

Green Digital Banking and Customer Satisfaction in Indian Public Sector Banks: An Empirical Study of Sustainable Digital Banking Practices

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Abstract

Background: Digital banking and environmental sustainability are increasingly converging within banking strategy. In India, public sector banks (PSBs) are expanding paperless transactions, digital documentation, electronic payments and green-oriented financial practices. Objective: This study examines whether Green Digital Banking Practices (GDBP) are associated with customer satisfaction and identifies the role of digital service quality and perceived sustainability value. Methods: Primary data were collected through a structured five-point Likert questionnaire. Seventy-six responses were received; seven respondents who indicated that they did not currently use mobile or internet banking of an Indian PSB were excluded from inferential analysis, leaving 69 eligible digital-banking users. Data were analysed using descriptive statistics, Cronbach's alpha, Pearson correlation and hierarchical multiple regression. Results: GDBP showed a positive association with customer satisfaction ($r = .363$, $p = .002$). Digital service quality had a stronger positive relationship with satisfaction ($r = .642$, $p < .001$), while sustainability value was also positively related to satisfaction ($r = .480$, $p < .001$). In the final regression model, the three predictors explained 44.1% of the variance in satisfaction; digital service quality remained the only statistically significant unique predictor. Conclusion: Sustainable digital banking is positively connected with customer satisfaction, but the customer experience appears to depend particularly on reliable, responsive, secure and convenient digital service delivery. The findings suggest that PSBs should integrate environmental value into digital banking without allowing sustainability communication to substitute for core service quality.

Keywords: Green Digital Banking; Customer Satisfaction; Public Sector Banks; Sustainability; Digital Service Quality; Green Finance

1. Introduction

Banking is undergoing a structural shift in which digital delivery, environmental responsibility and customer experience increasingly intersect. Mobile applications, internet banking, electronic statements, digital onboarding and real-time payment systems have reduced the need for many routine branch-based transactions. At the same time, banks are being encouraged to consider the environmental implications of their operations and financing decisions. Green banking therefore extends beyond financing environmentally beneficial

projects; it can also involve reducing paper consumption, encouraging electronic communication, improving resource efficiency and using digital channels to support more sustainable customer behaviour.

The Indian banking environment provides a particularly relevant setting for examining this convergence. The Reserve Bank of India (RBI) has reported sustained expansion of digital payments and noted that digital transactions accounted for 99.8% of the volume of non-cash retail payments in 2023–24. The RBI has also established a framework for green deposits, under which regulated entities choosing to accept green deposits must follow specified requirements concerning the use and governance of funds (Reserve Bank of India, 2023). These developments indicate that digitalisation and sustainability are no longer separate banking agendas. They increasingly form part of a broader transition toward technology-enabled and environmentally responsible financial services.

Public sector banks occupy an important position in this transition because of their extensive customer base, institutional reach and role in financial inclusion. However, the presence of a digital channel does not automatically create customer satisfaction. Customers evaluate banking applications and websites through accuracy, availability, security, responsiveness, ease of navigation and the extent to which services meet expectations. Recent Indian evidence similarly indicates that service-quality dimensions are associated with customer satisfaction in digital banking, with reliability, responsiveness, assurance, empathy and tangibility all receiving empirical attention (Bhuvanewari & Maruthamuthu, 2024).

1.1 Conceptual background

This study uses an integrated perspective drawing on the Technology Acceptance Model (TAM), SERVQUAL and Expectation Confirmation Theory (ECT). TAM explains technology use through beliefs such as perceived usefulness and perceived ease of use (Davis, 1989). In sustainable digital banking, convenience and ease of digital transactions can coexist with an environmental benefit, such as reduced paper use or fewer branch visits. SERVQUAL provides a customer-oriented framework for evaluating service quality through reliability, responsiveness, assurance, empathy and tangibles (Parasuraman et al., 1988). ECT proposes that satisfaction develops from the comparison between prior expectations and perceived performance (Bhattacharjee, 2001). Together, these perspectives support the argument that customers may value green digital banking, but their satisfaction ultimately depends on whether the digital service performs effectively and consistently.

