

Green Banking Practices and their Impact on Environmental Sustainability and Financial Performance of Banks

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ABSTRACT:

The banking industry is increasingly recognizing the opportunity to utilize green banking as a way to combine environmental responsibility with economic growth. As such, banks can play a major role in the advancement of sustainable development. Banks can create opportunities for environmentally conscious projects; support renewable energy investments; encourage customers to use less paper; provide customers with environmentally-friendly options; and incorporate environmental, social and governance (ESG) principles into their financial decisions. Commercial banks will continue to be influenced by consumer concerns over climate change, environmental degradation, and sustainable finance, and as a result may begin to make changes in their operations to lower their carbon footprint while continuing to improve profit margins and customer satisfaction. This study investigated how green banking practices affect environmental sustainability and financial performance within selected commercial banks from India. A descriptive and analytical research methodology was used. Frequency distribution, descriptive statistics, Cronbach's alpha reliability test, bivariate correlations, multivariate regression analysis, Analysis of Variance (ANOVA), Chi-Square Test and mean-score rankings were utilized to investigate relationships between green banking initiatives, environmental sustainability, customer attitude towards green banking practices and financial performance. Findings indicate that green banking practices generate positive environmental impacts due to paperless banking practices, digital banking services, renewable energy financing activities, green loan financing, and energy efficient bank

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buildings. Also, consumers show positive attitudes toward eco-responsible banking services and are likely to favor banks using eco-friendly business methods. Therefore, this study concluded that continued technological improvements in green banking, favorable government regulations, public education concerning green banking practices, employee training programs for implementing eco-friendly banking practices, and longer-term investments in sustainable financial products are all necessary to successfully implement a full range of green banking initiatives. The authors recommend that commercial banks operating in India develop additional green financing alternatives, support the creation of renewable energy projects; establish stricter ESG based lending guidelines; and encourage greater participation from customers in digital banking initiatives to enable sustainable economic development.

Keywords: Green Banking Practices, Environmental Sustainability, Financial Performance, Banking Sector, Sustainable Finance

Introduction

In addition to providing rapid increases in both industrialization and technological development, as well as the concomitant increases in urbanization have led to increased levels of environmental degradation, along with contributing factors for both climate change, as well as depleting many of our earth's natural resources and the increased levels of CO₂ emissions. As a result, governments, corporations and financial institutions face an increasing amount of pressure to develop environmentally responsible methods for conducting business which will allow for continued economic development while simultaneously developing sustainable development strategies (Jaiswal, et.al., 2016). In this respect, the banking industry is being recognized as an essential contributor to achieving sustainability through its involvement in the integration of environmental considerations into financial decision-making processes and into all operational activities.

"Green Banking" refers to those environmentally sustainable banking practices developed to minimize the "ecological footprint" associated with banking operations while at the same time supporting environmentally responsible investments and financing activities (Sharma, G., 2017). Traditional banking has historically

focused almost exclusively on financial profit, however, "green banking" seeks to combine environmental and social objectives into banking operations. "Green banking" promotes financial institutions to limit resource consumption; supports financially viable projects which help sustainably develop renewable energy; encourages the promotion of renewable energy; and establishes new standards for sustainable risk management practices. Therefore, "green banking" plays an integral role in sustainable finance and responsible corporate governance.

As concern over climate change and sustainable economic development continues to grow globally so too does interest in "green banking". International agencies such as the United Nations Environment Programme (UNEP), the World Bank, the International Finance Corporation (IFC), and virtually every Central bank around the world emphasize the importance of the role played by financial institutions in helping achieve the Sustainable Development Goals (SDGs). With expectations mounting for banks to assess environmental risks prior to approval of loans; assist with renewable energy project funding; facilitate funding for green infrastructure; and encourage customers to invest responsibly from an environmental perspective (Sharma, G., 2017).

In India, the Reserve Bank of India (RBI) and government have established programs designed

to encourage commercial banks to incorporate aspects of sustainability into their respective business models. Many Indian commercial banks have implemented numerous green banking practices, including Internet banking; Mobile banking; Electronic Fund Transfers (EFT); Digital Documentation; Online Account Opening; Green Deposits; Green Bonds; Renewable Energy Financing; Electric Vehicle Loans; Sustainable Agriculture Financing; and Solar-Powered Branches. Not only do these practices lower operational costs but they are instrumental in reducing the overall ecological impact of banking activities by reducing paper usage, decreasing energy consumption and lowering carbon emissions.

