AI Infusion in Indian Financial Services: Transforming Digital Payments, Credit Risk, Fraud Detection and Financial Inclusion

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Abstract:
Artificial intelligence (AI) is reshaping financial services through automated credit assessment, fraud detection, customer analytics, payment monitoring and generative AI-enabled workflows. This paper examines AI infusion in Indian financial services, focusing on banks, non-banking financial companies (NBFCs), insurance, capital markets and digital payments. It adopts a descriptive and analytical research design based on secondary data available up to 30 June 2026, drawing principally on the Reserve Bank of India's FREE-AI Committee Report (2025), RBI Annual Report 2025–26 and official UPI statistics. The paper distinguishes AI adoption indicators from digital-payment scale indicators and does not infer that payment growth was caused by AI. It identifies opportunities in fraud detection, credit underwriting, customer service and financial inclusion, alongside risks involving bias, privacy, cybersecurity, model opacity and institutional capacity. It recommends a phased, risk-based approach aligned with the RBI's FREE-AI principles, board oversight, model validation and customer grievance mechanisms. This paper states that responsible AI can strengthen the efficiency and inclusiveness of Indian finance only when supported by robust governance and measurable outcomes.

Keywords: Artificial intelligence, financial services, fintech, machine learning, fraud detection, credit risk, generative AI, financial inclusion, model governance.

1. Introduction

The financial sector is data-intensive and decision-driven. Banks, insurers, securities markets and payment providers process large volumes of structured and unstructured information while making decisions under uncertainty. These characteristics make finance particularly suited to artificial intelligence (AI), including machine learning, natural language processing, computer vision and generative AI. AI systems can identify patterns in transaction data, estimate default probabilities, detect unusual behavior, automate document review and support customer interactions.

The growth of generative AI has expanded the debate. Large language models can summaries financial documents, assist compliance teams, draft reports and support software development. However, outputs may be inaccurate, incomplete or fabricated. Financial institutions therefore need controls for confidentiality, source verification, human approval and audit trails. The central issue is not whether AI can perform tasks, but under what conditions its use creates sustainable value without undermining trust.

2. Review of Literature

The literature identifies both productivity potential and governance challenges. In India, Goel et al. (2024) analyzed annual reports of 32 commercial banks over FY 2015–16 to FY 2022–23 using text mining and a

panel fixed-effects approach. Their findings indicate that AI adoption was gaining momentum, led by private banks, with bank size and capital adequacy influencing adoption. The RBI FREE-AI Committee Report (2025) subsequently provided survey evidence across 612 supervised entities, finding that only 20.8% were using or developing AI. Together, these studies suggest that Indian financial institutions are progressing, but adoption remains uneven and concentrated among larger entities.

The International Monetary Fund (2024) has highlighted the potential for AI to affect financial stability through changes in market structure, operational dependencies, cyber risk and interconnected exposures. The IMF also notes that AI may improve efficiency and risk assessment but could amplify vulnerabilities if institutions rely on similar models, data providers or strategies. The OECD (2023) emphasises trustworthy AI principles, including transparency, robustness, accountability and respect for human rights.

3. Need and Significance of the Study

Financial institutions face rising transaction volumes, sophisticated fraud, changing customer expectations, regulatory complexity and pressure to control operating costs. Traditional rule-based systems remain useful but may struggle with rapidly changing patterns and unstructured information. AI can complement conventional approaches by detecting complex relationships and prioritising cases for human review. This study is significant because it connects the business case for AI with the governance requirements needed for safe and inclusive financial innovation.

4. Objectives of the Study

1. To examine the major applications of AI across Indian banking, NBFCs, insurance, capital markets and digital payment services.
2. To analyse RBI and government statistics on AI adoption and the growth of India's Digital financial ecosystem uptoJune2026.
3. To identify risks associated with AI-enabled financial decision-making in India, including bias, opacity, privacy and cyber risk.
4. To assess the implications of AI infusion for financial inclusion, customer experience and institutional competitiveness in India.
5. To offer practical recommendations for responsible AI implementation in financial institutions.

