



A STUDY OF EMERGING PATTERNS AND CHANGES IN INDIA'S BANKING SECTOR

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Abstract

India's banking sector has undergone substantial structural and technological change, moving from a predominantly branch-oriented model towards an increasingly digital, data-driven and customer-centric financial ecosystem. The present study examines emerging patterns and changes in India's banking sector with particular attention to digital banking, mobile banking, Unified Payments Interface (UPI), FinTech collaboration, artificial intelligence (AI), machine learning, digital lending, financial inclusion, cybersecurity and regulatory developments. The study is based entirely on secondary data obtained from the Reserve Bank of India (RBI), Government of India publications and recent academic literature. The review indicates that digital transformation has become a central feature of Indian banking, while FinTech has increasingly acted both as a source of competition and as a collaboration partner for traditional banks. Recent research also highlights the growing role of AI in risk assessment, fraud detection, customer service and financial decision-making. At the same time, cybersecurity, privacy, operational resilience, consumer protection and responsible use of AI have emerged as major challenges. RBI data indicate continued progress in financial inclusion and expansion of the digital payments ecosystem. The study concludes that the future of Indian banking will depend on the ability of banks to combine technological innovation with security, customer trust, financial stability, regulatory compliance and inclusive access. The paper contributes an integrated view of the major emerging patterns shaping the Indian banking sector.

Keywords: Indian banking sector. digital banking. UPI. FinTech. artificial intelligence. cybersecurity. financial inclusion. digital transformation. banking reforms. customer-centric banking.

1. Introduction

Banks play a central role in economic development by mobilising savings, allocating credit, facilitating payments and supporting investment and entrepreneurship. India's banking system includes public sector banks, private sector banks, foreign banks, regional rural banks, cooperative banks and other regulated financial institutions. Over time, reforms, competition and technological progress have changed the structure and delivery of banking services.

The earlier paper on which this study is based identified digitisation, mobile banking, blockchain, banking reforms and financial-sector developments as important areas of change. It also emphasised the influence of technology on operational efficiency and customer service. The present version updates that perspective by incorporating the post-COVID expansion of digital payments, FinTech, AI-enabled banking, cybersecurity, financial inclusion and recent regulatory priorities. The original paper described digital services as becoming an indispensable part of Indian banking and identified online banking, IMPS, RTGS and NEFT as important stages in the digital evolution of banking.

The COVID-19 period accelerated the use of remote and contactless financial services. Since then, UPI and other digital-payment channels have become deeply integrated into everyday transactions. At the same time, banking institutions increasingly use data analytics, AI and automation for customer service, fraud management, credit assessment and operational decision-making. Recent literature shows that the research agenda has also shifted from simple technology adoption towards questions of performance, financial inclusion, security, governance and responsible innovation.

Against this background, the present study examines the major emerging patterns and changes in India's banking sector and identifies the opportunities and challenges associated with the transformation.

2. Review of Literature

Pandey et al. (2024) conducted a bibliometric and content analysis of 366 Scopus-indexed publications on FinTech in banking and finance. The study identified major research clusters around digital transformation, crowdfunding, lending, credit sourcing, stock-market integration and blockchain, and highlighted the need for broader contextual and methodological research. This indicates that FinTech has moved from being a peripheral innovation to a major research and strategic theme in banking.

Choudhary and Thenmozhi (2024) reviewed 141 high-quality studies on FinTech using an ADO framework. They identified four major themes: bank–FinTech dynamics, FinTech business models, disruptive technologies and the broader footprints of FinTech. Their review shows that FinTech can operate both as a complement and a substitute to traditional financial providers, while bank–FinTech collaboration, regulatory support and risk management remain important areas for future research.

Research on digital transformation has also expanded considerably. A 2025 bibliometric study analysed 900 Scopus publications from 2011–2024 and found that banking digital transformation research increasingly addresses FinTech, technology adoption, customer experience and organisational change. The study also identified a gap in holistic approaches that integrate the different dimensions of banking transformation.

