

Green Banking Practices in India: A Comprehensive Review with Special Reference to Odisha

Surendra Kumar Senapati¹ & Dr. CA Amar Kumar Behera²

1. Research Scholar in Basic Science and Humanities, Silicon University, Bhubaneswar, Odisha, India.
2. Professor, Department of Basic Science and Humanities, Silicon University, Bhubaneswar, Odisha, India.
Email: ¹Surendra.senapati@gmail.com, ²amar.behera@silicon.ac.in

Abstract

Green banking has emerged as a critical component of sustainable finance, enabling the banking sector to minimize environmental impacts while supporting economic growth. This review paper synthesizes national and international literature on green banking practices, focusing on conceptual foundations, global developments, Indian initiatives, and region-specific insights with reference to Odisha. The study systematically analyses prior research on digitalization, green credit, sustainability reporting, customer and employee perceptions, and regulatory frameworks influencing green banking adoption. Existing studies indicate that while Indian banks have adopted several green initiatives such as paperless banking, renewable energy financing, and digital transactions implementation remains uneven, particularly in less-developed regions. The literature further reveals that customer awareness, employee readiness, institutional support, and regulatory pressure significantly influence adoption outcomes. However, region-specific empirical research, especially in states like Odisha, remains limited. By identifying thematic patterns, methodological trends, and empirical gaps, this review highlights the need for localized, stakeholder-focused research to strengthen green banking implementation. The paper contributes to the academic discourse by consolidating fragmented evidence and proposing future research directions aligned with India's sustainable finance agenda.

Keywords: *Green Banking, Sustainable Finance, Digital Banking, ESG, India, Odisha.*

1. INTRODUCTION

The accelerating pace of climate change, environmental degradation, and resource depletion has compelled policymakers, businesses, and financial institutions to adopt sustainable development strategies. Among these actors, the banking sector plays a pivotal role in shaping economic activities through capital allocation and financial intermediation. In this context, green banking has emerged as an important mechanism for integrating environmental and social considerations into banking operations, lending decisions, and strategic planning (Bihari & Pandey, 2015; Weber & Remer, 2011). Green banking seeks to minimize the ecological footprint of financial institutions while promoting investments that support environmentally sustainable and socially responsible development.

Globally, green banking gained momentum following international sustainability frameworks such as the Equator Principles, the United Nations Environment Programme Finance Initiative (UNEP FI), and the Paris Climate Agreement. These initiatives encouraged banks to assess environmental and climate-related risks and to incorporate sustainability criteria into credit appraisal and investment decisions (Campiglio et al., 2018). Empirical studies from developed and emerging economies demonstrate that banks adopting green practices often experience enhanced financial stability, improved risk management, stronger

stakeholder trust, and long-term profitability (Buallay, 2019; Friede et al., 2015). Consequently, green banking is increasingly viewed not merely as a corporate social responsibility initiative, but as a strategic imperative for sustainable finance.

In India, the concept of green banking has gained prominence over the past decade, supported by policy guidelines and regulatory encouragement from the Reserve Bank of India (RBI) and the Indian Banks' Association (IBA). Indian banks have introduced several green initiatives, including paperless banking, digital payment systems, energy-efficient branch operations, and green lending for renewable energy and environmentally friendly projects (Meher, 2014; Sahoo & Nayak, 2011). The rapid expansion of digital banking platforms has further accelerated the adoption of eco-friendly practices by reducing paper usage and energy consumption (Begum, 2018). However, existing literature suggests that green banking adoption in India remains largely compliance-driven and uneven across regions, with greater emphasis in metropolitan and economically advanced areas (Mallya, 2012).

States such as Odisha present a distinctive context for examining green banking practices due to variations in banking penetration, digital literacy, and infrastructural development. Despite national-level initiatives, empirical evidence on stakeholder perceptions and implementation challenges in less-developed regions remains limited. Understanding how customers and bank employees perceive and engage with green banking practices at the regional level is therefore essential for ensuring inclusive and effective implementation. This review study seeks to contextualize green banking within the Indian and global landscape while highlighting the need for region-specific research to support sustainable banking transformation.

