04*	0.02	0.08	-0.02*	1.00								
FSIZE (14)	-0.01**	-0.03*	-0.09**	-0.06*	0.07*	-0.03	0.06*	-0.06	0.05*	0.02**	0.07*	-0.03	-0.06	1.00							
LEV (15)	-0.03**	-0.01*	0.08*	0.11**	-0.09*	0.07	0.29*	0.15**	0.19*	-0.33	-0.09*	0.07	0.18*	0.09*	1.00						
CAP (16)	-0.02*	-0.05**	-0.22*	-0.18**	-0.08*	-0.06	-0.18*	-0.13*	-0.02	0.08*	-0.08*	-0.06	0.09	-0.17	-0.15*	1.00					
BAGE (17)	0.04***	0.12*	-0.18**	-0.07	0.17*	0.13**	0.27*	0.07	0.09	-0.21	0.17*	0.13*	-0.06	0.16	0.08	0.15**	1.00				
BIG4 (18)	-0.01	0.03	0.12	0.09	0.28	0.15*	-0.18*	0.08	0.02	0.05**	0.28	0.15*	0.05*	0.13	0.07	-0.36	-0.06	1.00			
BTYP _E (19)	0.05**	0.01*	0.03*	0.01**	0.04	-0.06	0.03*	0.08*	0.01	-0.04	0.03	0.06	0.05	0.05*	0.08	0.07*	-0.02	0.04	1.00		
GDP (20)	0.02*	0.06	0.09	0.07*	0.04	-0.03	0.08	0.07	0.25	0.09*	0.04	-0.03	-0.01*	0.11*	-0.02	-0.09**	0.27	0.06**	0.02	1.00	
INFL (21)	-0.03	-0.04	-0.08**	-0.05*	-0.02	0.06*	0.08	0.09	0.27*	-0.19	-0.02	0.06*	-0.05	0.07*	-0.05	0.02*	0.07	-0.06	0.04	-0.07*	1.00

Notes: The figures indicate the Pearson's correlation coefficients. ***, ** and * indicate that the correlation is respectively significant at 1%, 5% and 10% levels

Table 5. Effect of bank innovation initiatives on bank social, health and environmental initiatives

Dependent variable	BSHED	BSD	BHD	BED
Model	(1)	(2)	(3)	(4)
Independent variables				
BIIs	0.143** (2.50)	0.001* (1.78)	0.008 (0.92)	0.564*** (3.47)
Bank-level controls				
BSIZE	0.176*** (3.40)	0.189*** (3.56)	0.254** (1.97)	0.264** (1.96)
BGEN	0.168*** (3.27)	0.080* (1.75)	0.149*** (3.50)	0.056*** (3.08)
FSIZE	-0.208* (-1.74)	-0.085** (-2.40)	-0.036** (-2.31)	-0.346** (-2.05)
LEV	3.347*** (4.64)	2.368* (1.74)	2.830** (1.99)	2.486*** (3.80)
BAGE	2.987*** (3.46)	1.456*** (3.85)	1.849*** (3.20)	2.076** (2.42)
CAP	-1.803*** (-2.99)	-1.355*** (-3.81)	-2.083*** (-3.66)	-2.865*** (-3.28)
BIG4	0.053 (1.04)	0.038 (0.74)	0.090 (1.25)	0.047 (1.51)
PCT_INST	0.081*** (3.47)	0.069*** (3.53)	0.008*** (3.52)	0.038** (2.04)
PCT_GOV	-0.376** (-2.43)	-0.235** (-2.07)	-0.267** (-2.60)	-0.176** (-1.98)
PCT_FOR	0.003*** (3.56)	0.014*** (3.65)	0.005*** (3.26)	0.147*** (3.86)
BTYPE	0.020** (2.10)	0.019** (2.43)	0.010** (2.67)	0.043*** (3.74)
Country-level controls				
GDP	0.165 (0.34)	0.190* (1.69)	0.305 (1.38)	0.163 (0.99)
INFL	-0.057* (-1.69)	-0.051 (-1.47)	-0.067* (-1.83)	-0.045* (-1.68)
Constant	-3.568*** (-3.02)	-2.069*** (-3.86)	-1.654*** (-4.27)	-2.630*** (-4.50)
Year & country dummies	Yes	Yes	Yes	Yes
No. of observations	2785	2785	2785	2785
R-squared	0.43	0.57	0.54	0.47
F-value	57.0	49.4	38.6	50.9

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses.

