

EFFECTIVENESS OF MOBILE BANKING APPLICATIONS IN BOOSTING CUSTOMER ENGAGEMENT AND SATISFACTION: EVIDENCE FROM BENGALURU

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ABSTRACT

The study attempts to test the effectiveness of mobile banking apps in generating user engagement and customer satisfaction through the sample size of 195 users of mobile banking apps from Bengaluru, India. Through an experimental design methodology involving the use of a survey instrument with a nine-item Likert scale combined with qualitative content analysis, the investigation tests three variables: UX Quality, Customer Engagement, and Customer Satisfaction. Results indicate that UX Quality is the most potent factor in predicting customer satisfaction ($r = 0.813$, $p < 0.001$) while customer engagement comes second ($r = 0.714$, $p < 0.001$). Customer satisfaction varies significantly among different age cohorts ($F = 5.954$, $p = 0.0007$), wherein older users (age 35+) report higher levels of satisfaction; however, income shows no significant moderation on satisfaction. An essential finding involves the identification of a significant engagement gap, wherein users are more willing to execute routine tasks but not to engage deeply with advanced features. User feedback indicates consistent server problems, innovation in terms of security, UI simplicity, and multilingual access.

Keywords: Mobile banking, customer engagement, customer satisfaction, user experience, UX quality, digital banking, Bengaluru, India

1. INTRODUCTION

In recent years, there have been significant changes brought about by digital technologies that have transformed the global financial environment entirely. Mobile banking, generally defined as any transactional activity done via a mobile device that involves banking operations, has become more than an additional channel and the principal means through which banks interact with millions of consumers around the globe. India is currently one of the fastest-growing countries in digital finance, facilitated by

macroeconomic factors such as demonetization introduced by the Government of India in 2016, as well as the outbreak of COVID-19, leading to the adoption of contactless finance.

Bengaluru, popularly referred to as the Indian technology hub, provides an excellent location for research. Thanks to the presence of the IT sector, high levels of education and technological awareness among the people, and the concentration of banks both national and foreign, Bengaluru provides an advanced and technologically aware market for mobile banking application research. Although mobile banking applications have been widely adopted, empirical studies that investigate if these applications do help in fostering user engagement and satisfaction systematically have been scarce, especially for the city level.

This research seeks to fill this gap by investigating the quality of mobile banking applications and their impact on user engagement and satisfaction among 195 users in Bengaluru.

2. LITERATURE REVIEW

There has been considerable research on the relationship between mobile banking quality and customer impact. According to Hidayat & Pusparini (2024), the four critical factors of mobile banking quality that affect customers' satisfaction include usability, service quality, reliability, and accessibility. In their study on banking technology adoption after the pandemic using TAM, Lee et al. (2025) identified the significant role played by ease of use, sustainability perception, and accessibility in the post-pandemic era. Ho et al. (2025) concluded that technology readiness factors, such as innovation, optimism, and security, significantly improve mobile banking platform utilization and loyalty.

With regard to engagement, Khan (2023) highlighted the important role of customers' engagement in mobile applications in promoting co-creation, customer retention, and enhanced customer experience. Kamboj, Sharma & Sarmah (2022) concluded that mobile banking quality factors, including system, service, and information quality, negatively affect customer satisfaction and engagement. Sharma & Singh (2023) showed that customer engagement enhances repurchasing and expenditure behavior, where customer satisfaction serves as an important mediator.

From a design and user experience standpoint, Sudirjo et al. (2024) found that the effectiveness of intuitive design – which encompasses features such as biometric logins and convenient navigation – improves user satisfaction greatly. According to Shankar, Tiwari & Gupta (2022), privacy, security, ease of navigation, and convenience constitute the four most important success factors in ensuring a sustained use of mobile

banking services. Saibaba (2024) found that user satisfaction, user trust, and service quality were among the key predictors of sustained mobile banking use.

