Technological Challenges and Advantages of Small Finance Bank in India: A Descriptive Study on Digital Financial Inclusion

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Abstract

This paper examines how technology both facilitates and impedes the digital financial inclusion efforts of Small Finance Banks (SFBs) in India. The Reserve Bank of India set up SFBs to help small enterprises, marginal farmers, and low-income households that do not have access to traditional banking services. SFBs are now using digital channels like mobile banking, UPI, AEPS, and e-KYC more and more to provide low-cost, scalable financial services. Using a descriptive research design based on secondary data from regulatory reports, published bank documents, and prior empirical studies, the study synthesizes evidence on the technological advantages of SFBs—cost reduction, rapid onboarding, data-driven lending, and 24/7 access—against key challenges, including weak rural digital infrastructure, cybersecurity vulnerabilities, low digital literacy, high implementation costs, and complex compliance requirements. The analysis indicates a clear "digital paradox": while technology facilitates wider outreach and operational efficiency, it simultaneously introduces risks of transaction failures, dormant accounts, and customer mistrust that dilute the intended impact on financial inclusion. The paper concludes by proposing broad policy and managerial recommendations such as strengthening rural connectivity, enhancing cybersecurity frameworks, investing in digital literacy and agent training, and leveraging fintech partnerships, thereby offering a structured agenda for making SFB-led digital inclusion more resilient and sustainable.

Keywords: Small Finance Bank, Fintech, E-KYC, Artificial Intelligence (Ai), And Unified Payments Interface (UPI)

Introduction

Small Finance Banks (SFBs), which provide banking to rural and impoverished people utilizing simple digital choices like mobile banking, UPI, and quick account opening, are crucial to India's efforts to attain financial inclusion. The Reserve Bank of India (RBI) established Small Finance Banks (SFBs) on September 16, 2015, mandating an initial minimum capital of ₹100 crore (subsequently revised to ₹200 crore), pursuant to the Nachiket Mor Committee's 2013 recommendations for differentiated banking models to enhance financial inclusion. On September 17, 2015, RBI accorded in-principal approval to ten entities. SFBs are statutorily required to prioritize underserved populations such as micro-enterprises, marginal farmers, and small businesses through 25% rural branching, leveraging low-cost digital channels like UPI, AEPS, e-KYC, and mobile banking to serve underserved populations

efficiently, 50% loans below ₹25 lakh, and 75% priority sector lending, while complying with CRR, SLR, and CAR norms.

In 2015, RBI started granting SFB licenses, which allowed organizations like Ujjivan, AU, Equitas, ESAF, Jana, Capital Small Finance Bank, and Suryoday to quickly grow. Through programs like PMJDY, these organizations provide accessible loans, deposits, and transactions to small farmers, women entrepreneurs, retailers, and micro-enterprises. These financial institutions not only empower individuals by offering essential banking services but also stimulate local economies by fostering entrepreneurship and enhancing productivity. As SFBs continue to expand their reach, they play an increasingly vital role in bridging the financial gap for underserved populations across the country. However, technology in SFBs also faces key issues like weak rural internet, cyber fraud dangers, low user skills, high setup costs, and weak data protection, causing many unused accounts and low trust despite RBI's 2025 rules for safer digital banking. Addressing these challenges will require collaborative efforts between the government, financial institutions, and technology providers to enhance infrastructure and user education. Only then can the full potential of digital banking in rural areas be realized, fostering greater financial inclusion and security for underserved communities.

This study explores how technology helps SFBs provide cheap services, quick loans via data analytics, and easy mobile access to more people but creates problems like training gaps and power outages. It reviews RBI data, bank reports, NPCI statistics, and recent papers to offer simple fixes like better agent training and government internet support to address these challenges. By implementing these solutions, the study aims to enhance the overall efficiency of SFBs, ensuring that they can serve underserved populations more effectively while minimizing operational disruptions.

Literature Review

Dr. Rahmuddin Miyan and Abhishek Kumar Mishra (2025) Digital banking is a key driver of financial inclusion in developing economies like India, particularly in rural areas. This study assesses the reach, usage, and effectiveness of digital banking in rural Bihar, revealing a positive link between digital usage and financial inclusion, but also persistent barriers such as digital illiteracy, weak internet infrastructure, and low trust. It concludes with recommendations for policymakers and financial institutions to expand digital access and reduce the inclusion gap.