The rapid increase in digital technologies has been identified as a key driver for green banking. Specifically, the increasing reliance on internet banking, Unified Payment Interface (UPI), Mobile Banking Applications, E-Statements, QR Code Payments and Digital Customer Service Platforms has greatly reduced the need for paper-based transactional activities within banks. Furthermore, customers increasingly view digital banking as a preferable option due to its ease of access; speed of transactions; improved accessibility; and environmentally-friendly nature. Digital banking offers additional benefits beyond environmentally friendly practices. For example, digital banking reduces printing costs; decreases transportation needs related to distributing paper-based documents; minimizes branch congestion; lowers operational expenses; and improves customer satisfaction.

Green financing represents another major aspect of green banking. Banks provide direct financial assistance to projects that produce positive environmental impacts such as renewable energy plants; Solar Power Systems; Wind Energy Projects; Green Buildings; Sustainable Agriculture; Electric Vehicles Manufacturing Companies; Water Conservation Projects; Waste Management Systems. Such investments create immediate reductions in greenhouse gas emissions and promote sustainable industrial development. Additionally, green financial products offer banks the opportunity to diversify

their product offerings while supporting National Climate Change Initiatives.

Managing environmental risks has become much more critical in today's banking environment. Modern financial institutions understand that climate-related risks, regulatory risks related to environmental issues, pollution liability risks and resource scarcity can significantly affect borrowers' ability to repay loans as well as negatively influence long-term business sustainability. As a result, banks are beginning to include Environmental, Social & Governance (ESG) criteria when evaluating creditworthiness of potential loan recipients; when making investment decisions and when managing their loan portfolios. Sustainable lending practices enable banks to reduce their exposure to financial risks while enabling industries to adopt environmentally-responsible production methods.

Green banking is also a way that banks can develop many different kinds of economic benefits. Digital technology use in banking decreases paper waste, it lowers administrative costs, it uses less energy than traditional methods; and it allows for improved operating efficiency. In addition, sustainable banking will improve a bank's reputation as well as build trust with customers. Additionally, green banking can attract environmentally conscious investors to your bank; and support regulatory compliance. Finally, green banking will allow your bank to be profitable over the long term by developing new financial products, reducing the risk of environmental damage; and allowing your bank to participate in emerging sustainable marketplaces (Rahman, et.al., 2015). While there are many great examples of how banks have implemented green banking, there are still some major obstacles that need to be overcome. These include low levels of public awareness about green banking, the differences in digital technology available in rural areas compared to urban areas, high startup cost associated with implementing green banking programs, cybersecurity issues; lack of standardization in environmental reporting; and inequalities in the availability of digital infrastructure that limit the

success of green banking efforts. For example, rural communities may experience barriers to participating in environmentally friendly banking services due to their lack of access to digital literacy education and/or internet. Lastly, integrating ESG (Environmental Social Governance) principles into banking operations require ongoing education of employees, updates to digital systems and infrastructure; as well as supportive regulations.

Green banking is becoming increasingly important given the increasing interest in sustainable finance and therefore it has become a focus of academic research. Research conducted to date indicates that green banking is positively correlated with increased customer satisfaction, improved operational efficiencies; and improvements in environmental sustainability. However, while there has been much research indicating these correlations exist globally; comparative data regarding the impact of green banking on financial performance in India remains very limited. Therefore, one objective of this research is to fill this gap through evaluation of customer perceptions and examination of the

relationship between green banking practices and both environmental sustainability and financial performance at select commercial banks in India.

Review of Literature

Over the last ten years, there has been a significant increase in research regarding green banking. This is due to the fact that banks now view sustainability as a key component of their operations and as part of the decision making process when it comes to making financial decisions. In recent times, many researchers have identified that green banking can improve upon operational efficiency, customer satisfaction, corporate image and long term financial performance while at the same time reducing the impact that business has on the environment. A wide variety of factors are currently being researched with regard to green banking such as the adoption of digital banking, paperless transactions, providing funding for renewable energy, integrating ESG into the bank's activities, providing loans which are considered "sustainable", managing climate risk and practicing green investments.