1.2 Literature review

Recent research has begun to connect green banking, digital transformation and customer satisfaction. Mir et al. (2025), examining green banking practices in relation to customer satisfaction, reported positive effects for digital banking, green services and green loans, while green infrastructure was not a significant predictor in their model. This distinction is important because environmental symbolism alone may not produce a better customer experience. Customers are more likely to value sustainability when it is integrated with useful, accessible and trustworthy services.

Indian research has also highlighted the relationship between technological advancement and green banking. Chandrasekaran and Narayanan (2024) examined green banking initiatives alongside digital transformation and reported a positive relationship between digitalization and sustainable banking practices. Similarly, research focused on customer satisfaction with

green banking initiatives in Mysuru has emphasized paperless transactions, online banking, awareness and accessibility as areas requiring continued attention (Indresh & Krithika, 2025). These studies support the relevance of examining customers rather than treating green banking solely as an institutional or operational issue.

At the regulatory level, the RBI's green deposit framework provides an important institutional context for sustainable financial products. The framework is not mandatory for regulated entities, but institutions that accept green deposits are expected to comply with the prescribed framework (Reserve Bank of India, 2023). Research on Indian green banking also identifies regulatory, institutional and awareness-related barriers that can affect implementation (Chandran et al., 2025). Thus, customer awareness and communication are relevant alongside the actual availability of green products.

Bryson et al. (2016) examined the factors that influence customers' intention to use green banking services in India. Their work is relevant because the success of sustainable banking depends not only on the initiatives introduced by banks but also on whether customers are willing to use them. From a customer perspective, convenience, perceived value and awareness can influence acceptance. This suggests that banks need to communicate the practical benefits of green banking clearly rather than assuming that customers will automatically adopt environmentally friendly services.

Chitra and Gokilavani (2020) discussed green banking trends in India, including customer awareness, environmental sustainability and the operational benefits of adopting greener banking practices. Their discussion draws attention to the importance of helping customers understand services such as paperless transactions and electronic banking. The study is useful to the present research because awareness can affect how customers perceive a bank's sustainability efforts. When customers understand the purpose and benefits of these services, they may be better positioned to evaluate their overall banking experience.

Katti and Jagtap (2022) investigated customer awareness of green banking initiatives undertaken by the State Bank of India in western Maharashtra. Their study covered selected SBI branches across four districts and used questionnaire-based primary data. The focus on a public sector bank makes the research particularly relevant to the present article. It highlights the importance of examining whether customers are familiar with the initiatives offered by their own banks. Awareness is an important consideration because the benefits of an initiative may remain unnoticed if customers do not know that it exists or how to use it.

Suresh and Pratap (2024) studied customer awareness of green banking initiatives in Karnataka, comparing public and private sector banks. Their survey of 500 customers reported differences in awareness between the two groups, with the reported awareness level higher among private sector bank customers. These findings provide a useful regional context for research on Indian public sector banks. They also suggest that the introduction of sustainable services and the communication of those services should be considered separately. A bank may offer environmentally friendly facilities, but customers must recognise and understand them before those facilities can meaningfully shape their perceptions.

Chandrasekaran and Narayanan (2024) examined awareness of green banking initiatives among customers of public and private sector banks in Madurai. Their work adds to the Indian literature by considering customer awareness as an important aspect of green banking implementation. This is relevant because differences in awareness may reflect differences in communication, customer engagement and exposure to banking services. For the present study, it would be useful to consider whether customers of public sector banks recognise digital statements, electronic transactions and other paper-saving services as part of a broader sustainability effort.

Charan's study, *Customers Perception towards Green Banking Practices in India*, examines the status of green banking and customer perceptions of environmentally responsible banking practices. The study is relevant because it brings the customer into a discussion that might otherwise focus primarily on bank policies and operational efficiency. Customers may appreciate reduced paperwork and convenient digital services, but their perceptions can also depend on the accessibility and reliability of those services. This perspective supports the need to assess green banking from the user's point of view rather than relying only on the number of initiatives introduced by a bank.