2. OBJECTIVES OF THE STUDY

The primary objectives of this research review paper are:

- 1) To examine the conceptual and theoretical foundations of green banking.
- 2) To review global perspectives and empirical evidence on green banking practices.
- 3) To analyse green banking initiatives and adoption trends in India.
- 4) To assess the existing literature on stakeholder perceptions, digitalization, and sustainability reporting.
- 5) To identify region-specific insights and limitations related to green banking in Odisha.
- 6) To highlight research gaps and propose directions for future empirical studies.

3. REVIEW OF LITERATURE

3.1 Conceptual Foundations of Green Banking

Green banking represents a strategic approach within the financial sector that integrates environmental sustainability into core banking operations, lending decisions, and corporate governance. It encompasses practices aimed at minimizing the ecological footprint of banks while promoting sustainable economic development through responsible financing and operational efficiency (Buallay, 2019; Bătae et al., 2021). Common green banking practices include paperless and digital banking, green credit and loans, renewable energy financing, sustainability and ESG reporting, and the integration of environmental objectives within corporate social responsibility (CSR) frameworks. The conceptual foundation of green banking

is strongly anchored in stakeholder theory, institutional theory, and sustainability theory. Stakeholder theory posits that banks are accountable not only to shareholders but also to a wider group of stakeholders, including customers, employees, regulators, communities, and the natural environment (Cornett et al., 2016). From this perspective, green banking practices enhance trust, legitimacy, and long-term value by aligning financial objectives with societal and environmental expectations.

Institutional theory explains the diffusion of green banking practices as a response to regulatory pressure, normative expectations, and competitive forces within the banking ecosystem. Regulatory frameworks, such as climate-risk guidelines, green credit policies, and sustainability disclosure mandates, compel banks to adopt environmentally responsible practices to maintain legitimacy and compliance (Campiglio et al., 2018; Bolton & Kacperczyk, 2021). Empirical studies demonstrate that institutional pressure significantly influences banks' adoption of green lending, environmental risk management, and ESG disclosures, particularly in emerging economies (Kumar & Prakash, 2019). Sustainability theory further reinforces the conceptual basis of green banking by linking long-term financial performance with environmental responsibility. Extensive empirical evidence suggests that banks integrating ESG principles into their strategies experience improved risk management, financial stability, and reputational benefits without compromising profitability (Friede et al., 2015; Buallay, 2019). Green banking, therefore, is not merely a compliance-driven or ethical initiative but a strategic instrument for achieving sustainable competitiveness.

Collectively, these theoretical perspectives establish green banking as a multidimensional construct that balances economic efficiency, regulatory compliance, stakeholder expectations, and environmental stewardship. Understanding these conceptual foundations is essential for evaluating the effectiveness of green banking practices and for designing policies that promote sustainable finance across diverse regional and institutional contexts.

Table 1: Summary of Key Literature on ESG, Sustainability, and Green Banking

Authors & Year	Objectives of the Study	Key Findings	Research Gap Identified
Friede, G. et al., (2015)	To aggregate and evaluate empirical evidence on ESG and financial performance.	Majority of studies report a positive or neutral relationship between ESG factors and financial performance.	Limited sector-specific and region-based empirical studies in emerging economies.
Cornett, M. M. et al., (2016)	To examine the relationship between CSR activities and financial performance of banks.	Banks with stronger CSR engagement show improved profitability and reduced risk exposure.	Study does not specifically examine environmental or green banking initiatives.
Campiglio, E. et al. (2018)	To assess the role of central banks and regulators in addressing climate change risks.	Central banks play a critical role in integrating climate risk into financial regulation and monetary policy.	Empirical validation at national banking systems and micro-level institutional analysis is limited.
Buallay, A. (2019)	To analyse the impact of sustainability reporting on firm performance.	Sustainability disclosure positively influences firm performance, especially in socially sensitive industries such as finance.	Lack of disaggregated analysis of banking sub-sectors and country-specific regulatory contexts.

