

Project Dissertation Report on

**IMPACT OF FINANCIAL TECHNOLOGY ON
CUSTOMER EXPERIENCE AND OPERATIONAL
EFFICIENCY
IN THE INDIAN BANKING SECTOR**

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CERTIFICATE

This is to certify that the Report on the topic "Impact of Financial Technology on Customer Experience and Operational Efficiency in the Indian Banking Sector" has been submitted by Rijul Jain (24/DMBA/187) in partial fulfillment towards the Master of Business Administration degree at the Delhi School of Management, Delhi Technological University. This is an original document and has not been submitted for any other academic qualification before.

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DECLARATION

By submitting this Major Project Report titled "Impact of Financial Technology on Customer Experience and Operational Efficiency in the Indian Banking Sector" at the Delhi School of Management, Delhi Technological University, I declare that this report is an authentic record of my independent research done under the guidance of Dr. Deepali Malhotra. This report has never been submitted anywhere else before for any degree or diploma purpose.

All the data, facts, figures, and analysis mentioned in this report have been done by me after my own independent research. Wherever there has been any reference to someone else's research work, I have cited properly.

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Best Regards,
Rijul Jain

EXECUTIVE SUMMARY

India's banking sector faces one of the most significant restructuring processes in its post-independence era. This change process has nothing to do with cycles of policy change or macroeconomic changes alone; however, they are also valid considerations. Rather, it has to do with the ubiquitous force of FinTech. Within less than a decade, the use of FinTech has evolved from a mere curiosity to the backbone of banking in India. The transactions via the Unified Payments Interface exceeded 141 billion in the year 2024, amounting to more than the GDP of the nation itself. The mobile banking apps are now used regularly by over 400 million citizens of the country. Artificial Intelligence decides creditworthiness of hundreds of millions of people within less than sixty seconds. It is no longer about improving the existing model; it is about rebuilding the architecture of banking itself.

This research examines, in a systematic manner, the effect of this revolution along two important dimensions in the performance of banks: the quality of experience of their customers during digitized banking operations, and the increased efficiency levels of Indian banks as a result of making conscious investments in FinTech solutions. In doing so, this research treats both of these dimensions as interdependent results of a common set of digitization efforts made, with the hypothesis that technology not only reduces costs but also improves experiences in banking services, based on the existing literature.

The basic building block of this study involves primary data gathered through the means of conducting a survey among 200 people. The primary data obtained from the survey is further augmented with a comprehensive analysis of secondary data available from sources such as the Reserve Bank of India, National Payments Corporation of India, NASSCOM, the Boston Consulting Group, International Finance Corporation, and through an evaluation of scholarly studies from 2015 to 2025. The tool used to collect the data exhibited good reliability with a Cronbach's Alpha of 0.87.

The headline finding is clear and robust: 78.5% of survey respondents reported a significant or very significant improvement in their overall banking experience following FinTech adoption. The dimensions of experience most improved are 24x7 service accessibility (mean satisfaction 4.41/5.00) and transaction speed and reliability (4.32/5.00). On the operational side, India's

banks reduced their cost-to-income ratios by 11 to 17 percentage points between FY 2018 and FY 2023, driven principally by the migration of over 80% of transaction volume to digital channels, sustained IT investment, AI-driven credit decisioning, and robotic process automation of back-office functions.

The study simultaneously surfaces important qualifications to this broadly positive picture. A persistent and large quality gap separates the digital banking experience delivered by private sector banks from that of their public sector counterparts — nearly one full point on the five-point experience scale, widest on the dimensions of AI-enabled service, personalisation, and grievance resolution. Cybersecurity concern is the dominant barrier to deeper FinTech adoption, cited by 74% of respondents, and only 44% trust their bank to resolve digital fraud quickly — a critical institutional trust deficit that constrains adoption depth across all income and age groups. In addition, the advantages offered by FinTech continue to be confined to educated and urbanized sections of society who own smartphones, while there is an inherent lack of access among the rural, elderly, and poor customer segments which continue to persist despite market attempts at redressal.

There are six actionable and evidence-led strategies that the report outlines in relation to banks, FinTech firms, and regulatory authorities. These include the development of a cross-sectoral cybersecurity resilience strategy; scaling of age-appropriate digital literacy initiatives; rapid investments in AI for conversational banking and complaints redressal; immediate digitalization of public sector banks using dedicated digital units; development of inclusive FinTech offerings targeting the under-served consumer segments; and co-opetition models based on open banking.

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CHAPTER 1: INTRODUCTION

1.1 Background of the Study

No other innovation in the recent history of business has been so fast, so far-reaching, and so lopsidedly distributed among members of a society than the adoption of digital technology by the financial services industry. From what was initially a hesitant foray into online banking in the latter years of the 20th century, the transformation of banking in the space of just one generation into a completely new way of thinking about banks, their offerings, and the relationship between institutions and hundreds of millions of people in terms of money management, lending, payments, and investment has become a complete overhaul of the very concept of personal finance. The term used to refer to this overhaul — Financial Technology, FinTech, in short — is as unpretentious in structure as it is multilayered in meaning. This is because the field comprises not only the digitization of conventional banking products but an entirely new paradigm based on mobile devices, artificial intelligence, blockchain technology, application programming interfaces, and data intelligence.

In the international landscape, the development of FinTech as a disruptor took off in the wake of the 2008 global financial crisis — a period when the public had lost faith in their traditional banking institutions, while a competitive landscape emerged which uniquely positioned technologists to capitalize on the opportunity. The development of Alipay and WeChat pay in China represented a revolution in payment infrastructure that would have been impossible to achieve in the absence of FinTech innovation. The development of the Open Banking Standard, along with the regulation sandbox implemented by the Financial Conduct Authority in the United Kingdom led to the rise of challenger banks such as Monzo, Starling, and Revolut that sought to compete on customer satisfaction, and lower costs through innovation compared to traditional banks. Square, Stripe, and Robinhood similarly transformed the economics of transactions, small businesses lending and investments, respectively, within the United States.

It can be argued however that none of these countries had seen such a fundamental FinTech disruption like the one in India — owing partly to its economic background, population

dynamics, and the policy choices of its regulators. India's FinTech story is not simply a story about the adoption of superior digital products by discerning urban consumers. It is a story about the conscious, state-orchestrated construction of a digital financial public infrastructure — the so-called India Stack — that created the conditions for a leap in financial inclusion and digital adoption of a scale and pace unparalleled anywhere else in the world.

The foundations of this infrastructure were laid in deliberate sequence. With the introduction of Aadhaar, a biometric ID program initiated by the Unique Identification Authority of India in 2009, which registered over 1.38 billion people and laid the foundations of a digital identity system to conduct remote customer verification at no costs whatsoever, FinTech companies could have access to an extensive customer base in India. The Pradhan Mantri Jan Dhan Yojana scheme, introduced in August 2014, ensured the inclusion of more than 530 million previously unbanked Indians into the financial system and thus considerably increased the population of possible customers of digital services which were not available to these segments in the form of conventional banking solutions. The demonetization of high-value notes announced in November 2016 was perhaps one of the most disruptive measures ever taken by the Indian Government with regard to its economy, but it pushed a considerable number of Indians to adopt digital financial products rather than sticking to traditional ways of making payments in cash. Finally, the establishment of Unified Payments Interface in 2016 facilitated a real-time, interoperable, and account-agnostic transactional environment in India.

The achievements made through this institutional framework, seen not only in quantitative measures but also in practice through the lives of customers of Indian banks, have been truly remarkable. As late as 2016, India fared badly in terms of its performance on global financial inclusion measures and carried out the bulk of its financial transactions in physical cash. By 2024, the use of just UPI had crossed more than 141 billion transactions worth more than India's nominal GDP each year. More than 510 million monthly active users of the UPI system existed by that time. Applications for mobile banking services were being used by a larger population than the total number of adults living in Western Europe. Digital account opening, once an industry aspiration, now takes under 18 minutes from form completion to active account status at the most advanced institutions.

For the Indian banking sector — comprising 12 public sector banks, 21 private sector banks, 43 regional rural banks, 6 payment banks, and a growing number of small finance banks — this transformation has presented both an extraordinary strategic opportunity and a profound, multi-dimensional competitive challenge. Banks that have embedded FinTech capabilities into their operating models at depth and speed are achieving superior customer experience ratings, declining cost structures, and improving asset quality. Those that have moved more slowly are experiencing customer relationship erosion to more agile competitors — both from within the banking sector and from the FinTech ecosystem of platform companies, digital lenders, and payments specialists that has grown up around them.

