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Green banking and sustainability: A comprehensive analysis

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Abstract

Green banking has gone from being a niche concept to becoming part of the sustainable finance landscape all over the world, requiring financial institutions to balance profit and environmental stewardship. This extensive review integrates evidence from over 70 published studies, including four focal papers on India, Bangladesh and Malaysia to offer a multi-dimensional analysis of green banking across theoretical, empirical, comparative and policy dimensions. The review adopts the lenses of Legitimacy Theory, Stakeholder Theory, Institutional Theory, the Resource-Based View (RBV), the Natural Resource-Based View (NRBV) and Microfoundations of Dynamic Capabilities to explore the organisational and regulatory forces that enable or hinder the adoption of green banking. The results of this review are consistent with the positive impact of green banking practices (GBP) on the banks' sustainable performance (BSP), competitive advantage (CA), organisational performance (OP), and environmental performance. The mediating roles of Green Brand Image (GBI) and Green Banking Policy (GBP) and the moderating effect of Green CSR (GCSR) are documented and theorised. The review further outlines the landscape of practical green banking initiatives – including paperless banking, solar powered ATMs, green bonds and waste-to-energy financing – and looks at contributions to the United Nations Sustainable Development Goals (SDGs). Barriers identified and analysed include regulatory fragmentation, lack of financial incentives, greenwashing risks, institutional inertia and technological capacity gaps. The paper ends with an integrated policy framework and agenda for future research.

Keywords: *Green banking; sustainable finance; ESG; green brand image; green banking policy; competitive advantage; sustainable performance; developing economies; regulatory framework; UN SDGs*

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1 INTRODUCTION

The coming together of finance and environmental sustainability is one of the defining challenges of the twenty-first century. Global warming, rising sea levels, loss of biodiversity, and the increased rate of extreme weather events now have measurable economic costs to all sectors including the banking sector (Mir & Bhat, 2022; Chandran et al., 2025). Financial institutions, previously seen as

environmentally neutral intermediaries, have been 're-conceptualised' as important actors because their decisions regarding lending and investment can either maintain high carbon pathways or speed up the transition to a low carbon economy (Volz, 2018; Jeucken & Bouma, 1999; Park & Kim, 2020).

This reconceptualisation has been institutionalised through green banking, which is broadly defined as the integration of environmental, social and governance (ESG) issues into the internal operations and external financing activities of banks (Bai, 2011;

Goyal & Joshi, 2011; Lalon, 2015). This concept has developed from the initial literary articulation of ethical and socially responsible banking into a sophisticated field of practice that includes green bonds, sustainability-linked lending, financing of renewable energy projects, carbon credit instruments, environmental risk assessment in credit decisions, and systemic reforms in governance (Zheng et al., 2021; Khairunnessa et al., 2021; Saif-Alyousfi & Alshammari, 2025).

The worldwide green finance market size was USD 5.07 trillion in 2024 and is expected to reach USD 23.99 trillion by 2032, at a compound annual growth rate (CAGR) of 21.45% (Speednet Software, 2025). This trend exemplifies the mainstreaming of green finance in developed economies, as regulatory requirements are steadily encouraging banks to embed sustainability into the core of their activities. Sustainable Finance Disclosure Regulation (SFDR), taxonomy-based requirements for ESG disclosure and mandates for sustainability-linked lending have fundamentally revolutionised the way banks allocate capital in the European Union (Bruno & Lagasio, 2021; Chandran et al., 2025). Similarly, the Green Credit Guidelines in China have also made it mandatory for all commercial banks to do an environmental risk assessment (Zhou et al., 2022).

But the uptake is patchy across the world. Green banking in emerging economies, where climate vulnerability is often the greatest, is largely voluntary, fragmented and institutionally under-supported (Aslam & Jawaid, 2022; Rehman et al., 2021). India, Bangladesh and similar developing economies face the challenge of balancing economic growth and the transition to sustainable finance, often without the regulatory certainty, financial incentives and technical capacity that make green banking viable at scale (Chandran et al., 2025; Thapliyal & Gupta, 2026).