Kumar, K., & Prakash, A. (2019)	To analyse sustainability reporting practices in Indian banks.	Private sector banks outperform public sector banks in sustainability disclosure quality.	Lack of stakeholder perception analysis and limited focus on implementation challenges at the regional level.
Bătae, O. M. et al., (2021)	To examine the relationship between ESG performance and financial stability of banks.	Strong ESG performance significantly enhances banks' financial stability and risk management, particularly during economic stress periods.	Limited focus on emerging economies and lack of region-specific evidence from developing countries like India.
Bolton, P., & Kacperczyk, M. (2021)	To investigate whether investors price carbon risk in asset valuation.	Investors penalize firms with high carbon emissions through higher expected returns, indicating growing carbon risk awareness.	Study focuses mainly on capital markets; limited implications explored for banking sector lending practices.

3.2 Global Perspective on Green Banking

Global research positions green banking as a critical strategic response to escalating climate risks, environmental degradation, and the financial transition toward a low-carbon economy. Across developed and emerging economies, banks are increasingly integrating environmental, social, and governance (ESG) considerations into their lending, investment, and risk management frameworks to enhance long-term resilience and sustainability (Friede et al., 2015; Buallay, 2019). Empirical evidence from European banking systems indicates that institutions with robust ESG integration exhibit greater financial stability, improved risk-adjusted returns, and stronger stakeholder confidence, particularly during periods of economic uncertainty (Bătae et al., 2021). Investor-focused studies further demonstrate that climate-related risks are increasingly priced into financial markets. Firms with higher carbon emissions are subject to higher financing costs, prompting banks to incorporate carbon risk assessments into credit appraisal and portfolio management decisions (Bolton & Kacperczyk, 2021). This shift reflects a growing recognition that environmental risks translate into financial risks, thereby influencing banks' capital allocation strategies.

China's experience with green banking provides compelling evidence of the effectiveness of regulatory intervention. The introduction of green credit guidelines has significantly redirected financial resources toward environmentally responsible firms while restricting credit access to highly polluting industries (Liu et al., 2019; Zhang et al., 2020). These policies have not only reduced environmental externalities but also strengthened banks' credit risk management practices. Similarly, the rapid growth of green bonds in global capital markets has demonstrated positive effects on firm valuation, investor confidence, and access to sustainable finance without adversely affecting profitability (Flammer, 2021; Tang & Zhang, 2020).

Despite these positive outcomes, global studies caution against potential unintended consequences of poorly designed green finance policies. Inadequate pricing of climate risks and rigid regulatory frameworks may increase systemic risk or disproportionately disadvantage small and medium-sized enterprises (SMEs) with limited access to green financing instruments (Campiglio et al., 2018; Wu et al., 2024). Furthermore, inconsistencies in ESG disclosure standards across countries limit the comparability and effectiveness of green banking initiatives (Bătae et al., 2021). The global literature underscores that effective green banking requires

strong governance mechanisms, transparent disclosure frameworks, and region-specific policy adaptations. These insights provide valuable lessons for emerging economies seeking to balance financial inclusion, environmental sustainability, and financial stability through green banking practices.