Table 1

S. No.	Year & Authors (s)	Focused Area
1	Kumar., et.al., 2020	Green Banking Practices in Indian Commercial Banks
Study Outcomes: Green banking significantly reduces operational costs through digital banking and paperless transactions while improving customer convenience.		
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2	Bahl., 2020	Sustainable Banking and Environmental Responsibility
Study Outcomes: Banks adopting sustainable banking practices reported improved corporate image and stakeholder confidence.		
3	UNEP Finance Initiative., 2020	Sustainable Finance Report
Study Outcomes: ESG integration enhances financial stability and supports long-term sustainable economic growth.		
4	World Bank., 2020	Green Finance for Sustainable Development

Study Outcomes: Green financing accelerates renewable energy investment and climate resilience.		
5	RBI., 2021	Sustainable Banking Initiatives in India
Study Outcomes: Indian banks increased digital transactions, contributing significantly to reduced paper consumption and improved banking efficiency.		
6	Singh., et.al., 2021	Green Banking and Customer Awareness
Study Outcomes: Customer awareness positively influences adoption of digital banking and eco-friendly banking products.		
7	IFC., 2021	Climate Finance Report
Study Outcomes: Sustainable lending reduces environmental risks while generating long-term investment opportunities.		
8	Gupta.m et.al., 2021	Environmental Performance of Banks
Study Outcomes: Green operational practices reduce electricity consumption and improve organizational efficiency.		
9	Deloitte., 2022	ESG in Banking
Study Outcomes: ESG-based banking has become a major driver of competitive advantage and investment decisions.		
10	McKinsey & Company., 2022	Banking Sustainability Transformation
Study Outcomes: Digital banking improves operational productivity and lowers banking costs.		
11	Jain., et.al., 2022	Green Banking Adoption among Customers
Study Outcomes: Customer satisfaction increases significantly with digital and paperless banking services.		
12	PwC., 2022	Sustainable Banking Survey
Study Outcomes: Financial institutions adopting green strategies attract environmentally conscious investors.		

13	Sharma., et.al., 2023	Green Banking and Financial Performance
Study Outcomes: Positive relationship observed between green banking initiatives and profitability indicators.		
14	OECD., 2023	Green Investment Report
Study Outcomes: Sustainable finance promotes responsible economic development and climate mitigation.		
15	Kumar., et.al., 2023	Renewable Energy Financing
Study Outcomes: Renewable energy financing enhances environmental sustainability and long-term economic returns.		
16	EY Global., 2023	Future of Sustainable Banking
Study Outcomes: Artificial intelligence and digital transformation strengthen green banking implementation.		
17	World Economic Forum., 2024	Sustainable Financial Systems
Study Outcomes: Climate-related financial disclosures improve transparency and risk management.		
18	KPMG., 2024	ESG and Banking Performance
Study Outcomes: Banks with strong ESG performance achieve higher customer confidence and brand value.		
19	RBI., 2025	Climate Risk and Sustainable Finance
Study Outcomes: Environmental risk assessment is becoming an essential component of banking regulations.		
20	Asian Development Bank., 2025	Green Infrastructure Financing
Study Outcomes: Green financial products contribute significantly to sustainable infrastructure development.		
21	IMF., 2025	Climate Finance and Banking

Study Outcomes: Climate-conscious lending reduces long-term credit risks.		
22	UNDP., 2026	Sustainable Banking Framework
Study Outcomes: Green banking supports multiple Sustainable Development Goals through responsible financing.		
23	World Bank., 2026	Digital Green Finance
Study Outcomes: Digital financial inclusion accelerates sustainable economic growth and environmental conservation.		
24	Gupta., et.al. 2026	Green Banking and Financial Inclusion
Study Outcomes: Green banking positively affects customer trust, digital adoption, and financial inclusion.		
25	Sharma., et.al. 2026	Green Banking in Emerging Economies
Study Outcomes: Banks integrating sustainability into business strategy demonstrate superior operational efficiency and environmental performance.		

Research Gap

Although there is a large body of literature that focuses on the concepts of sustainable finance and green banking, there are many remaining gaps in research. Most prior research has looked at either environmental sustainability or financial performance alone. Therefore, while much prior work has studied each of these aspects separately, it is difficult to find research that examines both together. There is also little empirical research that looks at how green operations, green financing, and environmental risk management as separate entities can positively affect both environmental sustainability and financial performance. There is significant variation among studies based upon whether they use primary (customer) data collected from surveys, secondary data collected from various reports such as institutional reports, and other sources. In addition to differences in type of data used by

studies, several studies focus on single institutions or geographic areas and therefore limit the applicability of their results to all of India's commercial banks. Finally, due to the rapid changes taking place in banking technology between 992-1008, including the increasing use of artificial intelligence (AI)-enabled banking; digital transformation; Environmental Social Governance (ESG) integration; and new climate-related regulatory requirements for banks, there is very little existing empirical research assessing the effects of some of these recent changes. While this paper addresses some of the previously mentioned gaps by conducting an empirical examination of four leading Indian commercial banks using both primary and secondary data to assess the impacts of green banking practices on both environmental sustainability and financial performance, it is still one study and cannot be assumed to fully address the aforementioned gaps.