This review synthesises four focal studies – Mir and Bhat (2022), Gazi et al. (2025), Chandran et al. (2025), and Thapliyal and Gupta (2026) – and over 70 peer-reviewed sources in the green banking, green finance, ESG, and sustainable development

literatures to address the evolving landscape. The review is organised as follows: Section 2 discusses conceptual definitions and evolution of ; Section 3 describes theoretical frameworks; Section 4 reviews global and regional adoption; Section 5 reports key green banking practices; Section 6 summarises evidence on sustainability outcomes; Section 7 discusses barriers and challenges; Section 8 discusses roles of GBI, GBP and GCSR; Section 9 presents comparative institutional analysis; Section 10 presents SDG contributions mapping; Section 11 presents policy recommendations; and Section 12 concludes with future research directions.

2 CONCEPTUAL DEFINITIONS AND THE EVOLUTION OF GREEN BANKING

2.1 Definitional Landscape

In the literature there are many overlapping definitions of green banking, emphasising different dimensions of the concept. Bai (2011) defines it as “environmentally friendly banking and a set of practices and responsibilities that establish a business to be ecologically friendly”. Goyal and Joshi (2011) define it as “moral financial services” which includes environmentally friendly and socially responsible banking activities. Bangladesh Bank (2020) mentions that the goal is to protect the environment and sustainable development by considering all social and environmental factors.

Lalon (2015) emphasises the systemic dimension saying green banking is "complete banking systems that ensure significant economic growth while simultaneously improving environmental-friendly practices." According to Masukujjaman and Aktar (2013) “environmentally friendly banking system that helps to prevent environmental deterioration in order to make this world more livable”. More recently, Thapliyal and Gupta (2026) describe it as “an innovative ideology adopted by banks to save the environment by minimising the bank’s internal and external carbon emissions that fosters sustainable growth.”

The diversity of definitions reflects three core dimensions: (1) greening of a bank’s internal operations to reduce its direct environmental footprint, (2) reorientation of lending and investments to environmentally beneficial activities and (3) inclusion of environmental risk assessment in

credit and investment decisions. This three-part model forms the conceptual backbone of this review.

2.2 Historical Evolution

The formal institutional roots of green banking can be traced back to 1980 when Triodos Bank became the first bank to include an obligation for environmental safety in its operational charter (Gazi et al., 2025). The concept became more widely recognised in the 1990s when environmental externalities became part of mainstream economics, and Jeucken and Bouma (1999) described banks' more dynamic attitude towards sustainability.

Regulatory experiments began in the 2000s with the introduction of the Green Banking Policy by Bangladesh Bank in 2011, making Bangladesh one of the first developing countries to formalise green banking requirements (Gazi et al., 2025; Khairunnessa et al., 2021). In 2012, China adopted its Green Credit Guidelines, moving from voluntary to mandatory environmental reporting for large commercial banks (Zhou et al., 2022). The 2015 Paris agreement and 2030 SDG Agenda provided normative momentum, thus embedding green banking within global climate governance (Chandran et al., 2025; Bukhari et al., 2022).

The 2020s have seen the growing institutionalisation in developed economies (EU's Taxonomy Regulation, UK's Sustainability Disclosure Requirements (SDR), and climate stress tests by central banks) and growing momentum in emerging markets where green bond markets, priority sector lending for renewables and ESG disclosure requirements are being progressively introduced (Saif-Alyousfi & Alshammari, 2025; Thapliyal & Gupta, 2026).

3 THEORETICAL FRAMEWORKS

3.1 Legitimacy Theory

Legitimacy Theory, building on Suchman's (1995) seminal work, suggests that for organisations to survive and gain access to resources, they must align their practices with society's values and norms. This framework is applied in green banking to account for the motivation of banks to undertake sustainability initiatives when there are no strict legal requirements, because the social contract between banks and society requires the banks to act in an environmentally responsible way (Brown & Deegan, 1998; Gazi et al., 2025).

Gazi et al. (2025) draw on legitimacy theory to argue that Green Brand Image (GBI) acts as a legitimacy signal, conveying a bank's environmental commitments to regulators, investors and communities. A strong GBI institution is perceived to function within the proper bounds of its social contract, leading to greater stakeholder confidence and facilitating the continuous operational licence. Empirically, the study shows that legitimacy-seeking behaviour through GB practices, GBI and GBP is translated into measurable improvements in sustainable performance, thus confirming the predictive utility of the theory in banking contexts.