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

Table 6. The effect of bank innovation initiatives on bank financial performance

Dependent Variable Model	ROA (1)	NIM (2)
Independent Variables		
BIIs	0.064*** (3.95)	0.085** (2.30)
Bank-level controls		
BSIZE	-0.418* (-1.82)	-0.453** (-2.86)
BGEN	0.049** (2.14)	0.089** (2.46)
FSIZE	-0.090** (-2.31)	-0.056** (-2.45)
LEV	-0.865** (-2.69)	-0.203** (-2.70)
BAGE	0.586*** (3.47)	0.395*** (3.48)
CAP	-0.401*** (-3.55)	-1.672* (-1.90)
BIG4	-0.029 (-1.48)	-0.065 (-1.07)
PCT_INST	0.067*** (3.50)	0.084*** (3.57)
PCT_GOV	-0.053 (-1.57)	-0.065 (-1.34)
PCT_FOR	0.358*** (3.74)	0.325** (2.19)
BTYPE	0.138* (2.69)	0.041** (2.43)
Country-level controls		
GDP	0.189* (1.67)	0.243* (1.68)
INFL	-0.055 (-1.46)	-0.052 (-1.57)
Constant	3.652*** (3.14)	-2.486*** (-4.50)
Year & country dummies	Yes	Yes
No. of observations	2785	2785
R-squared	0.51	0.50
F-value	43.8	45.2

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 7. Effect of bank social, health and environmental disclosure on bank financial performance

Dependent Variable Model	ROA (1)	ROA (2)	ROA (3)	ROA (4)	NIM (5)	NIM (6)	NIM (7)	NIM (8)
Independent Variables								
BSHED	0.058** (2.35)				0.062** (2.34)			
BSD		0.025*** (3.46)				0.008** (2.37)		
BHD			-0.057** (-2.30)				-0.004*** (-3.90)	
BED				0.008 (1.60)				0.050 (1.38)
Bank-level controls								
BSIZE	-0.380** (-2.52)	-0.265* (-1.68)	-0.186** (-2.46)	-0.452** (-2.35)	-0.452* (-1.80)	-0.305** (-2.37)	-0.254** (-1.98)	-0.153** (-2.52)
BGEN	0.060* (1.77)	0.156** (2.38)	0.078*** (3.56)	0.102** (2.43)	0.052** (2.41)	0.098*** (3.68)	0.165*** (3.20)	0.075** (2.05)
FSIZE	-0.065*** (-3.27)	-0.007** (-2.30)	-0.054** (-2.59)	-0.016** (-2.17)	-0.037* (-1.73)	-0.042** (-2.46)	-0.083** (-1.97)	-0.001** (-2.08)
LEV	-0.480** (-2.56)	-0.329** (-3.45)	-0.425*** (-3.10)	-0.182** (-2.39)	-0.205** (-2.36)	-0.320*** (-3.95)	-0.235** (-2.31)	-0.500** (-2.46)
BAGE	0.205*** (3.36)	0.359** (2.30)	0.347*** (3.82)	0.404** (2.37)	0.325** (2.17)	0.541*** (3.56)	0.205** (2.42)	0.326*** (4.23)
CAP	-0.289** (-2.35)	-0.156*** (-3.74)	-0.307** (-2.53)	-0.240** (-2.11)	-0.503** (-2.80)	-0.540*** (-4.06)	-0.421** (-2.43)	-0.254* (-1.80)
BIG4	-0.087 (-1.53)	-0.050 (-1.28)	-0.092 (-1.37)	-0.017 (-1.02)	-0.059 (-1.47)	-0.030 (-0.86)	-0.089 (-1.45)	-0.024 (-1.20)
PCT_INST	0.097*** (4.68)	0.084** (2.51)	0.052** (2.48)	0.077*** (4.29)	0.012*** (3.84)	0.039*** (3.60)	0.063** (2.04)	0.045** (1.99)
PCT_GOV	-0.010 (-1.08)	-0.007 (-0.59)	-0.034 (-0.89)	-0.046 (-1.28)	-0.090 (-0.82)	-0.005 (-1.54)	-0.018 (-0.85)	-0.003 (-1.27)
PCT_FOR	0.293** (2.43)	0.340*** (3.47)	0.452** (2.50)	0.195*** (3.49)	0.345** (2.53)	0.320*** (3.42)	0.407** (2.35)	0.153** (2.09)
BTYPE	0.087** (2.50)	0.052*** (3.01)	0.007*** (3.49)	0.084*** (4.52)	0.068** (2.11)	0.095*** (3.84)	0.032*** (4.07)	0.088** (2.42)
Country-level controls								
GDP	0.360** (2.54)	0.234* (1.73)	0.325* (1.68)	0.291 (1.57)	0.210 (1.07)	0.354** (2.42)	0.450* (1.73)	0.324** (2.45)
INFL	-0.034 (-1.40)	-0.058 (-0.87)	-0.053 (-1.20)	-0.042 (-1.53)	-0.025 (-1.07)	-0.038 (-0.86)	-0.090 (-1.58)	-0.011 (-0.20)
Constant	-3.153*** (-3.48)	-2.319** (-2.34)	-3.852*** (-4.85)	-5.321*** (-3.50)	4.230*** (3.25)	3.207*** (4.50)	4.821** (2.67)	2.325*** (3.56)
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2785	2785	2785	2785	2785	2785	2785	2785
R-squared	0.46	0.57	0.43	0.50	0.48	0.54	0.47	0.38
F-value	48.5	50.2	58.7	47.8	52.3	42.7	59.4	50.9

