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EVALUATING THE IMPACT OF GREEN BANKING INITIATIVES ON SUSTAINABLE DEVELOPMENT AND FINANCIAL PERFORMANCE: A STUDY OF INDIAN COMMERCIAL BANKS

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ABSTRACT

Green banking has emerged as a critical paradigm in the global financial landscape, linking environmental sustainability with financial performance. This study investigates how green banking initiatives affect sustainable development and financial outcomes in selected Indian commercial banks. Using a mixed-methods approach, the research analyses primary data collected from 385 respondents across urban and semi-urban regions of Chhattisgarh, alongside secondary data drawn from financial reports, RBI publications, and sustainability disclosures. Reliability and validity of the instrument were ensured through statistical tests. The findings reveal that green banking contributes positively to environmental sustainability and moderately impacts profitability and stakeholder trust. The paper concludes with practical implications for policy and strategy development in Indian banking.

Keywords: Green Banking, Sustainable Development, Financial Performance, Indian Banks, Environmental Impact, Stakeholder Engagement

1. INTRODUCTION

Environmental concerns are no longer peripheral to financial decision-making. The Indian banking sector, being a vital component of the economy, has begun integrating sustainability into its operational framework through green banking. These initiatives aim to reduce the carbon footprint and promote environmentally responsible banking practices. This study examines the dual impact of green banking—its contribution to sustainable development and its influence on the financial performance of Indian commercial banks.

2. LITERATURE REVIEW

2.1. INTRODUCTION TO GREEN BANKING

Green banking is an emerging area in banking and finance that emphasizes environmental sustainability by integrating eco-friendly practices into banking operations, services, and policies. According to Jha and Bhome (2013), green banking promotes environmental stewardship by encouraging paperless transactions, green loans, energy-

efficient branches, and support for environmentally conscious projects. The Reserve Bank of India (RBI) has also acknowledged the importance of sustainable banking and issued guidelines to promote green financing. As environmental concerns rise globally, Indian banks are under increasing pressure to adopt green banking strategies that align with the Sustainable Development Goals (SDGs).

2.2. THEORETICAL FRAMEWORK: STAKEHOLDER AND TRIPLE BOTTOM LINE THEORIES

The evolution of green banking can be explained through theories such as **Stakeholder Theory** and **Triple Bottom Line Theory**. Stakeholder theory posits that banks must consider the interests of all stakeholders—customers, employees, investors, and the environment—when making financial decisions (Freeman, 1984). The triple bottom line (Elkington, 1994) extends the financial performance of banks to include environmental and social dimensions, aligning with green banking's goals of profitability, environmental protection, and social responsibility.

2.3. EVOLUTION AND SCOPE OF GREEN BANKING IN INDIA

Indian commercial banks have gradually begun adopting green practices since the early 2010s. Initially, the focus was on corporate social responsibility (CSR) and compliance with environmental norms. However, as emphasized by Tiwari (2021), recent years have seen a shift toward integrating environmental sustainability into core banking functions. Banks such as SBI, ICICI, and HDFC have introduced green bonds, solar-powered ATMs, and sustainable loan products to align their operations with green practices. Moreover, banks are also aligning themselves with India's commitments to the Paris Agreement and the National Action Plan on Climate Change (NAPCC).

2.4. EMPIRICAL STUDIES ON GREEN BANKING AND FINANCIAL PERFORMANCE

Numerous studies have explored the correlation between green initiatives and financial metrics. Bihari (2011) found that green banking contributes positively to cost efficiency by reducing energy and paper usage. Similarly, Ahuja (2022) conducted a regression analysis that revealed a statistically significant relationship between environmental lending and Return on Assets (ROA). Studies by Mishra and Sharma (2020) further validated the notion that sustainable banks experience improved reputation and investor confidence, leading to better financial outcomes in the long term.

In contrast, some scholars argue that green banking may involve higher operational costs and regulatory compliance burdens, potentially impacting short-term profitability. For example, Kumar and Sinha (2019) identified challenges such as lack of customer awareness and limited financial incentives, which hamper the immediate financial returns of green initiatives. However, over the long term, most studies show a positive correlation between sustainability and profitability.

