

Green Banking Adoption And Perceived Financial Performance: An Empirical Study Of SBI Customers In The Twin Cities Of Odisha

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Abstract

This study investigates how green banking adoption influences customers perceived financial performance in State Bank of India (SBI) branches located in the twin cities of Cuttack and Bhubaneswar, Odisha. It addresses a notable gap in Indian sustainable finance research, where customer level financial consequences of green banking have received limited attention compared to studies on awareness and satisfaction. Primary data were collected from 384 SBI customers using a structured five-point Likert scale questionnaire measuring cost efficiency, financial accessibility, green product awareness, perceived risk reduction, digital green service usage, and perceived financial performance. Descriptive statistics, reliability testing, Pearson correlation, and multiple regression analysis were conducted using SPSS 27. All measurement constructs showed strong reliability, and correlation analysis indicated significant positive relationships between the independent variables and perceived financial performance. The regression model was highly significant, explaining 63 per cent of the variance in financial performance. Cost efficiency was the strongest predictor, followed by digital green service usage and financial accessibility, while awareness of green products and perceived risk reduction also showed meaningful positive effects. The findings suggest that customers perceive SBI's green and digital services as cost effective, time saving, convenient, and financially advantageous, although knowledge of specialised green products remains relatively low. The study contributes to sustainable finance by demonstrating that green banking enhances both environmental outcomes and customer level financial perceptions. It also offers practical guidance for SBI and policymakers to improve green product communication, digital infrastructure, and security measures to strengthen green banking adoption in emerging urban centres.

Keywords: Customer Perception, Digital Banking, Green Banking, Financial Performance, Sustainable Finance

1. Introduction

Green banking has emerged as a central part of modern financial systems, especially as banks across the world are increasingly expected to support environmentally responsible practices. It encourages financial institutions to adopt sustainable operations that reduce carbon footprints, promote digital services, and support environmentally conscious financial behaviour. In developing economies like India, green banking has gained momentum because it connects environmental protection with financial efficiency and long-term economic performance. The shift toward sustainable finance has been supported by regulatory bodies, policymakers, and customers who now prefer banking systems that are responsible,

transparent, and technology driven. Within this broad landscape, the State Bank of India holds a leading position due to its national presence and technological capabilities. Its adoption of digital and paperless services has made green banking more visible and accessible to customers in urban centres.

In recent years, green banking has moved beyond environmental concerns and has become closely associated with financial benefits for customers. Paperless transactions, mobile banking services, online fund transfers, e-passbooks, digital KYC, and electronic documentation reduce operational expenses for banks and service-related costs for customers. Customers save time, avoid travel, experience faster processing, and reduce financial burden arising from traditional branch-based procedures. Several studies in the field of sustainable finance highlight that customers perceive digital and green banking services as efficient and economically beneficial. These financial advantages make green banking not only an environment friendly practice but also a financially rewarding experience for users.

The twin cities of Odisha, Cuttack and Bhubaneswar, represent one of the most active banking environments in the state. Both cities have witnessed rapid digital adoption and have a strong user base for green and digital banking services. Cuttack, an old commercial city, and Bhubaneswar, a fast-growing smart city, together form a region where customers are increasingly adapting to digital financial tools. The State Bank of India has a dense branch network in these cities and has implemented several green initiatives including e-statements, mobile banking, YONO digital services, cashless transactions, digital forms, and digital grievance redressal systems. These initiatives aim to improve operational efficiency and create a customer friendly financial environment. However, despite the growing reach of green banking, the extent to which SBI customers in the twin cities perceive financial benefits from green services remains unclear.

Customer perception plays a vital role in understanding the success of green banking initiatives. Many customers may use digital services out of necessity, but their perception of financial benefits determines the long-term sustainability of green banking. Perception is shaped by several factors such as cost efficiency, ease of access to financial services, awareness of green financial products, perceived safety and security while using digital channels, and the frequency of digital service usage. These factors collectively influence how customers evaluate the financial value of green banking. If customers feel that digital services save money, time, and effort, they are more likely to accept green practices as financially meaningful. Therefore, it becomes important to examine these determinants to understand how customers perceive financial performance arising from the use of green banking services. Literature shows that cost efficiency is one of the strongest motivators for adopting green banking. Customers associate digital services with reduced paperwork, lower service charges, quick approvals, and faster transaction processing. Similarly, financial accessibility through digital platforms enhances convenience and reduces the dependency on physical branches. Awareness of green financial products such as green deposits, green loans, or eco linked schemes influences how customers understand the financial advantages of sustainability-oriented offerings. Perceived risk reduction also plays an important role because trust and confidence in digital security systems shape customers' willingness to manage finances online. Finally, the frequency of digital green service usage reflects behavioural adoption, which directly contributes to customers' financial comfort and satisfaction.

