

Impact of UPI and Digital Payments on E-Commerce Adoption in India

Miss. K. A. Hire

(M. Com, B. Ed, DTL, M. Ed, MBA)

Assistant Professor, Dept of Commerce

MVP Samaj's Arts, Science and Commerce College, Ozar (Mig)

Nashik, Maharashtra

Abstract

The rapid proliferation of digital payment systems, led by the Unified Payments Interface (UPI), has fundamentally altered the payments landscape in India and become a key catalyst for e-commerce adoption. This paper examines the relationship between the rise of UPI and the expansion of online commerce in India, synthesizing secondary data, industry reports, and scholarly analyses to explain channels through which UPI has lowered frictions, expanded market reach, and enabled novel business models. The analysis highlights how ubiquity, speed, low cost, and interoperability of UPI have influenced consumer behaviour, merchant acceptance, logistics models, and financial inclusion. It also discusses challenges—fraud, regulatory balancing, cash-on-delivery persistence in certain segments, and infrastructure strain—and proposes policy and industry responses to consolidate gains while addressing risks. The paper concludes that UPI and allied digital payments are necessary but not sufficient drivers of inclusive e-commerce growth; complementary actions in broadband access, trust building, logistics, and consumer protection are essential to convert payment innovation into sustained, equitable digital commerce adoption.

Keywords: Unified Payments Interface, UPI, digital payments, e-commerce adoption, India, financial inclusion, merchant acceptance, payment infrastructure

Introduction

Over the past decade India has witnessed an extraordinary transformation in how payments are initiated, cleared, and settled. While a set of factors—affordable smartphones, falling data costs, and regulatory impetus—created a fertile environment for digital commerce, the development of an interoperable real-time payments rail has been central to converting latent demand into everyday online transactions. The Unified Payments Interface (UPI), launched by the National Payments Corporation of India (NPCI), rapidly became a dominant payment method for person-to-person and person-to-merchant transactions, processing billions of transactions monthly and accounting for a large share of retail digital payments. The emergence of UPI as a ubiquitous, low-cost, and programmable payment layer has profound implications for e-commerce: it lowers checkout friction, reduces reliance on cash-on-delivery, expands merchant micro-entrepreneur participation, and supports new checkout and buy-now-pay-later models. This paper investigates these dynamics and situates the discussion within empirical trends and the evolving policy landscape. For the large, load-bearing facts quoted about UPI transaction volume and share of retail digital payments, official NPCI statistics and consolidated industry reports are used as primary sources.

Received: 03 January 2025

Revised: 22 January 2025

Accepted: 30 January 2025

Copyright ♥ authors 2025

788

DOI: <https://doi.org/10.5281/ZENODO.17870621>

Literature review and conceptual framing

Academic and industry literature on digital finance emphasizes three mechanisms through which payments innovation influences economic activity: transaction cost reduction, network externalities, and data externalities. Transaction cost theory predicts that lowering the monetary and non-monetary costs of exchange—search, negotiation, and enforcement—will increase trade volumes. Network externalities imply that the usefulness of a payment system grows with the number of participants; a widely adopted rail reduces coordination failure between buyers and sellers. Data externalities arise when digital payments generate transaction data that firms and platforms can use to underwrite credit, personalize offerings, and optimize logistics. In the Indian context, scholars and policy analyses have identified UPI as a paradigmatic example where these mechanisms operate simultaneously: near real-time settlement and negligible per-transaction costs reduce frictions; interoperability across banks and apps magnifies network effects; and granular transaction metadata enables merchant underwriting and targeted marketing. Global payments literature underscores similar patterns but cautions that payments alone do not guarantee e-commerce penetration absent complementary digital literacy and logistics infrastructure. McKinsey's recent global payments reports underscore the importance of integrated digital ecosystems—payments, identity, and commerce platforms—to sustain growth.