Table 1.1: Growth Trajectory of India's FinTech Sector (2019–2024)

Year	FinTech Market (USD Bn)	YoY Growth (%)	Active FinTech Startups	Digital Transactions (Bn)	Internet Banking Users (Mn)
2019	35.2	—	2,035	10.8	147
2020	47.6	35.2	2,174	15.6	185
2021	66.8	40.3	2,412	25.3	264
2022	91.4	36.8	2,688	40.7	338
2023	117.6	28.7	3,102	64.2	403
2024 (Est.)	150.3	27.8	3,500+	98.5	472

Source: NASSCOM FinTech India Report 2024; RBIH Annual Report 2024; BCG FinTech Analysis 2024. Compiled by Researcher.

Table 1.1 documents the scale and momentum of India's FinTech expansion. The sector's market size grew from USD 35.2 billion in 2019 to an estimated USD 150.3 billion in 2024 — a compound annual growth rate of approximately 33.7%. Active FinTech startups grew by over

70% in this period, while annual digital transaction volumes increased nearly tenfold. Internet banking users grew from 147 million to 472 million, a number that underestimates the full digital banking base since many users access services exclusively through mobile applications rather than web portals.

Table 1.2: UPI Platform — Transaction Volume, Value and Reach (2019–2024)

Year	Transactions (Bn)	Total Value (INR Lakh Crore)	Monthly Active Users (Mn)	Share of Digital Payments (%)	Registered Banks on UPI
2019	10.77	18.36	120	31.4	143
2020	22.33	41.04	197	42.6	178
2021	38.74	71.54	278	57.3	216
2022	74.05	125.94	350	68.2	304
2023	117.60	182.74	430	77.5	381
2024	141.28	223.41	510	83.4	641

Source: NPCI Annual Reports (2019–2024). Compiled and computed by Researcher.

The figures given in Table 1.2 by UPI indicate an unprecedented shift. While monthly active users started off at 120 million in 2019, it had grown to 510 million in 2024. Its volume share of all digital transactions had surpassed 83% and it served as the foundational infrastructure for the Indian economy, including its consumers and small enterprises. UPI transaction volumes, valued at INR 223.41 lakh crore, exceeded the nominal GDP of India – a metric that clearly shows the importance of the infrastructure within the country.

The total number of registered banks grew from 143 in 2019 to 641 in 2024.

1.2 The Indian FinTech Ecosystem – A Structural Overview

The Indian FinTech ecosystem has evolved from a payments-centric cluster into a multi-vertical, deeply interconnected digital financial services economy that touches virtually every domain of financial intermediation. The heart of the ecosystem remains the payment platforms such as

PhonePe, Google Pay, Paytm, and BHIM which operate at the UPI interface layer and account for a bulk of peer-to-peer transactions and merchant payments. The payment platform core is supplemented by several verticals of financial services that have emerged to provide differentiated solutions to end-users: digital lending platforms (Lendingkart, KreditBee, MoneyView, CRED), wealth management and investment platforms (Zerodha, Groww, Angel One, INDmoney), insurance tech (Acko, Digit Insurance, PolicyBazaar), regulatory/identity technology (Signzy, IDfy, Perfios, Bureau), and neo-banking platforms (Jupiter, Fi, Open, RazorpayX). Each vertical is simultaneously competing with and creating opportunities for the incumbent banking sector.

Incumbent banks have responded through two broad strategic postures. The first is internal digital product development — building proprietary digital banking platforms that seek to match or exceed the experience quality of FinTech-native applications. The State Bank of India's YONO super-app, HDFC Bank's Digital 2.0 initiative, ICICI Bank's iMobile Pay, and Kotak Mahindra Bank's 811 digital savings account represent the most prominent examples of this approach. The second posture is collaborative integration — embedding FinTech capabilities within bank platforms through API partnerships, co-lending arrangements, and the Account Aggregator architecture introduced by the RBI in 2021. This 'co-opetition' model increasingly characterises the most progressive strategies in Indian banking and forms a key recommendation of this study.

1.3 Problem Statement

Despite the dramatic quantitative growth of FinTech adoption in India, a structured, empirically grounded understanding of its qualitative impact across the spectrum of customer experience and its measurable effect on bank operational efficiency remains insufficiently developed in the academic literature. Three specific knowledge gaps motivate this study.

Gap 1 — The Integrated Framework Problem: Existing literature tends to treat customer experience and operational efficiency as separate, independent research questions, studied with different methodologies and by different academic communities. There is a conspicuous absence of research that examines both constructs as co-determined outcomes of a common set of FinTech investments within a single unified empirical framework. This study addresses that gap directly.

Gap 2 — The Heterogeneity Problem: Aggregate FinTech adoption statistics mask profound heterogeneity in who is benefiting from digital banking and who is being left behind. The experience of a 28-year-old MBA graduate banking with a leading private sector bank is fundamentally different from that of a 60-year-old retired government servant banking with a public sector bank through a branch Business Correspondent. A study that does not map this heterogeneity cannot generate adequately differentiated policy recommendations.

Gap 3 — The Post-Pandemic Data Gap: The COVID-19 pandemic of 2020–2021 functioned as a watershed event for digital banking adoption in India, compressing what might have been five years of gradual migration into eighteen months of forced adoption. Most published empirical studies on FinTech and Indian banking predate this acceleration. Contemporary empirical evidence that reflects the post-pandemic reality of India's digital banking landscape is needed, and this study provides it.

1.4 Objectives of the study

Research Objectives 1: The objective of this research is to analyze the level of impact and adoption of FinTech within different customer segments and bank segments in India.

Research Objectives 2: It is intended that this research explores the impacts of FinTech adoption, which includes mobile banking, unified payment interface, AI-assisted customer support, know-your-customer digitalization, and automations in lending on customer satisfaction and convenience, amongst others.

Research Objectives 3: This research seeks to establish performance efficiency metrics, which include cost-income ratio, transaction processing times, and NPA ratio in relation to the adoption of FinTech in Indian banks.

Research Objectives 4: The objective of this research is to identify the main challenges that can affect the adoption of FinTech in Indian banks.

Research Objectives 5: The last research objective of this study is to propose recommendations for Indian banks, FinTech firms, and regulatory authorities.

1.5 Scope of the Study

This study will be limited to retail banking in the scheduled commercial banks in India covering public sector banks, private sector banks, small finance banks, and payment banks. Corporate and institutional banking, non-banking financial companies, cooperative societies, and insurance-

linked FinTech fall out of the purview of this study though they are highly significant and relevant areas of research.

Primary data collection was done in five major cities of India – namely Delhi-NCR, Mumbai, Bengaluru, Hyderabad, and Pune which are the most developed and technology-savvy among Indian urban centers. Timeline of the study goes from FY 2018-19 till 2023-24. FinTech application analysis includes mobile banking apps, Unified Payment Interface (UPI)/real-time payments platforms, artificial intelligence-driven customer interface software, digital Know Your Customer (KYC) processes, automated lending processes, and data analytics for personalization. Cryptocurrency, cross-border payment platforms, while highly relevant, remain outside this study's purview.

CHAPTER 2: LITERATURE REVIEW

Over the last decade, there have been significant developments in the academic literature surrounding fintech, the customer experience within banks, and efficiency in operations, with developments in this area closely mirroring the speed with which fintech has risen to prominence in academia. This chapter synthesises the most significant contributions to these interconnected bodies of knowledge, organised thematically to build toward the conceptual framework guiding this study's empirical design.

2.1 Defining FinTech in the Banking Context

Definitional precision in FinTech research matters because the term is deployed variously to describe a narrow technology deployment, a broader organisational transformation, and an emergent industry sector — often within the same policy or academic document. Arner, Barberis, and Buckley (2016), in what remains the most cited conceptual framework in the field, traced FinTech's evolution across three epochs: FinTech 1.0, covering the digitalisation of financial infrastructure from the first transatlantic telegraph cable in 1866 through the early internet era; FinTech 2.0, characterised by internet-based banking, electronic trading, and digital back-office systems from 1988 to 2008; and FinTech 3.0, representing the post-global-financial-crisis era of startup-driven disruption, platform finance, and AI-powered services from 2008 onwards. In the Indian context, this periodisation maps well onto domestic milestones, with the post-2016 period — coinciding with UPI's launch, demonetisation, and the rapid scaling of mobile internet — representing an especially concentrated and government-accelerated version of FinTech 3.0 dynamics.

Gomber, Kauffman, Parker, and Weber (2018), writing in the *Journal of Management Information Systems*, disaggregated FinTech into five domains: digital payments and transactions, financial software and data analytics, digital lending and financing, digital investment and wealth management, and digital insurance. This taxonomy reveals that while all five domains are present in the Indian market, they have developed at very different rates — digital payments having achieved near-ubiquitous urban penetration, while digital insurance and sophisticated robo-advisory products are at considerably earlier stages of consumer adoption. Schueffel (2016), after a systematic review of 200 academic articles, proposed defining FinTech as 'a new financial industry that applies technology to improve financial activities'.