5. Research Methodology

The paper follows a descriptive and analytical research design based on secondary data available up to 30 June 2026. The principal sources are the RBI FREE-AI Committee Report (2025), RBI Annual Report 2025–26 (published May 2026), RBI payment-system statistics, NPCI/Ministry of Finance UPI data, and selected industry research. The RBI survey of 612 supervised entities is used as the main measure of AI adoption; UPI statistics are used to describe the scale of India's digital financial ecosystem. Percentages are interpreted using their original denominators. No primary survey has been conducted and no synthetic observations have been created. The study treats the RBI supervised-entity survey as the primary AI-adoption measure and UPI figures as contextual indicators of digital finance scale; the two are not statistically conflated.

6. AI Adoption in Indian Financial Institutions

The Reserve Bank of India's FREE-AI Committee Report (August 2025) provides the most comprehensive official baseline available for this study. The RBI Department of Supervision survey covered 612 supervised entities during February–May 2025, representing close to90% of the sector's asset size. Only 20.80% (127 entities) were using or developing AI systems. Adoption was concentrated among larger banks, while smaller

urban co-operative banks and NBFCs faced resource and infrastructure constraints. No AI usage was reported among Tier 1 urban co-operative banks; adoption among Tier 2 and Tier 3 UCBs remained below 10%. Among 171 surveyed NBFCs, 27% reported some AI use; no adoption was observed among asset reconstruction companies (RBI, 2025).

The RBI's separate in-depth FinTech Department survey of 76 entities found that 67% were exploring at least one generative AI use case. The report cautions that many such initiatives were experimental and limited to internal productivity or basic customer support. This distinction is important: "exploring" a Gen AI use case does not mean that the institution has deployed it in production. The RBI also reported that 35% of respondents used public-cloud deployment for AI, and that only around one-third had some level of Board-level AI oversight; only one-fourth reported formal processes for AI-related incidents or failures (RBI, 2025).

Across 583 AI applications in production or under development, customer support accounted for 15.6%, credit underwriting 13.7%, sales and marketing 11.8%, and cybersecurity 10.6%. These are shares of reported AI applications, not percentages of financial institutions. They show that Indian adoption has initially focused on customer-facing assistance, process automation and selected risk functions rather than fully autonomous financial decision-making (RBI, 2025).

6.2 Digital Payments as the Indian Financial Data Ecosystem

India's expanding digital payments infrastructure creates a large-scale environment in which AI can support fraud analytics, transaction monitoring, customer service and operational resilience. The RBI Annual Report 2025–26, published on 29 May 2026, records 24,16,169 lakh UPI transactions, The correct table unit is volume in lakh: 24,16,169 lakh, equivalent to 24,161.69 crore transactions, with transaction value of ₹314.2 lakh crore in FY 2025–26. UPI represented nearly 86% of retail payment transaction volume. UPI volume rose by 30% and value by 20.6% year-on-year (RBI, 2026).

The Ministry of Finance reported that 55.49 crore users were onboarded on UPI by June2026. Annual UPI volume increased from 4,595.61 crore transactions in FY 2021–22 to 24,161.69 crore in FY 2025–26, while value rose from ₹84.16 lakh crore to ₹314.23 lakh crore. The expansion demonstrates the scale and importance of India's digital payment rails. It does not, by itself, measure AI adoption or prove that AI caused payment growth. Rather, it indicates the scale of data and the corresponding need for robust fraud detection, authentication, dispute management and customer protection (Ministry of Finance, 2026).

6.3 Statistical Analysis and Interpretation: India

Table1. AI adoption and use cases in Indian financial institutions (RBIsurvey,2025)

Indicator	Reported statistic	Interpretation
Supervised entities surveyed	612	Banks, NBFCs, ARCs and AIFIs; close to 90% of asset size
Using or developing AI	20.8%(127entities)	Early-stage adoption across supervised entities
NBFCs using AI	27%of 171 NBFCs	Adoption varies by institution size and resources
Tier 2 and Tier 3 UCB adoption	Below10%	Significant capacity gap among smaller UCBs
GenAI exploration	67%of 76entities	Exploration, not necessarily production deployment

Public cloud used for AI	35%of respondents	Cloud use raises vendor, privacy and resilience considerations
Customer support share of AI use cases	15.6%of 583 applications	Largest reported functional category
Credit under writing share	13.7%of 583 applications	AI supports credit assessment and risk segmentation
Sales and marketing share	11.8%of 583 applications	Customer targeting and lead generation
Cyber security share	10.6%of 583 applications	Threat detection and security operations

Interpretation: The 20.8% adoption rate is calculated over 612 supervised entities, not over all Indian financial institutions. The 67% GenAI figure relates to 76 selected entities and measures exploration of at least one use case. The 15.6%, 13.7%, 11.8% and 10.6% figures are shares of 583 AI applications. Keeping these denominators separate avoids misleading comparisons.