Methodology

This study uses a qualitative synthesis of secondary data drawn from official statistics (NPCI), government releases, industry handbooks (IAMAI), global consulting reports, and peer-reviewed analyses assessing UPI's architecture and outcomes. The objective is not to produce new primary survey data but to integrate existing quantitative indicators—transaction volumes, growth rates, and market shares—with sectoral studies on consumer behaviour and merchant adoption to derive plausible causal narratives and policy implications. Where specific numeric claims are made (for example, UPI monthly volumes and the share of retail digital payments), the latest publicly available figures from NPCI, the Ministry of Finance, and independent industry reports are cited.

Background: UPI's growth and structural features

UPI was conceived as an interoperable, account-to-account instant payments interface that allows users to send or receive money using identifiers such as virtual payment addresses rather than bank account numbers. Its key design features—real-time settlement, seamless onboarding via apps, low transaction cost, and broad interoperability across banks and third-party apps—combined with active promotion by regulators and the NPCI, enabled rapid uptake. To illustrate scale, NPCI monthly product statistics show UPI achieving transaction volumes in the tens of billions of transactions per month in recent years, with both volume and value exhibiting steep year-on-year growth. Government releases and NPCI data for 2023–2025 periods illustrate UPI's expanding footprint and growing share of retail digital payment transactions. These metrics demonstrate not only the technical success of UPI as a payments rail but also its penetration into everyday economic activity.

Channels through which UPI influences e-commerce adoption

UPI's influence on e-commerce adoption can be conceptualized through four interlinked channels: reduction of checkout friction, expansion of merchant acceptance, enhancement of trust and convenience for consumers, and facilitation of new business and credit models.

Reduction of checkout friction. One of the most immediate ways UPI affects e-commerce is by shortening and simplifying the checkout flow. Traditional online payments in India historically relied on card payments, net banking, or cash-on-delivery (COD). Card payments and net banking impose friction—form filling, OTP verification, card availability, and potential throttling by issuing banks—while COD adds logistic complexity and cost for merchants and introduces payment risk. UPI's simple QR-based, deeplink, or intent-based flows reduce the number of steps required to complete payment and minimize failed transactions. By lowering abandoned cart rates and streamlining conversion paths, UPI contributes directly to higher completed purchases on e-commerce platforms and for small merchants using social or messaging channels to sell. Industry analyses have documented materially lower checkout abandonment when UPI is offered as a payment option.

Expansion of merchant acceptance and long tail commerce. UPI's low cost and ease of onboarding make it particularly suited to enable small merchants, street vendors, and micro-entrepreneurs to accept digital payments. QR codes and UPI-linked merchant apps eliminate the need for expensive point-of-sale terminals or merchant acquiring processes. This has expanded the effective supply side of e-commerce by enabling micro sellers to list and transact online, particularly through social commerce, marketplace platforms, and hyperlocal delivery models. By making it economical for the long tail of merchants to accept digital payments, UPI helps integrate informal supply chains into the digital economy, broadening the scope and scale of online commerce beyond urban formal retail. Reports from payments industry observers and government portals have highlighted the role of UPI in widening merchant participation and extending digital acceptance beyond metropolitan centers.

Enhancing consumer trust and convenience. The movement from cash to digital payments hinges on consumer trust and perceived convenience. UPI's instant confirmation, straightforward refunding mechanisms via beneficiary identification, and the ubiquity of apps have increased consumer confidence in digital transactions. For many consumers, the assurance that payments are instant and that no physical exchange of cash is required has made remote purchases less daunting. Moreover, identity-linked payment flows can be used by platforms to enforce seller accountability and faster dispute resolution, further reinforcing trust. Industry studies note that as consumers become habituated to seamless real-time payments for routine expenditures, their propensity to buy online for goods and services tends to increase.