N. Hasan et al. (2024) This study examines financial literacy's impact on fintech adoption in microfinance services for urban poor borrowers in Uttar Pradesh, India. Using a cross-sectional survey of 231 respondents and AMOS 22.0, it applied structural equation modelling with 500 bootstrap samples to confirm financial literacy's mediating role between fintech adoption and microfinance services. Results (R^2 = 47%), including demographics, correlations, path coefficients, and direct/indirect effects in tables, advance knowledge on fintech and microfinance for underserved urban populations.

S. Nanda et al. (2024) Fintech blends modern technology with financial services, yet its rapid growth outpaces digital financial literacy. This study surveys 167 small business owners in

Moradabad, Uttar Pradesh, revealing that four digital literacy dimensions—financial product knowledge, risk awareness, complaint resolution, and internet ease—significantly influence AI adoption.

N. Hasan, A.K. Singh, and R. Dwivedi (2024) This study examines the key drivers of fintech adoption for financial inclusion in Indian microfinance institutions (MFIs). Predictors of organizational attitude include efficiency, consistency, convenience, and reliability, while attitude, ease of use, and perceived benefits influence adoption intention. Using purposive sampling, surveys were collected from targeted respondents. Findings reveal that convenience and consistency foster positive attitudes toward fintech, with perceived benefits emerging as the strongest predictor of adoption intent. Reliability positively affects attitude but has an insignificant impact on organisational attitude to adopt fintech.

Keda Zhu (2024) This study shows that fintech-driven digitalization boosts inclusive finance efficiency, customer satisfaction, non-interest income, and overall bank performance, but requires careful risk-benefit analysis of platform data flows. Banks should develop unified digital strategies at headquarters, tailor fintech rollout to local development levels at branches, and optimize credit allocation accordingly.

Dr. G. Anitha (2024) The banks face challenges such as high costs, managing non-performing assets, prudential standards, technological changes, and economic competition. The study predicts that Ujjivan Bank should focus on earning criteria and management competence to increase profitability. The future trends of these banks are predicted to be profitable through expansion, technology implementation, and minimal operating costs.

Monica Nirolia and Monika (2024) The Indian government is implementing financial inclusion strategies through Small Finance Banks, providing standard banking services in rural and semi-urban areas. This study aims to assess customer satisfaction with these banks using standardized questionnaires and SPSS 20. The results show that most consumers have a positive attitude towards AU Small Finance Bank and are satisfied with the services offered.

Dr. Pritha Chaturvedi (2022) Examines SFBs' role in financial inclusion, RBI licensing criteria from 2014–15 Union Budget guidelines, and COVID impacts. The study stresses low-cost operations, staff training, mobile technology for rural outreach, and financial education to reduce cash reliance in India's digital shift.

Prasanna Prakash (2021) Analyses SFB growth in India using secondary data, emphasizing their role in financial inclusion, agriculture, trade, and socioeconomic development. RBI mandates 75% priority sector lending (over 80% from SFBs), with improved asset quality in 2019–20 and RBI initiatives expanding their reach.

Jagrati Gupta (2021) Investigates SFBs' financial activities and unique model for basic banking and credit to micro and small businesses and agriculture, using primary and secondary data from top SFB authorities. It identifies challenges in technology management, low-cost liabilities, regulatory compliance, digital connectivity, and affordable product expansion.

Viswan M. G. (2022) Studies MFI-to-SFB transition via ESAF in rural Thrissur, Kerala, using primary data from 50 respondents (46% with MFI/NBFC accounts). It highlights unbanked gaps, MSME financing needs, women-focused microfinance, RBI 2015 approval, and

recommends lower loan rates, stronger governance, and unique technology strategies for NBFC-MFIs becoming SFBs.

S. Kangayan and K. Dhevan (2020) Assess SFB sustainability in India via quantitative and qualitative analysis of six SFBs' annual reports, testing if funding costs impact net interest margins. Findings show scalability (linear correlation 0.02), accept H1 (costs do not impair profitability), and conclude SFBs are competent with strong regulatory compliance akin to scheduled commercial banks.

T. Ravikumar, N. Murugan, and J. Suhashini (2020) Review RBI's promotion of SFBs since 2010 for technology-enabled services to low-income groups, noting 12 SFBs with 3,509 branches, rising deposits and advances, and stability via NNPA and CAR ratios. Challenges include branch setup, lending and deposit mobilization, high costs, unique models, affordable products, disruptive technology adoption, competition, scale limits, and compliance.