Table 2. Growth in UPI transactions in India

Financial year	Volume (crore transactions)	Value (₹lakh crore)	Annual growth/ note
2021–22	4,595.61	84.16	Baseline
2022–23	8,371.44	139.15	Strong expansion
2023–24	13,112.95	199.95	Continued expansion
2024–25	18,586.60	260.56	Continued expansion
2025–26	24,161.69	314.23	30.0% volume growth; 20.6% value growth

Interpretation: Transaction value grew approximately 3.73 times over the same period (314.23 ÷ 84.16). These are calculated ratios from official reported figures. They describe the growth of digital payments, not the measured impact of AI. As payment volumes expand, AI-based anomaly detection and risk scoring may help institutions identify suspicious patterns, but must be combined with authentication controls, customer awareness and effective grievance redressal.

6.4 Implications for Banking, NBFCs, Insurance and Capital Markets in India Commercial banks: AI can support early-warning signals for loan stress, customer onboarding, transaction monitoring, AML alert prioritisation, branch-level service analytics and call-centre assistance. Public-sector banks may benefit from shared infrastructure and reusable models, while private banks may have greater ability to invest in data engineering and advanced analytics. Model outputs used for credit decisions should be explainable, auditable and subject to human review.

6.5 NBFCs and microfinance: AI-enabled cash-flow analysis and alternative data may help assess borrowers with limited formal credit histories. However, poor-quality or non-consensual data can lead to unfair exclusion, excessive lending or privacy violations. The RBI survey's 27% NBFC adoption rate indicates both a developing opportunity and a need for proportionate, affordable technology support. **Insurance:** AI can assist claims triage, document extraction, fraud screening, customer support and risk assessment. Insurers

should validate models across geographies, occupations and customer groups to avoid unfair pricing or claim delays. Any automated claim decision should have a transparent review and appeal process.

Capital markets and securities: AI may support market surveillance, suspicious-trading detection, research summarisation, investor service and compliance monitoring. Systems should be tested for false positives, model drift and the risk that similar automated strategies amplify market movements.

7. Findings

- AI has applications across lending, fraud monitoring, insurance claims, payments, investment research and compliance.
- Generative AI creates additional productivity opportunities but introduces accuracy, confidentiality and oversight concerns.
- The financial value of AI depends on data quality, integration, staff capability and lifecycle governance.
- Fairness, explainability, cybersecurity, third-party concentration and model drift are material risks.

8. Recommendations

- Adopt a use-case-first strategy: begin with clearly defined, measurable problems such as document classification, internal knowledge search or fraud-alert prioritization.
- Establish AI governance committee involving finance, risk, compliance, IT, cybersecurity, legal and business teams.
- Create an inventory of AI models and classify the may customer impact, financial materiality and operational criticality.

Conduct fairness testing and monitor outcomes across relevant customer segments; provide explanations and appeal mechanisms for consequential decisions.

- For Indian financial institutions, align implementation with applicable RBI, SEBI, IRDAI, DPDP and other relevant requirements, checking current circulars and sector-specific obligations before deployment.

9. Conclusion

AI infusion is changing the way financial institutions evaluate risk, detect fraud, serve customers and manage information. Generative AI adds new possibilities for knowledge-intensive tasks, but its outputs require verification and strong controls. The long-term contribution of AI to finance will depend on responsible deployment. Institutions must combine innovation with fairness, transparency, privacy, cybersecurity, resilience and clear accountability. AI should augment professional judgement and strengthen institutional capability, not replace governance or transfer responsibility to an algorithm. A phased approach based on measurable use cases, independent validation and continuous monitoring can help financial institutions realise sustainable value while protecting customers and financial stability.

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