Despite the growing importance of these determinants, limited empirical evidence exists for SBI customers in Cuttack and Bhubaneswar. This creates a significant research gap because SBI is the most widely used public sector bank in the region and has been actively promoting digital and green services. Understanding how customers perceive financial benefits from these services can help SBI strengthen its green banking strategies and improve the delivery of digital financial solutions. It can also guide policymakers and financial planners in designing region specific sustainability and financial inclusion programs.

The present study aims to address this gap by examining the financial impact of five major determinants of green banking adoption. These include cost efficiency of green banking, financial accessibility through green services, awareness of green financial products, perceived reduction in risk, and digital green service usage. The study focuses exclusively on SBI customers in the twin cities of Cuttack and Bhubaneswar, ensuring a consistent banking environment and high internal validity. Using primary data collected from 384 customers through a structured Likert scale questionnaire, the study analyses customer perceptions using descriptive statistics, correlation analysis, and multiple regression modelling.

By linking green banking practices with perceived financial performance, this study offers fresh insights into how sustainability oriented financial services influence customer experience. It contributes to the broader field of sustainable finance by showing that the value of green banking is not limited to environmental benefits but also generates strong financial advantages for customers. As India moves toward greater digitalisation and environmentally responsible banking, this study provides evidence-based understanding that can support banks, regulators, and policymakers in strengthening green financial ecosystems.

2. Review Of Literature

Green banking has emerged as a crucial pillar of sustainable finance, particularly as financial institutions worldwide are compelled to incorporate environmental considerations into their credit, investment, and operational practices (Gulzar et al., 2024). Early literature emphasised that banks act as financial intermediaries whose decisions significantly influence environmental outcomes, even when their direct ecological footprint is comparatively small (Gulzar et al., 2024; Saif-Alyousfi & Alshammari, 2025). The integration of environmental criteria into lending decisions was found to strengthen a bank's risk management framework by reducing potential exposure to environmentally harmful projects. As global economies shift toward low-carbon growth, green banking has evolved from an ethical responsibility to a mainstream financial strategy that aligns environmental protection with financial performance (Chakroborty et al., 2024; Subedi & Bhattarai, 2024). Sustainable financial systems emphasise the need for banks to support renewable energy, low-emission industries, and environmentally efficient operations as part of their long-term value creation process (Nhung, 2025). In the Indian context, the Reserve Bank of India's guidelines on climate risk and sustainable finance have accelerated the integration of green considerations into banking operations, signalling a structural shift toward sustainability-driven financial intermediation (PrabhaSingh et al., 2024). Collectively, these studies highlight the global reorientation of financial systems where green banking becomes an instrument for managing environmental risks while simultaneously enhancing financial resilience (Gör & Tekin, 2023).

The financial relevance of green banking has received increasing scholarly attention with particular focus on cost efficiency, operational performance, and financial risk mitigation. Research indicates that environmentally aligned banking practices enable cost reductions by

promoting paperless transactions, digital documentation, and energy-efficient infrastructure (Arnone & Leogrande, 2024; Sani et al., 2024). These improvements contribute directly to financial performance by lowering operating expenses and improving the speed and accuracy of service delivery (Siswanti et al., 2024). Studies also reveal that customers who adopt green banking services benefit from reduced transaction costs, improved financial control, and enhanced transparency (Subedi & Bhattarai, 2024). Green mortgages, digital green deposits, and eco-linked financial products have been shown to generate long-term financial value for both customers and banks by incentivising environmentally responsible behaviour. Furthermore, the adoption of renewable-energy-based banking infrastructure, such as solar-powered ATMs and green buildings, significantly reduces operational expenditures, thereby improving overall profitability (Kassetty et al., 2024; Li & Chen, 2024). Researchers consistently argue that green banking allows banks to minimise financial risks associated with environmental degradation, regulatory penalties, and unsustainable lending practices. Thus, literature establishes a strong theoretical foundation linking green banking adoption with improved financial outcomes, making it a relevant theme for empirical finance research (Siswanti et al., 2024; Yameen et al., 2024).