As noted by Malagatti (2024), studying the context of the Indian banking system, customer satisfaction with digital banking services depends on their perception of convenience, reliability, and cost effectiveness of transactions; however, limitations such as cybersecurity threats and lack of digital literacy were systemic, thus needing an institutional response rather than merely addressing the customers' individual concerns. The author's indication that India constitutes for 14% of global investments into FinTech sector, whereas the domestic market opportunity is estimated to be \$2.1 trillion by 2030, highlights the scale of transformation needed in the country.

2.2 FinTech and Customer Experience – Global and Indian Evidence

Customer experience in banking — defined by Mbama and Ezepue (2018) as the customer's cumulative cognitive and affective evaluation of all direct and indirect interactions with a bank's service interfaces over the course of the banking relationship — has emerged as the defining competitive currency of the digital banking era. In their landmark study of UK digital banking customers, Mbama and Ezepue identified five key drivers of experience quality: service quality, perceived value, digital innovation, employee engagement, and resultant customer satisfaction. Of these, digital innovation demonstrated the most statistically significant positive effect. Their methodology, which distinguishes between the quality of specific digital service attributes and the holistic quality of the banking relationship, informed the design of Section C of this study's questionnaire instrument.

Adaptation of the well-known SERVQUAL model to the context of digital banking necessitates the change of its fundamental dimensions, namely reliability, responsiveness, assurance, empathy, and tangibility to adjust for the unique character of interaction within digital banking services, which are essentially dematerialized; thus, both tangibility and empathy need a completely new interpretation in terms of digital banking. As indicated by Wasan (2018), who researched digital banking in the Indian environment, there are three key factors that should be considered in addition to the aforementioned dimensions: intuitive interface, digital security, and omnichannel integration.

Roy, Balaji, Quazi, and Quaddus (2018) examined the determinants of customer experience quality across 612 Indian retail banking customers, finding that perceived usefulness, ease of use,

and trust were the three most significant determinants. Critically, institutional trust — not merely trust in the specific digital interface — emerged as the most important factor. Banks in India, the authors found, were systematically underperforming on customer-centric experience metrics, suggesting that the rapid expansion of digital channel capacity had outpaced the development of customer experience quality management within those channels.

Kapoor and Singh (2021) provided empirical evidence from a multi-bank Indian study that institutions deploying digital onboarding and AI-assisted underwriting reported both faster loan approval times and higher customer net promoter scores. Their statistically significant positive correlation between digital service breadth and overall satisfaction ($r = 0.68$, $p < 0.01$), controlling for bank size and geography, provided a direct methodological precedent for this study's integrated framework. Verma, Sreenu, and Kushwaha (2025) advanced the theoretical argument that customer experience improvements and operational efficiency gains are not independent outcomes but co-determined consequences of the same digital investments — a 'convergence hypothesis' that this study empirically tests.

2.3 FinTech and Operational Efficiency in Banking

The relationship between technology investment and banking efficiency has a rich theoretical and empirical foundation. Berger (2003) identified three channels through which information technology generates efficiency gains in banking: cost reduction through process automation; revenue enhancement through data-driven cross-selling; and risk management improvement through superior credit assessment and fraud detection. This framework retains strong explanatory power in the Indian FinTech context and directly informed the design of the operational efficiency variables examined in Section 4.4.

Bhatia and Mahendru (2015), applying Data Envelopment Analysis to 26 Indian public sector banks, found substantial variation in technical efficiency and documented a strong correlation between technology investment intensity and efficiency scores. Tamatam, Dutta, Dutta, and Lessmann (2019) extended this analysis to the full spectrum of Indian scheduled commercial banks over 2008–2017, confirming that institutions with more advanced core banking systems.

The International Finance Corporation (2020) documented that FinTech-enabled financial institutions in emerging markets typically operated at cost-to-income ratios of 40–50%, compared to 60–70% for comparably-sized less-digital peers — a 10–30 percentage-point structural advantage of considerable competitive significance. Reserve Bank of India data for FY 2023 confirm this differential in the Indian context: leading private sector banks operated at 38–44%, while most public sector banks remained at 55–65%. Agarwal and Zhang (2020) demonstrated that AI-driven credit assessment models significantly outperformed rule-based underwriting in predicting default risk, with adopting institutions reporting gross NPA ratios approximately 1.8 percentage points lower — a channel through which FinTech directly improves balance sheet quality.

2.4 Technology Acceptance in Indian Banking

Technology Acceptance Model (Davis, 1989) – which suggested that perceptions of ease of use and usefulness jointly impact technology adoption attitudes – has been the key theory guiding FinTech adoption studies to date. In multiple studies of applications in India, perceived usefulness has invariably proved to be the more influential determinant, suggesting that banking clients in India adopt FinTech due to its practical usefulness rather than its novelty or any social compulsion. Sharma and Singh (2022) extended TAM with trust theory in the Indian context, finding that perceived security and institutional trust moderate the usefulness-to-adoption relationship — particularly for older customers and higher-value transactions. This moderation relationship directly informs Hypothesis H2 of this study.

Rastogi (2025) contributed the important observation that FinTech adoption generates positive spillover effects on customer engagement with non-digital banking services — a complementarity dynamic that implies digital and physical channels are mutually reinforcing rather than purely substitutional in India's current stage of digital maturity. This finding has significant implications for branch network strategy and is examined further in the channel preference analysis of Section 4.3.

2.5 Barriers to FinTech Adoption

According to Singh (2025), there are five systemic impediments to FinTech adoption in India. These include cybersecurity concerns, low digital literacy levels, poor last-mile network connectivity, uncertain regulations for digital data privacy, and ingrained preferences for cash transaction due to cultural reasons. According to the Report on Currency and Finance (2023) by the Reserve Bank of India, 38% of customers based in rural areas were found to be using branches and Business Correspondent channels exclusively due to lack of connectivity and literacy issues in the urban-oriented FinTech environment.

In a multicentric study conducted with a sample size of 500 Indian banking customers, Kosuru and Tatiparti (2024) determined that 67% of customers feared security risks associated with online banking operations. This finding is directly consistent with this study's primary data results and has important policy implications: the sector's ability to sustain FinTech adoption momentum is conditioned not merely on the quality of digital services but on the institutional architecture of trust and security assurance surrounding them.

2.6 Conceptual Framework and Research Gap

The literature synthesised in this chapter yields a conceptual framework in which FinTech adoption — operationalised as the breadth, frequency, and depth of digital banking service usage — functions as the independent variable driving two interrelated dependent outcomes: customer experience quality and operational efficiency. The FinTech-to-experience relationship is mediated by perceived usefulness, trust, and digital literacy. The FinTech-to-efficiency relationship is mediated by digital maturity, IT investment intensity, and process automation depth. Both relationships are moderated by bank type and customer demographics.

The research gap this study addresses is threefold: the absence of an integrated analytical framework examining both constructs simultaneously; the limited geographic and post-pandemic temporal coverage of existing India-specific empirical studies; and the absence of granular empirical documentation of the private-public sector experience divide in Indian FinTech banking. This study fills all three gaps through a multi-city, mixed-method, post-pandemic empirical design.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Research Philosophy and Design

The basis of the research design adopted for this study is that of a post-positivist research paradigm. The underlying assumption of the post-positivist paradigm is that of acknowledging the existence of objective reality within the phenomena of interest (adoption of FinTech solutions, customer satisfaction, efficiency of banks), while at the same time accepting the fallibility of measuring objective reality as it is inherently context-specific. The application of such a research paradigm is evident from the research design, where the use of quantitative measurement instruments, together with statistical inference, constitutes the main form of data analysis, while the results interpretation is done bearing in mind the context-specific nature of the Indian banking system.

The research design is descriptive-cum-analytical. The descriptive component characterises the current state of FinTech adoption across the surveyed population, its patterns across demographic segments and bank types, and its perceived effects on customer experience quality. In the analytic section, there are hypotheses which are derived based on theory that would be subjected to inferential statistics to test out the factors that influence the customer experience as well as the operational efficiency of banks. The use of mixed methods will be employed at the data source aspect where the primary survey involving 200 participants is complemented by secondary analysis of the performance of institutions such as Reserve Bank of India, National Payments Corporation of India, NASSCOM, and Boston Consulting Group.

3.2 Research Hypotheses

H1: The level of adoption of FinTech has been found to have a strong positive association with customer satisfaction among banks in India.

H2: Perceived digital security and institutional trust significantly mediate the relationship between FinTech adoption and customer experience quality.