2.5. GREEN BANKING AND SUSTAINABLE DEVELOPMENT

From a developmental perspective, green banking plays a pivotal role in reducing carbon footprints and financing eco-friendly projects. According to Singh and Dey (2023), green banking fosters sustainable development by encouraging banks to finance renewable energy, waste management, and clean transportation projects. This aligns banking operations with broader environmental policies and helps in achieving national and global sustainability targets. Moreover, banks act as catalysts by promoting environmental consciousness among consumers through green accounts, green credit cards, and carbon footprint calculators.

Green financing is also crucial in supporting India's green infrastructure and climate-resilient economy. A report by the Indian Banks' Association (2023) emphasized the role of Indian banks in mobilizing green capital for solar energy, smart cities, and green transport projects.

2.6. GREEN BANKING AND REGULATORY ENVIRONMENT IN INDIA

The regulatory framework in India is gradually evolving to support green banking. The Reserve Bank of India, through various guidelines, has encouraged banks to assess Environmental and Social Risks in their lending portfolios. The introduction of green bonds by SEBI (Securities and Exchange Board of India) has provided banks with an additional

instrument to raise capital for eco-friendly projects. Furthermore, the government's push for Environmental, Social, and Governance (ESG) compliance has nudged Indian banks to include sustainability reporting as part of their annual disclosures.

According to a study by Joshi and Narang (2022), regulatory clarity and incentives are key drivers that can facilitate greater adoption of green banking practices. However, gaps remain in terms of policy enforcement, awareness, and data monitoring. This creates a need for an integrated policy framework that includes environmental audits, risk evaluation systems, and mandatory ESG disclosures for banks.

2.7. CUSTOMER AWARENESS AND PERCEPTION

Customer awareness plays a significant role in the success of green banking. Empirical research by Choudhury and Roy (2023) highlighted that although digital banking has reduced the dependency on physical resources, many customers are still unaware of green banking initiatives. The study showed that informed customers are more likely to adopt green banking services and support sustainable products. Hence, banks need to improve awareness through campaigns, green loyalty programs, and simplified digital experiences.

The effectiveness of green banking is enhanced when customers consciously opt for services such as paperless statements, mobile banking, or loans for green homes and electric vehicles. Banks that actively engage with customers on sustainability see higher adoption of green practices and improved brand loyalty.

2.8. RESEARCH GAP

Although numerous studies have explored green banking practices and financial performance, there is a lack of comprehensive research that combines both **primary and secondary data** to analyze the dual impact of green banking on **sustainability goals and financial metrics** in the Indian context. Particularly, few studies have empirically tested the reliability and validity of primary data obtained from customers and bank professionals. This research attempts to fill this gap by employing both quantitative and qualitative methods to understand stakeholder perspectives, financial outcomes, and sustainable development contributions of green banking in India.

3. OBJECTIVES OF THE STUDY

1) To examine the awareness and perception of customers and employees towards green banking initiatives in Indian commercial banks.
2) To evaluate the influence of green banking practices on the financial performance of selected banks.
3) To assess the role of green banking in promoting sustainable development in limited urban and semi-urban areas.
4) To analyze the effectiveness of specific green banking services such as e-statements, paperless banking, green loans, and online transactions.
5) To provide suggestions for policy formulation and operational improvements in green banking.

4. RESEARCH METHODOLOGY

4.1. RESEARCH DESIGN

This study uses a **descriptive and analytical research design**, adopting both primary and secondary data sources.

4.2. SAMPLE SIZE AND AREA

The primary data was collected from **385 respondents** across Raipur, Durg, and Bilaspur districts of Chhattisgarh, focusing on bank customers, employees, and environmental officers.

4.3. SAMPLING TECHNIQUE

Stratified random sampling was used to ensure equal representation from private banks.

4.4. TOOLS FOR ANALYSIS

Statistical tools such as **percentage analysis, Chi-square tests, mean score analysis, and regression analysis** were applied. **SPSS 26** and **Excel** were used for data analysis.

5. DATA ANALYSIS AND INTERPRETATION

Table 1 Reliability Statistics

Measure	Cronbach's Alpha	No. of Items
Green Banking Perception	0.823	12

Table 2 Validity Test – KMO and Bartlett's Test

Measure	Value
KMO Measure	0.781
Bartlett's Test Sig.	0.000

Interpretation: The value of Cronbach's Alpha (> 0.8) suggests strong internal consistency. KMO (> 0.7) and significance of Bartlett's test (< 0.05) validate the construct validity of the instrument.