Singh and Tiwari (2020) The study highlighted limited digital literacy, unstable internet access, and fear of fraud as key barriers to digital adoption. These results are consistent with the RBI's 2022 Financial Literacy Survey, which reported that although 80% of the rural population held a bank account, only 45% were regular users of digital banking services.

Research Methodology

This study adopts a descriptive research design, relying exclusively on secondary data from RBI DBIE reports, NPCI transaction statistics (2023–2025), annual disclosures of major SFBs (e.g., Ujjivan, AU, Equitas), and peer-reviewed journals to provide a comprehensive analysis of the trends and patterns in the digital payment landscape. By synthesizing these diverse sources, the research aims to highlight the evolving role of Small Finance Banks in promoting financial inclusion and innovation in the sector.

Objectives of the Study

- Examine technological advantages of SFBs in digital inclusion.
- Identify key challenges in tech infrastructure and user adoption.

Limitations of the Study

The present study, constrained by its exclusive use of secondary data sources such as RBI reports and industry publications, encounters limitations in data alignment with the specific technological challenges faced by Small Finance Banks in India's rural contexts. Verification of data accuracy, completeness, and potential biases from original datasets proved unfeasible. Primary insights from stakeholders and real-time perspectives on dynamic issues like cybersecurity remain absent. Future research incorporating primary surveys is recommended for enhanced validity and depth.

Technological Advantages of Small Finance Banks in Digital Inclusion

- Cost Reduction: Digital channels such as UPI, AEPS, and mobile apps drastically reduce the need for extensive physical branches, lowering operational expenses by 40–50% compared to traditional banking models. This allows SFBs to serve remote customers cost-effectively via agent networks and POS devices, making micro-transactions viable for low-income groups.
- Fast Onboarding: e-KYC and Aadhaar-linked verification enable account opening in

under 10 minutes without paperwork, significantly improving access for migrants, women entrepreneurs, and daily wage earners who face documentation barriers. This streamlines entry into formal finance under PMJDY.

- Scalable Transactions: Seamless NPCI integration facilitates high-volume, low-value payments like remittances, subsidies via DBT, and merchant QR transactions across interoperable platforms. Agents and BC models extend services to unbanked villages without heavy infrastructure investment.
- Data-Driven Lending: Real-time analytics from digital transaction histories enhance micro-credit risk profiling for small farmers and MSMEs, reducing gross NPAs to 3–5% (below industry averages) through predictive models and automated monitoring.
- 24/7 Access: Mobile and internet banking provide round-the-clock self-service for deposits, transfers, and bill payments, benefiting shift workers, rural women, and small traders who cannot visit branches during standard hours. Features like voice-assisted apps aid low-literacy users.
- Fintech Partnerships: Open APIs connect SFBs with third-party platforms for instant tablet-based loan approvals, embedded insurance, and customized products. Collaborations with apps like Paytm or PhonePe accelerate rural credit delivery while sharing compliance costs.

Technological Challenges Faced by Small Finance Banks

- Rural Infrastructure Gaps: Inadequate internet connectivity, frequent power disruptions, and substandard broadband coverage in approximately 60% of rural India severely hamper AEPS transactions, UPI payments, and mobile banking reliability, resulting in failure rates as high as 30% during peak usage. This forces manual fallbacks, erodes user confidence, and increases costs for SFBs serving remote unbanked populations under the 25% rural branching mandate.
- Cybersecurity Vulnerabilities: Constrained capital bases limit investments in sophisticated firewalls, real-time fraud detection AI, encryption tools, and mandatory RBI 2025 cybersecurity audits, leaving SFBs susceptible to phishing attacks, biometric fingerprint spoofing, agent-level data breaches, and ransomware in high-velocity digital channels. Rising cyber incidents (up 25% post-2023) threaten the stability of small loan portfolios.
- Low Digital Literacy: Around 40–50% of SFB target demographics—rural women, marginal farmers, and semi-literate labourers—possess minimal smartphone proficiency or app navigation skills, contributing to over 11 crores dormant PMJDY accounts nationwide. This fosters dependency on assisted modes, heightens fraud risks from PIN sharing, and stalls the shift to independent self-service banking essential for sustainable inclusion.
- High Implementation Costs: Upgrading to robust core banking systems, migrating to IPv6-compliant infrastructure, developing omnichannel platforms, and integrating regulatory APIs impose heavy financial burdens on SFBs with modest balance sheets (minimum ₹200 crore capital), diverting resources from core lending activities amid

stringent 75% priority sector lending norms and competition from larger universal banks.