Table 2: Global Studies on Green Banking, ESG, and Sustainable Finance

Authors & Year	Objectives of the Study	Key Findings	Research Gap Identified
Friede, G. et al. (2015)	To synthesize empirical evidence on ESG and financial performance.	Majority of studies report positive or neutral relationship between ESG factors and financial performance.	Insufficient sector-specific and emerging-market-focused studies.
Campiglio, E. et al. (2018)	To explore the role of central banks and regulators in addressing climate change risks.	Financial regulators can influence climate outcomes through prudential regulation and monetary policy.	Lack of micro-level empirical validation within individual banking systems.
Buallay, A. (2019)	To assess the impact of sustainability reporting on firm performance.	Sustainability disclosure positively influences financial performance, especially in financial institutions.	Does not examine behavioral or institutional factors affecting reporting quality.
Liu, Z. et al. (2019)	To assess the impact of China's green credit policy on firm investment behavior.	Green credit policies redirect capital toward environmentally responsible firms.	Context-specific to China; limited generalizability to other emerging economies.
Tang, D. Y., & Zhang, Y. (2020)	To examine shareholder value effects of green bond issuance.	Shareholders benefit from green bond issuance through positive market reactions.	Long-term performance and risk impacts require further investigation.
Zhang, B. et al. (2020)	To track implementation outcomes of green credit policy in China.	Green credit policy reduces lending to polluting firms and supports cleaner production.	Limited insight into stakeholder perceptions and banking operational challenges.
Flammer, C. (2021)	To evaluate the impact of corporate green bond issuance on firm performance.	Green bond issuance improves firm valuation and investor confidence without harming profitability.	Limited examination of banking institutions as issuers and intermediaries.
Batae, O. M. et al., (2021)	To examine the relationship between ESG performance and financial stability of banks.	Strong ESG performance enhances financial stability and reduces risk exposure in banks.	Limited evidence from developing economies and absence of regional-level banking analysis.
Wu, X. et al. (2024)	To analyse the effect of climate finance regulation on systemic risk.	Poorly designed climate regulations may increase systemic financial risk.	Need for balanced regulatory frameworks and empirical country-level studies.

3.3 Green Banking Initiatives in India

Green banking initiatives in India have gained momentum over the past decade, largely driven by regulatory interventions, rapid digitalization, and increasing awareness of sustainability concerns. The Reserve Bank of India (RBI) has played a catalytic role by issuing guidelines on sustainable finance, climate risk management, and more recently, by introducing the Green Deposits Framework to channel funds toward environmentally sustainable projects (RBI, 2023; Campiglio et al., 2018). These policy measures have encouraged banks to integrate environmental considerations into their operational and lending strategies. Indian banks have

widely adopted operational green practices such as paperless banking, mobile and internet banking, electronic statements, and digital payment systems. Empirical studies indicate that these initiatives significantly reduce paper usage, energy consumption, and operational costs while enhancing customer convenience (Begum, 2018; Sharma & Sofat, 2022). Digital transformation has thus emerged as a key enabler of green banking in India, particularly in urban and semi-urban regions.

Despite these advancements, sustainability reporting and environmental disclosure practices remain inconsistent across the Indian banking sector. Kumar and Prakash (2019) observe that private sector banks demonstrate higher disclosure quality, transparency, and ESG integration compared to public sector banks. This disparity is attributed to differences in governance structures, competitive pressures, and strategic orientation. Nevertheless, the overall level of standardized sustainability reporting in Indian banking remains below global best practices (Buallay, 2019). Corporate social responsibility (CSR) initiatives aligned with environmental sustainability have also become an integral part of green banking in India. Studies reveal that CSR-driven green initiatives positively influence customer trust, satisfaction, and loyalty, thereby strengthening banks' brand image and stakeholder relationships (Fatma & Rahman, 2016; Maqbool & Zameer, 2018). Such initiatives include financing renewable energy projects, supporting eco-friendly enterprises, and promoting environmental awareness among customers.

To explain adoption behaviour, researchers have applied technology adoption frameworks such as the Unified Theory of Acceptance and Use of Technology (UTAUT) and the Technology–Organization–Environment (TOE) model. Empirical findings suggest that perceived usefulness, ease of use, facilitating conditions, and organizational support significantly influence the adoption of green banking practices among both employees and customers (Mahajan & Singh, 2021; Kumar & Kulkarni, 2023). However, challenges such as limited awareness, skill gaps, and infrastructural constraints continue to impede uniform adoption across regions. While India has made notable progress in green banking implementation, the literature highlights the need for stronger regulatory enforcement, standardized disclosure frameworks, and region-specific strategies to ensure inclusive and effective adoption.