Jain et al. (2024) developed a conceptual model to examine whether green banking practices influence customers' attitudes and behavioural intentions. Their work is valuable because it distinguishes customers' attitudes towards green banking from their intention to use it. These concepts are related, but they are not identical to satisfaction. A customer may support environmentally responsible banking in principle without being satisfied with the digital services provided. The distinction reinforces the need for the present study to examine customer satisfaction as a separate outcome rather than treating positive attitudes towards sustainability as sufficient evidence of a good banking experience.

Jain and colleagues (2025) examined the role of perceived benefits in customers' attitudes and intentions towards green banking in India. Their study included 298 customers of public and private sector banks in the Delhi–National Capital Region. The findings indicate that perceived benefits influence behavioural intention indirectly through customer attitudes. This suggests that customers need to see a clear reason to adopt green banking services. In practical terms, faster transactions, reduced paperwork, easy access and transparent environmental benefits may be more persuasive than sustainability messages alone. For public sector banks, communicating these benefits may therefore be an important part of encouraging customer acceptance.

Jain et al. (2026) extended the theory of planned behaviour to study green banking adoption among Indian customers. Their study used responses from 293 green banking service users in the Delhi–National Capital Region. The findings highlight environmental concern as an important factor associated with customers' attitudes, subjective norms and perceived behavioural control. This perspective is useful because customer adoption depends on more than an individual's environmental values. Customers must also feel that the services are accessible and manageable. The present study can build on this distinction by considering whether digital banking facilities are sufficiently convenient and understandable to support satisfaction among public sector bank customers.

Aracil et al. (2021) reviewed sustainable banking research published between 1995 and 2019, analysing 676 articles through bibliometric techniques. Their review organised the literature around ethical foundations, sustainable products and the business case for sustainability. The study shows that sustainable banking is a broad concept that connects social responsibility with financial products and business performance. This is important for the present research because green digital banking should not be assessed solely through environmental intentions. Its relevance to customers also depends on the quality and usefulness of the services through which sustainability is delivered.

Chandran et al. (2025) examined green banking adoption in India through institutional and stakeholder perspectives. Their review discusses regulatory uncertainty, institutional barriers and the need for more consistent approaches to sustainable banking. This work provides a useful explanation for why green banking practices may develop unevenly across financial institutions. For customers, such differences may affect the visibility, availability and consistency of green products and services. The study therefore supports the need to examine

both institutional initiatives and the customer experience, particularly in public sector banks operating within India's changing sustainable-finance environment.

Thapliyal et al. (2025) investigated green banking practices, environmental performance and sources of green financing in Indian banks. Their study extends the discussion beyond paperless transactions by considering how banking practices relate to environmental outcomes and financing for green activities. This distinction matters because digital convenience and environmental impact are separate dimensions of sustainability. Customers may be satisfied with online services without knowing whether a bank's broader financing decisions support environmental objectives. The present study can therefore distinguish between customer-facing green services and the wider sustainability practices of the institution.

Ojha (2025) reviewed research on green banking and sustainability, identifying themes such as green finance, institutional support, stakeholder involvement and barriers to adoption. The review also highlights challenges associated with awareness, implementation costs and perceived complexity. These issues are relevant to Indian banking because sustainable practices need to be both operationally feasible and understandable to customers. The findings support a broader assessment of green banking in which the availability of services, customer communication and institutional readiness are considered together. They also point to the value of examining the experiences of customers rather than assuming that formal adoption automatically results in effective implementation.

The Reserve Bank of India (2023) introduced a framework for accepting green deposits to encourage the financing of eligible green activities, protect depositors' interests and address concerns about greenwashing. The framework applies to specified regulated entities that accept green deposits; it should not be interpreted as requiring every bank to offer such deposits. Although the framework primarily concerns sustainable financial products rather than customer satisfaction, it provides an important regulatory context for the present research. Clear communication about green financial products, their intended use and their associated disclosures may help customers make informed decisions and assess the credibility of a bank's sustainability commitments.