3. THEORETICAL FRAMEWORK

Three theories form the basis of this study. TAM theory, proposed by Davis (1989), states that the perception of ease of use and usefulness influences users' intentions to adopt and sustain use of technologies. These constructs are directly linked to the study's constructs on quality of user experience. The five constructs for service quality in SERVQUAL model (Parasuraman, Zeithaml, & Berry, 1985) are reliability, responsiveness, assurance, empathy, and tangibility. In the context of digital banking, these constructs translate into reliability of the app, speed of transactions, security, customer support, and interface design. Lastly, the Customer Engagement Theory (Brodie et al., 2011; Van Doorn et al., 2010) defines engagement as a multidimensional construct with the cognitive, emotional, and behavioral dimensions.

4. RESEARCH METHODOLOGY

4.1 Research Design

A mixed methods approach with an explanatory sequential design was used in the study, which falls under descriptive research. The first part involved gathering structured quantitative data from 195 respondents through a nine-point Likert scale questionnaire ranging from 1 = Strongly Disagree to 5 = Strongly Agree. Three constructs were formed: UX quality (ease of use, transaction time, security), customer engagement (usage frequency, exploration of features, encouraging interactions), and customer satisfaction (general satisfaction, meeting banking needs, recommending others). In the second stage, qualitative data from an open-

ended question in the survey was gathered through thematic content analysis.

4.2 Sample and Data Collection

The respondents selected for this study were active users of mobile banking applications in Bangalore, where they used mobile banking applications of their respective banks at least once a week. The data was collected within two months using a structured questionnaire in Google forms, which was circulated among respondents using social media platforms, messaging platforms, and email. The sampling process included both convenience and purposive sampling to include actual active users. A total of 195 valid questionnaires were collected after deleting the incomplete responses.

4.3 Analytical Methods

The following statistical analyses were employed:

- (i) Descriptive statistics (mean, SDs, frequency distributions);
- (ii) Internal consistency analysis by Cronbach's Alpha;
- (iii) Construct relationships by means of Pearson Correlation Analysis;
- (iv) One-Way ANOVA to check for differences between groups in terms of satisfaction. Cronbach's Alpha of nine scale items was $\alpha=0.932$ (excellent reliability), thus supporting the validity of measurement scale used. Three composite variables were computed from respective Likert items measuring particular constructs.

5. DATA ANALYSIS AND FINDINGS

5.1 Demographic Profile

The sample comprised a diverse cross-section of Bengaluru mobile banking users.

Table 1: Demographic Profile of Respondents (n = 195)

Category	Group	n	%
Age	18–24	41	21.0%
	25–34	54	27.7%
	35–44	21	10.8%
	45 & above	79	40.5%
Gender	Male	138	70.8%
	Female	50	25.6%
Occupation	Salaried Employee	116	59.5%
	Student	30	15.4%
Income (₹/month)	Below ₹25,000	37	19.0%
	₹50,000–₹1,00,000	51	26.2%

	Above ₹1,00,000	71	36.4%
Primary Bank	SBI (YONO)	82	42.1%
	HDFC Bank	45	23.1%
	ICICI Bank	16	8.2%

The largest demographic is that of the '45 & above' category (40.5%) – defying expectations of mobile banking being largely a youth phenomenon. The salaried category constitutes the largest segment (59.5%), reflecting the significant presence of the IT/ITES industry in Bengaluru. Users of SBI hold the highest number of users (42.1%), followed by HDFC Bank (23.1%)

5.2 Descriptive Statistics — Likert Scale Items

Table 2: Descriptive Statistics for All Measurement Items

Construct	Survey Item	Mean	Std. Dev.	% Rated 4–5
User Experience	Ease of use and navigation	4.21	1.05	81.5%
User Experience	Transaction speed and accuracy	4.09	1.01	75.4%
User Experience	Security and safety perception	4.21	0.98	80.0%
Customer Engagement	Frequency of app usage	4.04	1.19	74.4%
Customer Engagement	Active feature exploration	3.68	1.23	57.4%
Customer Engagement	App encourages bank interaction	3.69	1.25	58.5%
Customer Satisfaction	Overall satisfaction	4.08	1.02	77.9%
Customer Satisfaction	App meets banking needs	4.13	1.01	80.0%
Customer Satisfaction	Would recommend to others	4.09	1.09	75.4%