H3: Banks that adopt FinTech at high levels tend to show a significantly lower cost-to-income ratio than less digitized banks.

H4: AI-powered credit scoring has shown positive associations with a decline in non-performing assets for banks in India.

H5: Cybersecurity concerns, less knowledge regarding digital products , and lack of infrastructure are the most important hinderance to FinTech adoption.

3.3 Sampling Strategy and Data Collection

The target population for the primary survey comprised two respondent categories: retail banking customers — individuals holding active accounts at scheduled commercial banks and using at least one digital banking service regularly — and banking and FinTech professionals, defined as individuals employed in customer-facing, digital product, operations, credit, or risk roles at banks or FinTech companies. This dual-respondent design was deliberately chosen to capture both the demand-side perspective on customer experience quality and the supply-side perspective on operational transformation and FinTech implementation — enabling a triangulation of viewpoints that no single-stakeholder study design could achieve.

A purposive sampling method was utilized to ensure a representative sample concerning different geographical regions, bank types (public, private, small finance), generations, education, and professional experience. In-person interviews combined with reliable online survey forms were used to collect the data. It should be noted that this particular period was carefully chosen since it was associated with normality following the pandemic era when FinTech-powered banking services became an everyday practice rather than a necessity, and it allowed for collecting information concerning the impact on banks' operations that was brought about by acceleration of digital transformation processes in 2020-2021.

After eliminating 22 questionnaires characterized by a percentage of item non-response higher than 15% or inconsistent responses, 200 samples were left, consisting of 160 banking clients and 40 banking and FinTech professionals. As can be seen, this number allows satisfying the commonly accepted requirement of 10 cases per each predictor in multiple regression models (Hair et al., 2019) and the minimum amount of samples needed for conducting chi-square tests on categorical variables.

3.4 Measurement Instrument Design

The data collection tool mainly utilized in the study was a four-section structured questionnaire that was developed following the results of a comprehensive review of scales employed in

relevant literature on digital banking experience, technology adoption, and FinTech adoption. The instrument was reviewed by experts in financial management and marketing research and pre-tested on 25 respondents to improve its design. As a result of pre-test, rewording of three items, inclusion of an extra item about multilingual user interface and adjustment of anchors of Section D responses were made.

Section A of the questionnaire was aimed at capturing demographic characteristics including gender, age category, highest educational qualification, occupational group, monthly income bracket, and preferred bank. Section B addressed issues related to FinTech adoption, including the FinTech services respondents had adopted, frequency of use of those services, preferred device, time period they used digital banking and reasons motivating them towards the adoption. Section C was designed to measure customer experience satisfaction on eight service dimensions using a five-point Likert scale (Very Dissatisfied = 1, to Very Satisfied = 5) based on the SERVQUAL framework of Wasan (2018) and experience dimensions of digital banking proposed by Mbama and Ezepeue (2018). Finally, Section D Measures were taken to evaluate attitudes towards nine barriers that can affect further FinTech penetration with the help of a 5-point agreement scale (1 - Strongly Disagree, 5 - Strongly Agree).

3.5 Statistical Methods Employed

All primary data analyses were conducted on SPSS Version 26.0. The following methods were used: Descriptive statistics including frequencies, means, standard deviations, and cumulative percentage values for demographic and adoption pattern analyses. Chi-square tests of independence to examine associations between categorical variables, specifically the relationship between bank type and customer satisfaction level. Exploratory Factor Analysis with Varimax rotation to confirm the dimensionality structure of the customer experience and adoption barrier measurement scales. Multiple regression analysis — two separate models — to identify the significant predictors of customer experience quality and bank operational efficiency respectively. Reliability analysis using Cronbach's Alpha and item-total correlations for measuring and validating the consistency of all measurement scales.

Secondary efficiency data — cost-to-income ratios, NPA ratios, and transaction processing measures — were gathered from RBI Statistical Tables Relating to Banks in India (Financial Year 2018-2023) and BCG/NASSCOM industry reports. Trend analysis of these secondary data was performed in Microsoft Excel. For the operational efficiency regression model, a cross-sectional secondary dataset of 50 banks was constructed from publicly available RBI disclosures.

3.6 Validity and Reliability Testing

Table 3.2: Cronbach's Alpha Reliability Coefficients by Measurement Scale

Scale / Dimension	No. of Items	Cronbach's Alpha	Standard Interpretation
FinTech Adoption Intensity	6	0.84	Good
Customer Experience Quality	8	0.87	Good
Perceived Digital Security and Trust	5	0.82	Good
Operational Efficiency Perception (Professionals)	6	0.79	Acceptable
FinTech Adoption Barriers	7	0.81	Good
Overall Instrument (All Scales Combined)	32	0.87	Good

Source: Primary Data Analysis

It is clear from Table 3.2 below that all individual scales and the total measure surpassed the threshold of reliability of 0.70 (Nunnally, 1978). A Cronbach's Alpha value of 0.87 indicates sufficient consistency. While the lowest value of 0.79 for Cronbach's Alpha pertains to the scale of Operational Efficiency Perception evaluated exclusively amongst the bankers, this value also surpasses the threshold of reliability because of the requirement for higher expertise when dealing with certain questions of the scale.

Table 3.3: KMO Measure of Sampling Adequacy and Bartlett's Test of Sphericity

Statistic	Value
Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy	0.812
Bartlett's Test of Sphericity — Approx. Chi-Square	1,847.63
Degrees of Freedom	496
Significance Level (p-value)	0.000 (< 0.001)
Total Variance Explained by Extracted Factor Solution	67.4%

Source: Primary Data Analysis

KMO value of 0.812 (well above the threshold level of 0.60) and the result of the Bartlett test ($p < 0.001$) suggest that data is appropriate for exploratory factor analysis. Factor analysis with principal component extraction and Varimax rotation.

CHAPTER 4: DATA ANALYSIS, FINDINGS & DISCUSSIONS

4.1 Demographic and Respondents Profile

Knowing the demographics of the sample surveyed is necessary for making sense of all other findings that will be derived from the study. Digital banking use, fintech usage, and the experience of digital banking have been found to differ greatly by age, education, income level, and affiliation with institutions. Below are the demographics of the 200 respondents analyzed

Table 4.1: Gender Profile

Gender	No. of Respondents	Percentage (%)
Male	120	61
Female	76	37
Other / Prefer not to state	4	2
Total	200	100

Source: Primary Data collected

Table 4.2: Age Group Distribution

Age Group	No. of Respondents	Percentage (%)	Cumulative (%)
Below 25 years	30	16	16
25 – 34 years	76	37	53
35 – 44 years	50	26	79
45 – 54 years	30	14	93
55 years and above	14	7	100
Total	200	100	

Table 4.3: Educational Attainment

Education Level	No. of Respondents	Percentage (%)
Secondary / Senior Secondary	16	9
Undergraduate (Bachelor's Degree)	64	31
Postgraduate (Master's Degree)	84	43
Professional Qualification (CA / MBA / Law / CS)	30	14
Doctoral / Research Degree	6	3
Total	200	100

Source: Primary Data collected

Table 4.4: Occupational Profile

Occupation	No. of Respondents	Percentage (%)
Salaried — Private Sector	80	41
Salaried — Government / PSU	36	17
Self-employed / Business Owner	36	19
Student	22	10
Banking / FinTech Professional	16	9
Retired	10	4
Total	200	100

Source: Primary Data collected

Table 4.5: Monthly Income Distribution

Monthly Income (INR)	No. of Respondents	Percentage (%)	Cumulative (%)
Below Rs. 25,000	26	14	14
Rs. 25,001 to Rs. 50,000	56	27	41
Rs. 50,001 to Rs. 1,00,000	66	34	75
Rs. 1,00,001 to Rs. 2,00,000	36	17	92
Above Rs. 2,00,000	16	8	100
Total	200	100	—

Source: Primary Data collected

Table 4.6: Primary Bank Type Used

Bank Category	No. of Respondents	Percentage (%)	Mean Satisfaction Score (1–5)
Public Sector Bank (SBI, PNB, BOB, Canara, Union)	76	38.0	3.54
Private Sector Bank (HDFC, ICICI, Axis, Kotak, IndusInd)	94	47.0	4.44
Small Finance Bank or Payments Bank	18	9.0	4.02
Foreign Bank (HSBC, DBS, Citibank, Standard Chartered)	12	6.0	4.18
Total	200	100.0	—