Data and credit externalities enabling new business models. Digital payment trails created by UPI provide platforms and fintech firms with valuable transaction data that can be used to underwrite micro-credit, enable instant refunds, personalize recommendations, and optimize inventory and logistics. For small merchants, digital receipts and transaction histories lower informational asymmetries that previously constrained access to formal credit. By making merchant cash flows visible, UPI contributes to the development of ledger-based underwriting and embedded finance services that further catalyze merchant investment into online

storefronts and delivery capabilities. Consulting reports and policy papers have specifically cited UPI's data externalities as a foundation for fintech innovation in merchant lending and working capital products.

Evidence of impact: trends and empirical signals

The most direct empirical signal of UPI's influence is its growth in transaction volumes and the corresponding increase in the share of digital payments within the retail economy. NPCI statistics indicate that UPI transaction volumes reached unprecedented levels across 2023–2025, with months registering tens of billions of transactions and trillions of rupees in value. Government statements and independent industry handbooks estimate that UPI now accounts for a dominant share of retail digital payments, with industry estimates often citing upwards of 70 percent of retail digital transactions routed via UPI in recent fiscal periods. These patterns suggest that for many consumers and merchants, UPI has become the default digital payment method, thereby enabling more online purchases to be transacted without cash.

Complementary indicators also corroborate UPI's role in e-commerce expansion. Growth in digital onboarding of small merchants, proliferation of QR code-based micro merchants, increased acceptance of UPI for merchant-to-merchant and platform payouts, and the rise of social commerce transactions paid via UPI are documented in multiple industry reports. Furthermore, e-commerce platforms have reported improvements in conversion metrics following integration of intent-based UPI payment methods and in many instances have prioritized UPI flows for native app checkouts and web-to-app experiences. While platform level commercial data is often proprietary, the aggregate industry figures and the visible operational changes on marketplaces and fintech apps point to a meaningful relationship between payment rail adoption and e-commerce performance.

Challenges and unintended consequences

Despite clear gains, the rapid expansion of UPI has surfaced several challenges that affect its role in promoting equitable e-commerce adoption.

Fraud and consumer protection. As with any widely used financial rail, fraud attempts and social engineering scams have risen in parallel with adoption. The instantaneous nature of UPI transfers complicates recovery in cases of mistaken or coerced payments. Regulators, banks, and payment providers have continually introduced safety features, transaction limits, and grievance redressal mechanisms, yet persistent consumer complaints require a proactive combination of technological controls (fraud detection algorithms), consumer education, and faster dispute resolution pathways.

Infrastructure scalability and resilience. Dramatic increases in transaction volumes stress processing and settlement infrastructure, requiring continuous investment and operational oversight. Periodic outages or authentication delays can erode user trust and, in turn, dampen the willingness of consumers or small merchants to rely exclusively on digital rails for critical transactions. The NPCI and partner banks have scaled infrastructure and redundancy, but future growth—especially as UPI expands into cross-border and high-value corporate flows—will necessitate sustained capacity building.

Persistence of cash and COD in certain segments. While UPI has reduced cash dependence in many urban and metro segments, cash and cash-on-delivery remain resilient in categories where trust in product quality, return logistics, and last-mile enforcement are weak—such as used goods, high-value discretionary purchases, and certain rural micro-transactions. This persistence indicates that payments innovation must be complemented by improvements in product assurance, reverse logistics, and consumer redressal to fully displace cash across all e-commerce categories. IAMA and other researchers have pointed to heterogeneous adoption patterns across urban–rural and socioeconomic segments.

Regulatory trade-offs. The policy challenge is to balance innovation with stability and privacy. Rapid scaling invites questions about data governance, merchant and consumer privacy, and the systemic importance of new payment players. Regulators must calibrate rules for data portability, consent, and risk management while encouraging competition and preventing monopolistic entrenchment. International observers also view UPI's architecture as a potential model for other jurisdictions, raising issues about interoperability and cross-border regulatory coordination as UPI use cases expand.