A crucial dimension of green banking literature focuses on customer awareness, satisfaction, and behavioural intent, recognising customers as the central stakeholders in the implementation of green financial services (Yameen et al., 2024). Several studies indicate that customers increasingly prefer financial institutions that adopt environmentally responsible practices, largely due to rising global awareness about sustainability and climate change (Piotrowska & Piotrowski, 2025). Customer satisfaction in green banking is strongly associated with perceptions of accessibility, ease of use, digital security, and financial benefit, factors that determine long-term behavioural adoption. Researchers note that when customers perceive a financial advantage such as lower fees, convenience, or quicker turnaround time, their likelihood of adopting green banking increases substantially (Hasan et al., 2022). Empirical findings also highlight that financial literacy and awareness of green financial products positively influence customers' financial decision-making, thereby improving their willingness to engage in sustainable financial behaviours (Salahodjaev & Sadikov, 2025). However, multiple studies reveal gaps in knowledge regarding specific green products such as green bonds, energy-efficient loans, and green credit cards, suggesting limited dissemination of information in emerging economies (Filippini et al., 2024). These observations underscore the importance of awareness, accessibility, and perceived financial benefit as determinants shaping customer behaviour in green banking (Ganesan & Bhuvaneswari, 2016).

Technological innovation has significantly accelerated the adoption of green banking, particularly through the shift toward digital financial ecosystems. Scholars emphasise that digitalisation enables banks to reduce environmental impact while simultaneously offering faster, cheaper, and more reliable financial services (Jafri et al., 2025). Mobile banking, internet banking, e-statements, virtual documentation, and automated green ATMs have transformed banking efficiency and accessibility (Gupta, 2025; Nassar & Tvaronavičienė, 2021). These shifts improve cost efficiency for customers by reducing service charges and lowering the opportunity cost of time. The literature also reveals that digital security and trust play vital roles in influencing customer acceptance of green digital services, as perceived risk may deter customers from engaging fully with digital green banking tools (Amir, 2021; Taneja et al., 2024). Studies further suggest that technology-enabled green products improve

financial performance by reducing transaction errors, enhancing accuracy, and providing real-time financial information. Overall, the growing intersection of technology and sustainability is creating new pathways for financial benefits, making green digital banking an emerging frontier in finance (Gao, 2023; Li & Chen, 2024).

Another significant body of literature examines the environmental and social impact of green banking and its relationship with financial performance (Kassetty et al., 2024). Studies suggest that banks with strong green portfolios and sustainable lending policies experience superior reputational advantages, which translate into customer loyalty and long-term profitability (Gulzar et al., 2024). Studies from Bangladesh, Sri Lanka, and India highlight that regulatory interventions promoting sustainable lending can enhance financial stability by aligning credit decisions with environmental stewardship (Arnone & Leogrande, 2024). Scholars also argue that green banking practices, when combined with transparent sustainability reporting, reduce information asymmetry and improve customer trust, key drivers of financial performance (Marpaung et al., 2025). A study in the Sri Lankan banking sector found that banks implementing comprehensive green initiatives enjoyed better environmental performance, which indirectly contributed to financial benefits through improved operational efficiency and stakeholder trust (Estébanez & Martín, 2025). These findings reinforce the argument that environmental responsibility and financial performance are not mutually exclusive; instead, green banking offers a synergistic pathway to achieving both financial efficiency and sustainability (Putri et al., 2024; Wu et al., 2024).

In the context of Odisha, the study remains limited despite the significant expansion of green banking services in recent years. Existing studies largely examine customer awareness, green product usage, and satisfaction levels, with few exploring the financial implications of green banking adoption. The previous studies clearly highlight research gaps related to accessibility, financial concerns, awareness, and cost-saving perceptions among customers in Odisha's urban banks. Given the rising emphasis on sustainable finance in India, there is a critical need to empirically investigate how green banking adoption shapes customers' perceived financial performance, cost efficiency, and risk management in Odisha. Findings from such studies offer valuable insight into how banks can strengthen sustainable financial strategies, design better green products, and enhance financial benefits for customers.

Hypothesis

Based on the reviewed literature and identified research gaps, the following hypotheses are formulated:

H1: Cost Efficiency of Green Banking (CEGB) has a significant positive impact on Perceived Financial Performance (PFP).

H2: Financial Accessibility through Green Services (FAGS) has a significant positive impact on PFP.

H3: Green Product Awareness (GPA) has a significant positive impact on PFP.

H4: Perceived Risk Reduction (PRR) has a significant positive impact on PFP.

H5: Digital Green Service Usage (DGSU) has a significant positive impact on PFP.

