

ROLE OF AI AND UPI IN PROMOTING DIGITAL FINANCIAL INCLUSION IN INDIA: A DESCRIPTIVE STUDY

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Abstract

The rapid growth of financial technology has changed the way financial services are delivered and accessed in India. Artificial intelligence (AI) and the Unified Payments Interface (UPI) have become important components of this transformation: AI is increasingly applied in fraud detection, risk assessment, financial analysis, customer support and personalised services, while UPI provides an interoperable platform for instant digital payments. This study examines the role of AI and UPI in promoting digital financial inclusion in India, focusing on the growth of UPI-based payments, the applications of AI in digital financial services and their contribution to improving access to financial services. It adopts a descriptive research design based on secondary data from the National Payments Corporation of India, the Reserve Bank of India, the World Bank and research publications. UPI transaction volume rose by about 9.7% between April and August 2026 and the number of banks live on UPI increased from 713 to 752, while the RBI Financial Inclusion Index reached 64.2 in March 2024 and account ownership stood at 90% for both men and women in 2024. The study also considers the major challenges, including cybersecurity threats, digital fraud, data privacy concerns, limited digital literacy and regulatory requirements. It concludes that the responsible integration of AI and UPI, together with effective security measures, data protection, digital awareness and suitable regulatory support, can contribute to a more accessible and inclusive digital financial ecosystem in India.

Keywords

Artificial Intelligence, Unified Payments Interface, Digital Financial Inclusion, Digital Financial Services, FinTech

1. Introduction

The rapid growth of digital technology has significantly transformed the financial sector in India. Financial technology (FinTech) has enabled financial services to become more accessible, convenient and technology-driven (Gomber et al., 2017; Schueffel, 2016), and among the major developments, AI and UPI have gained considerable importance in the digital financial ecosystem (Lee & Shin, 2018; Philippon, 2016). AI is increasingly used for fraud detection, risk assessment, financial analysis and customer support, while UPI enables convenient and instant digital payments by connecting different banks and payment platforms (National Payments Corporation of India [NPCI],

2026). The growing use of these technologies has created new opportunities for individuals and businesses to access and use financial services digitally (Haddad & Hornuf, 2019).

Digital financial inclusion focuses on ensuring that people can access and effectively use appropriate financial services through digital channels. Although AI and UPI can support wider financial access, challenges such as cybersecurity, digital fraud, data privacy, limited digital literacy and unequal access to digital infrastructure remain important concerns. This study therefore examines the development of UPI-based digital payments, the applications of AI in financial services, and the opportunities and challenges associated with their contribution to digital financial inclusion in India.

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2. Review of Literature

Recent research has increasingly examined the relationship between digital payment technologies, AI, FinTech and financial inclusion in India. Haque et al. (2025) examined UPI usage and financial inclusion in rural India using primary data from rural areas of Aligarh district and found that age, education, occupation and income were associated with the likelihood of adopting UPI, highlighting the importance of socio-economic conditions. Rao and Upadhyaya (2026) studied the acceptance of UPI payment applications among small-scale merchants, treating UPI as an important component of digital public infrastructure that can support wider participation in the formal financial system. Esakki (2026) reported positive relationships between UPI adoption, digital payment usage and financial inclusion among 300 respondents in Tamil Nadu. Chopra et al. (2026) examined digital public infrastructure in rural India using transaction data and household surveys from 200 villages across four states and reported improvements in business registrations, savings accounts and female-owned enterprises in areas with higher UPI adoption.

Research on AI in financial services has also expanded considerably. A bibliometric review of AI and machine-learning applications in the banking, financial services and insurance sector identified FinTech, risk management and anti-money-laundering as major research areas, indicating the growing role of AI in financial-sector operations and decision-making. A recent systematic review of AI and financial inclusion highlights the potential of AI-driven FinTech to improve access to financial services while identifying concerns related to technology access, governance, privacy and responsible implementation, suggesting that technological advancement must be accompanied by measures that support inclusive and responsible development.

2.1 Research gap: The existing literature provides evidence on UPI adoption and financial inclusion and on the growing applications of AI in financial

services, but these areas are often examined separately. The present study addresses this gap by considering AI and UPI together and examining their combined relevance, opportunities and challenges for digital financial inclusion in India through secondary data.

3. Objectives of the Study

1. To examine the growth and adoption of UPI-based digital payment services in India using selected secondary data.
2. To analyse the role of AI in digital financial services in improving efficiency, transaction security, fraud detection, risk assessment and accessibility.
3. To assess the contribution of AI and UPI to digital financial inclusion in India and identify the major challenges involved.