Notes: All the variables used are fully defined in Table 2. t-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 8. Bank innovation initiatives on bank social, health and environmental initiatives, bank financial performance: Moderating effect of corporate governance

Dependent variable Model	BSHED (1)	BSD (2)	BHD (3)	BED (4)	ROA (5)	NIM (6)
Independent variables						
CGDI	0.250** (2.47)	0.125* (1.78)	0.174** (2.13)	0.324* (1.67)	0.156** (2.53)	0.280* (1.75)
BIIs*CGDI	0.584*** (4.95)	0.063** (1.99)	0.017 (1.56)	0.182** (2.54)	0.345*** (3.70)	0.264*** (3.28)
BIIs	0.098 (1.64)	0.045* (1.72)	0.132 (1.45)	0.178* (1.69)	0.024 (1.57)	0.051* (1.73)
Bank-level controls						
BSIZE	0.105** (2.41)	0.156*** (3.75)	0.305** (2.47)	0.187** (2.39)	-0.250* (-1.68)	-0.307** (-2.51)
BGEN	0.154*** (4.80)	0.098** (2.47)	0.580*** (3.19)	0.017*** (2.98)	0.043** (2.56)	0.052** (2.07)
FSIZE	-0.157* (-1.80)	-0.060** (-2.33)	-0.058** (-2.49)	-0.206** (-2.72)	-0.077** (-2.10)	-0.035** (-2.46)
LEV	2.957*** (3.42)	2.185* (1.83)	2.357** (2.42)	2.204*** (3.57)	-0.581** (-2.30)	-0.354** (-2.46)
BAGE	3.845*** (3.87)	2.560*** (3.29)	2.540*** (3.18)	2.042** (2.39)	0.371*** (3.45)	0.458*** (3.37)
CAP	-1.450*** (-3.54)	-1.108*** (-3.47)	-2.254*** (-3.50)	-2.456** (-2.14)	-0.364*** (-3.28)	-1.465* (-1.73)
BIG4	0.077 (1.38)	0.059 (0.87)	0.078 (1.46)	0.040 (1.32)	-0.035 (-1.53)	-0.074 (-1.42)
PCT_INST	0.062** (2.76)	0.078*** (3.04)	0.097*** (3.89)	0.051** (2.46)	0.078*** (3.90)	0.063** (2.14)
PCT_GOV	-0.180** (-2.37)	-0.175** (-2.46)	-0.358** (-2.51)	-0.140** (-2.34)	-0.032 (-1.41)	-0.057 (-1.36)
PCT_FOR	0.014*** (3.48)	0.020*** (3.17)	0.078*** (3.55)	0.135*** (3.71)	0.317*** (3.53)	0.405** (2.37)
BTYPE	0.055** (2.47)	0.027** (2.54)	0.038** (2.42)	0.056*** (3.27)	0.149* (2.54)	0.053** (2.19)
Country-level controls						
GDP	0.150 (1.43)	0.287* (1.79)	0.245 (1.08)	0.153 (1.24)	0.154 (1.63)	0.287* (1.81)
INFL	-0.042* (-1.73)	-0.058 (-1.24)	-0.042 (-1.53)	-0.030* (-1.72)	-0.041 (-1.56)	-0.047 (-1.40)
Constant	-2.235*** (-3.87)	-3.475*** (-4.10)	-2.874*** (-5.37)	-3.453*** (-3.92)	4.352*** (3.46)	-3.509*** (-3.28)
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2785	2785	2785	2785	2785	2785
R-squared	0.47	0.54	0.51	0.45	0.57	0.53
F-value	59.5	53.1	45.3	52.6	44.9	47.5