3.2 Stakeholder Theory

Based on Freeman and Reed's (1983) Stakeholder Theory, a firm has to take into account the interests of multiple constituencies—not only shareholders but also regulators, customers, employees, investors and civil society. Green banking translates this theory into the practice of requiring financial institutions to integrate environmental responsibility into their relationships with each stakeholder group (Donaldson & Preston, 1995).

In India, regulatory bodies (RBI, SEBI) push for sustainability disclosures; institutional investors call for ESG-aligned portfolios; civil society organisations pressure banks for responsible lending; and increasingly retail customers demand environmentally responsible financial products (Chandran et al., 2025). The theory accounts for the heterogeneity of the drivers for green banking adoption and why banks with more diversified and engaged stakeholder ecosystems adopt more robust green strategies (Gazi et al., 2025).

3.3 Institutional Theory

DiMaggio and Powell (1983) in their Institutional Theory, there are three types of isomorphic pressure which lead organisations to similar practices. These are coercive pressure (regulatory mandates), normative pressure (professional standards and industry expectations) and mimetic pressure (imitating successful peers). These three pressures in the context of green banking justify the faster adoption in regulated, professionalised and competitive environments (Chandran et al., 2025; Bukhari et al., 2020).

India's voluntary, advisory architecture is a case of weak coercive pressure: in the absence of legal mandates, banks have low institutional commitment to sustainability (Chandran et al., 2025). International ESG frameworks are

more normatively pressuring for private banks (ICICI, HDFC) than public sector banks. Mimetic pressure is created when international banking peers adopt green strategies that Indian banks observe and selectively imitate. The theory predicts and the evidence confirms that stronger coercive frameworks lead to more uniform and substantive green banking adoption.

3.4 Resource-Based View (RBV) and Natural Resource-Based View (NRBV)

Barney (1991) RBV states that only valuable, rare, inimitable, and non-substitutable resources can bring sustained competitive advantage to firms. Thapliyal and Gupta (2026) contend that green banking practices are the resources in this framework that are valuable (reducing costs and attracting customers), rare (unevenly distributed), inimitable (embedded in organisational culture), and non-substitutable (no other alternative achieves same sustainability performance nexus).

Hart (1995) extends this to argue that environmental stewardship is itself a strategic resource. Incorporating pollution prevention, product stewardship, and sustainable development into core strategies enables companies to attain resource positions that are difficult for competitors to duplicate. Examples of NRBV-consistent resources in banking that drive both environmental performance and competitive positioning include green finance portfolios, environmental risk assessment capabilities, and solar infrastructure.

3.5 Microfoundations of Dynamic Capabilities

Green banking practices are characterised as organisational microfoundations (or routines) that are collectively contingent to enable banks to sense (detect demand for green loans), seize (launch green loan offerings), and reconfigure (transform organisational structures and processes) through the application of Teece's (2007) dynamic capabilities framework operationalised by Thapliyal and Gupta (2026). Internal green practices provide competitive advantage based on cost, reduce regulatory risk and cost efficiency. Banks' external green practices enable them to become leaders in sustainability-driven markets and, therefore, gain a differentiation-based advantage. These dynamic capabilities, taken together, result in better organisational performance on both financial and non-financial measures.

4 GLOBAL AND REGIONAL TRENDS IN GREEN BANKING

4.1 Developed Economies

Developed economies have largely put green banking on a formal footing through mandatory regulatory frameworks and structured financial incentives. The Green Finance Strategy, taxonomy regulation and SFDR of the European Union have introduced mandated ESG disclosure and sustainability-linked investment classifications for all major financial institutions (Bruno & Lagasio, 2021; Chandran et al., 2025). Germany, Netherlands and Sweden call for banks to integrate ESG principles into investment and lending decisions. US SEC and Federal Reserve have developed sustainability reporting guidelines (Chandran et al., 2025).

Among them, the Green Credit Guidelines of China are one of the most comprehensive mandatory frameworks in the world, requiring all commercial banks to conduct environmental risk assessments before issuing loans and report green credit statistics annually (Zhou et al., 2022). The People's Bank of China has contributed to this by providing financial incentives, including tax incentives and lower interest rates for green bonds, which has significantly grown the green credit market in China. These regulatory architectures have largely fuelled the surge in ESG debt issuance globally from USD 0.2 trillion in 2015 to an estimated USD 2.5 trillion in 2024 (ASUENE, 2024).