Mir et al. (2025) examined the relationship between green banking practices and customer satisfaction in selected public and private sector banks. Their findings showed significant positive relationships for digital banking, green services and green loans, whereas green infrastructure was not a significant predictor in their model. This distinction suggests that visible environmental investments do not necessarily translate into a better customer experience. Customers may respond more directly to services they use and benefits they can experience. The study provides a particularly relevant foundation for the present article, which examines how digital and sustainable banking practices relate to customer satisfaction in Indian public sector banks.

Davis (1989) developed the Technology Acceptance Model to explain how perceived usefulness and perceived ease of use influence the acceptance of information systems. Although the study was not specifically about green banking, its concepts are relevant to digital banking services. Customers are more likely to accept a banking application or online facility when they believe it helps them complete tasks effectively and is easy to operate. These considerations can also influence satisfaction: a paperless service may support sustainability, but if it is difficult to navigate, customers may not view it positively. The model offers a useful theoretical basis for examining the practical side of green digital banking.

DeLone and McLean (2003) updated their information systems success model to include system quality, information quality, service quality, use, user satisfaction and net benefits. Their framework is relevant to digital banking because customer satisfaction depends on more

than whether a service is available. The system must work reliably, provide accurate information and support users when problems arise. Applied to green digital banking, the model suggests that reducing paper use is only one part of a successful service. Customers must also experience dependable transactions, clear digital records and adequate support if the service is to contribute positively to satisfaction.

Parasuraman et al. (2005) developed and validated E-S-QUAL to assess the quality of electronic services. Their work provides a useful foundation for understanding the customer experience of online banking, where efficiency, fulfilment, system availability and privacy are important considerations. These dimensions are relevant to green digital banking because customers increasingly interact with banks through electronic channels instead of relying entirely on physical documents and branch visits. However, digital delivery alone does not establish high service quality. If a service is unreliable or raises concerns about privacy, its environmental advantages may not be enough to sustain customer satisfaction.

Zeithaml et al. (2002) reviewed the development of service quality in electronic environments and discussed how customers evaluate services delivered through digital channels. Their work helps explain why convenience should not be treated as the only measure of successful digital banking. Customers also consider whether the service performs as expected, whether information is dependable and whether problems can be resolved. These considerations are relevant when banks encourage customers to replace paper-based processes with electronic alternatives. A green digital service is more likely to support satisfaction when its environmental purpose is accompanied by dependable performance and a positive user experience.

Venkatesh et al. (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT), integrating several models of technology acceptance. The framework highlights performance expectancy, effort expectancy, social influence and facilitating conditions as factors associated with technology use. In the context of green digital banking, these concepts help explain why customers may differ in their willingness to use online services, even when the services are available to everyone. The framework also draws attention to the importance of practical support and ease of use. For public sector banks, accessible digital facilities and appropriate customer guidance may be as important as promoting the environmental benefits of paperless banking.

1.3 Research gap

Although prior studies have examined digital banking service quality or green banking separately, fewer empirical studies bring together paperless digital practices, green financial products, eco-conscious infrastructure, digital service quality and perceived sustainability value within a single customer-satisfaction framework focused on Indian public sector banks. Much of the available literature also examines adoption, environmental performance, or general green banking awareness rather than the combined customer experience of sustainable digital banking. The present study addresses this gap using primary survey data collected from users of Indian public sector banks.

1.4 Rationale and objectives

The rationale for the study is that sustainable digital banking should be evaluated not only by its environmental promise but also by its customer consequences. If green practices reduce friction, improve access and create a stronger sense of responsible banking, they may

contribute to satisfaction and loyalty. Conversely, if sustainability initiatives are poorly communicated or digital services remain unreliable, environmental claims may have limited influence on satisfaction.

The objectives are:

- 1) To assess customers' perceptions of Green Digital Banking Practices among Indian public sector banks
- 2) To examine the relationship between GDBP and customer satisfaction
- 3) To assess the relationship between digital service quality and customer satisfaction
- 4) To examine the relationship between perceived sustainability value and customer satisfaction
- 5) To identify which of these factors provides the strongest unique explanation of customer satisfaction.