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 9. Effect of bank social, health and environmental initiative on bank financial performance:
Moderating effect of corporate governance

Dep. Variable Model	ROA (1)	ROA (2)	ROA (3)	ROA (4)	NIM (5)	NIM (6)	NIM (7)	NIM (8)
Ind. Variables								
CGDI	0.106*** (3.54)	0.235** (2.07)	0.287*** (4.60)	0.132*** (3.54)	0.087** (2.01)	0.245*** (3.80)	0.380** (2.56)	0.154** (1.98)
BSHED	0.030* (1.85)				0.051 (1.62)			
BSHED*CGDI	0.437*** (4.89)				0.654*** (3.51)			
BSD		0.018* (1.68)				0.014** (1.99)		
BSD*CGDI		0.094*** (3.50)				0.058*** (3.27)		
BHD			-0.032* (-1.87)				-0.014* (-1.82)	
BHD*CGDI			0.058 (1.62)				0.032 (1.53)	
BED				0.011 (1.27)				0.034 (1.51)
BED*CGDI				0.089*** (3.43)				0.056** (2.54)
Bank-level controls								
BSIZE	-0.402*** (-3.47)	-0.325* (-1.70)	-0.211** (-2.47)	-0.352** (-2.09)	-0.389* (-1.72)	-0.311** (-2.43)	-0.304** (-2.35)	-0.160*** (-2.89)
BGEN	0.074* (1.82)	0.238** (2.56)	0.063*** (3.14)	0.128** (2.05)	0.024** (2.30)	0.064*** (3.48)	0.172*** (3.11)	0.058** (2.45)
FSIZE	-0.053*** (-3.00)	-0.024** (-2.58)	-0.087** (-2.36)	-0.025** (-2.66)	-0.043* (-1.79)	-0.032** (-2.58)	-0.064** (-2.30)	-0.053** (-2.46)
LEV	-0.528** (-2.30)	-0.410** (-3.97)	-0.359*** (-3.58)	-0.231** (-2.57)	-0.253** (-2.40)	-0.317*** (-3.32)	-0.243** (-2.57)	-0.538** (-2.32)
BAGE	0.345*** (3.19)	0.304*** (2.78)	0.407*** (3.13)	0.432** (2.53)	0.382** (2.31)	0.453*** (3.28)	0.236** (2.59)	0.450*** (3.87)
CAP	-0.157** (-2.40)	-0.203*** (-3.17)	-0.348** (-3.91)	-0.259** (-2.40)	-0.511** (-2.54)	-0.536*** (-3.78)	-0.384** (-2.51)	-0.268* (-1.74)
BIG4	-0.063 (-1.44)	-0.047 (-1.50)	-0.075 (-1.38)	-0.033 (-1.44)	-0.040 (-1.32)	-0.029 (-0.70)	-0.078 (-1.34)	-0.037 (-1.53)
PCT_INST	0.065*** (3.20)	0.071** (2.34)	0.090** (2.01)	0.064*** (3.25)	0.035*** (3.63)	0.046*** (3.55)	0.050** (2.37)	0.034** (2.05)
PCT_GOV	-0.024 (-1.51)	-0.019 (-1.35)	-0.048 (-0.64)	-0.050 (-1.36)	-0.061 (-1.05)	-0.003 (-1.47)	-0.032 (-0.61)	-0.041 (-1.39)
PCT_FOR	0.308** (2.63)	0.359*** (3.17)	0.480*** (3.63)	0.232*** (3.54)	0.310** (2.36)	0.452*** (3.18)	0.386** (2.53)	0.175** (2.41)
BTYPE	0.092** (2.64)	0.085*** (3.72)	0.042** (2.33)	0.075*** (3.21)	0.050** (2.04)	0.061*** (3.18)	0.046*** (3.51)	0.092** (2.56)
Country-level controls								
GDP	0.542** (2.39)	0.380* (1.75)	0.317* (1.71)	0.198 (1.43)	0.252 (1.39)	0.307** (2.20)	0.398* (1.75)	0.340** (2.83)
INFL	-0.029 (-1.51)	-0.051 (-0.96)	-0.048 (-1.32)	-0.036 (-1.40)	-0.017 (-1.12)	-0.052 (-0.94)	-0.069 (-1.60)	-0.058 (-1.27)
Constant	-4.230*** (-3.17)	-3.984** (-3.40)	-4.245*** (-3.52)	-3.452*** (-3.47)	5.148*** (3.89)	4.526*** (3.14)	3.584** (3.91)	3.482*** (3.78)
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	2785	2785	2785	2785	2785	2785	2785	2785