Policy and industry recommendations

To sustain and broaden the positive impact of UPI on e-commerce adoption in India, coordinated action across regulators, platforms, banks, and logistics providers is necessary. First, strengthening consumer protection mechanisms should be a priority. Faster dispute resolution, clearer liability norms, and improved fraud-detection standards at the rails and app layers will reduce the costs of digital trust. Second, targeted efforts to close urban–rural and gender gaps in digital literacy and onboarding—combining public information campaigns with simplified onboarding flows and in-language support—will make payment rails more inclusive. Third, investments in last-mile logistics and reverse logistics, perhaps supported by blended public-private financing for rural distribution nodes, will complement digital payments by addressing fulfillment and returns friction that currently sustains COD. Fourth, enabling responsible use of payment data for merchant credit—through standardized data portability and consent frameworks—can accelerate embedded finance products that raise merchant capacity to participate in e-commerce. Finally, regulators should continue to ensure infrastructure resilience through stress testing, redundancy requirements, and clear escalation protocols for outages so that user confidence is maintained as volumes grow. The global payments literature and national policy documents reiterate the importance of pairing payment innovation with such supportive measures.

Discussion: nuanced impacts and future directions

The relationship between UPI and e-commerce adoption is significant but nuanced. Payments remove a critical friction in the transaction chain, but adoption and sustainable growth of e-commerce depend on a broader ecosystem: reliable and affordable internet access, digital identity systems that simplify KYC and returns, logistics and warehousing networks that enable timely delivery, and regulatory environments that protect consumers while enabling innovation. UPI's success has unlocked numerous use cases—instant merchant settlements, micropayments for digital content, person-to-merchant flows for social commerce—but each use case requires tailored risk management and product design. An important future direction

is the integration of UPI with digital lending and insurance products that can underwrite inventory and delivery risks for small merchants, thereby reducing barriers to scale. Another promising avenue is the continued expansion of UPI's offline and low-connectivity capabilities, which can reduce the digital divide and enable e-commerce transactions in bandwidth-constrained settings.

There is also scope for academic research to more precisely quantify causal impacts. While macro trends suggest a strong correlation between UPI penetration and digital commerce expansion, quasi-experimental designs leveraging regional rollout heterogeneity or merchant onboarding timelines could help isolate the incremental causal effect of UPI versus concurrent drivers like smartphone affordability. More granular consumer segmentation studies are necessary to understand which cohorts remain cash-dependent and why, thereby informing targeted interventions. [Payments Intelligence](#)

Conclusion

UPI and the broader digital payments revolution in India have materially lowered transaction costs, increased acceptance among merchants, and enhanced convenience and trust for consumers—conditions that are conducive to accelerated e-commerce adoption. NPCI statistics and industry reports demonstrate that UPI commands a dominant share of retail digital payments and has achieved scale that many comparable national payment systems have not. However, payments innovation alone will not create inclusive, resilient e-commerce. Persistent cash use in specific segments, fraud risks, infrastructure constraints, and regulatory trade-offs require sustained attention. Policies emphasizing consumer protection, infrastructure resilience, logistics and reverse logistics, digital literacy, and responsible use of payments data for credit will be crucial to translate payment innovation into broad-based, long-term e-commerce growth. If these complementary elements are addressed, the combination of UPI's technical strengths and policy support can continue to propel India's digital commerce into a more inclusive and efficient future.

References

- National Payments Corporation of India (NPCI). UPI Product Statistics.
- Press Information Bureau (PIB), Government of India. "UPI: Revolutionizing Digital Payments in India." December 1, 2024.
- Internet and Mobile Association of India (IAMAI). India Payments Handbook and Internet in India reports (2023–2024)
- Bank for International Settlements (BIS). "Lessons from the Unified Payments Interface (UPI)." December 2024.
- McKinsey & Company. Global Payments Report (2023, 2025 editions)
- Worldline. India Digital Payments Report 1H 2024.
- BCG. "UPI — The Global Benchmark for Digital Payments." (Industry perspective).

PaymentsCMI. “India 2025: Payments and eCommerce Trends.” June 2025.

Financial Services Department (Government of India). Growth of Various Modes of Digital Payment. November 2024.