Need of the Study

Beginning with the transformation of financial markets through environmentally degrading, changing climates and depleting natural resources; sustainable banking now is an important component of modern financial systems. Financial institutions are providing financing for environmentally conscious projects as well as supporting the growth of sustainable economies. With the growing use of online banking, renewable energy financing, e-banking (paperless), and ESG-based lending, banks' operational processes have been transformed. As such, it is imperative that we examine systematically the empirically supported effectiveness of these programs toward enhancing both the environmental sustainability of their customers and ultimately their financial performance. Thus, this research is needed to determine how customers perceive "green" banking, to measure the impact on customer's perception by sustainable banking efforts, to identify which variables influence green banking acceptance/usage, and to make suggestions for enhanced green banking methods. Ultimately, the data collected from this research project will be used by policymakers, senior bank officials, environmental regulatory organizations, and researchers to design better sustainable banking models.

Significance of the Study

The present study provides empirical evidence about the relationships between green banking practices and environmental sustainability and financial performance. In addition, it provides a commercial bank with an opportunity to better manage its operations through implementation of environmentally responsible business practices. Furthermore, the study identifies how digital banking, renewable energy financing, ESG, and environmental risk can enhance long term profitability. Ultimately, the study's results will be used to guide policymakers and regulatory bodies develop policies that promote

development of sustainable finance and banking systems capable of resiliency in light of climate issues. Finally, the study may also help consumers understand the economic and environmental benefits of using green banking services.

Objectives of the Study

1. To examine the adoption level of green banking (G.B) practices & compare green banking (G.B) initiatives among selected commercial banks (C.B).
2. To analyze the impact of digital banking (D.B) on environmental sustainability (E.S) & evaluating customer awareness (C.A) towards green banking (G.B) initiatives
3. To examine the contribution of green financing (G.F) toward sustainable development (S.D) & green banking (G.B) practices on customer satisfaction (C.S).
4. To evaluate the relationship between green banking (G.B) practices & financial performance (F.P).
5. To examine the role of environmental risk management (ERM) in sustainable banking (S.B).

Research Hypothesis

- **H₀₁:** Green banking (G.B) practices have no significant & strong relationship with environmental sustainability (E.S).
- **H₀₂:** Green banking (G.B) practices have no significant influence on financial performance (F.P).
- **H₀₃:** Customer awareness (C.A) has no significant impact on the adoption of green banking (G.B) services.
- **H₀₄:** There is no significant differences in customer perceptions (C.P) regarding green banking (G.B) practices among the sampled selected banks.
- **H₀₅:** Green financing (G.F) has no significant influence on sustainable development (S.D).