Recent systematic research has linked FinTech innovation with financial inclusion and financial stability. The 2024 review in Emerging Markets Review shows that financial innovation can improve access to formal financial services, while also raising questions about stability, regulation and consumer protection. Thus, digitalisation should be assessed not only in terms of convenience and efficiency but also in terms of its wider financial-system effects.

AI and machine learning are another major emerging pattern. A 2024 bibliometric review of AI and ML in financial services analysed 1,045 studies and identified major research clusters involving FinTech, risk management, anti-money laundering and related applications. The findings demonstrate the broadening role of AI beyond automation towards risk and compliance functions.

A 2024 mixed-method literature study on AI in banking identified predictive modelling for risk assessment and detection, financial decision-making, customer-service delivery and AI-enabled FinTech applications as major themes. The study also indicates that future research needs to examine governance, customer behaviour and responsible implementation of AI.

Hentzen et al. (2022) reviewed AI in customer-facing financial services and found that existing studies have concentrated on algorithmic accuracy, credit scoring and consumer adoption. The authors called for greater attention to financial behaviour, regulation, ethics and policy. This is particularly relevant to Indian banks as AI-enabled services become more common.

Cybersecurity has become a parallel concern. **Javaheri et al. (2024)** systematically reviewed 74 studies on cybersecurity threats in FinTech and developed a taxonomy of threats and defence strategies. Their findings demonstrate that rapid technological development and AI-enabled cyber threats require stronger and more adaptive security arrangements.

Indian banking research also shows that digitalisation is changing credit processes. A study of Indian banks published in Digital Finance examined how digitalisation, Big Data and soft information can support SME credit evaluation. The study illustrates how digital tools can change not only customer-facing services but also internal banking processes such as lending and credit assessment.

Recent Indian evidence also emphasises the supply-side foundations of digital payments. Motheram and Buteau (2026) examined digital-payment adoption across 711 Indian districts between 2020 and 2024, focusing on merchant networks and digital infrastructure as drivers of UPI adoption. This indicates that the next stage of banking digitalisation depends not only on consumer demand but also on infrastructure and the availability of digital acceptance points.

The Reserve Bank of India (2025) reported continued progress in financial inclusion and digital payments. The Financial Inclusion Index increased by 6.8 per cent year-on-year to 64.2 in March 2024, while RBI continued initiatives to expand digital-payment coverage, financial literacy and credit access.

RBI's 2024–25 regulatory and supervisory review further emphasised cyber and IT risk assessment, fraud detection, consumer protection and the need to strengthen governance and risk management in the financial system. The evidence indicates that banking transformation is therefore simultaneously a technological, operational and regulatory transformation.

3. Research Gap

The existing literature provides extensive evidence on individual dimensions of banking transformation, including digital banking, FinTech, UPI, AI, cybersecurity and financial inclusion. However, these themes are often examined separately. There is a need for an integrated study that connects technological change with operational efficiency, customer service, financial inclusion, risk management and regulatory developments in the Indian context. The 2025 digital-transformation bibliometric study similarly notes that much of the literature focuses on specific dimensions rather than providing a holistic view.

The present study addresses this gap by examining the major emerging patterns together and by relating technological transformation to the broader development and resilience of India's banking sector.

4. Objectives of the Study

- To understand the nature and development of the banking sector in India.
- To identify the major emerging patterns and changes in Indian banking.
- To examine the influence of digitalisation and FinTech on banking operations and services.
- To analyse the growing role of UPI, mobile banking, AI, data analytics and digital lending.
- To examine the relationship between technological development and financial inclusion.

5. Scope of the Study

The study is restricted to the Indian banking sector and focuses on broad structural and technological developments. It covers public sector banks, private sector banks and the wider regulated banking ecosystem where relevant. The analysis concentrates on developments in the digital era, with particular attention to the period from approximately 2020 to 2026 while using earlier literature to establish historical context.

