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AI Adoption in Indian FinTech Firms: A Comparative Review of Digital Payment and Financial Service Platforms

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Theme 4: Business Innovation, Entrepreneurship & Digital Finance

Abstract - Artificial intelligence (AI) is moving from a back-office analytical tool to a core layer of India's digital financial infrastructure, yet existing studies tend to examine a single firm or a single technology and rarely compare FinTech categories. This paper presents a comparative review of AI adoption across six Indian platforms: PhonePe, Paytm and Google Pay (consumer-facing payment apps) and Razorpay, Cashfree and PayU (merchant-facing payment gateways). Drawing only on secondary data (academic literature, regulator publications, official statistics, company disclosures and industry reports), the study examines AI's contribution to customer experience, operational efficiency, fraud management and financial inclusion. A transparent disclosure-intensity coding is used to compare platforms. Findings indicate that gateways disclose more AI activity in operational efficiency and fraud management, consumer apps in customer-facing automation, and that evidence on AI-enabled financial inclusion is the thinnest across all six. Data privacy, regulatory compliance and ethical AI emerge as shared constraints. The paper proposes a conceptual framework linking enablers, business-model context, AI capabilities, outcomes and moderating constraints, and sets out propositions and directions for future empirical research.

Keywords: AI; FinTech; Digital Payments; Financial Services; Customer Experience; Financial Inclusion; Digital Innovation; India.

1. INTRODUCTION

India's Unified Payments Interface (UPI) has grown from 1.78 crore transactions in FY2016-17 to more than 24,162 crore in FY2025-26, with annual value of about Rs. 314 lakh crore (YourStory, 2026). At this scale, payment firms generate behavioural and transactional data that is well suited to machine learning, while fraud, failed payments and support load grow in step with volume. AI has therefore become a strategic capability for FinTech business models, not merely a cost-saving tool.

Prior work on AI in finance has largely concentrated on banks, credit scoring or algorithmic trading, or treated FinTech as a homogeneous group (Cao, 2022; Ashta & Herrmann, 2021). Digital payment providers differ sharply in their business models: consumer apps compete for user attention and UPI volume, whereas gateways compete on merchant payment success and risk control. This paper asks whether those differences show up in how AI is adopted.

The study addresses four research questions: **RQ1** How is AI used across leading Indian consumer payment apps and merchant gateways? **RQ2** How does AI contribute to customer experience, operational efficiency, fraud management and financial inclusion? **RQ3** What data-privacy, regulatory and ethical challenges

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constrain adoption? **RQ4** What conceptual framework explains adoption patterns across FinTech business models? The contribution is a cross-category comparison, a replicable coding of public disclosures, and a framework with testable propositions relevant to the conference theme of FinTech, digital payments and financial inclusion.

2. Literature Review and Research Gap

FinTech and business innovation. Gomber et al. (2018) interpret FinTech as a force of disruption that reshapes products, processes and business models, while Arner et al. (2016) trace its evolution after the global financial crisis. Digital payments are widely seen as the entry point for broader digital finance and inclusion (Ozili, 2018; Demirgüç-Kunt et al., 2022).

AI in financial services. Cao (2022) surveys AI techniques and challenges in finance, covering fraud detection, risk analytics and customer service. Ashta and Herrmann (2021) discuss opportunities and risks of AI across banking, investment and microfinance, including opacity and bias. Explainability is a recurring concern (Arrieta et al., 2020), and Jobin et al. (2019) show convergence on principles such as transparency, fairness and accountability across AI ethics guidelines.

Technology adoption lenses. Classic models, including the Technology Acceptance Model (Davis, 1989), diffusion of innovations (Rogers, 2003), the technology–organisation–environment framework (Tornatzky & Fleischer, 1990) and UTAUT (Venkatesh et al., 2003), explain adoption at individual or firm level. They say less about how a platform's business model shapes which AI capabilities it prioritises.

Research gap. Three gaps follow. First, studies are often single-firm or technology-centric. Second, there is little comparison between digital payment providers and financial service platforms. Third, the joint contribution of AI to customer engagement, operational performance, financial inclusion and business innovation is insufficiently understood. This paper responds with a comparative, multi-outcome review of six platforms.