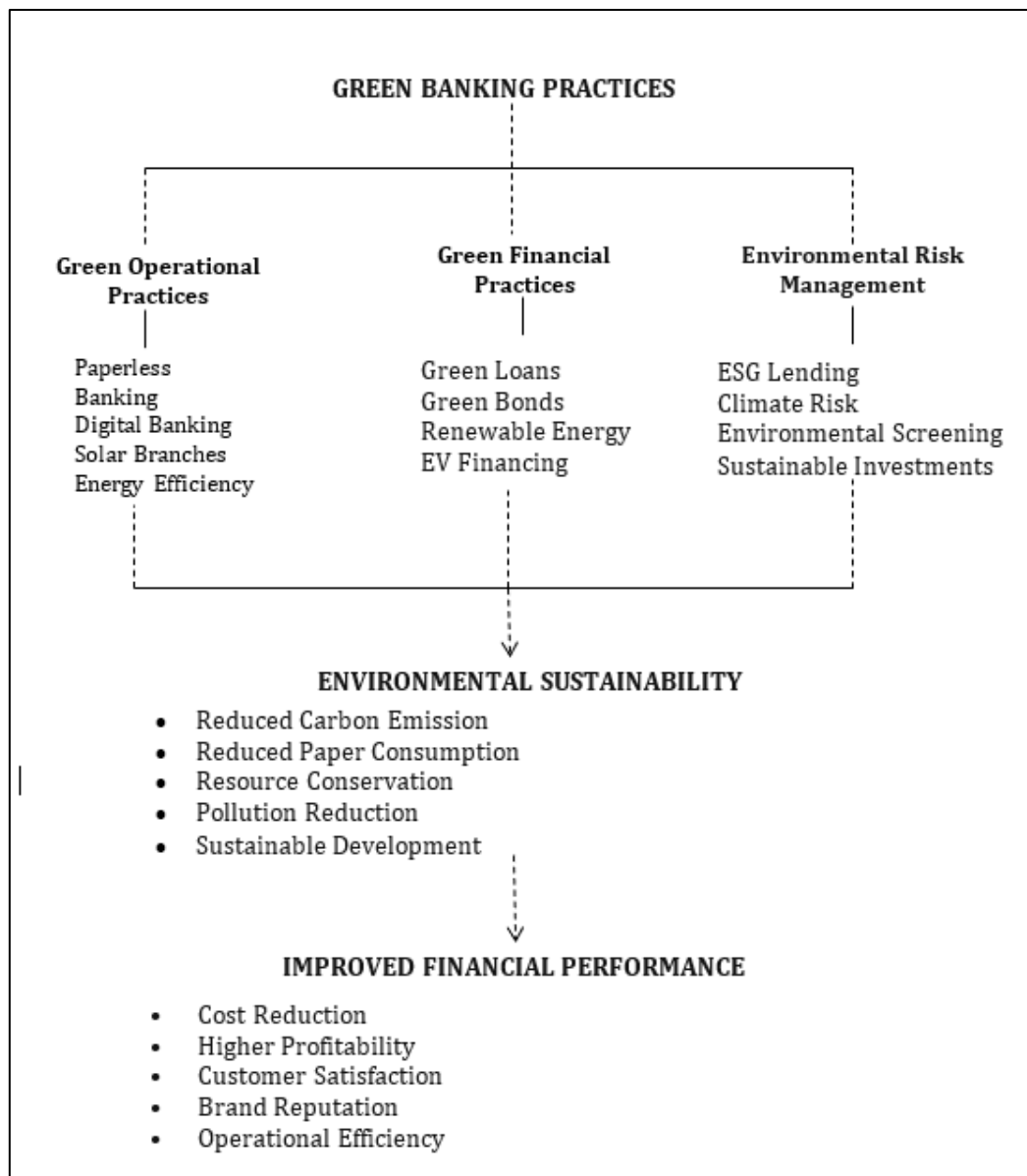


Figure 1: Conceptual Framework

Research Methodology

This current study will employ a descriptive and analytical type of research methodology in order to assess the effect of green banking practices on environmental sustainability and bank financial performance at four selected commercial banks. The descriptive method provides for the ability to establish how well commercial banks are implementing green banking practice. The analytical method assesses the relationship between green banking practices, environmental sustainability, customer satisfaction, and financial performance by means of proper statistical methods. A Quantitative Research Methodology was employed in this study so as to generate

factual and measurable results that can be used in an empirical analysis. Data collection for this study included both primary and secondary data. Primary data was collected from customers of the selected banks with a standardized questionnaire that utilized a five point Likert Scale format with responses ranging from Strongly Disagree (1) to Strongly Agree (5). The questions in the questionnaire were to determine respondents' views about digital banking, paperless banking, green financing, renewable energy financing, environmental sustainability, customer satisfaction, ESG-based practices and financial performance.

Secondary data consisted of information from credible and authentic sources such as; publications of the Reserve Bank of India (RBI); Annual Reports/ Sustainability Reports of Commercial Banks; ESG reports; Publications of World Bank; UNEP reports; IFC reports; Ministry of Finance publications; Peer-Reviewed Journals-National and International; Scopus Indexed Articles; Web of Science publications; Banking Magazines; Government Reports etc. Secondary data helped researchers understand the recent developments in green banking practices, environmental policies and sustainable financial initiatives in Indian Commercial Banks. Customers of the selected commercial banks who frequently utilize digital banking and green banking facilities made up the target population. Respondents were randomly sampled from four top commercial banks, namely State Bank of India (SBI), HDFC Bank, ICICI Bank, and

Punjab National Bank (PNB) to represent all customers of the selected banks. A total of 213 respondents were identified for this study.