6. Research Methodology

The study follows a descriptive and analytical research design based entirely on secondary data. The original paper also used secondary sources and described the study as descriptive in nature.

Secondary information has been drawn from Reserve Bank of India annual reports and publications, Government of India policy documents, and peer-reviewed academic literature published in recognised journals. Recent literature from 2022–2026 was emphasised to update the earlier review. The analysis is thematic rather than statistical because the objective is to identify and interpret major sectoral patterns rather than estimate a causal relationship from primary survey data.

Major analytical themes: digital transformation; digital payments and UPI; FinTech and bank collaboration; AI and machine learning; digital lending and credit assessment; financial inclusion; cybersecurity and privacy; customer experience and trust; regulation and operational resilience.

7. Emerging Patterns and Changes in India's Banking Sector

7.1 Digital Transformation

Indian banking has moved from computerisation of routine operations to integrated digital banking ecosystems. Internet banking, mobile applications, automated service channels, digital onboarding, electronic payments and data-driven decision-making have reduced dependence on physical branches for many routine transactions. Recent research describes digital transformation as a strategic requirement for efficiency, competitiveness and adaptation to changing customer expectations.

7.2 UPI and Digital Payments

UPI has become one of the most visible transformations in India's banking and payment system. Its real-time, low-friction functionality has supported widespread use among consumers and merchants. Recent evidence indicates that UPI's share of digital transaction volume increased substantially between 2019 and 2024, while credit-card use also expanded but at a slower pace than UPI.

The continuing expansion of digital payments has implications for banks' payment infrastructure, fraud-management systems, customer support, transaction monitoring and financial inclusion. RBI has also supported measures to deepen digital-payment coverage across districts and to improve access for underserved groups.

7.3 FinTech and Bank–FinTech Collaboration

FinTech has changed the competitive structure of financial services by introducing new payment, lending, advisory and technology-based business models. Current literature suggests that FinTech firms can compete with banks while also providing technologies and services that banks can integrate into their own operations. Consequently, bank–FinTech partnerships, platform-based services and embedded financial products are becoming important components of the banking ecosystem.

7.4 Artificial Intelligence and Machine Learning

AI and ML are increasingly relevant to fraud detection, credit scoring, risk assessment, customer service, anti-money-laundering activities, personalisation and financial decision-making. Literature reviews show that AI research in finance has expanded from technical applications towards customer-facing services and governance questions.

The use of AI also creates risks relating to explainability, bias, privacy, model risk and operational dependence. Therefore, banks need governance mechanisms that combine algorithmic performance with human oversight, auditability and consumer protection.

7.5 Digital Lending and Credit Assessment

Digitalisation is transforming the way banks collect and analyse information for lending. Big Data and digital records can complement traditional financial information and improve the speed of credit assessment, particularly for small businesses. Evidence from Indian banks shows that digital tools can facilitate the use of soft information and data-driven assessment in SME financing.

At the same time, rapid digital lending requires careful attention to responsible lending, data privacy, transparency, customer consent and credit-risk management.

7.6 Financial Inclusion

Digital banking has strengthened the potential to reach customers who were previously underserved by conventional banking channels. Financial inclusion now involves not only opening accounts but also ensuring access to payments, credit, savings,

financial literacy and suitable digital services. RBI reported that the Financial Inclusion Index reached 64.2 in March 2024 and continued initiatives to deepen digital-payment access and credit delivery.

7.7 Cybersecurity, Fraud and Privacy

Greater digital dependence has increased exposure to cyber threats, fraud, identity theft, data breaches and technology-related operational failures. Recent systematic reviews identify cybersecurity as one of the central challenges associated with FinTech and digital banking.

RBI's recent regulatory work places continued emphasis on cyber/IT risk assessment, fraud detection, consumer protection and operational resilience. Therefore, cybersecurity should be treated as a core banking function rather than merely an IT issue.

7.8 Customer Experience and Trust

Modern customers increasingly expect banking services to be fast, convenient, accessible and personalised. However, convenience must be supported by trust and security. Recent research on FinTech adoption identifies trust, security, perceived usefulness and performance expectations as important factors influencing adoption.