3. RESEARCH METHODOLOGY

The study is a structured narrative review (Snyder, 2019; Tranfield et al., 2003) based exclusively on secondary data: peer-reviewed literature, regulator publications (RBI, 2025), official UPI statistics reported in the press, company announcements and earnings commentary, and industry coverage published between 2024 and September 2026. Six platforms were purposively selected to cover three consumer apps and three gateways with national relevance.

To compare platforms on a common basis, each was scored from 0 to 3 on four outcome domains using a *disclosure-intensity* rubric: **0** = no public evidence found in the sources reviewed; **1** = limited or indirect mention; **2** = documented deployment; **3** = documented deployment with a company-stated quantified result or target. Scores were assigned by the author from the sources in Table 1. They measure how much is publicly disclosed, not true adoption depth or effectiveness, and company-reported figures are unaudited. The scores are therefore indicative and should be read as a structured summary of evidence, not as a statistical test.

4. MARKET CONTEXT: SCALE AND CONCENTRATION

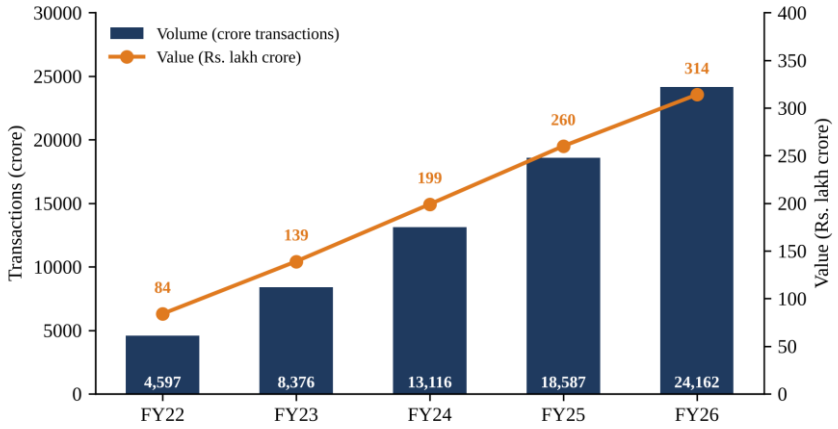
Figure 1 shows UPI volume rising from 4,597 crore transactions in FY2021-22 to 24,162 crore in FY2025-26, while value reached about Rs. 314 lakh crore, growth of 30% in volume and 21% in value over the previous year (YourStory, 2026). Monthly volume touched 2,366 crore in July 2026. For the third-party app layer, NPCI data reported for October 2025 put PhonePe at 46.3% of volume, Google Pay at 35.2% and Paytm at

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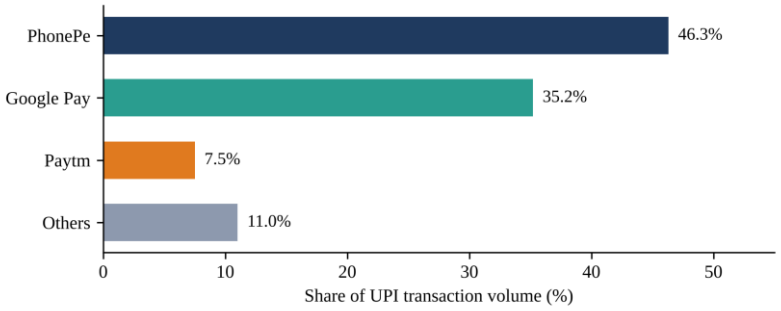
7.5% (Inc42, 2025), as shown in Figure 2. This concentration means that AI investments by a few firms can affect a very large share of national payment traffic.

Figure 1: UPI transaction volume and value, FY2021-22 to FY2025-26



Source: Compiled by the author from NPCI data as reported by YourStory (2026) and Benzinga (2023). FY2023-24 and FY2024-25 are rounded press-reported figures.

Figure 2: UPI app share of transaction volume, October 2025



Source: NPCI data as reported by Inc42 (2025). “Others” is the residual.