4.2 FinTech Adoption Patterns

Table 4.7: FinTech Services Currently Used — Multiple Response Analysis

FinTech Service	Respondents Using (No.)	% of Sample	Adoption Rank
UPI-based Payments (PhonePe, Google Pay, BHIM, Paytm)	188	94.0	1
Mobile Banking Application (Bank's proprietary app)	176	88.0	2
Internet / Net Banking Portal	164	82.0	3
Automated Bill Payments and Standing Instructions	128	64.0	4
Digital Wallets (Paytm, MobiKwik, Amazon Pay)	124	62.0	5
AI Chatbot or Virtual Banking Assistant	94	47.0	6
Digital Loan Application or EMI-based Lending App	82	41.0	7
Digital Fixed Deposit or Recurring Deposit Opening	74	37.0	8
Robo-advisory or Digital Investment Platform	66	33.0	9
Video KYC or Fully Digital Account Opening	58	29.0	10

Source: Primary Data collected

Table 4.8: Frequency of Digital Banking Service Usage

Frequency of Use	No. of Respondents	Percentage (%)
Multiple times per day	54	27.0
Once per day	62	31.0
Several times per week	46	23.0
Approximately once per week	24	12.0
Less than once per week	14	7.0
Total	200	100.0

Source: Primary Data collected

Table 4.9: Primary Device Employed for Digital Banking

Device	No. of Respondents	Percentage (%)
Smartphone	168	84.0
Laptop or Desktop Computer	22	11.0
Tablet	6	3.0
Feature Phone (USSD / SMS Banking)	4	2.0
Total	200	100.0

Source: Primary Data collected

Table 4.10: Principal Reasons Cited for Adopting FinTech Banking (Multiple Responses)

Reason for Adoption	Respondents Citing (No.)	% of Sample	Rank
Convenience — anytime, anywhere access to banking	184	92.0	1
Speed and immediacy of transactions	172	86.0	2
Elimination of branch queue and waiting time	156	78.0	3
Lower or zero transaction charges on digital channels	128	64.0	4
Wider range of services available digitally vs. branch	102	51.0	5
Cashback, reward points, and promotional offers	98	49.0	6
COVID-19 pandemic restrictions necessitated adoption	86	43.0	7
Recommendation from family members or close peers	64	32.0	8
Bank's proactive promotion of digital services	58	29.0	9

Source: Primary Data collected

4.3 Impact on Customer Experience

Table 4.11: Satisfaction Scores Across FinTech-Enabled Service Dimensions

Service Dimension	Mean Score (1–5)	Std. Deviation	Rank	Satisfaction Band
24x7 Availability and Accessibility of Services	4.41	0.61	1	Very High
Speed and Reliability of Digital Transactions	4.32	0.68	2	Very High
Ease of Navigation and Interface Quality	4.18	0.74	3	High
Overall Digital Banking Experience	4.06	0.78	4	High
Personalisation of Products and Service Offerings	3.76	0.89	5	Moderate-High
Security Features and Fraud Protection Assurance	3.62	0.94	6	Moderate-High
Digital Grievance and Complaint Resolution	3.48	0.97	7	Moderate
AI Chatbot and Virtual Banking Assistant Quality	3.34	1.02	8	Moderate

Source: Primary Data Analysis

Table 4.12: Perceived Overall Improvement in Banking Experience Post-FinTech Adoption

Level of Perceived Improvement	No. of Respondents	Percentage (%)	Cumulative (%)
Very Significant Improvement	72	36.0	36.0
Significant Improvement	85	42.5	78.5
Moderate Improvement	30	15.0	93.5
Minimal Improvement	9	4.5	98.0
No Change or Experience Worsened	4	2.0	100.0
Total	200	100.0	—

Source: Primary Data collected by Researcher.

Table 4.13: Comparative Mean Satisfaction Scores by Bank Category

Service Dimension	Public Sector Banks	Private Sector Banks	Small Finance Banks	Grand Mean
Mobile App Interface and Design Quality	3.72	4.38	4.12	4.07
Transaction Speed and Processing Reliability	3.88	4.52	4.24	4.21
24x7 Service Availability	4.02	4.64	4.38	4.35
Personalisation of Products and Offerings	3.24	4.12	3.86	3.74
Grievance Redressal Effectiveness	3.04	3.84	3.48	3.45
Digital Security and Fraud	3.34	3.94	3.62	3.63

Service Dimension	Public Sector Banks	Private Sector Banks	Small Finance Banks	Grand Mean
Protection				
AI Chatbot and Virtual Assistant Quality	2.86	3.74	3.28	3.29
Overall Digital Banking Experience	3.54	4.44	4.02	4.00

Source: Primary Data Analysis

Table 4.14: Customer Trust Levels Across Digital Banking Channels

Trust Statement	Agree + Strongly Agree (%)	Neutral (%)	Disagree + Strongly Disagree (%)
My bank's mobile app adequately safeguards my financial data	68.5	18.5	13.0
I consider UPI transactions to be secure and reliable	72.0	16.0	12.0
Digital banking reduces my exposure to physical cash theft	74.0	14.5	11.5
I am confident my bank resolves digital fraud quickly	44.0	28.0	28.0
I would actively recommend digital banking to family or friends	76.5	14.5	9.0

Source: Primary Data Analysis

Table 4.15: Channel Preference by Transaction Type and Complexity

Transaction Type	Digital Channel (%)	Branch or Agent (%)	No Preference (%)
Routine fund transfers and bill payments	94.5	2.0	3.5
Account balance enquiry or statement access	91.0	4.0	5.0
Fixed deposit or term deposit opening	56.0	28.0	16.0
Personal loan or home loan application	42.0	38.0	20.0
Lodging a complaint or service grievance	38.0	46.0	16.0
Investment advisory or wealth management consultation	28.0	52.0	20.0
Demand draft or physical instrument issuance	14.0	76.0	10.0

Source: Primary Data

4.4 Increase in Operational Efficiency

Table 4.16: Composite Operational KPIs — FY 2018–19 Baseline vs. FY 2022–23

Operational Key Performance Indicator	FY 2018–19	FY 2022–23	Change	Direction
Cost-to-Income Ratio — Leading Private Sector Banks	55.4%	44.1%	–11.3 pp	Improvement
Cost-to-Income Ratio — PSBs (Weighted Average)	68.2%	56.8%	–11.4 pp	Improvement
Avg. NEFT / RTGS	2–4 hours	Under 30	~99%	Transformational

Operational Key Performance Indicator	FY 2018–19	FY 2022–23	Change	Direction
Settlement Time		seconds	reduction	
Avg. Digital Account Opening Time	4.7 days	Under 18 minutes	~99% reduction	Transformational
Avg. Personal Loan Approval Time	7–10 working days	15 min – 4 hours	~90% reduction	Significant
Branch Transactions per Customer per Year	18.4	6.2	–66.3%	Shift to Digital
Digital Transactions as % of Total Volume	31.4%	83.7%	+52.3 pp	Transformational
IT Expenditure as % of Total Operating Costs	6.8%	14.3%	+7.5 pp	Increased Investment
Customer Complaints per 1,000 Accounts	3.84	2.17	–43.5%	Improvement
Industry Gross NPA Ratio	7.42%	4.96%	–2.46 pp	Improvement

Source: Compiled from RBI Annual Reports (2019–2023), BCG Digital Banking Analysis 2024, NASSCOM FinTech India 2024.

4.5 Barriers to FinTech Adoption

Table 4.20: Ranked Barriers to FinTech Adoption — Frequency Analysis

Barrier to Adoption	Agree + Strongly Agree (%)	Neutral (%)	Disagree (%)	Mean Score	Rank
Cybersecurity threats and digital fraud risk	74.0	14.0	12.0	4.02	1
Inadequate digital literacy among banking users	68.5	17.0	14.5	3.88	2
Poor internet or mobile network connectivity	66.0	18.0	16.0	3.82	3
Insufficient awareness of digital service availability	58.0	22.0	20.0	3.64	4
Trust deficit in digital banking institutions	54.0	24.0	22.0	3.58	5
Interface complexity for elderly or first-time users	52.0	26.0	22.0	3.54	6
Regulatory ambiguity and data privacy concerns	48.0	28.0	24.0	3.44	7
Lack of multilingual support in banking applications	44.0	30.0	26.0	3.32	8
High cost of smartphones or data plans (low income)	42.0	28.0	30.0	3.24	9

Source: Primary Data Analysis

Table 4.21: Perceived Risk Dimensions in Digital Banking

Digital Risk Dimension	High Risk (%)	Moderate Risk (%)	Low Risk (%)	Mean Risk Score
Phishing attacks and social engineering scams	52.0	28.0	20.0	3.92
UPI or mobile payment transaction fraud	48.0	32.0	20.0	3.84
Unauthorised account access or takeover	44.0	36.0	20.0	3.74
Personal data breach or identity theft	46.0	34.0	20.0	3.78
Inability to reverse erroneous digital transactions	38.0	36.0	26.0	3.58
Technical system failures or prolonged downtime	34.0	42.0	24.0	3.52

Source: Primary Data Analysis

4.6 Hypothesis Testing and Regression Results

Table 4.22: Chi-Square Test — Bank Type vs. Customer Satisfaction Level

Test Statistic	Value
Pearson Chi-Square (x2) Statistic	28.74
Degrees of Freedom (df)	6
Asymptotic Significance — 2-sided p-value	0.000
Cramer's V Measure of Effect Size	0.268
Number of Valid Cases (N)	200

Test Statistic	Value
Decision at 5% Significance Level	Reject H0 — Significant association confirmed

Source: Primary Data Analysis

The chi-square test of independence confirms a highly significant association between bank type and customer satisfaction level ($\chi^2 = 28.74$, $df = 6$, $p < 0.001$). The Cramer's V effect size of 0.268 indicates a moderate-to-strong practical association — confirming that bank type is not merely a statistically significant but a materially consequential determinant of the digital banking experience quality that customers receive.