4.2 Emerging Economies: Asia

South and Southeast Asia is seeing an increase in green banking, but it is uneven. Among the developing countries, Bangladesh is an early mover to have put in place formal green banking requirements in 2011 through Bangladesh Bank. With the introduction of projects such as the Bangladesh Sustainable Finance Initiative (BSFI) and Sustainable Finance Refinancing Scheme (SFRS), the Bangladesh Bank (BB) has provided low-cost lending for environmentally sustainable assets (Gazi et al., 2025; Zheng et al., 2021). At present, Bangladesh Bank has set the minimum requirement of 5% of total outstanding loans as direct green finance and 20% as sustainable finance for banks.

India has made progress but is lagging. The RBI issued its first Environmental and Social Risk Management (ESRM) circular in 2007, added renewable energy to the priority

sector lending category in 2015, and released a discussion paper on climate risk and sustainable finance in 2021 (Chandran et al., 2025). SEBI had introduced the Business Responsibility and Sustainability Reporting (BRSR) framework in 2021. It has been made mandatory for top 1,000 listed companies from FY 2022-23 onwards. In 2024, the RBI issued a draft “Disclosure Framework on Climate-related Financial Risks”. These advancements notwithstanding, India’s approach continues to be highly advisory and non-binding, resulting in a patchwork adoption across the sector (Thapliyal & Gupta, 2026).

4.3 Emerging Economies: Africa and Latin America

Broadly, green banking is in an early stage and voluntary in sub-Saharan Africa and Latin America. Developing countries such as India, Brazil and South Africa have introduced voluntary sustainability guidelines but adoption has been patchy among banks in the absence of regulatory compulsion (Chandran et al., 2025). Limited access to capital, weak regulatory frameworks and capacity gaps continue to be barriers across EMDEs globally (CPI, 2025) as highlighted in the Climate Policy Initiative’s State of Green Banks 2025 report. In these regions, green banks have increasingly turned to alternative institutional models, namely green finance facilities within existing public development banks, rather than stand-alone green bank architectures.

5 KEY GREEN BANKING PRACTICES AND INITIATIVES

5.1 Internal Greening

The most easily implementable green banking dimension is to reduce the bank’s own environmental footprint by changing its internal processes, infrastructure and resource consumption.

Digital Transformation & Paperless Banking. The shift to digital banking e-statements, net banking, mobile applications, online bill payments is both a commercial need and an ecological intervention (Mir & Bhat, 2022). Thapliyal and Gupta (2026) report that digital-first strategies lead to lower operational costs and at the same time reduce environmental impact. MayBank Malaysia adopted a paperless policy and digitalised all internal procedures and safely recycled about 136,570 kg of sensitive papers in Malaysian and Singaporean locations (Mir & Bhat, 2022).

Energy Efficiency & Renewable Infrastructure. Top green banks are investing in energy-efficient retrofits of branches, LED lighting systems, automated energy management and renewable energy generation. According to the bank’s latest sustainability report, SBI has installed 3,534 solar-powered ATMs and 795 rooftop solar systems in its buildings (Thapliyal & Gupta, 2026). According to Mir and Bhat (2022), SBI’s solar ATM program has contributed to a reduction of CO₂ emissions by some 2,000 tonnes a year since 2008. In 2020 MayBank reduced electricity consumption by 8.5% to 50,102,311 kWh compared to 2019 and reduced water consumption by 11.7% (Mir & Bhat, 2022).

Sustainable Building Design. The construction and retrofitting of branch networks to comply with green building certification standards (LEED, IGBC, TERIGRIHA in India) leads to significant reduction in long-term energy and water consumption. SBI launched the “SBI Green Home Loan” product with a concession of interest rate of 0.25%, and reduction of 5% in margin for LEED certified properties (Mir & Bhat, 2022).

Refuse disposal. Increased use of operational frameworks of green banking in the standardisation of responsible disposal of e-waste, paper recycling systems and effluent treatment. MayBank has licensed contractors who properly dispose of outdated electrical devices and it has recycling systems in all branches (Mir & Bhat, 2022).

5.2 External Green Finance

The element of green banking in terms of financing involves the reallocation of lending and investment towards environmentally-friendly activities and away from highcarbon industries.