Table 3: Studies on Green Banking Initiatives and Digital Sustainability in India

Authors & Year	Objectives of the Study	Key Findings	Research Gap Identified
Fatma & Rahman (2016)	To assess the impact of CSR initiatives on customer trust in the banking sector.	CSR initiatives significantly enhance customer trust and positive brand perception.	Environmental dimensions of CSR not analysed independently.
Campiglio et al. (2018)	To evaluate the role of central banks and regulators in addressing climate change risks.	Regulatory policies can effectively integrate climate risks into financial systems.	Lack of empirical validation at the bank-level in emerging economies.
Begum (2018)	To examine the role of digital financial services in promoting sustainable banking practices in India.	Digital banking significantly reduces paper usage and operational costs while improving banking efficiency.	Limited assessment of customer awareness and rural–urban adoption differences.
Maqbool & Zameer (2018)	To study the relationship between CSR initiatives and customer loyalty in Indian banks.	CSR-driven initiatives positively affect customer loyalty and satisfaction.	Limited focus on green or environmentally oriented CSR initiatives.

Buallay (2019)	To analyse the relationship between sustainability reporting and firm performance.	Sustainability disclosure positively influences financial performance in banking institutions.	Does not explore country-specific regulatory and institutional influences.
Kumar & Prakash (2019)	To analyse sustainability reporting practices of Indian banks.	Private sector banks outperform public sector banks in sustainability disclosure quality.	Stakeholder perception and implementation challenges remain unexplored.
Mahajan & Singh (2021)	To identify factors influencing green banking adoption using the TOE framework.	Technological readiness, organizational support, and regulatory pressure influence adoption.	Does not examine behavioral factors such as environmental awareness.
Sharma & Sofat (2022)	To analyse the link between digital banking adoption and environmental sustainability.	Digital banking adoption contributes significantly to environmental sustainability outcomes.	Lack of longitudinal analysis and region-specific evidence.
Kumar & Kulkarni (2023)	To examine determinants of green banking adoption using the UTAUT model.	Perceived usefulness, facilitating conditions, and social influence drive green banking adoption.	Focused primarily on urban customers; limited generalizability to rural regions.

3.4 Customer and Employee Perceptions

Customer and employee perceptions play a decisive role in the successful adoption and implementation of green banking practices. Existing Indian literature consistently highlights that while customers demonstrate high familiarity with digital banking services such as mobile banking, internet banking, and e-statements, their awareness of advanced green banking products such as green loans, carbon financing, and sustainability-linked deposits remains relatively low (Debnath & Roy, 2019; Bhalla, 2023). This awareness gap limits the effective utilization of green financial products, despite growing environmental concerns among banking customers. Empirical studies indicate that environmental consciousness positively influences customers' intention to adopt green banking services; however, convenience, perceived usefulness, and trust continue to be the dominant determinants of actual adoption behavior (Sharma & Sofat, 2022; Kumar & Kulkarni, 2023). Customers are more inclined to engage with green banking initiatives when these services align with their existing digital banking habits and offer tangible benefits such as cost savings, ease of access, and service reliability. Moreover, transparent communication and credible sustainability disclosures significantly enhance customer trust and acceptance of green banking products (Fatma & Rahman, 2016).

Employee perceptions and readiness are equally critical to the effective execution of green banking strategies. Research suggests that institutional support, leadership commitment, and structured training programs significantly improve employees' engagement and pro-environmental behavior within banks (Azad & Tulasi Devi, 2024; Mahajan & Singh, 2021). Employees who receive adequate training and incentives are more likely to support green initiatives, promote eco-friendly products, and integrate sustainability principles into daily banking operations.

However, the literature also reveals notable challenges, particularly within public sector banks. Bureaucratic structures, resistance to change, and skill gaps related to sustainability and digital technologies often slow the pace of green banking implementation (Malik & Garg, 2024; Patil & Sharma, 2024). In contrast, private sector banks tend to exhibit higher employee readiness due to flexible organizational structures and performance-driven cultures. The

reviewed studies emphasize that both customer awareness and employee preparedness are essential for advancing green banking adoption in India. Bridging awareness gaps through targeted communication, enhancing employee capabilities through training, and fostering a sustainability-oriented organizational culture are crucial for strengthening the effectiveness of green banking initiatives across diverse banking institutions.