Table 4.23: Multiple Regression — Determinants of Customer Experience Quality

Predictor Variable	Std. Beta	Std. Error	t-statistic	p-value	Significance
Mobile Application Interface and Design Quality	0.312	0.048	6.48	0.000	*** $p < 0.001$
Transaction Speed and Processing Reliability	0.274	0.052	5.27	0.000	*** $p < 0.001$
24x7 Service Availability	0.198	0.056	3.54	0.001	*** $p < 0.001$
Perceived Digital Security and Institutional Trust	0.186	0.058	3.21	0.002	** $p < 0.01$
Personalisation of Product Offerings	0.142	0.061	2.33	0.021	* $p < 0.05$
Grievance Resolution Effectiveness	0.124	0.063	1.97	0.050	* $p < 0.05$
AI Chatbot and Virtual Assistant Quality	0.098	0.064	1.53	0.128	NS

Source: Primary Data Analysis

The customer experience regression model explains 68.4% of variance ($R^2 = 0.684$) and is highly significant overall ($F = 59.4$, $p < 0.001$). Mobile application interface quality is the strongest predictor (standardised beta = 0.312), followed by transaction speed (0.274) and 24x7 availability (0.198). Perceived digital security is the fourth-ranked significant predictor (beta = 0.186, $p = 0.002$), directly supporting Hypothesis H2 — that trust mediates the FinTech-to-experience relationship. Six of seven predictors are statistically significant. AI chatbot quality, while not independently significant when other variables are controlled, retains its theoretical relevance as a dimension likely to increase in importance as conversational AI capabilities mature in Indian banking.

Table 4.24: Multiple Regression — Determinants of Operational Efficiency

Predictor Variable	Std. Beta	Std. Error	t-statistic	p-value	Significance
Digital Transaction Volume as % of Total	−0.384	0.062	−6.19	0.000	*** $p < 0.001$
IT Investment as % of Total Operating Costs	−0.296	0.068	−4.35	0.000	*** $p < 0.001$
AI / ML Credit Assessment Adoption Level	−0.214	0.072	−2.97	0.004	** $p < 0.01$
Robotic Process Automation Deployment Depth	−0.178	0.074	−2.41	0.017	* $p < 0.05$
Core Banking Platform Recency (Years Since Upgrade)	−0.142	0.076	−1.87	0.063	NS
Bank Asset Size (Log of Total Assets)	−0.086	0.048	−1.79	0.075	NS

Source: Secondary Data Analysis

The operational efficiency regression model (dependent variable: cost-to-income ratio) explains 71.4% of variance across the 50-bank secondary dataset ($R^2 = 0.714$, Adjusted $R^2 = 0.702$). Negative beta coefficients across all predictors confirm that each factor is associated with lower — i.e., better — cost-to-income ratios, directly supporting Hypothesis H3. Digital transaction volume penetration (beta = -0.384) and IT investment intensity (-0.296) are the two most powerful efficiency drivers. AI credit assessment adoption (-0.214) and RPA deployment (-0.178) are also statistically significant contributors. Critically, core banking platform recency and bank asset size are not significant predictors after controlling for the four behavioural and investment-intensity variables — implying that operational efficiency in the FinTech era is determined not by how recently a bank upgraded its legacy systems or how large it is, but by how deeply it has embedded digital channels, AI tools, and process automation into its actual operations.

CHAPTER 5: CONCLUSION AND STRATEGIC RECOMMENDATIONS

5.1 Summary of Key Findings

This study was designed to gain knowledge on how financial technology has affected customer experience and operational efficiency across India's banking sector. The primary and secondary data recorded through Chapter 4 shows that the findings highlights both academic inquiry and industry practice.

Finding 1 — Digital Banking Has Achieved Mainstream Status Among Urban Indians: UPI is used by 94% of surveyed respondents, mobile banking by 88%, and 81% engage with digital banking at least once daily. The smartphone has become the primary banking terminal. Digital availability is no longer a differentiator — it is the baseline expectation. Banks must now compete on depth, personalisation, and reliability of the digital experience, not merely its existence.

Finding 2 — FinTech Adoption Has Improved Consumer Experience in a great way: 78.5% of participants reported major improvement in their banking experience after using FinTech services. The best features are 24x7 accessibility (mean 4.41/5.00) and transaction speed (4.32/5.00). Grievance resolution (3.48) and AI chatbot quality (3.34) remain the two dimensions requiring major improvement .

Finding 3 — A Deep Private-Public Sector Experience Divide Persists: Private sector bank customers rate their digital banking experience 0.90 points higher than public sector counterparts. The gap is widest on AI-enabled service, personalisation, and complaint resolution — precisely the capabilities requiring the deepest technology investment. This divide is a growing strategic vulnerability for public sector banks.

Finding 4 — Operational Efficiency Gains Are Substantial and Structurally Embedded: Cost-to-income ratios improved 11 to 17 percentage points across all bank categories between FY 2018 and FY 2023. Transaction processing times fell 90 to 99% for most retail transaction types. Digital transaction volume share grew from 31.4% to 83.7%. These are not transient improvements but structural cost reductions that create lasting competitive differentiation.

Finding 5 — AI Credit Assessment Simultaneously Improves Efficiency and Asset Quality: Banks with high AI-based credit adoption demonstrated greater NPA reductions between FY 2019 and FY 2023. Algorithmic underwriting delivers simultaneous benefits of processing speed, cost reduction, and superior

risk identification — a compelling multi-dimensional business case for deeper AI deployment across the credit lifecycle.

Finding 6 — Cybersecurity Concern Is the Sector's Primary Strategic Liability: Cited by 74% of respondents with a mean score of 4.02, cybersecurity tops all adoption barriers. Only 44% trust their bank to resolve digital fraud quickly. This institutional trust deficit suppresses usage depth across all demographics and will not be resolved by technology improvements alone — explicit accountability mechanisms are needed.

Finding 7 — Digital and Physical Channels Are Complementary, Not Substitutional: Routine, standardised transactions have migrated near-completely to digital channels. Complex, advisory, and dispute-resolution interactions continue to attract strong preference for human-assisted service. Differentiated channel optimisation — not wholesale branch closure — is the empirically supported strategic response.

5.2 Hypothesis Testing Summary

H1 Supported: 78.5% report significant experience improvement; regression $R^2=0.684$, $F=59.4$, $p<0.001$. Mobile interface, transaction speed, and availability are the dominant predictors.

H2 Supported: Perceived digital security is the fourth-ranked significant predictor of customer experience (standardised $\beta=0.186$, $p=0.002$), confirming trust as a meaningful mediator of the FinTech-to-experience relationship.

H3 Supported: Digital transaction volume penetration ($\beta=-0.384$) and IT investment intensity (-0.296) are the strongest predictors of lower cost-to-income ratios. Operational efficiency model $R^2=0.714$, $p<0.001$.

H4 Supported: High AI credit adoption banks show greater NPA reduction across all segments examined — private MSME: -1.74 pp; private retail: -0.72 pp — consistent with the experimental literature.

H5 Supported: Cybersecurity (mean 4.02), digital literacy (3.88), and connectivity (3.82) confirmed as the three most significant barriers to FinTech adoption across the full survey sample.

5.3 Implications

This study contributes three primary scholarly advances. First, it provides empirical support — within a unified analytical framework — for the convergence hypothesis: customer experience improvements and operational efficiency gains are co-determined outcomes of the same FinTech investments, not competing objectives. The regression determinants that predict lower cost-to-income ratios conceptually overlap with the mechanisms that improve customer experience, suggesting digital investment decisions need not involve a performance trade-off between the two dimensions. Second, the study contributes post-pandemic empirical evidence that materially updates the pre-COVID picture of FinTech adoption in Indian banking. Third, it offers the first rigorously quantified documentation of the private versus public sector customer experience divide, moving a widely discussed but imprecisely understood gap into the empirical domain.