4. Research Methodology

The study adopts a descriptive research design based on secondary data obtained from Reserve Bank of India (RBI) publications, NPCI reports, World Bank reports, research articles, academic journals, books and institutional publications relating to UPI-based digital payments, AI applications in financial services and digital financial inclusion. The information is organised and presented using tables, percentages and trend analysis, and relevant data are compared to identify developments in UPI adoption and the contribution of AI and digital payment services to financial inclusion. The study also considers major issues affecting digital financial inclusion, including cybersecurity risks, digital fraud, data privacy, digital literacy and access to digital infrastructure. It is limited by the availability and reliability of published secondary information and does not include primary data collected from users or financial institutions.

5. Data Analysis and Interpretation

Table 1. Growth of UPI Transactions in India, April–August 2026

<i>Month</i>	<i>Banks live on UPI</i>	<i>Transaction volume (million)</i>	<i>Transaction value (₹ crore)</i>
April 2026	713	22,346.80	29,02,988.05
May 2026	720	23,201.93	29,90,424.21
June 2026	731	22,716.07	28,92,138.67
July 2026	741	23,658.35	29,87,880.49
August 2026	752	24,508.96	29,82,355.95

Source: National Payments Corporation of India (2026), UPI product statistics.

Table 1 shows a generally increasing trend in UPI usage between April and August 2026. Transaction volume increased from 22,346.80 million in April to 24,508.96 million in August, an increase of approximately 9.67%, and the number of banks live

on the UPI platform increased from 713 to 752, indicating continued expansion of the UPI ecosystem. Although transaction value fluctuated across the months, it remained close to ₹29 lakh crore throughout the period.

Table 2. Selected Financial Inclusion Indicators

<i>Indicator</i>	<i>Value</i>
RBI Financial Inclusion Index (March 2024)	64.2
Year-on-year growth	6.8%

Source: Reserve Bank of India (2025), Annual Report 2024–25.

The RBI reported that India's Financial Inclusion Index increased to 64.2 in March 2024, registering year-on-year growth of 6.8%, with improvement across all three sub-indices (Reserve Bank of India,

2025). This indicates continued progress in financial inclusion and provides the broader context in which digital financial services such as UPI operate.

Table 3. Digital Financial Access Indicators in India, 2024

<i>Indicator</i>	<i>Percentage (%)</i>
Adults with an account – men	90
Adults with an account – women	90
Adults owning a mobile phone	65

Source: World Bank (2025), Global Findex 2025 (data for 2024).

Account ownership among both men and women in India was 90% in 2024, while 65% of adults owned a mobile phone (World Bank, 2025). These indicators show that important foundations for participation in digital financial services are in place; however, access alone does not guarantee effective inclusion, as digital literacy, security, privacy and connectivity also influence the use of digital financial services.

Overall, the secondary data show three important developments: UPI expanded considerably in both transaction volume and participating banks during

April–August 2026; India's Financial Inclusion Index reached 64.2 in March 2024; and high account ownership and substantial mobile-phone access create favourable conditions for digital financial participation. Together, these indicators provide a quantitative basis for examining how UPI and AI-enabled financial services can contribute to digital financial inclusion.

6. Role of AI in Digital Financial Services

AI plays an important role in digital financial services by analysing large amounts of financial data, identifying patterns and supporting faster decision-making, thereby improving efficiency, security and accessibility. Its main applications are as follows:

- **Fraud detection:** analysing transaction patterns to identify unusual or suspicious activities.
- **Risk assessment:** assessing credit and financial risks by analysing relevant data.
- **Digital payments and UPI:** supporting transaction monitoring, fraud prevention and payment security.
- **Financial analytics:** processing financial and customer data to generate insights for better decisions.
- **Customer service:** providing quick responses to routine queries through chatbots and virtual assistants.
- **Automation:** automating repetitive activities such as data processing, transaction monitoring and routine verification.

When combined with digital payment systems such as UPI, AI can therefore contribute to a more secure, efficient and inclusive digital financial ecosystem.

7. Regulatory Challenges in Digital Financial Inclusion

RBI Digital Lending Guidelines, 2022: The Reserve Bank of India (2022) introduced guidelines to strengthen customer protection and ensure responsible digital lending, covering transparency in lending, disclosure of important information, responsible data collection, grievance redressal and the involvement of regulated entities. These measures are important for maintaining trust and protecting borrowers.

Digital Personal Data Protection Act, 2023: The Act provides a legal framework for the processing and protection of digital personal data (Ministry of Electronics and Information Technology, 2023). Since digital financial services involve the collection and processing of personal and financial information, appropriate data-protection practices are essential for privacy, security and user trust.

Effective implementation of these regulatory and

data-protection requirements is important for ensuring a secure, transparent and inclusive digital financial ecosystem in India.