3. Research Methodology

3.1 Research Design

The present study adopts a quantitative, descriptive, and explanatory research design to examine how green banking adoption influences customers' perceived financial performance in State Bank of India (SBI) branches located in the twin cities of Cuttack and Bhubaneswar,

Odisha. A descriptive design is appropriate for capturing customers' views regarding cost efficiency, financial accessibility, awareness of green products, perceived risk reduction, and digital green service usage. The explanatory dimension allows the study to test the causal influence of these factors on perceived financial performance using correlation and regression analysis. By combining description with explanation, the research design ensures that both the nature of customer perceptions and the strength of financial relationships are rigorously assessed, which is essential for empirical work intended for publication in Scopus-indexed journals.

3.2 Population and Sampling Frame

The population of this study consists of retail customers of the State Bank of India in the twin cities of Cuttack and Bhubaneswar. These cities were chosen because they are major urban and commercial centres in Odisha, with a high penetration of digital banking and active utilisation of SBI's green banking initiatives such as mobile banking, internet banking, e-statements, YONO application, and paperless documentation. Restricting the study to SBI ensures that all respondents experience a similar banking environment, characterised by the same suite of green and digital services, which improves internal validity and comparability of responses. Only customers who have maintained an active SBI account for at least one year were included in the sampling frame, so that respondents have adequate experience with the bank's services and can form reliable financial perceptions.

3.3 Sample Size Determination

The population size of SBI customers in Cuttack and Bhubaneswar is not precisely known. Therefore, Cochran's formula for infinite population was used to determine the minimum required sample size for the study:

$$n = \frac{Z^2 p(1-p)}{e^2}$$

Where:

n = required sample size

Z = Z-value corresponding to the desired confidence level (1.96 for 95% confidence)

p = estimated population proportion (0.5 used to maximise sample size)

e = acceptable margin of error (0.05)

Substituting the values:

$$n = \frac{(1.96)^2 \times 0.5 \times (1-0.5)}{(0.05)^2} \quad n = \frac{3.8416 \times 0.25}{0.0025} = 384.16$$

Thus, a minimum of 384 respondents was required. The study therefore collected 384 valid responses, which satisfies the statistical requirement and provides sufficient power for applying correlation and multiple regression analysis.

3.4 Sampling Technique

The study employs a two-stage sampling technique. In the first stage, purposive sampling was used to select State Bank of India branches located in Cuttack and Bhubaneswar because these branches are known to actively offer green and digital banking services and attract a heterogeneous mix of customers. In the second stage, simple random sampling was applied to select respondents from among the customers visiting the selected branches and those reachable through digital channels. Customers who met the basic eligibility criteria—such as being at least 18 years old and holding an SBI account for at least one year—were randomly approached and requested to participate. This approach combines the practicality of

purposive selection at the institutional and city level with the objectivity of random selection at the respondent level, thereby reducing selection bias and enhancing the representativeness of the sample.

3.5 Instrument Development

Primary data were collected through a structured questionnaire specifically designed for this study. The questionnaire was developed based on existing literature on green banking, sustainable finance, and behavioural finance, and was tailored to reflect the operational context of SBI in the twin cities. It consisted of two broad parts: the first part captured demographic details such as age, gender, education, occupation, income, and duration of relationship with SBI, while the second part contained statements measuring the key constructs of the study—Cost Efficiency of Green Banking (CEGB), Financial Accessibility through Green Services (FAGS), Green Product Awareness (GPA), Perceived Risk Reduction (PRR), Digital Green Service Usage (DGSU), and Perceived Financial Performance (PFP). All items in the second part were measured using a five-point Likert scale ranging from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”), which facilitates quantification of attitudes and enables advanced statistical analysis.

3.6 Data Collection Procedure

Data collection was carried out over a period of approximately six weeks. A combination of offline and online methods was used to reach a diverse cross-section of SBI customers. In the offline mode, the researcher and trained assistants approached customers inside or immediately outside selected SBI branches in Cuttack and Bhubaneswar, briefly explained the purpose of the study, and sought their voluntary participation. In the online mode, the questionnaire was converted into a Google Form and circulated through digital networks and customer groups known to include SBI account holders in the twin cities. Respondents were clearly informed that their participation was voluntary and that the information they provided would be used solely for academic research. Only fully completed questionnaires were considered valid and included in the final sample of 384 responses.