R-squared	0.41	0.55	0.40	0.47	0.45	0.50	0.43	0.47
F-value	45.3	48.2	57.9	46.2	52.0	40.4	57.1	53.5

Notes: All the variables used are fully defined in Table 2. t-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

Table 10. Additional analysis: Bank innovation initiatives, bank social, health and environmental initiatives and bank financial performance in different periods

Additional analysis	SDGs (2015-2022)				PRE-SDGs (2007-2014)			
Panel A: Impact of BIIs on BSHED	BSHED (1)	BSD (2)	BHD (3)	BED (4)	BSHED (5)	BSD (6)	BHD (7)	BED (8)
BIIs	0.235*** (3.68)	0.092** (2.45)	0.005* (1.68)	0.814*** (4.30)	0.056 (1.07)	0.005 (0.89)	0.033 (0.54)	0.092 (1.58)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1473	1473	1473	1468	1312	1312	1312	1254
R-squared	0.48	0.50	0.44	0.45	0.42	0.43	0.38	0.38
Panel C: Impact of BIIs on BFP	ROA (1)		NIM (2)		ROA (3)		NIM (4)	
BIIs	0.308*** (3.59)		0.485** (2.53)		0.045 (1.18)		0.030 (1.56)	
Controls	Yes		Yes		Yes		Yes	
Year & country dummies	Yes		Yes		Yes		Yes	
No. of observations	1473		1473		1312		1312	
R-squared	0.45		0.49		0.45		0.40	
Panel D: Effect of BSHED on BFP	ROA (1)	ROA (2)	ROA (3)	ROA (4)	ROA (5)	ROA (6)	ROA (7)	ROA (8)
BSHED	0.569** (2.08)				0.010 (1.46)			
BSD		0.340*** (3.39)				0.008 (1.37)		
BHD			0.016** (2.50)				0.038 (1.54)	
BED				0.143* (1.72)				0.005 (0.87)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year & country dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	1473	1473	1473	1468	1312	1312	1254	1254
R-squared	0.45	0.50	0.48	0.42	0.43	0.45	0.50	0.38

Notes: All the variables used are fully defined in Table 2. *t*-statistics estimated using robust standard errors are reported in parentheses. ***, ** and * indicate statistical significance at 1%, 5% and 10% levels, respectively.

