



Digital Banking and Green Banking Adoption: The Role of Customer Awareness Among Bank Customers in Chennai

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ABSTRACT :

Digital banking is typically adopted for convenience, yet it can also support environmentally responsible banking by reducing paper-based documentation and physical branch visits. This study examines whether greater adoption of digital banking is associated with greater adoption of green banking practices among bank customers, and which factors best explain green banking adoption. A descriptive, quantitative, cross-sectional design was used. Primary data were collected through a structured questionnaire from 100 bank customers in Chennai selected by convenience sampling. Constructs (digital banking adoption, green banking awareness, green banking adoption and customer satisfaction) were measured with five-item, five-point Likert scales. Data were analysed using percentage analysis, Pearson correlation, multiple linear regression and Chi-square tests. Digital banking adoption and green banking adoption were significantly and positively correlated ($r = 0.651$, $p < 0.001$). Digital banking adoption and green banking awareness together explained 64% of the variance in green banking adoption ($R^2 = 0.64$, $F = 86.45$, $p < 0.001$); awareness was the stronger predictor ($\beta = 0.53$, $p < 0.001$) compared with digital banking adoption ($\beta = 0.32$, $p = 0.001$). Awareness was significantly associated with monthly income and occupation, but not with age, gender or banking duration. Only 6% of respondents named environmental sustainability as their main motivation for using digital banking; time saving (32%) and convenience (26%) dominated. The findings suggest that digital banking provides a pathway to green banking, but that customer awareness of the environmental dimension is what helps convert digital usage into green behaviour.

1. Introduction

Banking has moved from a branch-centred, paper-intensive model to a technology-enabled one. Mobile and internet banking, digital payments, electronic statements and digital documentation now allow customers to complete many routine transactions without visiting a branch. Financial technologies such as artificial intelligence, biometrics, cloud services, big data, blockchain and open banking have further supported digital authentication, service automation and the digitisation of transactions, including the replacement of traditional paperwork (Melnychenko, Volosovych & Baraniuk, 2020).

At the same time, environmental sustainability has become a concern for financial institutions. Green banking integrates environmental considerations into banking operations, services, financing and investment, and is increasingly linked to sustainable finance and climate-risk management (Park & Kim, 2020). A recent systematic review identifies digital banking itself as one of the recognised green banking practices, alongside green lending, green services, green investments and green infrastructure financing (Muchiri, Erdei-Gally & Fekete-Farkas, 2025).

This connection raises a behavioural question: does the use of digital banking actually translate into the adoption of green banking practices by customers? A customer may use mobile banking daily because it saves time, without recognising or valuing its environmental benefits. Zhang et al. (2022) identify insufficient customer awareness as a major challenge for green banking. Awareness may therefore be a behavioural bridge between digital usage and green adoption.

This paper examines that pathway from the customer's perspective. It addresses three objectives: (1) to assess customer awareness of green banking practices; (2) to analyse the relationship between digital banking usage and green banking adoption; and (3) to identify the major factors influencing customers' adoption of green banking practices.

2. Literature Review and Conceptual Framework

2.1 Digital banking and customer experience

Research on digital banking has largely concentrated on technology, service quality and satisfaction. A systematic review of 146 studies identified usability, security, trust, convenience and customer service as key drivers of satisfaction and loyalty, while noting challenges such as security concerns, digital illiteracy and resistance to change (Lolemo & Pandya, 2024). In a study of 222 customers in Northern India, Kaur et al. (2021) found customers generally satisfied with digital banking, with reliability the strongest determinant, followed by tangibility and responsiveness. Barjaktarovic Rakocevic, Rakic and Rakocevic (2025), using 535 valid responses, reported that digital banking services influence bank choice and that service characteristics, expectations and perceived risks shape satisfaction. Hakizimana, Wairimu and Muathe (2023) highlight digital access, channels, value and financial inclusion as central to digital banking transformation and performance.

2.2 Green banking

Studies of green banking have focused mainly on banks' operations, financing and environmental performance. Chen et al. (2022), using data from 322 banking employees, found that employee-related, daily-operation and policy-related green practices positively influenced green financing, and that green project financing improved environmental performance. Zhang et al. (2022), using structural equation modelling on 352 respondents, found that green banking activities improved environmental performance and green financing, and flagged limited customer awareness as a barrier. Park and Kim (2020) place green banking within the transition to a green economy and the role of regulators and institutions. Muchiri et al. (2025), reviewing 62 studies, also report regulatory barriers, socio-cultural resistance, compliance costs and greenwashing as implementation challenges. In the Indian context, Mir et al. (2025) found that digital banking, green services and green loans positively influenced customer satisfaction, whereas green infrastructure did not.