Green Loans & Green Credit Green banking’s external impact is based on the preferential financing of renewable energy installations, energy-efficient construction, sustainable agriculture, pollution control, and clean transportation (Muchiri et al., 2025). Under its sustainable banking portfolio, SBI invested INR 91.37 billion in solar roof projects, INR 20.93 billion in wind energy, INR 940 million in biomass, and INR 1.65 billion in hydro projects (Mir & Bhat, 2022).

Green bond. Green bonds are the flagship instrument of green capital market finance. In September 2018, SBI issued a green bond issue of USD 650 million, with subscriptions three times the offer value (Mir & Bhat,

2022). As of 2024, India's sustainable debt market had grown to USD 55.9 billion in GSS+ issuance, 83% of which were green bonds (Thapliyal & Gupta, 2026). Based on a panel of 1,738 bank-year observations, Palmieri and Geretto (2025) show that the issuance of green bonds and improvements in ESG performance positively affect banks' financial performance.

Financing Renewable Energy In November 2011, MayBank Ventures announced a series of diversified project holdings across the Asia-Pacific in the form of a USD 500 million renewable energy fund (Mir & Bhat, 2022). In 2020, MayBank was also engaged in four large-scale photovoltaic power plant projects with a total investment of about RM 1.3 billion, projects that are planned to replace coal and gas-fired stations in the local energy system (Mir & Bhat, 2022).

Investment in waste-to-energy and innovation. Around RM 374 million was refinanced by MayBank for the establishment of a waste-to-energy project in Negeri Sembilan, which is projected to transform 600 tonnes of garbage per day into up to 25 MW of electricity (Mir & Bhat, 2022).

Credit Environmental Risk Assessment Environmental due diligence as an integral part of credit approval processes is a key element of mature green banking systems. Zhixia et al. (2018) found that the Bangladesh Bank's implementation of specific standards on environmental risk assessment has led to the successful development of sustainable lending. Chen et al. (2022) showed that banks that do environmental risk assessment attract more green funding and have a positive contribution to environmental sustainability. Aslam and Jawaid (2022) show that adopting green banking practices leads to simultaneous improvement in environmental, financial and operational performance.

5.3 Green Governance and Institutional Structures

The governance aspect seeks to embed sustainability into organisational hierarchies, reporting systems, employee incentive schemes and stakeholder engagement frameworks. SBI created a dedicated ESG and Climate Finance Unit, signed the CDP, and launched a loan product, "Carbon Financing Plus" for Clean Development Mechanism (CDM) projects (Mir & Bhat, 2022). Punjab National Bank (PNB) has introduced financing for green hydrogen projects (Thapliyal & Gupta, 2026). HDFC Bank

has formed an ESG Apex Council. Axis Bank provided green financing of around ₹22,160 crore in FY 2024–2025 (Thapliyal & Gupta, 2026).

SBI and MayBank are both signatories of the Carbon Disclosure Project (CDP). Mir and Bhat (2022) reported that in 2012 MayBank scored 58 in CDP, up from 37 the year before. Now, banks regularly publish Business Responsibility and Sustainability Reports (BRSR) to ensure transparency and accountability to stakeholders (Thapliyal & Gupta, 2026).

6 GREEN BANKING AND SUSTAINABILITY OUTCOMES

6.1 Impact on Banks' Sustainable Performance

The relationship between green banking practices and sustainable performance (SP) is one of the most studied relationships in the green banking literature, and the consensus is very much in favour of a positive relationship. They have rigorous SEM evidence from 420 employees of Bangladeshi Islamic and state-owned commercial banks (Gazi et al., 2025). They find a significant direct effect of GB on BSP ($\beta = 0.15$, $p < 0.001$). Malsha et al. (2020) showed the positive mediation of employee green behaviour between green banking and sustainability performance. It is confirmed that green banking activities improve the banks' environmental performance and green financing plays a mediating role (Zhang et al., 2022).

Hapliyal et al. (2025) found that green banking practices have a positive effect on the environmental performance of banks and sources of green financing in Indian banks. Evidence provided by Zheng et al. (2021) indicates that green finance development in Bangladeshi PCBs has a significant positive impact on sustainable development outcomes in economic, social and environmental terms. Siahaan et al. (2020) also confirms the positive relationship between green banking sustainability and financial performance of Indonesian listed banks. Hossain et al. (2020) discovered positive impacts of green banking on the financial performance of the listed Bangladeshi banks.