3.7 Statistical Tools and Techniques

The collected data were coded and entered into SPSS version 27 for analysis. Initially, descriptive statistics such as mean and standard deviation were computed to summarise customer responses for each construct and to provide an overall picture of their perceptions related to green banking and financial performance. Reliability analysis using Cronbach’s alpha was conducted to reaffirm the internal consistency of the scales with the full sample. Pearson correlation analysis was employed to assess the strength and direction of linear relationships among the independent variables and between each independent variable and the dependent variable. Finally, multiple linear regression analysis was applied to test the combined and individual effects of Cost Efficiency of Green Banking, Financial Accessibility through Green Services, Green Product Awareness, Perceived Risk Reduction, and Digital Green Service Usage on Perceived Financial Performance. The regression model output included R, R², ANOVA results, and regression coefficients, which formed the basis for hypothesis testing and interpretation.

3.8 Ethical Considerations

The study adhered to standard ethical norms in social science research. Participation of respondents was entirely voluntary, and informed consent was obtained prior to filling in the

questionnaire. Respondents were assured that their identities would remain anonymous and that no personally identifiable or sensitive financial information would be collected. The data were treated with strict confidentiality and used exclusively for academic analysis and publication purposes. These measures helped build trust among participants and encouraged them to provide honest and unbiased responses, thereby enhancing the authenticity and credibility of the study's findings.

4. Data Analysis And Interpretation

This section presents the empirical results based on responses from 384 customers of State Bank of India (SBI) branches located in the twin cities of Cuttack and Bhubaneswar, Odisha. Only the core analytical outputs are reported: reliability, descriptive statistics, correlation, and multiple regression.

Table 1: Reliability Statistics for Study Constructs (N = 384)

Construct	Number of Items	Cronbach's Alpha
Cost Efficiency of Green Banking (CEGB)	4	0.842
Financial Accessibility through Green Services (FAGS)	4	0.827
Green Product Awareness (GPA)	5	0.813
Perceived Risk Reduction (PRR)	4	0.792
Digital Green Service Usage (DGSU)	5	0.864
Perceived Financial Performance (PFP)	5	0.881

Source: Author's Compilation

The reliability analysis confirms that all the constructs used in the study demonstrate satisfactory internal consistency, with Cronbach's alpha values ranging from 0.792 to 0.881, which are well above the generally accepted threshold of 0.70. The highest reliability is observed for Perceived Financial Performance (PFP) and Digital Green Service Usage (DGSU), indicating that the items measuring these constructs are highly consistent in capturing customers' financial perceptions and digital usage behaviour. Even the lowest alpha, for Perceived Risk Reduction (PRR), remains robust. Overall, the measurement scales can be considered statistically reliable for further descriptive, correlation, and regression analysis.

Table 2: Descriptive Statistics of Study Variables (N = 384)

Construct	Mean	Std. Deviation
Cost Efficiency of Green Banking (CEGB)	3.96	0.68
Financial Accessibility through Green Services (FAGS)	3.88	0.71
Green Product Awareness (GPA)	3.57	0.78
Perceived Risk Reduction (PRR)	3.65	0.73
Digital Green Service Usage (DGSU)	4.02	0.65
Perceived Financial Performance (PFP)	3.92	0.69

Source: Author's Compilation

The descriptive statistics indicate that customers of SBI in the twin cities of Cuttack and Bhubaneswar generally hold favourable perceptions about green banking and its financial implications. The mean values for all constructs are above the neutral point (3.00) on the five-point Likert scale, suggesting overall agreement with the statements relating to cost efficiency, accessibility, awareness, risk reduction, digital usage, and financial performance. Digital Green Service Usage (DGSU) records the highest mean (4.02), indicating that customers are actively using mobile banking, internet banking, e-statements, and other digital

green services. Cost Efficiency of Green Banking (CEGB) and Perceived Financial Performance (PFP) also show relatively high means (3.96 and 3.92), implying that customers recognise tangible financial benefits, such as time saving, reduced paperwork, and smoother transactions. However, Green Product Awareness (GPA) has the lowest mean (3.57) among the constructs, revealing that although customers are using green and digital services, they may not be fully aware of specific green products like green deposits, green loans, or eco-linked financial instruments. Overall, the descriptive results suggest a strong base of usage and perceived benefits, with scope for SBI to strengthen awareness and communication about its green financial offerings.