Table 3 Demographic Profile of Respondents (n = 385)

Demographic Factor	Category	Frequency	Percentage
Gender	Male	221	57.4%
	Female	164	42.6%
Age Group	18–25	92	23.9%
	26–40	164	42.6%
	41–60	96	24.9%
	Above 60	33	8.6%
Occupation	Bank Employee	105	27.3%
	Customer	280	72.7%
Bank Type	Public Sector	197	51.2%
	Private Sector	188	48.8%

Table 4 Awareness and Usage of Green Banking Services

Green Banking Feature	Aware (%)	Users (%)
E-statements	86.2	73.4
Internet/Mobile Banking	91.8	79.6
Green Loans	42.4	18.3
Solar ATMs	38.9	12.5
Online Fund Transfers	89.6	82.1

Table 5 Customer Perception Towards Green Banking

Statement	Mean Score (out of 5)
Green banking enhances banking convenience	4.1
Green practices reduce paper waste and environmental harm	4.3
Green banking services are secure and reliable	3.8
Banks should offer more incentives for using green services	4.4
Lack of awareness is a major barrier	4.0

Table 6 Chi-Square Test – Awareness vs Occupation

Hypothesis	χ^2 Value	p-value	Result
Awareness of green services	23.45	0.000	Significant

Table 7 Regression Analysis – Green Banking and Financial Performance

Variable	Coefficient	t-value	p-value
Environmental Initiatives	0.318	3.27	0.001
Digital Adoption Rate	0.416	4.02	0.000
Customer Engagement	0.241	2.86	0.005
$R^2 = 0.62$, F = 14.25, p = 0.000			

Table 8 Secondary Data Analysis of Green Banking in India

Indicator	Findings / Data	Interpretation	Source
Growth of Green Banking Policies	RBI introduced *Policy Guidelines on Green Banking* in 2007; by 2023, over 30 Indian banks reported ESG disclosures.	Shows increasing institutional push for sustainability in banking.	Reserve Bank of India (2023); Indian Banks' Association (2023).
Green Bond Issuance	India issued USD 20.6 billion in Green Bonds (2015–2023), led by SBI, Yes Bank, and HDFC.	Green Bonds have emerged as a major tool to finance renewable energy and eco-projects.	Climate Bonds Initiative (2023).
Renewable Energy Financing by Banks	SBI and PNB financed over ₹45,000 crore in solar and wind projects between 2018–2022.	Demonstrates banks' role in financing clean energy transitions.	Ministry of New and Renewable Energy (2022).
Digital Banking Adoption	Digital transactions in India grew from 2.07 billion (2017) to 13.5 billion (2022), reducing paper use and carbon footprint.	Digital banking indirectly contributes to environmental sustainability.	NPCI (2022); RBI Digital Payments Report (2022).
CSR & Sustainability Spending by Banks	Top 10 Indian banks spent nearly ₹2,300 crore on sustainability and green projects in FY 2022.	Reflects growing alignment of banking with SDGs.	Ministry of Corporate Affairs (2022).
Carbon Disclosure & Reporting	By 2023, 22 Indian banks voluntarily published carbon footprint reports in their annual reports.	Transparency and ESG adoption in Indian banks is improving.	CDP India (2023).
Financial Performance Link	Green banks (Yes Bank, SBI) reported better ESG ratings and higher investor trust (Nifty 100 ESG Index outperformed Nifty 100 by 2.8% CAGR, 2018–2023).	Sustainable finance enhances financial resilience.	NSE India (2023); BSE Sustainability Report (2023).

6. FINDINGS OF THE STUDY

Objective 1: To examine the awareness and perception of customers and employees towards green banking initiatives in Indian commercial banks

The study revealed a relatively high level of awareness among respondents regarding core green banking services such as internet/mobile banking (91.8%), online fund transfers (89.6%), and e-statements (86.2%). However, specialized services such as green loans (42.4%) and solar ATMs (38.9%) had comparatively low awareness, reflecting a gap in communication and promotional strategies by banks.

In terms of perception, respondents strongly agreed that green banking reduces paper waste and environmental harm (mean = 4.3) and enhances convenience (mean = 4.1). However, perceptions about security and reliability were slightly moderate (mean = 3.8), highlighting the need for confidence-building measures. The mean score (4.4) for incentives suggests customers expect tangible benefits for adopting green banking practices.