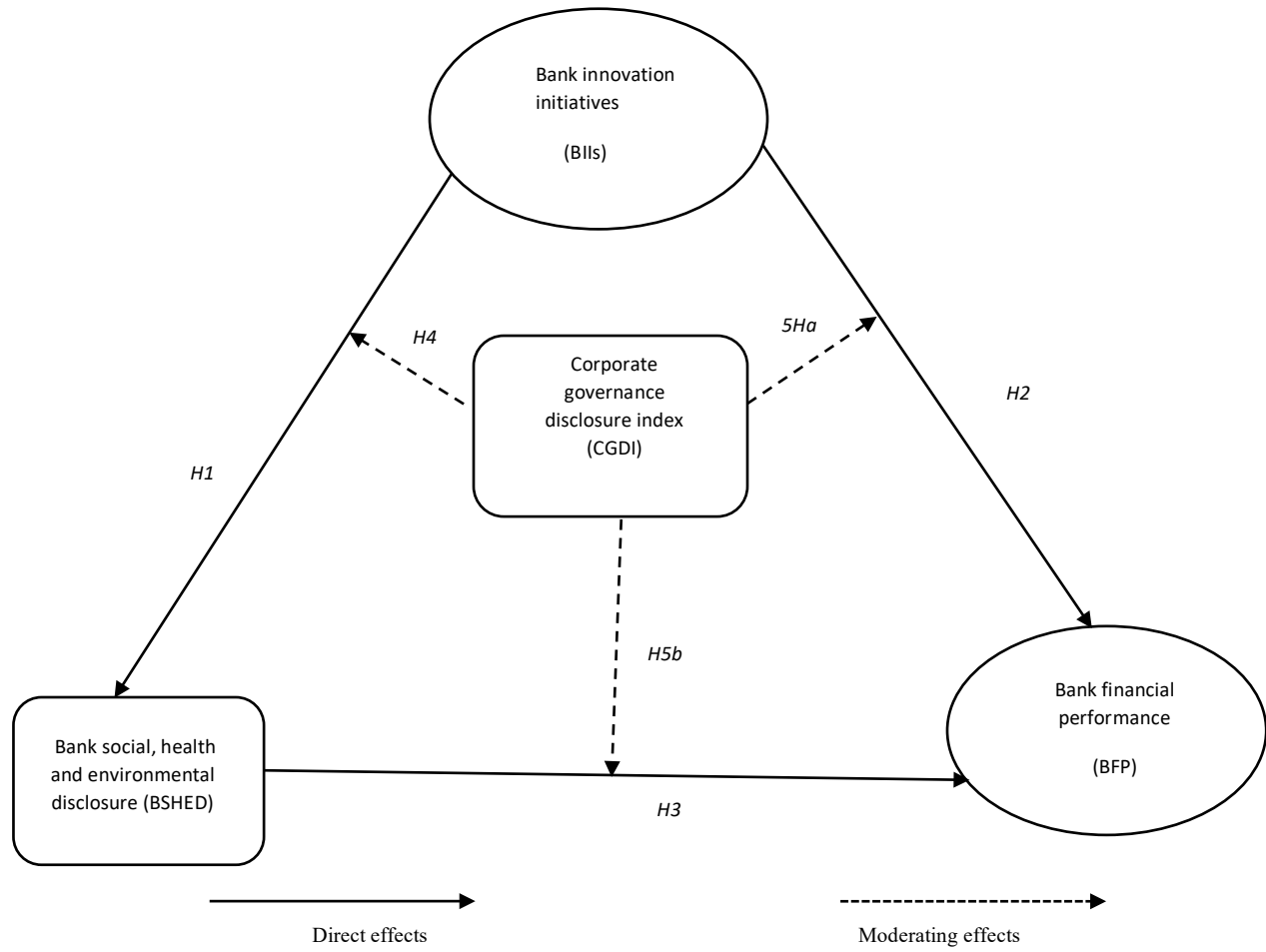


Figure 1: Conceptual framework