5. COMPARATIVE REVIEW OF PLATFORMS

5.1 Consumer-facing payment apps

PhonePe. Its founder reported at Global Fintech Fest 2026 that automation resolves about 94% of customer-support cases without human intervention, with a 96% target, while handling close to 12 billion transactions a month; about 80% of fraud investigations are handled by automated systems (The Arabian Post, 2026). The firm has added natural-language payment search, AI-assisted merchant onboarding and SmartPages, which generates payment pages from plain-language, including vernacular, descriptions. Leadership stresses selective adoption: not every experience improves with AI.

Paytm. Management credits AI-based fraud detection and collections for part of its FY2026 turnaround and says new investment will be directed to AI, using rented compute rather than its own data centre. It reports funnel conversion on agentic interfaces seven to eight times that of standard interfaces in a travel-booking pilot, and AI features on its Soundbox merchant devices (Outlook Business, 2026). The claims are management statements and are not independently audited.

Google Pay. Public AI evidence relates mainly to scam protection. Google reports more than a million fraud warnings a week on Google Pay, on-device call-scam detection using Gemini Nano, and a pilot of screen-

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sharing scam alerts with Navi, Paytm and Google Pay (TechCrunch, 2025). Reach is limited: on-device detection initially works only on Pixel 9 and later devices.

5.2 Merchant-facing payment gateways

Razorpay. In August 2026 Razorpay announced Vulcan, described as a transformer-based foundation model for payments built with NVIDIA and AWS, trained on about 3 trillion data points from 4 billion payments. It claims 8–10% higher payment success, 8 times more international card fraud stopped and 5 times more fraudulent or disputed transactions identified without extra alerts (Amazon Web Services, 2026). Earlier, it acquired the AI start-up Thirdwatch for e-commerce fraud and return-to-origin risk.

Cashfree. Its RiskShield system, launched in March 2024, applies machine learning across its merchant network and targets up to 40% lower fraudulent activity (IBS Intelligence, 2024). Its Agentic Payments Suite lets customers pay inside AI chat interfaces and uses voice AI to follow up on failed payments and abandoned carts; the claim that 80–90% of failure reasons are solvable in one conversation is marketing, not an audited result (Cashfree, 2026).

PayU. Announced in September 2026, Fraud Liability Protect uses machine-learning risk scoring on cross-border card payments to set the level of authentication and adds a layer in which PayU bears eligible fraud chargebacks. The company reports 4–5% better international card success rates, and one travel merchant reported a 14% rise in success and an 83% fall in fraud-to-sales ratio (The Arabian Post, 2026b).

Table 1: Evidence summary used for coding

Platform	Type	AI applications documented	Company-stated result	Source
PhonePe	Consumer app	Support automation; automated fraud investigation; NL search; AI merchant tools; internal agents	94% support cases automated; ~80% fraud investigations automated	Arabian Post (2026)
Paytm	Consumer app	Fraud detection; collections; merchant onboarding; Soundbox AI; agentic interface pilot	7–8x funnel conversion in agentic pilot; FY26 profitability credited partly to AI	Outlook Business (2026)
Google Pay	Consumer app	Scam warnings; on-device call-scam detection; screen-share alerts	1M+ fraud warnings per week	TechCrunch (2025)
Razorpay	Gateway	Vulcan payments foundation model; routing, fraud and risk scoring	8–10% higher payment success; 5x–8x more fraud caught	AWS (2026)
Cashfree	Gateway	RiskShield ML; agentic payments; voice AI recovery	Up to 40% fraud reduction (target)	IBS Intelligence (2024); Cashfree (2026)
PayU	Gateway	ML risk-based authentication; fraud liability cover	4–5% higher cross-border success; 83% lower fraud ratio (one merchant)	Arabian Post (2026b)

6. THEMATIC ANALYSIS

Figure 3 presents the disclosure-intensity scores and Figure 4 averages them by category. Fraud and risk management is the most consistently documented domain: five of six platforms score 3 or 2, and all three gateways score 3. Operational efficiency separates the groups, with gateways averaging 2.67 against 1.67 for