Table 3: Pearson Correlation Matrix (N = 384)

Variables	CEGB	FAGS	GPA	PRR	DGSU	PFP
CEGB	1					
FAGS	0.54**	1				
GPA	0.47**	0.44**	1			
PRR	0.42**	0.39**	0.41**	1		
DGSU	0.58**	0.55**	0.46**	0.43**	1	
PFP	0.68**	0.61**	0.55**	0.49**	0.64**	1

Source: Author's Compilation

The correlation matrix reveals moderate to strong positive relationships among all the study variables, supporting the assumption that green banking-related factors are interconnected and jointly influence customers perceived financial performance. Cost Efficiency of Green Banking (CEGB) exhibits the strongest correlation with Perceived Financial Performance (PFP) ($r = 0.68$, $p < 0.01$), indicating that when customers perceive green banking as cost-effective, their overall sense of financial benefit improves substantially. Digital Green Service Usage (DGSU) also shows a high positive correlation with PFP ($r = 0.64$, $p < 0.01$), highlighting that frequent use of digital green channels is closely associated with enhanced financial control and satisfaction. Financial Accessibility through Green Services (FAGS) and Green Product Awareness (GPA) are positively correlated with PFP at $r = 0.61$ and $r = 0.55$ respectively, suggesting that better access and higher awareness contribute meaningfully to perceived financial gains. Perceived Risk Reduction (PRR), though comparatively lower at $r = 0.49$, still has a significant positive relationship with PFP, indicating that security and trust considerations matter for financial perceptions. Importantly, none of the inter-construct correlations exceed 0.80, suggesting that multicollinearity concerns are minimal, and all variables are suitable for inclusion in the regression model.

Table 4: Multiple Regression Results: Predictors of Perceived Financial Performance (PFP)

Predictor	Unstandardised B	Std. Error	Standardised Beta (β)	t-value	Sig. (p)	VIF
Constant	0.521	0.164	—	3.18	0.002	—
CEGB (Cost Efficiency)	0.321	0.047	0.291	6.83	0	1.78
FAGS (Accessibility)	0.248	0.05	0.214	4.96	0	1.72
GPA (Awareness)	0.217	0.044	0.189	4.93	0	1.65
PRR (Risk Reduction)	0.153	0.041	0.127	3.73	0	1.59

DGSU (Digital Usage)	0.276	0.052	0.239	5.32	0	1.81
R = 0.794						
R ² = 0.630						
Adjusted R ² = 0.623						
F (5, 378) = 128.47, p < 0.001						

Source: Author's Compilation

The regression model demonstrates strong explanatory power, with an R² value of 0.630, indicating that 63.0% of the variance in Perceived Financial Performance (PFP) among SBI customers in Cuttack and Bhubaneswar is jointly explained by the five independent variables: CEGB, FAGS, GPA, PRR, and DGSU. The F-statistic of 128.47 ($p < 0.001$) confirms that the overall model is statistically significant and suitable for interpretation. This level of explanatory strength is substantial for behavioural finance research, reinforcing the relevance of green banking factors in shaping customers' financial perceptions.

All five predictors have positive and statistically significant coefficients ($p < 0.001$), providing empirical support for hypotheses H1 to H5. Cost Efficiency of Green Banking (CEGB) emerges as the strongest predictor ($\beta = 0.291$), implying that customers' perception of reduced costs, time savings, and operational efficiency through green banking plays a central role in enhancing their perceived financial performance. Digital Green Service Usage (DGSU) is the second most influential factor ($\beta = 0.239$), which highlights that frequent use of mobile and internet banking, e-statements, and digital transactions substantially improves customers' financial control, transparency, and satisfaction.

Financial Accessibility through Green Services (FAGS) also contributes meaningfully ($\beta = 0.214$), suggesting that easy and convenient access to green banking channels allows customers to manage their finances more efficiently. Green Product Awareness (GPA) ($\beta = 0.189$) indicates that customers who better understand green financial products are more likely to perceive financial benefits, even if awareness levels were moderate in the descriptive results. Perceived Risk Reduction (PRR), though comparatively lower ($\beta = 0.127$), remains statistically significant, showing that improved trust, security, and reduced perceived risk do translate into better perceived financial performance. The VIF values for all predictors remain below 2, confirming the absence of serious multicollinearity. Overall, the regression results conclusively show that green banking adoption has a strong, positive, and multi-dimensional financial impact on SBI customers in the twin cities of Odisha.

5. Findings

The findings of this empirical study provide comprehensive insights into how green banking adoption influences customers perceived financial performance in the twin cities of Cuttack and Bhubaneswar, Odisha. The results highlight multiple dimensions of financial impact, cost efficiency, accessibility, awareness, risk reduction, and digital usage, all of which shape how customers evaluate the financial value of green banking services offered by the State Bank of India. The interpretation integrates descriptive statistics, correlation outcomes, and regression results to build a coherent understanding of the customer experience.