2.3 Research gap

Digital banking and green banking are often studied separately. Three gaps follow from the literature reviewed. First, a *linkage gap*: little attention has been paid to whether customers who adopt digital banking also adopt environmentally responsible banking practices. Second, an *awareness gap*: digital banking may be adopted for convenience alone, with its environmental implications unrecognised. Third, a *behavioural and customer-experience gap*: the roles of awareness and digital usage in green adoption, alongside satisfaction, remain underexplored at the customer level.

2.4 Conceptual framework and hypotheses

The study is grounded in the relationship between technology adoption, customer awareness, behavioural adoption and customer satisfaction. Digital banking adoption is expected to be associated with green banking adoption, with green banking awareness acting as an important explanatory factor. Customer satisfaction is treated as a customer outcome of the overall digital and environmentally responsible banking experience. The following hypotheses are tested:

- **H1:** There is a significant relationship between digital banking adoption and green banking adoption.
- **H2:** Digital banking adoption and green banking awareness significantly influence green banking adoption.
- **H3:** There is a significant association between green banking awareness and each of age (H3a), gender (H3b), monthly income (H3c), occupation (H3d) and banking duration (H3e).

3. Methodology

3.1 Research design

The study uses a descriptive and quantitative cross-sectional design. The descriptive component profiles respondents and their digital banking usage and awareness; the quantitative component tests relationships among the constructs.

3.2 Population, sampling and sample

The population comprised bank customers in Chennai who use or have experience with banking services, particularly digital banking. Because no complete list of digital banking customers was available, convenience sampling (a non-probability technique) was used, and accessible, willing customers were approached through an online questionnaire. A total of 100 valid responses were obtained and analysed.

3.3 Data collection and instrument

Primary data were collected through a structured questionnaire with five sections: demographic profile (Section A), digital banking adoption (B), green banking awareness (C), green banking adoption (D) and customer satisfaction (E). Each construct was measured with five statements on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree), and mean composite scores were computed for each construct. Additional questions captured prior awareness of the term "green banking", the main motivation for using digital banking, the importance of environmental sustainability in choosing banking services, likelihood of increasing paperless banking, and ratings of the bank's digital and environmental efforts. Secondary data from journals, systematic reviews and prior empirical studies were used to develop the conceptual framework and interpret findings.

3.4 Analytical techniques

Percentage analysis described respondent characteristics and motivation. Pearson correlation tested the relationship between digital banking adoption and green banking adoption. Multiple linear regression modelled green banking adoption (dependent variable) as a function of digital banking adoption and green banking awareness:

$$\text{Green Banking Adoption} = \beta_0 + \beta_1 (\text{Digital Banking Adoption}) + \beta_2 (\text{Green Banking Awareness}) + \varepsilon$$

Chi-square tests examined associations between green banking awareness and demographic variables. Significance was assessed at the 5% level.

4. Results

4.1 Respondent profile

Of the 100 respondents, 54% were aged 21–25 years, 29% were 18–20 years, 16% were above 35 years and 1% were 31–35 years (none were 26–30). Fifty-five per cent were male and 45% female. Students formed 58% of the sample, salaried respondents 35%, self-employed 6% and others 1%; accordingly, 52% reported no personal income. The largest banking-experience group was 1–3 years (38%), followed by less than one year (28%), 4–6 years (16%), more than 10 years (16%) and 7–10 years (2%). The sample therefore skews young and student-heavy.

4.2 Motivation for using digital banking

Respondents selected one primary motivation. Time saving was the most frequent (32%), followed by convenience (26%), ease of use (19%), accessibility (8%), security (8%) and environmental sustainability (6%). Because the question is categorical, frequencies and rankings, not means, are the appropriate summary. Digital banking is thus used predominantly for functional reasons rather than environmental ones.

4.3 Correlation between digital banking adoption and green banking adoption

The Pearson correlation was $r = 0.651$ ($p < 0.001$, $N = 100$), indicating a positive and moderately strong relationship. H1 is supported: customers with higher digital banking adoption tend to report higher green banking adoption. This is an association and does not by itself establish causation.