1.5 Hypotheses

H1: Green Digital Banking Practices are positively associated with customer satisfaction among users of Indian public sector banks.

H2: Digital service quality is positively associated with customer satisfaction among users of Indian public sector banks.

H3: Perceived sustainability value is positively associated with customer satisfaction among users of Indian public sector banks.

2. Research Design

2.1 Study design and setting

The study adopted a quantitative, descriptive and cross-sectional research design. Primary data were obtained through a structured online questionnaire developed around the study constructs. The supplied response file contains 76 records collected between 4 and 5 August 2026. The questionnaire screened respondents for current use of mobile or internet banking services of an Indian public sector bank. Because seven respondents answered 'No' to this screening question, they were excluded from inferential analysis. The final analytical sample therefore comprised 69 eligible digital-banking users.

2.2 Sampling and respondents

The study used respondent-based survey sampling. The eligible participants represented customers of State Bank of India, Bank of Baroda, Canara Bank, Punjab National Bank and other public sector banks. The sample is therefore best interpreted as an exploratory empirical sample rather than a statistically representative sample of all Indian public sector bank customers. The largest bank groups in the valid sample were Bank of Baroda (27; 39.1%) and State Bank of India (25; 36.2%), followed by Canara Bank (12; 17.4%).

2.3 Instrument

The questionnaire included demographic and usage questions followed by 46 Likert-type statements measured from 1 = strongly disagree to 5 = strongly agree. The substantive constructs were Green Digital Banking Practices (11 items), Digital Service Quality (15 items), Sustainability Value (4 items), Environmental Consciousness (4 items), Digital Literacy (4 items), Customer Satisfaction (4 items) and Customer Loyalty (4 items). For the present study,

the primary dependent variable was Customer Satisfaction. Green Digital Banking Practices combined three dimensions: paperless and digital transactions, green financial products, and eco-conscious infrastructure.

2.4 Measures and scoring

Composite scores were calculated as the arithmetic mean of the items belonging to each construct. Higher scores indicate stronger agreement with the construct statements. Internal consistency was assessed using Cronbach's alpha. Pearson correlation was used to examine bivariate relationships. Hierarchical multiple regression was then used to assess the incremental explanatory contribution of digital service quality and sustainability value after considering GDBP.

2.5 Statistical analysis

Descriptive statistics included frequencies, percentages, means and standard deviations. Cronbach's alpha was used to evaluate internal consistency, with values above .70 treated as acceptable for exploratory research. Pearson's *r* was used to test associations between continuous composite scores. Three regression specifications were estimated: Model 1 with GDBP as the predictor; Model 2 adding digital service quality; and Model 3 adding sustainability value. Statistical significance was evaluated at $p < .05$. Analyses were performed using Python-based statistical routines for data cleaning and inferential analysis.

2.6 Ethical considerations

The study ensured voluntary participation, confidentiality, and responsible use of the information collected through the online questionnaire. Respondent email addresses were not used for analysis or reported in the manuscript. No institutional ethical approval reference number is reported, as none was available for the study.

3. Analysis

3.1 Respondent profile

Table 1: Profile of the respondents

Profile characteristic	n	%
Valid digital-banking users	69	100.0
Female	46	66.7
Male	23	33.3
Age 25–35 years	27	39.1
Age 36–45 years	23	33.3
Age below 25 years	10	14.5
Age 46–55 years	7	10.1
Age 56 years and above	2	2.9
Salaried employee	55	79.7
Student	5	7.2
Self-employed/business	5	7.2

Homemaker	4	5.8
Using digital banking >5 years	35	50.7
Using digital banking 3-5 years	26	37.7
Using digital banking 1-3 years	8	11.6
Daily digital banking use	34	49.3
A few times a week	16	23.2
A few times a month	19	27.5

Note. Percentages are based on the 69 respondents who confirmed current use of mobile or internet banking services of an Indian public sector bank.