6.2 Competitive Advantage

The most direct empirical evidence about the effect of green banking on CA is provided by Thapliyal and Gupta (2026). The study of 385 employees from four Indian

banks found a strongly significant path from GBP to CA ($\beta = 0.793$, $p = 0.000$, $R^2 = 0.632$). This shows that green banking practices explain 63.2 per cent of the variance in competitive advantage. The study shows that proactive green policy, compliance with regulations, green stakeholder agreements, adoption of digital technology, financing of renewable energy and involvement of top management contribute in building a bank's distinct image, reputation and goodwill which collectively enhance competitive positioning.

This finding is consistent with Leonidou et al. (2017) who show that proactive green policies create cost effectiveness and competitive advantage for firms. Molina-Azórín et al. (2015) prove that the inclusion of sustainability in management increases competitive advantage in service companies. This is based on the theoretical foundation provided by the work of Eiadat et al. (2008), which demonstrates that green business practices influence the competitive advantage through environmental innovation strategy.

6.3 Organizational Performance

Similar to the effect of green banking on the environment, the evidence on the effect of green banking on organisational performance is also positive. Thapliyal and Gupta (2026) find a significant direct effect of GBP on OP ($\beta = 0.440$, $p = 0.000$) because green rewards systems, training and workshops motivate and commit employees to enhance internal business processes and performance. Sultana et al. (2021) from Bangladesh confirm that banks adopting green practices increase customer satisfaction, which results in greater loyalty and retention. Aghaei et al. (2024) indicated that green vision and training programs motivate employees to voluntarily engage in green behaviours that lead to improved performance.

As Liu et al. (2021) show, the effective use of physical and human resources leads to better business performance directly. Le et al (2020) found a strong relationship between green supply chain management practices and environmental management. Further, the authors recommended that doing so can increase organisational performance. According to Mumtaz and Smith (2019), Pakistan has a huge scope of green finance because it helps in curbing environmental issues and also makes firms more accountable and competitive.

6.4 Environmental Performance

Green banking reduces banks' direct and indirect environmental footprints—measurably, not just in financial and competitive outcomes. Yameen et al. (2024) confirm that regulatory pressures, CSR orientation and global green trends significantly drive green banking innovations and green banking practices significantly improve operational efficiency and environmental sustainability. Risal and Joshi (2018) demonstrate from Nepal that governance mechanisms improve banks' environmental performance. Vidyakala (2020) supports this by studying Indian banks in Coimbatore and finding that GB practices, such as environmental training, energy-efficient operations, and green policy, positively affected environmental performance.

Green lending reduces banks' exposure to high-carbon credit risk and shifts capital to industries with less long-term regulatory and physical climate risk (Zhou et al., 2022). Mumtaz and Smith (2019) from Pakistan report that the scope of green finance is immense as it helps to curb environment issues in addition to making firms more accountable and competitive in reducing carbon emission.

7 BARRIERS AND CHALLENGES TO GREEN BANKING ADOPTION

7.1 Regulatory Fragmentation and Advisory-Only Frameworks

The most common structural barrier identified in emerging economies is the lack of mandatory and standardised regulatory frameworks. The green banking policies issued by RBI and SEBI in India are advisory and hence not enforceable which results in ambiguity in compliance (Chandran et al., 2025). Organisations respond to regulatory pressures only if they are clearly defined and legally binding, without legal compulsion (DiMaggio & Powell, 1983). As Larsen (2022) shows, financial institutions in emerging economies are unwilling to finance sustainable projects in the absence of strong regulation or financial incentives.

Banks can't incentivise sustainability-linked investments as there is no formal rating system for green credits. Regulatory ambiguity also results in greenwashing banks that only promise commitment to sustainability but do not adopt a proper green finance policy (Moran & Tal, 2024). India's green banking industry lacks a central monitoring system, resulting in inconsistent adoption of policies and

the ineffective implementation of sustainable finance initiatives (Chandran et al., 2025).

7.2 Lack of Financial Incentives

Empirical research has shown that the existence of low-interest green loans, tax exemptions, and government-warranted sustainability funds in a country lead to a greater number of financial institutions participating in green banking initiatives (Ji et al., 2022). However, in India, the absence of low-interest green loans and tax exemptions from environmentally friendly projects discourages financial institutions from actively promoting sustainable banking (Chandran et al., 2025). Most Indian financial institutions have business models that are capital constrained and cost sensitive. With no fiscal benefits, no regulatory penalties or stakeholder pressure (Chandran et al., 2025), banks view green banking as a non-essential add-on and not a core business requirement.