Table 4: Studies on Customer and Employee Perceptions of Green Banking

Authors & Year	Objectives of the Study	Key Findings	Research Gap Identified
Fatma & Rahman (2016)	To investigate the effect of CSR initiatives on customer trust in banking.	CSR initiatives significantly enhance customer trust and brand credibility.	Environmental CSR components not analysed independently.
Debnath & Roy (2019)	To analyse consumer awareness and perceptions toward green banking practices.	Environmental concern positively influences green banking adoption intentions.	Does not examine trust and convenience factors in depth.
Mahajan & Singh (2021)	To examine green banking adoption determinants using the TOE framework.	Technological readiness, organizational support, and regulatory pressure influence adoption.	Behavioural and psychological factors not sufficiently addressed.
Sharma & Sofat (2022)	To analyse the relationship between digital banking adoption and environmental sustainability.	Digital banking adoption contributes positively to environmental sustainability.	Limited region-specific and longitudinal analysis.
Bhalla (2023)	To assess customer awareness and adoption of green banking services in India.	Customers show high awareness of digital banking but limited knowledge of advanced green banking products.	Regional differences and rural customer perceptions remain underexplored.
Kumar & Kulkarni (2023)	To identify determinants of green banking adoption using the UTAUT model.	Perceived usefulness, facilitating conditions, and social influence drive adoption.	Limited focus on employee adoption behaviour and rural banking context.
Azad & Tulasi Devi (2024)	To examine the role of institutional support in shaping employee green behaviour in Indian banks.	Institutional support, leadership commitment, and training significantly enhance employees' pro-environmental behaviour.	Limited comparative analysis between public and private sector banks.
Malik & Garg (2024)	To identify barriers to sustainability implementation in public sector banks.	Bureaucratic inertia, skill gaps, and resistance to change hinder sustainability initiatives.	Does not propose actionable intervention strategies.
Patil & Sharma (2024)	To assess employee readiness for sustainable banking transformation.	Training, incentives, and organizational culture significantly influence employee readiness.	Longitudinal evidence on readiness over time is lacking.

3.5 Green Banking in Odisha: Regional Insights

Region-specific literature on green banking practices in Odisha remains limited, with most empirical insights derived from broader national or multi-state studies. Available evidence suggests that the implementation of green banking initiatives in Odisha is uneven, reflecting significant urban–rural disparities in digital infrastructure, financial inclusion, and sustainability awareness.

Urban bank branches demonstrate relatively higher adoption of digital and paperless banking practices, while rural and semi-urban areas continue to face infrastructural constraints and lower digital readiness (Sharma & Sofat, 2022; Mahajan & Singh, 2021). These disparities restrict the widespread diffusion of green banking initiatives across the state.

Studies focusing on regional banking development in India highlight that limited digital literacy, inconsistent internet connectivity, and inadequate training of bank personnel pose major challenges to green banking adoption in less-developed regions (Debnath & Roy, 2019; Kumar & Kulkarni, 2023).

In Odisha, these challenges are further compounded by socio-economic diversity and lower awareness of advanced green financial products such as green loans, sustainability-linked deposits, and renewable energy financing. As a result, green banking practices are often confined to basic digital services rather than comprehensive sustainability-oriented banking models.

Corporate social responsibility (CSR) and sustainability disclosure are identified as important mechanisms for improving stakeholder trust and encouraging green banking adoption. Empirical studies demonstrate that transparent sustainability communication enhances customer confidence and strengthens banks' environmental legitimacy (Fatma & Rahman, 2016; Buallay, 2019). However, banks operating in Odisha appear to underutilize structured sustainability reporting and targeted CSR communication, limiting their potential impact on customer awareness and participation in green initiatives (Kumar & Prakash, 2019).