4.4 Multiple regression: determinants of green banking adoption

Table 1. Regression of green banking adoption on digital banking adoption and green banking awareness

Statistic	Value
R	0.80
R ²	0.64
Adjusted R ²	0.63
F	86.45 ($p < 0.001$)

Predictor	Standardised β	p-value
Digital banking adoption	0.32	0.001
Green banking awareness	0.53	< 0.001

The model was significant and explained 64% of the variance in green banking adoption. Both predictors were significant, and green banking awareness was the stronger one. H2 is supported.

4.5 Demographic differences in green banking awareness

Table 2. Chi-square tests of association with green banking awareness

Demographic variable	χ^2	df	p-value	Result
Age	4.48	3	0.214	Not significant
Gender	1.26	1	0.263	Not significant
Monthly income	11.61	4	0.021	Significant
Occupation	7.96	3	0.047	Significant
Banking duration	3.58	4	0.466	Not significant

Awareness differed significantly by income (H3c) and occupation (H3d), but not by age (H3a), gender (H3b) or banking duration (H3e).

5. Discussion

The results point to a clear pattern. Digital banking adoption is positively associated with green banking adoption, which supports the view that digital channels can serve as a pathway to greener banking behaviour. However, the regression shows that digital usage is not the whole story: green banking awareness carries a larger standardised effect ($\beta = 0.53$) than digital banking adoption ($\beta = 0.32$). Customers who understand the environmental relevance of paperless services and e-statements are more likely to choose them.

The motivation data reinforce this reading. With only 6% naming environmental sustainability as their main reason for using digital banking, most customers appear to be using digital services for time saving and convenience. Environmental benefits are, in many cases, a by-product that customers may not recognise. This is consistent with Zhang et al. (2022), who identify limited customer awareness as a barrier to green banking, and with Muchiri et al. (2025), who include digital banking among green banking practices and emphasise awareness and implementation barriers.

The Chi-square results suggest that awareness is not simply a function of age or how long a person has banked, which challenges the assumption that younger or more experienced customers are automatically more aware. The significant associations with income and occupation indicate that awareness differs across socio-economic segments, which has implications for targeting.

5.1 Managerial and policy implications

Make the environmental benefit visible. Because customers use digital banking for convenience, banks should position green banking as an additional benefit of services customers already value, rather than as a separate responsibility.

Embed sustainability messages in digital channels. Mobile apps, internet banking, SMS and email can carry simple prompts, for example encouraging e-statements, and show concrete examples such as paper saved.

Target awareness programmes. Since awareness varies with income and occupation, segment-specific communication is likely to be more effective than uniform campaigns.

Promote paperless options and maintain service quality. Active promotion of e-statements and digital documents should go together with reliable, secure and easy-to-use digital services, which prior research links to satisfaction (Lolemo & Pandya, 2024; Kaur et al., 2021).

Measure and integrate. Banks should periodically assess whether awareness efforts translate into behaviour and embed green banking in long-term strategy instead of treating it as promotion.

6. Limitations and Directions for Future Research

The findings should be interpreted with caution. The sample of 100 respondents from Chennai was drawn by convenience sampling, limiting generalisability, and it is skewed towards young and student respondents (one age band is almost empty). Data are self-reported and cross-sectional, so response bias is possible and the results show associations and predictive relationships, not causation. The study covers selected dimensions of digital and green banking and customer perceptions rather than banks' internal practices. Customer satisfaction was measured but not modelled as an outcome in the inferential analysis. Future research could use larger, probability-based and multi-city samples, examine awareness as a mediator between digital usage and green adoption using structural equation modelling, model satisfaction as an outcome, use longitudinal designs, and compare customers of different banks.

7. Conclusion

This study examined the link between digital banking and green banking practices among bank customers in Chennai. Digital banking adoption was positively and significantly associated with green banking adoption, and together with green banking awareness it explained 64% of the variation in green adoption, with awareness the strongest predictor. Because digital banking is currently used mainly for time saving and convenience, the shift from digital to green banking is not only a technological transition but also an awareness and behavioural one. Banks that wish to strengthen green banking should therefore go beyond providing digital services and actively educate customers about the environmental value of paperless and digital alternatives.

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