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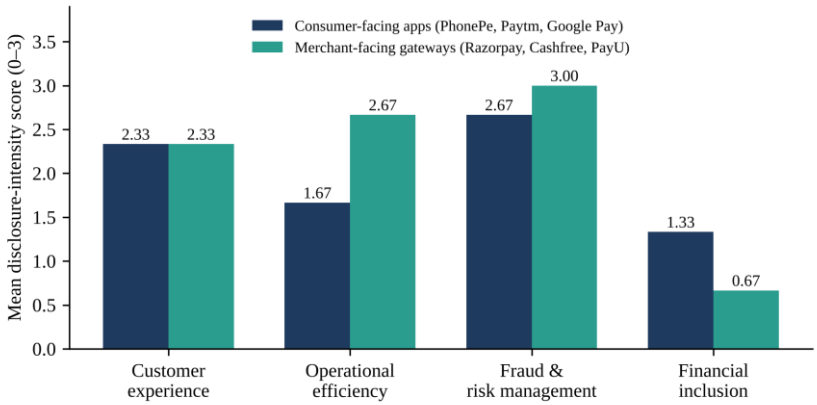
consumer apps, consistent with gateways selling payment success and risk control directly to merchants. Customer experience scores are equal on average (2.33), but through different mechanisms: conversational support and search in consumer apps, checkout and payment-recovery tools in gateways. Financial inclusion is the weakest domain, averaging 1.33 for consumer apps and 0.67 for gateways.

Figure 3: Disclosure-intensity scores by platform and outcome domain (0–3)



Source: Author's coding of public disclosures (Table 1). Dashed line separates consumer apps (above) from gateways (below). 0 = no evidence found; 3 = deployment with stated quantified result.

Figure 4: Mean disclosure intensity by business-model category



Source: Author's calculation from Figure 3 (n = 3 per group; descriptive only).

Customer experience. Consumer apps use AI for support deflection, voice and vernacular interfaces and in-app search, and early agentic pilots point to conversion gains. **Operational efficiency.** Gateways use AI to improve routing and authorisation success, which converts directly into merchant revenue, while consumer apps report internal gains such as automated investigations and faster product review. **Fraud management.** Fraud is where AI is most mature, since labelled data and measurable loss make the business case clear. **Financial inclusion.** Vernacular and voice interfaces, such as PhonePe's SmartPages, and merchant-facing insights on Paytm's Soundbox suggest inclusion potential, but none of the sources reports inclusion outcomes such as first-time users, credit access for small merchants or reduced exclusion error. This is the largest evidence gap.

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7. CHALLENGES: PRIVACY, REGULATION AND ETHICAL AI

Table 2 summarises the main constraints. The Digital Personal Data Protection Act, 2023 requires consent and purpose limitation for personal data, which affects model training on transaction histories. The Reserve Bank of India's FREE-AI committee report (RBI, 2025) proposes a board-approved AI policy, data governance, model lifecycle controls, disclosure to customers, a way to contest AI-driven decisions and incident reporting for regulated entities; it is currently advisory but may be folded into Master Directions (Bar & Bench, 2025). Open questions include liability among institutions, developers and vendors, and the compliance burden on smaller firms.

Table 2: Key challenges and mitigation themes

Challenge	Why it arises in payments	Regulatory anchor	Mitigation theme
Data privacy	Training and personalisation use sensitive transaction and device data	DPDP Act, 2023	Consent management; data minimisation; on-device inference
Regulatory compliance	AI decisions in a regulated payment environment; vendor and cloud dependence	RBI FREE-AI report, 2025	Board AI policy; model inventory; vendor contracts
Algorithmic bias and exclusion	Fraud and risk models may wrongly block thin-file or low-income users	FREE-AI fairness and customer-protection themes	Bias testing; human appeal route
Explainability and accountability	Opaque models complicate disputes and audits	FREE-AI; Arrieta et al. (2020)	Explainable models for high-impact decisions; audit logs
Evidence reliability	Most outcome figures are company-reported	None specific	Independent audits; standard metrics

An additional concern is the false-positive cost of fraud models. Aggressive blocking protects loss ratios but can exclude genuine users, which links fraud AI directly to the inclusion agenda and argues for reporting both fraud caught and legitimate transactions declined.