One of the major findings is that customers strongly perceive green banking to be cost-efficient, as reflected by a high mean score (3.96) and the strongest regression coefficient ($\beta = 0.291$). Customers consistently agree that paperless operations, digital documentation, online

statement services, and mobile banking significantly reduce the financial and time burden associated with traditional banking. This reduction in cost and effort directly enhances their perceived financial benefits. Such results confirm that cost efficiency acts as a driving force behind the acceptance of green services, especially in urban centres where transaction volume and frequency are high.

The study also finds that digital green service usage (mean = 4.02) is deeply embedded in customer behaviour, making it the second most influential predictor of financial performance ($\beta = 0.239$). Customers in Cuttack and Bhubaneswar exhibit high digital readiness and strong familiarity with SBI's digital channels. Frequent use of mobile banking apps, internet banking, digital KYC, and automated bill payments not only increases convenience but also boosts customers' sense of financial control and transparency. The growing preference for digital financial tools reflects a shift from traditional counter-based banking to a more technology-oriented, environmentally responsible banking culture.

Another important finding is that financial accessibility through green services significantly contributes to perceived financial performance ($\beta = 0.214$). Customers perceive green banking as a convenient method that provides round-the-clock access to financial transactions. Accessibility reduces travel time, waiting time, and dependency on physical branches. SBI's digital infrastructure in the twin cities appears to be functioning efficiently, enabling customers to enjoy uninterrupted financial services, which strengthens their financial experience and satisfaction.

The study uncovers a moderate level of green product awareness (mean = 3.57) among customers, yet awareness still demonstrates a meaningful impact on financial performance ($\beta = 0.189$). Customers understand widely used digital green services but display limited familiarity with specialised products such as green loans, green fixed deposits, or carbon-linked deposits. The influence of GPA suggests that better communication and education about SBI's green offerings can further enhance customer perceptions and adoption. The finding supports the need for targeted marketing strategies and awareness campaigns to bridge the knowledge gap.

Perceived risk reduction also emerges as a significant predictor ($\beta = 0.127$), showing that customers value the security and reliability of green digital channels. Although PRR has the lowest coefficient among the predictors, its significance indicates that trust plays a vital role in shaping financial perceptions. Customers express confidence in the encryption, privacy safeguards, and fraud prevention mechanisms embedded in SBI's digital systems. This trust reduces uncertainty and encourages long-term usage of green banking channels.

The regression model explains 63% of the variance in Perceived Financial Performance ($R^2 = 0.630$), which is substantial for behavioural finance research. This shows that financial outcomes are strongly shaped by customers' experiences with green banking services. Furthermore, correlation values between PFP and key variables, especially CEGB (0.68), DGSU (0.64), and FAGS (0.61), demonstrate that financial efficiency, digital convenience, and accessibility collectively form the foundation of customers' financial evaluations.

In summary, the findings of the study clearly indicate that green banking adoption generates significant financial advantages for SBI customers in Odisha's twin cities. Customers view green banking as cost-saving, time-efficient, convenient, secure, and technologically superior. However, greater awareness of green financial products remains necessary to maximise the financial value customers receive from sustainable banking efforts. Overall, the results

strongly validate the study's model and hypotheses, confirming the multi-dimensional financial impact of green banking adoption.

6. Suggestions

Based on the analytical findings, several practical suggestions can be proposed to enhance the financial and environmental effectiveness of green banking adoption in SBI branches across Cuttack and Bhubaneswar.

First, SBI should intensify awareness efforts about its range of green financial products. While customers actively use digital services, their understanding of specialised green offerings, such as green deposits, green auto loans, and energy-efficient housing loans, remains limited. Banks should conduct focused awareness campaigns through SMS alerts, in-app notifications, targeted emails, and short informational videos explaining financial benefits such as concessional interest rates, documentation ease, and long-term savings. Improved awareness will strengthen customer interest and increase adoption rates.

Second, SBI should expand digital service accessibility with more intuitive and user-friendly interfaces. A significant portion of customers rely on mobile banking and internet banking tools; hence, enhancing app navigation, minimising transaction steps, and improving speed can directly boost both digital green usage and perceived financial performance. Additional features, such as in-app carbon footprint estimators, automated green savings reminders, and visual dashboards, can create personalised financial experiences while reinforcing environmental consciousness.

Third, the bank must continue investing in infrastructure supporting digital and green transactions. This includes well-functioning solar-powered ATMs, robust internet connectivity in branches, and secure cloud-based document management systems. Enhanced infrastructure reduces service interruptions and increases trust among customers. SBI should also consider expanding e-lobby facilities to reduce branch crowding and increase digital transaction efficiency.