Comparative evidence from similar Indian states indicates that region-specific strategies—such as localized awareness campaigns, employee training programs, and collaboration with local communities—are essential for bridging adoption gaps (Maqbool & Zameer, 2018; Azad & Tulasi Devi, 2024). Strengthening institutional support and employee readiness is particularly critical in public sector banks, which dominate the banking landscape in Odisha. Overall, the literature underscores the need for context-sensitive green banking frameworks that address regional disparities, enhance digital inclusion, and promote sustainability awareness among customers and bank employees in Odisha.

Table 5: Literature Review on Green Banking, CSR, and Stakeholder Perceptions

Authors & Year	Objectives of the Study	Key Findings	Research Gap Identified
Azad & Tulasi Devi (2024)	To examine the impact of institutional support on employee green behaviour in Indian banks.	Institutional support and training significantly enhance employees' pro-environmental behaviour.	Comparative analysis across different regions and bank types is limited.
Buallay (2019)	To analyse the relationship between sustainability reporting and firm performance.	Sustainability disclosure positively affects financial performance in banking firms.	Limited focus on regional banking systems and implementation challenges.
Debnath & Roy (2019)	To assess consumer awareness and perception towards green banking.	Environmental concern positively influences customers' intention to adopt green banking.	Trust and convenience factors require deeper investigation.
Fatma & Rahman (2016)	To study the effect of CSR initiatives on customer trust in banks.	CSR initiatives significantly improve customer trust and brand credibility.	Environmental-specific CSR practices not examined separately.

Kumar & Kulkarni (2023)	To identify determinants of green banking adoption using the UTAUT model.	Perceived usefulness, facilitating conditions, and social influence drive adoption.	Limited focus on employee adoption and rural banking contexts.
Kumar & Prakash (2019)	To analyse sustainability reporting practices in Indian banks.	Private banks demonstrate better sustainability disclosure than public sector banks.	Stakeholder perceptions and regional variations remain unexplored.
Mahajan & Singh (2021)	To examine green banking adoption using the TOE framework.	Technological readiness, organizational support, and regulatory pressure influence adoption.	Behavioural and cultural factors need further examination.
Maqbool & Zameer (2018)	To analyse the relationship between CSR initiatives and customer loyalty.	CSR-driven initiatives positively affect customer loyalty and satisfaction.	Limited emphasis on green or environmental CSR initiatives.
Sharma & Sofat (2022)	To study the relationship between digital banking adoption and environmental sustainability.	Digital banking adoption contributes positively to environmental sustainability.	Lack of longitudinal and region-specific analysis.

4. RESEARCH GAP

A critical review of the existing literature on green banking reveals several unresolved gaps, particularly when examined through the regional lens of Odisha. While national and international studies provide valuable insights into green banking frameworks, regulatory mechanisms, and technological enablers, region-specific empirical evidence from Odisha remains largely absent.

Most existing studies generalize findings at the national level, overlooking the socio-economic diversity, infrastructural constraints, and banking penetration patterns unique to Odisha. This lack of localized empirical research restricts a nuanced understanding of how green banking practices are implemented and perceived within the state.

Furthermore, the literature offers limited comparative analysis of customer and employee perceptions within the same regional setting. In Odisha, where public sector banks dominate and digital literacy varies significantly across districts, understanding the alignment or divergence between customer expectations and employee readiness is crucial.

However, existing studies tend to examine these stakeholder groups in isolation, failing to capture their interdependent role in green banking adoption. Another significant gap relates to the insufficient examination of rural–urban disparities in green banking adoption. Odisha exhibits pronounced rural–urban differences in digital infrastructure, financial inclusion, and environmental awareness. Yet empirical research rarely disaggregates data to assess how these disparities influence access to and usage of green banking products and services.

Additionally, current studies largely emphasize compliance-driven adoption of green banking initiatives, focusing on regulatory mandates and technological implementation. There is limited exploration of behavioural, cultural, and attitudinal factors that shape green banking acceptance among customers and employees in Odisha’s distinct socio-cultural context.

Finally, existing adoption models inadequately integrate digital readiness and sustainability awareness, which are particularly relevant in regions with uneven technological access. Addressing these Odisha-specific gaps necessitates focused empirical research on commercial banks operating in the state to support inclusive and context-sensitive green banking implementation.