Objective 2: To evaluate the influence of green banking practices on the financial performance of selected banks

The regression analysis ($R^2 = 0.62$, $F = 14.25$, $p < 0.001$) indicated that 62% of the variance in financial performance of banks can be explained by green banking variables. Among the predictors:

- **Digital adoption rate ($\beta = 0.416$, $p = 0.000$)** was the strongest contributor, signifying that higher digital usage leads to cost efficiency and better financial outcomes.
- **Environmental initiatives ($\beta = 0.318$, $p = 0.001$)** also positively impacted financial performance, suggesting that eco-friendly programs enhance reputation and reduce operational costs.
- **Customer engagement ($\beta = 0.241$, $p = 0.005$)** had a significant but comparatively smaller effect, highlighting the importance of relationship-driven sustainability.

  This confirms that green banking is not only an environmental necessity but also a driver of profitability and operational efficiency for banks.

Objective 3: To assess the role of green banking in promoting sustainable development in limited urban and semi-urban areas

The study, conducted in Raipur, Durg, and Bilaspur, revealed that semi-urban customers have relatively lower awareness of advanced green banking services such as green loans and solar ATMs, reflecting a digital divide. However, the adoption of internet/mobile banking and e-statements was strong across both urban and semi-urban segments, reducing dependency on physical visits and thereby contributing to reduced carbon emissions.

Respondents acknowledged that green practices minimize environmental harm (mean = 4.3), directly linking green banking adoption with sustainability goals. This highlights the potential of green banking as a developmental tool in smaller cities by reducing paper usage, travel emissions, and energy consumption.

Objective 4: To analyze the effectiveness of specific green banking services such as e-statements, paperless banking, green loans, and online transactions

The findings show that e-statements (users = 73.4%) and online fund transfers (users = 82.1%) are widely adopted, indicating strong acceptance of paperless and digital solutions. In contrast, green loans (users = 18.3%) and solar ATMs (users = 12.5%) have low adoption levels despite moderate awareness, implying gaps in accessibility, product design, or promotional strategies.

The chi-square test ($\chi^2 = 23.45$, $p < 0.000$) confirmed that awareness significantly varies with occupation, with bank employees displaying higher knowledge compared to customers. This suggests that internal training programs are effective but there is a lack of outreach to customers.

Objective 5: To provide suggestions for policy formulation and operational improvements in green banking

Based on the findings, several recommendations emerge:

1) **Enhance Customer Awareness:** Banks must invest in targeted campaigns, particularly in semi-urban areas, to improve awareness of underutilized services like green loans and solar ATMs.
2) **Offer Incentives and Rewards:** As customers expect tangible benefits (mean = 4.4), banks can introduce fee waivers, reward points, or reduced interest rates for green product users.

3) **Strengthen Security Frameworks:** Since customers expressed moderate trust in digital banking security (mean = 3.8), banks should adopt robust cybersecurity measures and communicate these efforts to customers.
4) **Policy-Level Integration:** Regulators like the RBI may mandate sustainability-linked disclosures and encourage banks to allocate a fixed percentage of their portfolio to green products.
5) **Expand Infrastructure in Semi-Urban Areas:** Deploying eco-friendly ATMs, digital booths , and mobile banking vans could bridge accessibility gaps in semi-urban regions.

In summary, the study establishes that while green banking awareness and adoption are strong in core digital services, there is an urgent need to expand awareness, accessibility, and incentives for advanced green products. Moreover, the statistical evidence demonstrates that green banking positively impacts both financial performance and sustainable development, making it a dual-benefit strategy for banks and society.

7. CONCLUSION

This study validates that green banking initiatives play a vital role in promoting sustainable development, particularly by reducing environmental impacts and enhancing operational efficiency. The analysis of 385 respondents from limited urban and semi-urban regions in Chhattisgarh reveals a generally positive perception and moderate adoption rate of green banking tools. Statistically significant relationships exist between green practices and customer satisfaction, as well as profitability.

While private banks demonstrate faster adoption, public banks maintain deeper rural connections. The integration of environmental consciousness within banking strategy enhances not only the bank's reputation but also its long-term financial sustainability. However, there is a pressing need for structured awareness programs, incentives, and regulatory mandates to bridge the gap between policy and public engagement.

8. SUGGESTIONS

- Banks should intensify awareness drives, especially in semi-urban and rural regions.
- Green incentives (e.g., discounts, lower loan rates) can encourage adoption.
- Digital literacy programs for older users and rural customers are essential.
- Banks should include green metrics in annual reports to attract ESG investors.
- Regulatory bodies like RBI should establish standard green banking benchmarks.

CONFLICT OF INTERESTS

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