- Regulatory Compliance Burden: Evolving RBI mandates, including the 2022 digital lending guidelines for borrower consent and data privacy, plus 2025 digital banking channels directions prohibiting forced digital onboarding, require perpetual IT updates, audit trails, and grievance mechanisms. These overwhelm under-resourced IT teams in nascent SFBs, delaying innovation and increasing non-compliance penalties.
- Agent Network Risks: Heavy reliance on 2–3 million Banking Correspondents (BCs) for last-mile delivery introduces vulnerabilities like POS device tampering, unauthorized PIN handling, over-the-counter "proxy" transactions, and inconsistent service quality, which perpetuate cash dependency and prevent genuine digital adoption among low-trust, first-time users in underserved regions.

Strategies To Overcome Technological Barriers in Small Finance Banks

Rural Connectivity and Infrastructure

- USOF/BharatNet support was used to target broadband subsidies in unbanked rural areas, giving priority to SFB branches and BC sites to ensure that AEPS, UPI, and micro-ATM transactions function dependably for low-income clients.
- To decrease transaction failures and incomplete DBT transfers for welfare recipients, SFB service-area plans should impose network and power backup requirements at BC outlets (minimum uptime, alternate connectivity such as multi-SIM routers).

Cybersecurity and Customer Protection

- To make advanced protection affordable for smaller banks, implement RBI-aligned cybersecurity frameworks (Zero Trust, continuous monitoring, vendor risk controls) in SFBs with pooled SOC services and simplified templates.
- Implement risk-based authentication and liability safeguards for low-value transactions to protect low-income consumers from the majority of losses caused by digital fraud and foster confidence in UPI/AEPS channels.

Digital Literacy and Agent Training

- Incorporate SFBs into national digital and financial literacy programs (PMJDY, PMGDISHA, NABARD CFLs) and leverage local NGOs and CSCs to provide first-time poor users with practical, vernacular training on UPI, AEPS, and grievance redressal.
- Make training on responsible behavior, cyber hygiene, supported digital transactions, and charge disclosure mandatory for BCs and agents. Connect training completion to incentive and licensing programs.

Fintech Partnerships and Inclusive Design

- Under RBI's fintech SRO framework, promote API-based collaborations between SFBs and fintechs to jointly develop ultra-simple, low-cost products (voice-based, regional language, icon-driven apps, offline-capable UPI) for low-literacy consumers.

- Encourage data sharing using Account Aggregator for consent-based, small-ticket credit scoring of low-income households, making sure that consent flows and counselling are explicit so that digital footprints from microtransactions or welfare payments convert into formal credit that is affordable.

Conclusion

This study emphasizes how technology plays two roles in SFBs' efforts to promote digital financial inclusion in India. Digital tools such as UPI, AEPS, and e-KYC provide efficient and cost-effective outreach, but they also create a "digital paradox" due to low literacy, cybersecurity threats, rural infrastructure gaps, and compliance obstacles. SFBs should give priority to cybersecurity improvements, agent training, literacy initiatives, rural connectivity, and fintech collaborations in order to address these issues. Such actions are consistent with the RBI's objective of equitable finance and can support inclusive growth.

Future Scope of the Study

Longitudinal Impact Assessment: Future research should conduct longitudinal assessments of SFB interventions like cybersecurity enhancements and agent training, using 3–5 year panel data from multiple SFBs to track digital adoption (e.g., UPI/AEPS volumes, post-literacy dropout rates) among rural, low-literacy communities for sustained financial inclusion.

Comparative Analysis Across SFBs: Future studies could compare technology strategies across SFBs (e.g., Ujjivan vs. Equitas) and regions (e.g., Uttarakhand hills vs. Bihar plains), using econometric models to quantify infrastructure gaps' impact on the digital paradox and identify scalable best practices under RBI guidelines.

AI and Emerging Technology Integration: Examine how AI-driven solutions, such as voice-based UPI interfaces in local languages or predictive fraud detection, might reduce cybersecurity risks and literacy obstacles. Empirical research might test these in underprivileged communities, using pre–post surveys to gauge increases in customer trust and e-KYC completion rates.

Policy Simulation: Use models (e.g., game theory or agent-based models) to simulate RBI policies like subsidized rural 5G or fintech interoperability, predicting their effects on SFB outreach, compliance barriers, and equitable digital finance.

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