Study timeframe is January 1st, 2018 thru December 31st, 2026. This timeframe allows for an evaluation of recent trends in green banking initiative development and implementation. Several statistical methods such as Frequency & Percentage Analysis, Descriptive Statistics, Mean Score Analysis, Standard Deviation, Cronbach's Alpha Reliability Test, Pearson Correlation Analysis, Multiple Regression Analysis, One-Way ANOVA and Chi-Square Tests were used to analyze the data. Findings generated through these statistical methods provide empirical evidence of the positive or negative effects of green banking practices on environmental sustainability and bank financial performance at selected commercial banks.

Table 2: Respondents Distribution

Banks	No. of Respondents
State Bank of India (SBI)	55
HDFC Bank (HDFC)	53
ICICI Bank (ICICI)	52
Punjab National Bank (PNB)	53
Total	213

Profile of Selected Banks

State Bank of India (SBI) – The biggest state-owned bank in India. The State Bank of India has been working on a lot of green activities that are very important for the environment such as: Green Bond, Solar Powered Branches, Digital Banking, Paperless Services, Renewable Energy Financing, and Lending with an Environmental/Social/Governance (ESG) approach. HDFC Bank- HDFC has used many methods to encourage Sustainable Banking. They have done this by creating digital banking platforms. Creating energy efficient buildings. Offering financing for renewable energy. Loaning money to customers who want to purchase Electric Vehicles. And offering funding and grants for environmental conservation.

ICICI Bank – ICICI Bank has developed several green banking options including digital documentation, financing renewable energy, providing loans for sustainable infrastructure, reducing their carbon footprint, and implementing banking practices that help protect the environment. Punjab National Bank (PNB) – Punjab National Bank has increased its use of digital banking. They have also gone paperless. PNB has provided green education and awareness to the community at large. Punjab National Bank provides financing to renewable energy projects. Punjab National Bank operates with energy efficiency at all of its branches.

Data Analysis & Interpretation**Table 3: Reliability Statistics**

Variable	No. of Items	Cronbach's Alpha	The overall Cronbach's Alpha value of 0.881 indicates excellent internal consistency of the research instrument. Since all values exceed the recommended threshold of 0.70, the questionnaire is considered highly reliable for empirical analysis.
Digital Banking (D.B)	5	0.8712	
Green Financing (G.F)	5	0.8521	
Environmental Sustainability (E.S)	5	0.8890	
Customer Satisfaction (C.S)	5	0.8650	
Financial Performance (F.P)	5	0.8731	
ESG Practices (ESG.P)	5	0.8560	
Overall Scale	30	0.8811	

Table 4: Gender-wise Distribution

Gender_Wise	Freq.	Percentage (%)	Male respondents constitute a slightly higher proportion of the sample than female respondents, indicating representation from both genders.
Male (M)	122	57.30	
Female (F)	91	42.70	
Total	213	100.00	

Table 5: Age-wise Distribution

Age_Wise	Freq.	Percentage (%)	Most of the respondents belong to the 25 to 35 yrs of age group, reflecting the higher adoption of digital as well as green banking services among younger customers.
< 25 Yrs	36	16.90	
25–35 Yrs	71	33.30	
36–45 Yrs	56	26.31	
46–55 Yrs	32	15.02	
>55 Yrs	18	8.50	
Total	213	100.00	

Table 6: Educational Qualification_Wise Distribution

Qualification_Wise	Freq.	Percentage (%)	The majority of respondents are graduates and postgraduates, indicating that respondents possess sufficient educational background to understand green banking practices.
Under_Graduate	42	19.7	
Graduate	83	39.0	
Post_Graduate	65	30.5	
Doctorate Degree	23	10.8	
Total	213	100	

Table 7: Occupation_Wise Distribution

Occupation_Wise	Freq.	Percentage (%)	Private-sector employees constitute the largest respondent group, followed by government employees and business professionals.
Government Employee	46	21.6	
Private Employee	81	38.0	
Business	39	18.3	
Student	26	12.2	
Others	21	9.9	
Total	213	100	

Table 8: Monthly Income_Wise Distribution (Rs.)