5. FINDINGS OF THE REVIEW

The synthesis of global, national, and regional literature on green banking reveals several important findings that highlight both the potential and the challenges associated with the adoption of sustainable banking practices in India.

- ❖ *First*, the review consistently demonstrates that green banking initiatives contribute significantly to environmental sustainability by reducing paper consumption, energy usage, and carbon emissions through digital and paperless operations. In addition to environmental benefits, green banking enhances operational efficiency by lowering transaction costs and improving service delivery, while also strengthening banks' corporate reputation and stakeholder trust.
- ❖ *Second*, digitalization emerges as the most critical enabler of green banking adoption in the Indian context. The widespread adoption of mobile banking, internet banking, and electronic payment systems has accelerated the transition toward eco-friendly banking practices. Digital platforms not only reduce the environmental footprint of banking operations but also increase customer convenience and accessibility, thereby encouraging wider participation in green banking initiatives.
- ❖ *Third*, regulatory pressure plays a decisive role in shaping green banking implementation, particularly in public sector banks. Guidelines and policy initiatives issued by regulatory authorities have compelled banks to adopt sustainability-oriented practices, although the extent of adoption often reflects compliance requirements rather than proactive strategic intent. Private sector banks, by contrast, tend to integrate green banking more strategically to enhance competitiveness and brand value.
- ❖ *Fourth*, the literature highlights that customer awareness and trust are crucial determinants of green banking adoption. While customers are increasingly aware of digital banking services, awareness of advanced green financial products remains limited. Trust in banks' environmental claims and transparency significantly influences customers' willingness to adopt green banking services.
- ❖ *Fifth*, employee engagement and training are identified as key drivers of successful green banking implementation. Banks that invest in employee capacity building, institutional support, and incentive mechanisms demonstrate higher levels of adoption and effective execution of green initiatives.
- ❖ *Finally*, the review underscores persistent regional disparities in green banking adoption, with less-developed states lagging metropolitan regions due to infrastructural constraints, digital literacy gaps, and lower awareness levels. These findings collectively emphasize the need for inclusive, region-specific strategies to strengthen green banking adoption across India.

6. CONFLICTS OF THE RESEARCH

Despite the growing emphasis on green banking as a strategic instrument for sustainable finance, a fundamental conflict persists between policy intent and practical implementation within the Indian banking sector. While regulatory frameworks and sustainability guidelines promote environmentally responsible banking practices, their adoption on the ground remains largely compliance-driven rather than strategically embedded, particularly in less-developed regions such as Odisha. Banks face an inherent tension between short-term operational

priorities such as cost efficiency, profitability, and customer convenience and the long-term investments required for comprehensive green banking transformation, including employee training, sustainability reporting, and the development of specialized green financial products. Additionally, disparities in digital infrastructure, stakeholder awareness, and institutional readiness create conflicting outcomes across regions, where urban areas benefit disproportionately compared to rural and semi-urban contexts. This divergence between regulatory aspirations, organizational capacity, and stakeholder engagement highlights a structural conflict that limits the effectiveness and inclusiveness of green banking initiatives. Addressing this conflict requires region-specific, stakeholder-oriented strategies that reconcile regulatory expectations with local socio-economic realities and institutional constraints.

7. CONCLUSION

This research review consolidates global, national, and regional literature on green banking to present a comprehensive understanding of its evolution, implementation, and challenges. While India has made significant progress in integrating green banking practices, adoption remains uneven and largely compliance driven. Odisha exemplifies this gap, where infrastructural limitations, low awareness, and limited empirical research hinder sustainable banking transformation. The review underscores the necessity of region-specific, stakeholder-centric studies to inform policy and practice. Future research should empirically examine perceptions, behavioural drivers, and institutional readiness in Odisha to support inclusive and effective green banking adoption. Strengthening awareness, training, and digital infrastructure will be critical to aligning banking operations with India's sustainable development goals.

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