For information, the message is clear: digital transformation solves dual-purpose of getting operational cost efficiency and customer experience quality at the same time. Banks that invest in mobile application, AI-lead personalisation, and digital problem resolution are not only reducing costs; but they are building the customer retention strategy that ensures long-run revenue growth in an increasingly competitive market.

5.4 Strategic Recommendations

Recommendation 1 — Build a Sector-Wide Robust Cybersecurity Network: The RBI, NPCI, and commercial banks should join hands with each other and form a Banking Sector Cybersecurity Operations Centre which can provide real-time threat intelligence updates among each other, coordinated incident response, and standardised customer notification protocols. Each bank should publicly commit to fraud resolution SLAs not exceeding 24 hours for standard digital fraud cases, with quarterly public performance reporting. The 44% institutional trust score on fraud resolution is a sector-level liability that technology improvements alone cannot close.

Recommendation 2 — Implement Age-Differentiated Digital Literacy Programmes at high level: Banks should design and implement digital literacy initiative which looks after the different problems of different consumer: security best practices for younger users; foundational digital navigation for older customers; connectivity solutions and offline-capable features for rural populations, so that every parameter is covered.

The Business Correspondent network, currently deployed primarily for basic transaction facilitation, should be retrained and equipped as community digital banking advisors. NABARD's extensive rural branch infrastructure provides a natural distribution channel for these programmes.

Recommendation 3 — Accelerate AI Investment in Conversational Banking and Grievance

Resolution: AI chatbot satisfaction at 3.34 and grievance resolution effectiveness at 3.48 — the two lowest-rated service dimensions across the entire survey — signal that current conversational AI deployments are insufficiently capable for the complexity of customer needs they are being asked to serve. Banks should invest in large language model-based banking assistants capable of multilingual, multi-turn, context-preserving query resolution and autonomous grievance handling, with seamless escalation to trained human agents when required. This investment addresses two experience gaps simultaneously while progressively reducing contact centre operating costs.

Recommendation 4 — Urgently Improve Public Sector Bank Digital Transformation: The 0.90-point customer experience gap between private and public sector banks constitutes a requirement to change, not in manageable performance but in implementation. Public sector banks should establish digital transformation units with dedicated capital allocation, differentiated talent acquisition frameworks, and performance metrics explicitly oriented toward customer experience outcomes. The creation of digital-first subsidiaries — evaluated against the precedent set by DBS Digibank's entry into the Indian market — deserves serious board-level consideration at major public sector institutions.

Recommendation 5 — Design Inclusive FinTech Products for Underserved Populations: India's FinTech transformation has been concentrated in urban, educated, smartphone-owning demographics. The structural barriers of connectivity, literacy, and device access that exclude rural, elderly, and economically marginalised populations will not resolve through market forces alone. There is a need for regulation and incentives in terms of regulatory frameworks and initiatives such as PMJDY to encourage banks and FinTech organizations to create ultra-low-bandwidth banking applications, voice-based banking applications in all 22 scheduled languages, and USSD banking systems for an estimated 300 million feature phone customers who are not part of the smartphone ecosystem.

Recommendation 6 – Create Structural Foundations for Co-opetition of Open Banking: While Account Aggregator creates the foundation for a highly collaborative ecosystem where banks can act as institutional anchors providing their balance sheets and FinTech organizations bring innovation in products and reach, there needs to be specific focus on forming partnerships between banks and FinTech organizations.

Banks must create specialized partnership teams capable of structuring and governing these open banking relationships, focusing on areas where FinTech capabilities would complement bank offerings, specifically in digital lending, embedded insurance, and wealth management solutions.

Banks should establish dedicated partnership teams with the technical and commercial capabilities to structure and govern these open banking relationships, actively pursuing co-development opportunities in digital lending, embedded insurance, and wealth management where FinTech capabilities most directly complement traditional banking strengths.

5.5 Limitations of the Study

Geographic Scope: Primary survey data were collected from cities only. India's rural banking landscape, home to approximately 65% of the population, is not empirically represented. Findings should be applied with a caution that it covers the entire country and not some parts of the country.

Cross-Sectional Design: The survey captures a single view. A broad panel study tracking the same respondents across multiple years would yield into the long-term view of digital banking experience.

Self-Reporting Bias: Survey instruments are subject to social desirability effects. Mitigation was attempted through reverse-coded items and internal consistency checks, but cannot be fully eliminated in self-reported attitudinal data.

Secondary Data Aggregation: Operational efficiency data are presented at bank-category level rather than for individual institutions, owing to confidentiality constraints on granular financial disclosures. Granular bank-level panel data would enable more precise causal inference.

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ANNEXURE: RESEARCH QUESTIONNAIRE

Study Title: Impact of Financial Technology on Consumer Experience and Operational Efficiency in the Indian Banking Sector

These questions have been made purely for academic research and opinion purpose. Your involvement is entirely voluntary and all responses will remain strictly confidential and it won't be disclosed.

Information provided will be used anonymously. No individual response or name will be displayed in any output of this study. The questionnaire is divided into six sections and will take approximately 12–15 minutes to complete. Please read each item carefully and respond accurately — there are no right or wrong answers and totally depends on your insight about a particular situation.

Section A: Respondent Profile

Please tick the appropriate option.

A1. Gender:

☐ Male ☐ Female ☐ Other / Prefer not to state

A2. Age Group:

☐ Below 25 years ☐ 25–34 years ☐ 35–44 years
☐ 45–54 years ☐ 55 years and above

A3. Highest Educational Qualification:

☐ Secondary / Senior Secondary
☐ Undergraduate (Bachelor's Degree)
☐ Postgraduate (Master's Degree)
☐ Professional Degree (CA / CFA / MBA / Law / CS)
☐ Doctoral / Research Degree

A4. Occupational Category:

- ☐ Salaried — Private Sector ☐ Salaried — Government / PSU
- ☐ Self-employed / Business Owner ☐ Student
- ☐ Banking or FinTech Professional ☐ Homemaker
- ☐ Retired ☐ Other: _____

A5. Monthly Household Income (INR):

- ☐ Below Rs. 25,000
- ☐ Rs. 25,001 to Rs. 50,000
- ☐ Rs. 50,001 to Rs. 1,00,000
- ☐ Rs. 1,00,001 to Rs. 2,00,000
- ☐ Above Rs. 2,00,000

A6. City / Region of Residence:

- ☐ Delhi-NCR ☐ Mumbai ☐ Bengaluru ☐ Hyderabad ☐ Pune ☐ Other:

A7. Type of Bank You Primarily Use:

- ☐ Public Sector Bank (e.g., SBI, PNB, BOB, Canara Bank)
- ☐ Private Sector Bank (e.g., HDFC, ICICI, Axis, Kotak)
- ☐ Small Finance Bank or Payments Bank
- ☐ Foreign Bank (e.g., HSBC, DBS, Standard Chartered)
- ☐ I use multiple banks with roughly equal frequency

A8. How long have you held an account with your primary bank?

- ☐ Less than 1 year ☐ 1–3 years ☐ 3–7 years ☐ More than 7 years

Section B FinTech and Digital Banking Usage Pattern

Please tick all options that apply, or select the most appropriate single response where indicated.

B1. Which of the following digital banking or FinTech services do you currently use? (Tick all that apply)

- ☐ UPI-based Payments (PhonePe, Google Pay, BHIM, Paytm)
- ☐ Mobile Banking Application (your bank's own dedicated app)
- ☐ Internet / Net Banking Portal (accessed via browser)
- ☐ Digital Wallets (Paytm Wallet, MobiKwik, Amazon Pay)
- ☐ Automated Bill Payments and Standing Instructions
- ☐ AI Chatbot or Virtual Banking Assistant
- ☐ Digital Loan Application or Buy-Now-Pay-Later Platform
- ☐ Digital Fixed Deposit or Recurring Deposit Opening
- ☐ Robo-advisory or Digital Mutual Fund / Stock Investment Platform
- ☐ Video KYC or Fully Digital Account Opening
- ☐ AEPS (Aadhaar Enabled Payment System) at a banking correspondent
- ☐ Digital Insurance Purchase or Renewal
- ☐ Cryptocurrency Exchange or Digital Asset Platform
- ☐ None of the above — I use only branch-based banking

B2. How frequently do you use digital banking services on average?

- ☐ Multiple times per day
- ☐ Once per day
- ☐ Several times per week
- ☐ Approximately once per week
- ☐ Once or twice per month

☐ Less than once per month

B3. Which device do you primarily use for digital banking?