3.2 Reliability and descriptive statistics

Construct	Items	Cronbach's α	Mean	SD
Green Digital Banking Practices (GDBP)	11	0.913	3.577	0.912
Digital Service Quality	15	0.953	3.814	0.764
Sustainability Value	4	0.973	3.982	1.042
Environmental Consciousness	4	0.908	4.127	0.806
Digital Literacy	4	0.940	4.105	0.912
Customer Satisfaction	4	0.934	4.232	0.819
Customer Loyalty	4	0.890	4.145	0.815

All principal constructs demonstrated high internal consistency, with Cronbach's alpha values ranging from .890 for Customer Loyalty to .973 for Sustainability Value. The mean Customer Satisfaction score was 4.232, indicating generally favourable evaluations. GDBP had a mean of 3.577, while Digital Service Quality averaged 3.814. Sustainability Value averaged 3.982, suggesting that respondents generally perceived environmental value in digital banking.

3.3 Correlation analysis

Variable 1	Variable 2	Pearson r	P
Green Digital Banking Practices (GDBP)	Customer Satisfaction	0.363	0.002
Digital Service Quality	Customer Satisfaction	0.642	<.001
Sustainability Value	Customer Satisfaction	0.480	<.001

Customer Satisfaction	Customer Loyalty	0.786	<.001
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GDBP was positively correlated with Customer Satisfaction ($r = .363$, $p = .002$), supporting H1 at the bivariate level. Digital Service Quality showed a substantially stronger relationship with Customer Satisfaction ($r = .642$, $p < .001$), supporting H2. Sustainability Value was also positively associated with Customer Satisfaction ($r = .480$, $p < .001$), supporting H3 at the bivariate level. The strong relationship between satisfaction and loyalty ($r = .786$, $p < .001$) further indicates that satisfaction is relevant to respondents' stated continuation and recommendation intentions, although loyalty was not treated as the primary outcome in the regression analysis.

3.4 Regression analysis

Regression model	R ²	Adj. R ²	F	Model p	Key B	Key p
Model 1: GDBP only	0.132	0.119	10.15	0.002	0.326	0.002
Model 2: GDBP + Digital Service Quality	0.441	0.424	26.01	<.001	0.888	<.001
Model 3: GDBP + Digital Service Quality + Sustainability Value	0.441	0.415	17.07	<.001	0.885	<.001

Model 1 shows that GDBP alone explained 13.2% of the variance in Customer Satisfaction ($R^2 = .132$, $p = .002$). When Digital Service Quality was added, explained variance increased to 44.1% ($R^2 = .441$). In Model 2, the coefficient for GDBP became negative and was not statistically significant at the .05 level ($B = -.225$, $p = .072$), whereas Digital Service Quality remained strongly significant ($B = .888$, $p < .001$). Adding Sustainability Value in Model 3 produced virtually no additional explanatory power ($R^2 = .441$), and its unique coefficient was not significant ($B = .003$, $p = .983$). The final model was statistically significant, $F(3,65) = 17.07$, $p < .001$, and explained 44.1% of the variance in customer satisfaction.

These results require careful interpretation. The positive bivariate relationships indicate that respondents who perceive stronger green digital banking practices and greater sustainability value also tend to report higher satisfaction. However, GDBP and Sustainability Value overlap substantially with perceived digital service quality. Once service quality is considered simultaneously, service performance accounts for most of the unique predictive contribution. Thus, the evidence supports a customer-experience pathway in which sustainability is beneficial, but its contribution to satisfaction is difficult to separate from the quality of the digital banking service itself.

4. Discussion

The study provides empirical evidence that Green Digital Banking Practices are positively

associated with customer satisfaction among the surveyed users of Indian public sector banks. The mean GDBP score of 3.577 indicates moderately positive perceptions rather than exceptionally strong endorsement. By contrast, satisfaction was high at 4.232, suggesting that respondents were generally pleased with their digital banking experience even though perceptions of green banking practices were less pronounced. This difference is analytically important: customers may already be satisfied with digital banking for functional reasons while still having room for greater awareness and engagement with its environmental dimensions.