8. Findings

1. UPI has become an important component of India's digital payment ecosystem, with transaction volume and the number of participating banks growing during the selected period; this expansion of digital payment infrastructure supports greater access to convenient financial services.

2. The increase in the Financial Inclusion Index indicates continued progress in financial inclusion in India and provides a broader context for the growth of digital financial services.

3. AI is an important technology in financial services, particularly in fraud detection, risk assessment, financial analysis and customer support.

4. UPI and AI contribute in different but complementary ways: UPI supports convenient digital transactions, while AI strengthens the efficiency, security and accessibility of financial services.

5. Cybersecurity, digital fraud, data privacy, limited digital literacy and unequal access to digital infrastructure remain important challenges, and the effective use of AI and UPI requires appropriate security measures, digital awareness and regulatory safeguards.

9. Suggestions

1. Awareness programmes should be promoted to help users understand digital payments, online safety, responsible use of financial technologies and relevant digital-finance regulations.

2. Financial institutions and payment platforms should strengthen security systems to reduce fraud and unauthorised transactions, and follow strong data-protection practices to safeguard customers' personal and financial information.

3. AI applications in financial services should be implemented with appropriate monitoring,

transparency and safeguards to ensure reliable and responsible decision-making.

4. Better connectivity and user-friendly, affordable digital services should be encouraged, particularly for users who face difficulties in accessing digital financial platforms.

10. Conclusion

AI and UPI are important components of India's evolving digital financial ecosystem. The analysis indicates continued growth in UPI-based digital payments and progress in financial inclusion, while AI offers applications that can improve the efficiency, security and accessibility of financial services. At the same time, cybersecurity risks, digital fraud, data privacy concerns, limited digital literacy and unequal access to digital infrastructure need continued attention, so technological development should be supported by effective security measures, digital awareness, responsible AI practices and appropriate regulatory safeguards. The effective integration of AI and UPI can support wider participation in digital financial services and advance digital financial inclusion in India.

References

- [1]. Chopra, K., Sidana, N., & Arora, R. (2026). Digital public infrastructure as a driver of financial inclusion in India. *Discover Sustainability*, 7, Article 155. <https://doi.org/10.1007/s43621-025-02507-9>
- [2]. Esakki, N. (2026). Impact of UPI adoption and digital payment usage of financial inclusion: An empirical study of Tamil Nadu state. *International Journal on Research and Development – A Management Review*, 15(1), 325–336. <https://doi.org/10.65521/ijrdmr.v15i1.2187>
- [3]. Gomber, P., Koch, J.-A., & Siering, M. (2017). Digital finance and FinTech: Current research and future research directions. *Journal of Business Economics*, 87(5), 537–580. <https://doi.org/10.1007/s11573-017-0852-x>
- [4]. Haddad, C., & Hornuf, L. (2019). The emergence of the global FinTech market: Economic and technological determinants. *Small Business Economics*, 53(1), 81–105. <https://doi.org/10.1007/s11187-018-9991-x>
- [5]. Haque, M. I., Azeez, A. N. P., & Akhtar, S. M. J. (2025). UPI and financial inclusion in rural India: A case study. *Development and Sustainability in Economics and Finance*, 6, Article 100056. <https://doi.org/10.1016/j.dsef.2025.100056>
- [6]. Lee, I., & Shin, Y. J. (2018). FinTech: Ecosystem, business models, investment decisions, and challenges. *Business Horizons*, 61(1), 35–46. <https://doi.org/10.1016/j.bushor.2017.09.003>
- [7]. Ministry of Electronics and Information Technology. (2023). Digital Personal Data Protection Act, 2023. Government of India.
- [8]. National Payments Corporation of India. (2026). Unified Payments Interface (UPI) product statistics. NPCI.
- [9]. Philippon, T. (2016). The FinTech opportunity (NBER Working Paper No. 22476). National Bureau of Economic Research. <https://doi.org/10.3386/w22476>
- [10]. Rao, K., & Upadhyaya, P. (2026). Small-scale merchants' acceptance of UPI payment apps: Evidence from India. *Humanities and Social Sciences Communications*. <https://doi.org/10.1057/s41599-026-08005-1>
- [11]. Reserve Bank of India. (2022). Guidelines on digital lending (RBI/2022-23/111). Reserve Bank of India.
- [12]. Reserve Bank of India. (2025). Annual report 2024–25. Reserve Bank of India.
- [13]. Schueffel, P. (2016). Taming the beast: A scientific definition of FinTech. *Journal of Innovation Management*, 4(4), 32–54. https://doi.org/10.24840/2183-0606_004.004_0004
- [14]. World Bank. (2025). The Global Findex Database 2025: Connectivity and financial inclusion in the digital economy. World Bank. <https://www.worldbank.org/en/publication/globalfindex>