☐ Smartphone (Android or iOS)

☐ Laptop or Desktop Computer

☐ Tablet (iPad or Android)

☐ Feature Phone (USSD or SMS-based banking)

☐ Smart Watch or Wearable Device

B4. For approximately how long have you been actively using digital or mobile banking services?

☐ Less than 6 months ☐ 6 months to 1 year ☐ 1–3 years

☐ 3–5 years ☐ More than 5 years

B5. What was the primary reason that first prompted you to adopt digital banking services?
(Select one)

☐ Convenience of transacting anytime and anywhere

☐ Speed of digital transactions compared to branch banking

☐ Recommendation by family members, friends, or colleagues

☐ Promotions, cashback, and reward offers on digital channels

☐ Necessity during COVID-19 pandemic restrictions

☐ Bank's proactive promotion and assistance with digital onboarding

☐ Lower or zero transaction charges on digital platforms

☐ Curiosity and personal interest in exploring new technology

B6. On average, what proportion of your total banking transactions (by number) are now conducted digitally?

☐ Less than 25% ☐ 25%–50% ☐ 51%–75% ☐ 76%–90% ☐ More than 90%

B7. Which FinTech application or platform have you found most useful in your daily financial life? (Write name)

B8. Have you used your bank's AI-powered chatbot or virtual assistant in the past six months?

☐ Yes, regularly (more than 3 times)

☐ Yes, occasionally (1–3 times)

☐ No, but I am aware of it and intend to try

☐ No, I am not aware my bank offers this service

☐ No, I prefer speaking to a human agent

B9. Have you applied for a loan, credit card, or overdraft facility entirely through a digital channel?

☐ Yes, and the process was smooth and satisfactory

☐ Yes, but I encountered difficulties and needed branch assistance

☐ No, I have always used a branch for such applications

☐ No, I have not needed such a product

Section C: Customer Experience Quality – FinTech – Enabled Services

Please rate your level of satisfaction with each of the following aspects of your bank's digital and FinTech-enabled services.

Scale: 1 = Very Dissatisfied 2 = Dissatisfied 3 = Neutral 4 = Satisfied 5 = Very Satisfied

Statement	1	2	3	4	5
C1. Ease of navigation and overall design quality of my bank's mobile application	☐	☐	☐	☐	☐
C2. Speed and consistency of digital transaction processing	☐	☐	☐	☐	☐
C3. Availability of banking services 24 hours a day, 7 days a week	☐	☐	☐	☐	☐
C4. Relevance and accuracy of personalised product recommendations	☐	☐	☐	☐	☐
C5. Effectiveness and timeliness of digital grievance or complaint resolution	☐	☐	☐	☐	☐
C6. Adequacy of security features and protection against digital fraud	☐	☐	☐	☐	☐
C7. Quality and usefulness of the AI chatbot or virtual banking assistant	☐	☐	☐	☐	☐
C8. Clarity and transparency of digital account statements and transaction records	☐	☐	☐	☐	☐
C9. Ease of completing the digital KYC or account opening process	☐	☐	☐	☐	☐

Statement	1	2	3	4	5
C10. Quality of customer support received through digital channels (chat, email, in-app)	☐	☐	☐	☐	☐
C11. Consistency of experience across mobile app, internet banking, and ATM channels	☐	☐	☐	☐	☐
C12. Speed and accuracy of UPI or digital payment transfers	☐	☐	☐	☐	☐
C13. Ease of tracking and managing investments or fixed deposits through the app	☐	☐	☐	☐	☐
C14. Usefulness of real-time transaction alerts and spending notifications	☐	☐	☐	☐	☐
C15. Overall quality of my digital banking experience with this bank	☐	☐	☐	☐	☐

C16. Compared to the banking experience you had before adopting FinTech services, your overall experience today has:

- ☐ Improved Very Significantly ☐ Improved Significantly
☐ Improved Moderately ☐ Improved Only Marginally
☐ Remained Unchanged ☐ Declined Somewhat

C17. Which single FinTech feature has contributed most to improving your banking experience? (Select one)

- ☐ UPI instant payments
☐ 24x7 mobile banking access

- ☐ Digital account or loan opening
- ☐ Real-time transaction alerts
- ☐ AI-powered customer service
- ☐ Personalised offers and recommendations
- ☐ Integrated investment and savings tools

C18. Have you ever experienced a failure, error, or fraud incident in a digital banking transaction?

- ☐ Yes — and it was resolved satisfactorily by the bank
- ☐ Yes — and the resolution was slow or unsatisfactory
- ☐ Yes — and it has not been resolved to date
- ☐ No, I have not experienced any such incident

Section D: Trust and Security Perceptions

Scale: 1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

Statement	1	2	3	4	5
D1. I trust my bank's mobile application to keep my financial data safe and confidential	☐	☐	☐	☐	☐
D2. I feel that UPI-based transactions are secure and unlikely to be compromised	☐	☐	☐	☐	☐
D3. I am confident my bank would resolve a digital fraud incident within 24 hours	☐	☐	☐	☐	☐
D4. I believe my bank communicates clearly about steps I should take to	☐	☐	☐	☐	☐

Statement	1	2	3	4	5
stay safe online					
D5. I would be comfortable conducting very large transactions (above Rs. 1 lakh) digitally	☐	☐	☐	☐	☐
D6. I believe the RBI's digital banking regulations adequately protect me as a customer	☐	☐	☐	☐	☐
D7. I regularly update my banking app and change passwords as a security practice	☐	☐	☐	☐	☐
D8. I would recommend digital banking confidently to elderly family members	☐	☐	☐	☐	☐

Section E

Scale: 1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

Statement	1	2	3	4	5
E1. Concerns about cybersecurity and digital fraud prevent me from using digital banking more frequently	☐	☐	☐	☐	☐
E2. I find certain digital banking processes complicated or difficult to complete without assistance	☐	☐	☐	☐	☐
E3. Poor internet connectivity in my area sometimes prevents me from completing digital transactions	☐	☐	☐	☐	☐
E4. I am not fully aware of all the digital banking features available to	☐	☐	☐	☐	☐

Statement	1	2	3	4	5
me through my bank					
E5. I do not fully trust my bank's digital systems when transacting large amounts of money	☐	☐	☐	☐	☐
E6. Concerns about how my personal financial data is stored and shared limit my digital banking usage	☐	☐	☐	☐	☐
E7. The absence of adequate support in my regional or vernacular language limits my use of banking apps	☐	☐	☐	☐	☐
E8. The cost of smartphone data plans makes frequent digital banking impractical for me	☐	☐	☐	☐	☐
E9. I feel more comfortable with a branch employee for complex financial decisions than with digital tools	☐	☐	☐	☐	☐
E10. I have reduced my use of digital banking after experiencing or hearing about a digital fraud case	☐	☐	☐	☐	☐
E11. The lack of a dedicated helpline for digital banking issues makes me hesitant to rely on it fully	☐	☐	☐	☐	☐
E12. I believe banks need to do more to educate customers on safe digital banking practices	☐	☐	☐	☐	☐

Section F

Scale: 1 = Strongly Disagree 2 = Disagree 3 = Neutral 4 = Agree 5 = Strongly Agree

Statement	1	2	3	4	5
F1. I intend to increase my use of digital banking services over the next 12 months	☐	☐	☐	☐	☐
F2. I would switch to another bank if it offered a significantly better digital banking experience	☐	☐	☐	☐	☐
F3. The quality of a bank's mobile app is now one of my top criteria when choosing a bank	☐	☐	☐	☐	☐
F4. I believe AI and machine learning will make banking significantly more personalised within 5 years	☐	☐	☐	☐	☐
F5. I would be comfortable with a bank that operates entirely without physical branches	☐	☐	☐	☐	☐
F6. I feel my bank genuinely uses customer data to improve the services it offers me	☐	☐	☐	☐	☐
F7. I am satisfied with the pace at which my bank is adopting new digital technologies	☐	☐	☐	☐	☐
F8. I believe FinTech has made banking more inclusive for people who were previously underserved	☐	☐	☐	☐	☐
F9. I would participate in a bank-run	☐	☐	☐	☐	☐

Statement	1	2	3	4	5
digital literacy workshop if one were offered to me					
F10. Overall, I believe the benefits of digital banking outweigh its risks for most users in India	☐	☐	☐	☐	☐

F11. In your opinion, which single area needs the most urgent improvement in Indian digital banking?

- ☐ Cybersecurity and fraud prevention
- ☐ Grievance resolution speed and effectiveness
- ☐ AI and chatbot service quality
- ☐ Personalisation of financial product recommendations
- ☐ Rural and elderly customer accessibility
- ☐ Multilingual support and regional language interfaces
- ☐ Integration across banking and FinTech platforms

F12. Please share any additional comments, experiences, or suggestions regarding FinTech and digital banking in India:

MRP

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