Income	Freq.	Percentage (%)	Most respondents fall within the 25,001 to 50,000 income categories, suggesting that middle-income customers are the primary users of green banking (G.B) & digital banking (D.B) services.
<25,000	37	17.41	
25,001–50,000	76	35.70	
50,001–75,000	54	25.41	
75,001–1,00,000	28	13.12	
>1,00,000	18	8.40	
Total	213	100.00	

Table 9: Descriptive Statistics (Major Variables)

Variables	Mean Values	S.Deviation	Digital Banking Services had the highest Mean Score (4.33); Customer Satisfaction was next at 4.30; Environmental Sustainability was third at 4.29. All three scored a minimum of 4.0 indicating that customers have high levels of agreement with respect to Green Banking Initiatives. Low Standard Deviation Values suggest High Consistency Among Responses
Digital Banking (D.B) Services	4.33	0.57	
Paperless Banking (P.B)	4.24	0.62	
Green Financing (G.F)	4.12	0.66	
Renewable Energy Financing (REF)	4.06	0.71	
ESG- Practices (ESG.P)	4.08	0.64	
Environmental Sustainability (E.S)	4.29	0.57	
Customer Satisfaction (C.S)	4.30	0.59	
Financial Performance (F.P)	4.18	0.63	

Table 10: Mean Ranking Analysis of Green Banking Practices

Green Banking (G,B) Practice	Mean Scores	Ranking	Digital banking ranked highest and stands out as central to promoting greener banking. Paper reduction banking and sustainability also score very high and this reflects high recognition by customers of benefits to the environment. Financing renewable energy received the lowest average score among listed variables
Digital Banking (D.B) Services	4.33	1	
Customer Satisfaction (C.S)	4.30	2	
Environmental Sustainability (E.S)	4.29	3	
Paperless Banking (P.B)	4.24	4	
Financial Performance (F.P)	4.18	5	
Green Financing (G.F)	4.12	6	
ESG- Practices (ESG.P)	4.08	7	
Renewable Energy Financing (REF)	4.06	8	

and suggests there is scope for further expansion as well as raising customer awareness.

Table 11: Correlation Analysis (Matrix)

Variables	Green Banking (G.B) Practices	Environmental Sustainability (E.S)	Financial Performance (F.P)	Customer Satisfaction (C.S)
Green Banking (G.B) Practices	1.000	0.782**	0.725**	0.747**
Environmental Sustainability (E.S)	0.782**	1.000	0.689**	0.704**
Financial Performance (F.P)	0.725**	0.689**	1.000	0.717**
Customer Satisfaction (C.S)	0.747**	0.704**	0.717**	1.000

Correlation is highly significant at a p-value of .01. All of the study variables have a very high relationship to each other as shown in the correlation matrix. There are strong positive correlations for green banking practices and both sustainability and environment ($r = 0.782$) and customer satisfaction ($r = 0.747$); likewise, there is a strong positive correlation for green banking practices and financial performance ($r = 0.725$). This shows that when green banking practices increase, so does the overall outcome of being sustainable, customer satisfaction increases and financial performance also improves.

Table 12: Model Summary

R	R_Square	Adjusted R_Square	Std. Err.	
0.814	0.664	0.658	0.461	The model explains approximately 66.4% of the variation in financial performance. This indicates that green banking practices significantly contribute to the financial success of banks.

Table 13: ANOVA for Regression Model

Source	Sum of Squares	df	Mean Square	F	Sig. Level	
Regression	88.3460	6	17.669	82.642	0.0000	The ANOVA results indicate that the regression model is statistically significant ($p < 0.001$), confirming that the independent variables collectively have a significant effect on financial performance.
Residual	44.2690	206	0.214			
Total	132.6150	212				

Table 14: Regression Coefficients

Variables	Beta Value	T_value	Sig. Level	Digital banking has the strongest positive impact on financial performance, followed by paperless banking and green financing. All predictors are statistically significant ($p < 0.05$), indicating that these practices positively influence financial outcomes.
Digital Banking (D.B)	0.342	6.843	0.0000	
Paperless Banking (P.B)	0.229	4.722	0.0000	
Green Financing (G.F)	0.215	4.363	0.0000	
ESG Practices (ESG.P)	0.174	3.696	0.0010	
Renewable Energy Financing (REF)	0.149	3.083	0.0020	

Table 15: One-Way ANOVA

Sources	Sum of Squares	df	Mean_Square	F Value	Sig. Level	Since the significance value (0.052) is slightly greater than 0.05, there is no statistically significant difference in customer perceptions of green banking practices among the four banks.
Between Groups	03.2140	4	1.071	2.639	0.052	
Within Groups	84.7860	208	0.406			
Total	88.0000	212				

Table 16: Chi-Square Analysis

Test	Values	df	Sig. Level	The Chi-square test indicates no statistically significant association between educational qualification and awareness of green banking practices ($p > 0.05$). Awareness appears to be widespread across educational groups.
Pearson Chi_Square	18.565	12	0.0990	
Likelihood Ratio	19.113	12	0.0861	
Linear-by-Linear Association	3.265	1	0.0710	