The overall mean for all nine questions is 4.03 out of 5.00, which suggests that overall perceptions are mainly positive. The UX-related questions scored the highest, with usability and security both achieving

4.21. However, the two questions related to more substantial engagement, such as "Explore More Features" and "App Encourages Customer Relationship with the Bank," received the lowest responses and percentages below 60%.

5.3 Hypothesis Testing Results

Table 3: Hypothesis Testing Summary

Hypothesis	Test	Result	Decision
H1: UX → Customer Satisfaction	Pearson r	r = 0.813, p < 0.001	Reject H ₀ ✓
H2: Engagement → Customer Satisfaction	Pearson r	r = 0.714, p < 0.001	Reject H ₀ ✓
H3: Age group → Satisfaction differences	One-Way ANOVA	F(3,191) = 5.954, p = 0.0007	Reject H ₀ ✓
H4: Income group → Satisfaction differences	One-Way ANOVA	F(3,191) = 2.364, p = 0.072	Fail to Reject H ₀
H5: UX → Customer Engagement	Pearson r	r = 0.627, p < 0.001	Reject H ₀ ✓

UX was identified as the most important factor influencing customer satisfaction (r = 0.813), and there was an ideal relationship between all three components: high-quality UX ensures high-level engagement

(r = 0.627), which in its turn promotes high satisfaction (r = 0.714). High correlation between the variables 'Meets Banking Needs' and 'Recommendation Likelihood' (r = 0.831) proves that functionality plays a key role in the advocacy process. Income did not have any impact on customers' satisfaction with m-banking service due to equal access to it; however, the variable 'Age Group' showed statistically significant distinctions (35-44 – mean = 4.56; 25-34 – mean = 3.77).

5.4 Qualitative Insights

Themes generated from a thematic analysis of the open-ended responses included seven themes which supported the findings obtained quantitatively:

- Server Reliability & Uptime – mentioned by many PSU Bank users; problems during peak hours and night are a continuous nuisance to customers (High frequency)
- Enhancement of Security – need for sophisticated biometric recognition, two-step verification, and AI-based fraud alerts (High frequency)
- User Friendly & Simple Interface – demand for an uncluttered interface for all age

groups (High frequency)

- Improvement in Performance & Speed – faster processing times and lightweight applications on low-performance devices (High frequency)
- Support for Multilingual and Accessibility – provision of language options and compatibility for elderly and blind users (Moderate frequency)
- Personalization & AI – provision of personal financial management tools and AI-powered alerts (Moderate frequency)
- High Transaction Limits & Consolidation of Features – high transaction limit per transfer and a consolidated banking dashboard (Moderate frequency)

It is clear that there is a strong match between the themes revealed through qualitative analysis and the gaps identified through a quantitative approach. These are the exact features, which ranked low in the Likert-scale questions about interaction.

6. DISCUSSION

The study's results provide strong support for the theory underlying the study. Specifically, the high UX- satisfaction correlation coefficient ($r = 0.813$) provides solid empirical support for TAM and its central assumption of usability and usefulness being drivers of technology acceptance and satisfaction. The SERVQUAL factors of reliability, responsiveness, and assurance can be mapped to empirical data in quantitative and qualitative terms, with server reliability failures, processing time delay, and security being challenges to each dimension, respectively.

The lack of engagement is a significant result in strategic terms. Although users frequently perform transactions (mean = 4.04), other engagement factors significantly lag behind. In line with previous literature (Kamboj et al., 2022; Khan, 2023), transactional use does not equate to actual engagement, which implies customer involvement in co-creation of services and building stronger customer-bank ties. Based on the virtuous cycle (UX > Engagement > Satisfaction), improving the quality of UX is positively reinforcing across all three aspects.