Saif-Alyousfi and Alshammari (2025) analyse 176 banks in 46 countries and conclude that consistent adoption of green banking needs structured regulatory and financial incentive frameworks. In India, the absence of incentives for green banking compliance makes the integration of sustainability a costly process and a voluntary, rather than profitable strategic approach.

7.3 Greenwashing and Symbolic Compliance

ESG transparency is often implemented without adequate internal risk governance due to increasing regulatory and market pressures, raising concerns of symbolic compliance and greenwashing (Marpaung et al., 2025). As green banking gets more noticed, some institutions resort to superficial green labels, without fundamental changes to their operations or lending portfolios. Non-transparent sustainability-linked lending criteria may lead financial institutions to avoid adopting green finance models, according to Partiti (2024).

In 2025, SEBI issued stricter regulations on sustainability disclosure requirements and the requirement for independent reviews of such disclosures to reduce greenwashing risks (Thapliyal & Gupta, 2026). This problem is especially severe in developing economies with limited monitoring capacity and weak enforcement mechanisms.

7.4 Technological and Human Capital Constraints

Effective green banking requires technological infrastructure (for environmental risk assessment, green project monitoring, data verification) and trained human capital (Chandran et al., 2025). In most developing countries, banks do not have the sophistication to automate sustainability assessments within the credit approval process. Factors influencing the adoption of green banking technology include lack of user knowledge, awareness of paperless banking, and capacity to assess sustainable finance (Factors Affecting Green Banking Technology Adoption, 2025).

According to Gazi et al. (2025), staff training in environmental protection is a key component of effective green banking, as a governance mechanism and as a driver of organisational green culture. A common constraint in emerging market banking systems is the lack of structured green finance capacity-building programs.

7.5 Consumer Awareness and Demand Gaps

However, consumer awareness and participation in green banking in India is still relatively low when compared to developed economies and this gap needs to be addressed by financial institutions (Chandran et al., 2025). This results in a demand side constraint. Banks are hesitant to invest in green product development unless they see signs of demand in the market. But demand cannot increase without the availability of products and awareness campaigns.

Sarath Chandran et al. (2024) empirically examine customer awareness of green banking products in Kerala, India. They find that although there is increasing awareness about the concept, knowledge of specific products and willingness to switch to green banking services is still minimal. This result supports the importance of demand-side interventions and supply-side regulatory reform.

7.6 Institutional Inertia in Public Sector Banks

Organisational inertia in large public sector banks in developing economies restricts the introduction of green banking. Entrenched processes, legacy IT systems, bureaucratic structures, and risk averse cultures hinder internal greening and external green finance innovation (Jaiwani & Gopalkrishnan, 2023). Mishra and Sant (2023)

show that the quality of sustainability disclosure by public sector banks in India is significantly lower than that of private and foreign banks.

Ajaz and Aijaz (2021) say that Indian banks are yet to catch up with the implementation of green banking services despite several opportunities and notifications by RBI and severe actions are needed along with awareness and training for customers as well as bankers. This is reflected across South Asian developing economy contexts.

8 COMPARATIVE INSTITUTIONAL ANALYSIS: INDIA AND MALAYSIA

Mir and Bhat (2022) systematically compare green banking initiatives at two of the largest financial institutions operating in their national banking sectors, namely, SBI (India) and MayBank (Malaysia). The comparison illustrates how institutions, within similar development contexts, implement green strategies with different emphases and results.

SBI has been a pioneer in solar energy infrastructure with more than 3,534 solar powered ATMs, 795 rooftop solar systems and 10 windmills with cumulative capacity of 15 MW in Tamil Nadu, Gujarat and Maharashtra. This unique solar footprint is a reflection of SBI's being the first bank in India to generate green electricity. SBI also launched first of its kind "SBI Green Home Loan" product and "Carbon Financing Plus" loan for CDM Projects. Since 2019, the SBI Green Marathon, spanning six cities, has served as both a public awareness and a branding initiative.