Banks therefore need to balance automation with accessible human support, transparent communication and effective grievance-redressal mechanisms, especially when customers face fraud or digital-service failures.

7.9 Regulation and Financial Stability

The transformation of banking has increased the importance of regulatory adaptation. New technologies can improve efficiency but may also introduce new forms of operational, cyber, third-party and model risk. RBI's 2024–25 regulatory review emphasised financial stability, governance, risk management, cybersecurity, fraud detection and consumer protection while supporting responsible innovation.

8. Findings

- Indian banking has shifted from conventional branch-centred delivery towards a digital and customer-centric ecosystem.
- UPI and other digital-payment channels have become major drivers of changes in banking behaviour and payment infrastructure.
- FinTech increasingly functions as both a competitor and a strategic partner to traditional banks.
- AI and machine learning are expanding into fraud detection, risk assessment, credit decisions, customer service and compliance.
- Digitalisation is changing internal processes such as SME credit assessment in addition to customer-facing services.
- Financial inclusion is increasingly linked with digital payments, financial literacy and digital access.
- Cybersecurity, fraud prevention, privacy and operational resilience are becoming strategic priorities.
- Customer trust remains essential even as banks increase automation and digital service delivery.
- Regulation must evolve alongside technological innovation to preserve financial stability and consumer protection.
- A holistic approach is required because technology, customer behaviour, operational efficiency, financial inclusion and risk management are interconnected.

9. Suggestions

- Strengthen cybersecurity through continuous risk assessment, security testing, fraud monitoring and rapid incident-response mechanisms.
- Expand customer education on safe digital banking, UPI fraud prevention, privacy and responsible use of digital credit.

- Develop responsible AI governance covering explainability, bias monitoring, human oversight, data quality and model validation.
- Strengthen bank–FinTech collaboration while maintaining clear accountability, data protection and regulatory compliance.
- Continue expanding digital-payment infrastructure in rural and underserved areas.
- Improve digital accessibility for elderly, low-literacy and digitally inexperienced customers.
- Use Big Data and AI to improve credit assessment while ensuring responsible lending and customer consent.
- Maintain effective grievance-redressal systems alongside digital self-service channels.
- Invest in employee reskilling so that banking staff can work effectively with AI, analytics and digital systems.
- Encourage innovation without weakening financial stability, consumer protection and institutional governance.

10. Limitations of the Study

- The study is based entirely on secondary sources and does not include a primary survey of bank customers or employees.
- The paper provides a broad sectoral assessment rather than a bank-by-bank performance comparison.
- Some emerging technologies are developing rapidly, so their long-term impact may change as regulation and adoption evolve.
- The study does not estimate causal relationships between technology adoption and bank profitability or efficiency.

11. Conclusion

India's banking sector is undergoing a broad transformation in which technology, customer expectations, FinTech and regulation are changing the traditional banking model. The transformation began with computerisation and electronic banking and has progressed towards mobile banking, UPI, data analytics, AI-enabled services, digital lending and integrated financial platforms. The original paper correctly identified digitisation, mobile banking and technology-enabled efficiency as important developments; the latest evidence shows that these changes have now become deeper and more systemic.

The future of Indian banking is therefore unlikely to be defined by digitalisation alone. Successful banks will need to combine innovation with cybersecurity, customer trust, responsible AI, financial inclusion, regulatory compliance and operational resilience. Recent RBI evidence on financial inclusion and supervisory priorities supports the view that technological progress must be accompanied by secure and inclusive financial-system development.

Overall, the emerging pattern is a movement from traditional banking towards an interconnected, data-driven and digitally enabled financial ecosystem. This creates significant opportunities for efficiency, inclusion and customer service, but it also requires continuous investment in skills, governance, security and responsible innovation. The study therefore concludes that the competitiveness and sustainability of Indian banks will increasingly depend on their ability to manage both the opportunities and the risks of digital transformation.

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