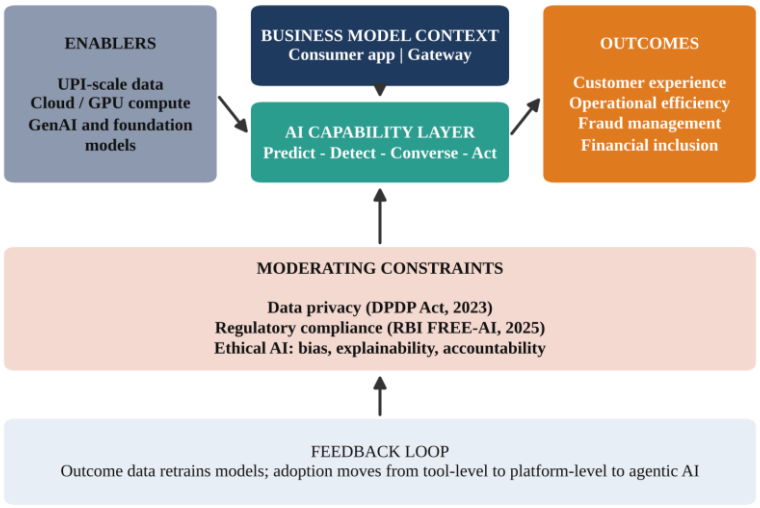
8. PROPOSED CONCEPTUAL FRAMEWORK

Figure 5 integrates the findings. **Enablers** (UPI-scale data, cloud and GPU compute, generative and foundation models) feed an **AI capability layer** of prediction, detection, conversation and autonomous action. The mix of capabilities deployed depends on **business-model context**, consumer app or gateway. Capabilities produce four **outcomes**, and outcome data feeds back to retrain models. **Moderating constraints** (privacy, regulation, ethical AI) shape how far and how fast firms move along a path from tool-level automation to platform-level foundation models and then agentic AI.

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Figure 5: Conceptual framework of AI adoption across FinTech business models



Source: Developed by the author from the review.

The framework yields four propositions for testing. **P1:** Merchant-facing gateways disclose and deploy AI more intensively in operational efficiency and fraud management than consumer apps. **P2:** Consumer apps prioritise customer-facing automation and conversational interfaces because competition is for user engagement at scale. **P3:** Documented AI-enabled financial inclusion outcomes lag behind other outcomes in both categories. **P4:** Stronger privacy and AI-governance requirements slow autonomous (agentic) deployment in high-impact decisions while raising investment in explainability and monitoring.

9. IMPLICATIONS AND DIRECTIONS FOR FUTURE RESEARCH

For managers, the review suggests matching AI investment to the revenue logic of the business model, and reporting outcomes on audited, comparable metrics. *For regulators*, standard disclosure of AI outcomes, including false-positive and exclusion rates, would improve comparability. *For entrepreneurs*, the gap in inclusion-focused AI, such as vernacular credit and merchant tools for micro-enterprises, is an opening for innovation.

Future research could (i) test P1–P4 using survey or panel data from FinTech managers; (ii) conduct firm-level case studies with primary interviews; (iii) measure inclusion outcomes with user-level data; (iv) examine agentic payments, including liability when an AI agent initiates a transaction; (v) extend the sample to lenders, wealth-tech and insurtech; and (vi) assess how the FREE-AI recommendations change adoption once codified.

Limitations. The study relies on public, largely company-reported sources, a small purposive sample and author coding, and several 2026 announcements are recent and not yet independently evaluated.

10. CONCLUSION

Across six leading Indian FinTech platforms, AI is most visibly embedded in fraud management, followed by operational efficiency and customer experience, and least visibly in financial inclusion. Gateways and consumer apps adopt AI differently, in line with their business models. Privacy, regulation and ethical AI are shared constraints that will shape the move to agentic payments. The proposed framework and propositions offer a base for empirical work on how AI creates value, and who it may leave behind, in India's digital finance ecosystem.

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