Maybank is the leader in green bond issuance and waste-to-energy financing. It's USD 500 million renewable energy fund (2011), RM 1.3 billion photovoltaic project financing (2020), RM 70 million Sun Lease contribution and RM 374 million waste-to-energy project in Negeri Sembilan are meaningful and innovative external green finance commitments. MayBank's collaboration with WWF-Malaysia and MYCAT on tiger conservation and RM 1 million donation in support of wild tiger conservation, reflects a broader dimension on biodiversity. MayBank is also ahead in paper recycling, having established comprehensive recycling systems at all its branches – a missing component in SBI's waste management.

Both banks are CDP signatories and are making important contributions to SDG 7 and SDG 13. However, gaps remain, with neither institution reporting significant initiatives towards SDG 14 (Life below Water) or SDG 15 (Life on Land), suggesting opportunities for scaling up biodiversity and ecosystem financing in both contexts.

9 GREEN BANKING AND THE UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

Green banking practices map directly onto a number of UN SDGs. Mir and Bhat (2022) link the initiatives of both SBI and MayBank to the specific SDG targets and validate their significant contributions to SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action). Bukhari et al. (2022) explicitly examine green banking as a tool for attainment of UN-SDGs 2030 and find that the aligned green banking initiatives accelerate SDG achievement in EM contexts.

SDG 7 – Affordable and Clean Energy Both focal banks contribute to SDG 7 through significant financing to renewable energy projects. India has shown a strong commitment and success in household electrification – more than 99.99% of houses were electrified by the end of March 2019 (Mir & Bhat, 2022). India has committed to producing 40% of its energy from non-fossil fuel sources by 2030 with a target of 450 GW of renewable energy and financing from the banking sector is key to this (Chandran et al., 2025).

SDG 13 – Climate Action: Green banking directly operationalises climate action through financing mitigation projects (renewable energy, energy efficiency), supporting adaptation (climate-resilient infrastructure), and integrating climate risk into financial decision-making (Saif-Alyousfi & Alshammari, 2025). India's Unnat Jyoti (UJALA) LED distribution scheme, partially supported by public sector bank financing, had saved around 38.6 MtCO₂ by December 2020.

The study by Chandran et al. (2025) maps the SDG contributions of SBI across all the seventeen SDGs and highlights the growing recognition of the poverty reduction, food security and employment generation dimensions of green banking as a part of social sustainable development, not only environmental sustainability.

10 CONCLUSION

This comprehensive review has synthesised over 70 studies using multiple theoretical perspectives, empirical settings and methodological strategies to provide an integrated account of the current state, outcomes, challenges and future pathways of green banking. This synthesis allows for several converging conclusions.

Green banking practices have a universally positive effect on banks' sustainable performance, competitive advantage, organisational performance, and environmental performance in different national contexts like Bangladesh, India, Malaysia, China, and other countries (Mir & Bhat, 2022; Gazi et al., 2025; Thapliyal & Gupta, 2026; Zheng et al., 2021). This evidence base is now sufficient to establish green banking as not just a peripheral CSR effort, but rather a core strategic capability with measurable financial and environmental returns.

The mediation analyses provided by Gazi et al. (2025) indicate that Green Brand Image (GBI) and Green Banking Policy (GBP) are structural transmission mechanisms, rather than peripheral outcomes, through which green practices produce sustainability benefits. Green CSR contributes to these effects; it indicates that green banking requires an organisational culture of environmental responsibility, not just innovations in products or policies. Thapliyal and Gupta (2026) find competitive advantage as a partial mediator between green banking practices and organisational performance (VAF = 48.53%). This confirms that sustainability and competitiveness are mutually reinforcing and not inherently conflicting objectives.

But the journey from aspiration to institutionalisation remains steep, especially in emerging economies. Scaling is hampered by regulatory fragmentation, lack of financial incentives, greenwashing risks, technological gaps and institutional inertia. Green banking regulation in India and similar developing economies is voluntary and advisory in nature, leading to patchy and superficial implementation (Chandran et al., 2025). The major policy interventions needed to make green banking a sector-wide norm instead of an elite institutional practice are mandatory green credit guidelines, structured financial incentives, mandatory ESG disclosure, institutional capacity-building and public-private partnerships.

The stakes are high. By 2050, climate change could force 216 million people to move within their own countries

(World Bank, 2021). Financial institutions have an irreplaceable role in preventing this future by directing capital away from high-carbon pathways and toward the renewable, resilient, and sustainable economic structures that viable futures require. Green banking is not just the future of finance, it is a prerequisite for the future.

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