The positive correlation between GDBP and satisfaction is consistent with recent research showing that digital banking and other green banking practices can contribute to customer satisfaction. Mir et al. (2025) similarly found positive effects for digital banking, green services and green loans, although their findings did not support a significant effect of green infrastructure. The present results extend this discussion by separating green digital practices from digital service quality and perceived sustainability value. They indicate that customers recognise a sustainability dimension in digital banking, but that recognition should not be interpreted as evidence that every green initiative independently increases satisfaction.

4.1 Importance of digital service quality

Digital Service Quality produced the strongest relationship with satisfaction ($r = .642$) and remained the only statistically significant unique predictor in the final regression model. This finding is consistent with SERVQUAL and with recent Indian evidence that reliability, responsiveness, assurance, empathy and tangibility matter for digital banking satisfaction (Bhuvanewari & Maruthamuthu, 2024). For PSBs, the implication is straightforward: environmental initiatives should be embedded in a high-quality digital experience. An electronic statement does not create customer value if the application is unavailable; a green product is unlikely to create satisfaction if customers cannot understand it; and sustainability communication cannot compensate for unresolved transaction problems.

The result also provides a useful interpretation of TAM. Customers may accept and continue using digital channels when those channels are useful and easy to operate. The questionnaire's digital interface, reliability and convenience items capture aspects of that experience. When these functional characteristics are strong, sustainability can become an additional layer of perceived value rather than the primary reason for satisfaction.

4.2 Sustainability value and green financial products

Sustainability Value recorded a relatively high mean of 3.982 and a significant bivariate correlation with satisfaction ($r = .480$). This suggests that customers appreciate the environmental meaning attached to digital banking and bank-level sustainability efforts. Nevertheless, its unique regression effect was negligible after digital service quality and GDBP were included. One interpretation is that sustainability value may operate as an attitudinal reinforcement mechanism: customers feel more positive about services that are both useful and environmentally responsible, but satisfaction is ultimately formed through the total service experience.

The green financial product dimension of GDBP had a lower mean than paperless digital transactions. This pattern suggests a practical awareness gap. Paperless statements and digital transactions are directly experienced by customers, whereas green deposits, renewable-energy financing and the use of green funds may be less visible. The RBI's green deposit framework

creates an institutional foundation for such products, but customer-level value depends on effective communication and transparency about how funds are used (Reserve Bank of India, 2023). PSBs could therefore strengthen digital channels by providing concise explanations, eligibility information and impact reporting for green financial products.

4.3 Eco-conscious infrastructure and visible sustainability

Within GDBP, eco-conscious infrastructure was positively associated with satisfaction, while the overall level of agreement was lower than for paperless digital transactions. This is understandable because customers may not regularly observe the environmental performance of branches, ATMs or digital infrastructure. Research on green banking has similarly suggested that not every visible green initiative translates automatically into customer satisfaction (Mir et al., 2025). From a managerial perspective, infrastructure investments may create stronger customer value when their environmental outcomes are made visible through credible, simple digital communication.

4.4 Customer loyalty implications

The strong correlation between Customer Satisfaction and Customer Loyalty ($r = .786$) is noteworthy even though loyalty was not the primary dependent variable. More satisfied respondents also tended to report stronger intentions to continue, recommend and remain with their bank. This finding supports the strategic argument that sustainable digital banking can matter beyond environmental positioning. However, because the present study is cross-sectional and uses self-reported intentions, it should not be interpreted as evidence of actual future retention behaviour.

4.5 Theoretical contribution

The study contributes to the literature by combining three established perspectives within a sustainable digital banking context. TAM explains why customers value functional digital access; SERVQUAL explains why service performance shapes the experience; and ECT helps explain why satisfaction reflects the relationship between expected and experienced service. The empirical pattern suggests that sustainability is best understood as a complementary value dimension rather than a substitute for digital service quality. This integrated interpretation helps reconcile why GDBP and sustainability value are positively correlated with satisfaction but lose statistical uniqueness when service quality is introduced simultaneously.