Table 17: Mean Score by Bank (Bank-wise Mean Comparison)

Banks	Mean Scores	Ranking
HDFC Bank (HDFC)	4.341	1
ICICI Bank (ICICI)	4.280	2
SBI Bank (SBI)	4.232	3
Punjab National Bank (PNB)	4.170	4

Table 18: Hypothesis Testing

Hypothesis	Statistical Test applied	Results
H01: Green banking (G.B) practices have no significant & strong relationship with environmental sustainability (E.S).	Correlation	H01: Rejected
H02: Green banking (G.B) practices have no significant influence on financial performance (F.P).	Regression	H02: Rejected
H03: Customer awareness (C.A) has no significant impact on the adoption of green banking (G.B) services.	Regression	H03: Rejected
H04: There is no significant differences in customer perceptions (C.P) regarding green banking (G.B) practices among the sampled selected banks.	One-Way ANOVA Test	H04: Accepted
H05: Green financing (G.F) has no significant influence on sustainable development (S.D).	Regression	H05: Rejected

Findings of the study

- Green banking practices are being widely adopted across commercial banks using Digital banking, paperless transactions, Green financing, renewable energy finance and ESG-based lending.
- Digital banking received the highest mean score among all of the bank's Green initiatives; thus customers clearly prefer to use technology to access banking services.
- Paperless banking has significantly reduced dependence on printed documents which contributes to conservation of natural resources as well as operational expenses for the bank.
- As a mechanism for supporting renewable energy projects, sustainable infrastructure, electric vehicles, environmentally responsible industries Green finance has emerged as an effective methodology.
- Renewable energy finance provides positive contributions toward climate change mitigation and sustainable economic development.
- Customers demonstrate high awareness regarding the environmental benefits associated with Green banking services.
- Green banking practices enhance Customer satisfaction by offering faster, more convenient, secure and environmentally friendly banking services.
- A strong positive relationship exists between Green banking practices and environmental sustainability.
- The financial performance of banks implementing Green banking practices is enhanced through reduction in operational costs and improvement in organizational efficiency.
- Esbg-based lending strengthens environmental risk management and promotes responsible investment decisions.
- Banks that employ sustainable operating strategies experience improved corporate image and greater stakeholder confidence.
- Statistical analysis confirms that Green banking positively influences both environmental sustainability and financial performance.
- Customer perception of Green banking does not differ among the four selected banks; thus uniform adoption of sustainability initiatives can be assumed.
- Continuous technological innovation is becoming a major driver behind sustainable banking.
- Green banking supports long-term sustainable development by integrating

environmental responsibility into decision-making processes.

Conclusion

Green banking is becoming a key element of sustainable financial development for the modern banking sector. Increasingly, financial institutions are making environmental considerations part of their operational activities, loan approval decisions, investment strategies and customer services. The shift towards green banking from traditional banking is a reflection of growing acknowledgment that economic growth and environmental sustainability must progress together. Green banking practices significantly contribute to environmental protection by reducing paper use, carbon emission reduction, promoting renewable energy, advocating sustainable investments, improving resource efficiency and enhance Digital transformation through Digital banking, paperless transactions, renewable energy financing and ESG-based lending. The study also shows that green banking has positive effect on the financial performance by providing cost reductions as a result of operational efficiencies, customer satisfaction, organizational reputation and business process efficiency. Green banking therefore creates value not only for the environment but also for financial institutions, customers, investors and society. The study also highlights the importance of incorporating

environmental risk assessment into banking operations. Climate-related financial risks will continue to increase in importance; thus it will be essential for banks to take responsible action with respect to sustainability strategies and responsible investment practices. Despite the progress made so far, more effort is required to strengthen customer awareness about green banking initiatives, technological infrastructure, environmental reporting standards and employee capabilities. Regulatory support and continuous innovation will remain crucial for expanding future green banking initiatives.

Limitations of the Research

The potential for the research to be affected by several constraints is as follows:

- The study is confined to a selected group of 4 Indian Commercial Banks.
- The number of people surveyed was 213 respondents, so they cannot reasonably provide an accurate picture of all banking.
- Since primary data is based upon survey respondents perception and opinions there can be possible bias.
- Future changes could possibly impact how green banking will occur since the study covered the time frame of 2018 through 2026.
- Selected aspects of both green banking and financial performance were studied.

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