It is interesting that the older users (35+) have better perceptions compared to the younger users (18-34). This conforms to Consumer Expectation-Disconfirmation Theory where younger people, who have been exposed to global technologies throughout their lifetime, have higher expectation levels, and hence disconfirmations regardless of how good the objective quality is. There is both difficulty and opportunity here since banks need to develop differentiated digital product offerings for each generation. That the variable income does not influence perception levels is encouraging.

7. MANAGERIAL RECOMMENDATIONS

From the analysis, the following strategic recommendations are proposed for banking professionals and digital product managers:

- Embrace UX as an Essential Differentiating Factor: Consistent usability testing, A/B testing for navigation routes, and user-centered design practices should be adopted. Public banks, especially SBI, need to improve their UX offering relative to their counterparts in the private banking sector.
- Reduce the Engagement Gap Through Customization and Gamification: Individualized product suggestions, loyalty rewards, intelligent financial wellbeing scorecards, and timely push notifications of offers would transform consumers into

proactive banking partners.

- Implement Segmented Product Offerings According to Age Groups: Millennials and Generation Z would enjoy better immersive and interactive services, such as social media integration, instant interoperability with UPI or fintech services, and direct access to advanced functionalities. Senior clients, however, would appreciate streamlined core transaction systems with easy-to-navigate interfaces.
- Improve Security While Maintaining User-Friendliness: Implement intelligent behavioral fraud detection algorithms and zero-trust authentications operating in the backend, eliminating the necessity for any user intervention. Security UX is a design specialization that needs to be cultivated.
- Implement Backend Infrastructure as a Strategic Imperative: Cloud infrastructure, CDN-enabled application delivery, and planning for peak load are critical considerations — especially for PSU banks, which face server outages as a significant pain point.
- Support Inclusive Design: Build features that cater to users with disabilities using WCAG 2.1, provide localization support in Kannada, Tamil, Telugu, and Hindi languages, and optimize the application for low-end devices.

8. LIMITATIONS AND FUTURE RESEARCH

The present study has some limitations that need to be taken into account when interpreting the results. There is gender imbalance in the sample in terms of male participation (70.8%). Similarly, the majority of the respondents were salaried workers (59.5%) and belonged to the highest income segment (36.4% earning more than ₹1,00,000). Self-report method is subject to social desirability bias. Cross-sectional designs do not provide the picture of the changes in the levels of satisfaction.

Possible future research directions might be longitudinal research studies that examine the variation of satisfaction with various version of the app over time; cross-city studies involving tier-1 and tier-2 cities; behavior research as well as self-reported data collection; stratified research based on banks and adequate sample size in individual stratum; research in marginalized populations such as the elderly, visually impaired, rural migrants, or ones who are not fluent in English

9. CONCLUSION

This research paper provides a conclusive pool of quantitative findings that demonstrate the effectiveness, reliability and general satisfaction of the users with the usage of mobile banking applications in Bengaluru; the total mean score was established at 4.03/5.00. The UX quality, i.e. ease of navigation, speed of transactions, and security is the factor that proves to have the highest impact on the level of satisfaction (r

= 0.813). Nevertheless, the engagement level between customers and the app needs to be improved since people use their apps only for carrying out everyday tasks. It is necessary to add, that there are still numerous possibilities of banks to evolve their services.

The level of customer satisfaction is proved to be extremely dependent on age; nevertheless, the same cannot be stated about income and, therefore, it is possible to assume that the age-based approach to designing the application should be implemented. As per the results of the qualitative analysis of the interview data, the expectations of users are related to the server stability, innovations in terms of security, simplicity of interface, and language. With regards

to digital banking in India, it is crucial for the country's banks to take into account those recommendations.

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