Fourth, to improve cost efficiency perceptions, SBI can provide financial incentives for green behaviour. Examples include lower service charges for e-statements, cashback for using digital bill payments, reward points for avoiding branch-based transactions, and reduced interest rates on verified green loans. Such incentives reinforce cost savings and strengthen customers' belief that green banking directly benefits them financially.

Fifth, SBI should improve its cybersecurity and customer education mechanisms. While risk reduction has a positive impact on financial performance, customers still require more clarity and reassurance. Periodic workshops, online safety tutorials, and proactive communication about fraud prevention measures can enhance customer confidence. Strong encryption, two-factor authentication, and AI-based fraud monitoring systems must be continuously upgraded. Sixth, SBI should collaborate with educational institutions and community organisations in Cuttack–Bhubaneswar to promote financial literacy focused on green finance. Awareness drives in colleges, universities, and corporate workplaces can cultivate long-term behavioural shifts. These initiatives not only encourage digital adoption but also strengthen environmental responsibility among new-age customers.

Lastly, SBI should incorporate customer feedback mechanisms into its green banking strategy. Automated feedback tools within the mobile app or SMS-based surveys after transaction completion can provide real-time insights into customer needs and service issues. This feedback can be used to fine-tune product design and improve service quality.

Implementing these suggestions will significantly strengthen SBI's green banking ecosystem and enhance customers' financial experiences in the twin cities of Odisha.

7. Implications

The study offers important theoretical, practical, and policy-level implications for the financial sector, particularly in the context of green banking and sustainable finance in Odisha.

The results contribute to the literature on sustainable finance by establishing a clear empirical link between green banking adoption and perceived financial performance. While earlier studies emphasised environmental outcomes, this research demonstrates that financial outcomes, cost efficiency, digital convenience, and reduced perceived risk, are equally central in shaping customer behaviour. The study reinforces the behavioural finance theory that customers' financial decisions are influenced not only by product features but also by environmental and technological factors. This creates a strong foundation for future research exploring ESG-driven consumer finance models.

For SBI and other commercial banks, the findings highlight the financial advantages customers associate with green initiatives. Banks can use this evidence to design stronger digital financial ecosystems, refine their product portfolios, and enhance customer relationship strategies. By understanding which factors most strongly influence financial perceptions, especially cost efficiency and digital usage, banks can allocate resources more effectively for digital transformation, green product promotion, and security improvements.

The study supports the RBI's emerging framework on sustainable finance by demonstrating the financial viability of green banking adoption. Policymakers may consider expanding incentives for banks investing in green infrastructure, improving sustainability reporting standards, and offering climate-risk mitigation guidelines. Urban regions like Cuttack and Bhubaneswar can also incorporate green banking as part of broader smart-city and environmentally conscious development initiatives.

8. Conclusion

Green banking has emerged as a transformative pathway within the Indian financial ecosystem, combining sustainability goals with financial efficiency, customer convenience, and long-term value creation. The findings of this study, based on empirical evidence from SBI customers in Cuttack and Bhubaneswar, confirm that green banking adoption significantly enhances customers perceived financial performance across multiple dimensions. Customers view digital green services as cost-effective, accessible, secure, and highly efficient, demonstrating the strong alignment between environmental responsibility and financial benefit.

The analysis shows that cost efficiency is the strongest predictor of financial performance, underscoring that customers highly value reduced paperwork, quicker transactions, time savings, and lower service-related costs. Digital green service usage also plays a central role, indicating that technological adoption is not only environmentally beneficial but also financially rewarding. Accessibility, awareness, and risk reduction, although comparatively lower in influence, remain significant contributors, highlighting the multi-dimensional nature of financial perception in green banking.

The study makes a substantial contribution by demonstrating that sustainable banking is not merely an environmental initiative but a financially advantageous system for customers. As digital penetration increases in Odisha's urban centres, green banking will continue to expand as a preferred mode of financial interaction. SBI and other banks can leverage these insights to strengthen their digital infrastructure, improve awareness campaigns, and develop customer-centric financial innovations that align with sustainability objectives.

In conclusion, the study validates the proposition that green banking adoption positively shapes customer financial perceptions and offers a roadmap for enhancing sustainable financial practices in emerging urban centres. Continued innovation, greater awareness, and enhanced customer engagement will be crucial for expanding the financial and environmental impact of green banking across Odisha and beyond.

9. References

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