4.6 Practical implications

First, PSBs should treat paperless banking as a customer-experience initiative as well as an environmental initiative. Electronic statements, digital KYC and digital notifications should be simple, reliable and accompanied by clear information about the environmental benefit. Second, banks should improve the visibility of green financial products. Digital applications can provide short explanations of green deposits, renewable-energy financing and energy-efficiency finance, together with transparent information about eligible uses of funds. Third, service-quality investment should remain central. The regression results show that reliability, responsiveness, assurance, empathy and digital interface quality have greater immediate relevance to satisfaction than sustainability value alone. PSBs should therefore

monitor application availability, transaction completion times, complaint resolution, cybersecurity communication and navigation quality.

Fourth, sustainability dashboards could make environmental value tangible. Where measurement is technically valid, banks could display indicators such as paper avoided through e-statements or the number of digital documents generated. Such information should be evidence-based and carefully communicated to avoid exaggerated environmental claims.

Finally, sustainability communication should be customer-centred. Rather than presenting green banking only as a regulatory or corporate responsibility activity, banks can connect it with customer benefits such as convenience, reduced paperwork, accessibility and transparent responsible finance.

4.7 Strengths and limitations

The strength of the study is that it uses primary customer-level data and evaluates green digital banking through multiple dimensions rather than relying on a single green banking indicator. The use of reliability, correlation and regression analysis also permits a more nuanced interpretation than descriptive percentages alone.

Several limitations should be recognized. First, the final sample contains only 69 eligible users, limiting statistical power and generalizability. Second, the sampling approach was respondent-based rather than probability sampling. Third, the data are cross-sectional and cannot establish temporal or causal relationships. Fourth, the sample is not proportionately distributed across banks, age groups or occupations. Fifth, seven of the 76 respondents did not meet the digital-banking usage criteria and were therefore excluded from inferential analysis. Finally, the study relies on self-reported perceptions rather than observed transaction behavior or bank-level environmental performance indicators.

5. Conclusion

This study examined the relationship between Green Digital Banking Practices and customer satisfaction using primary data from users of Indian public sector banks. The evidence shows that GDBP, digital service quality and sustainability value are all positively associated with customer satisfaction at the bivariate level. However, the regression analysis demonstrates that digital service quality provides the strongest unique explanation of satisfaction. Green digital banking therefore appears most effective when environmental responsibility is integrated into a dependable, secure, responsive and convenient digital service.

The findings have a clear strategic implication for Indian public sector banks. Digital sustainability should not be treated as a separate communication exercise. It should be embedded into the everyday customer journey through paperless processes, transparent green financial products, accessible digital interfaces and credible sustainability information. The RBI's policy framework for green deposits provides an enabling institutional context, while the continued expansion of digital payments creates a large platform through which sustainable banking practices can be delivered.

Future research should use larger probability-based samples across multiple regions of India and compare public and private sector banks. Longitudinal studies could examine whether sustainability initiatives influence actual retention and usage over time. Future models could also test mediation through trust, perceived usefulness or service quality and examine whether environmental consciousness or digital literacy moderates customer responses to green digital banking. Bank-level environmental indicators could further strengthen the evidence by connecting customer perceptions with measurable reductions in paper, energy use or travel-related emissions.

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Conflict of Interest

The authors declare no conflict of interest.

Ethical Approval

Ethical approval was not required for this study as it involved an anonymous, non-interventional questionnaire-based survey. Participation was voluntary, and the information collected was used solely for academic research purposes while maintaining respondent confidentiality.

Author Contributions

Parimala R: Conceptualization, methodology, questionnaire development, data collection, data analysis, interpretation and original manuscript preparation. Dr. Udaya Chandra: Research supervision, review, academic guidance and editing. Both authors approved the final manuscript.

Data Availability Statement

The analysed survey dataset is available from the corresponding author upon reasonable request, subject to appropriate protection of respondent information.

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