

Responsible Fintech In India: Sound Architecture, But Gates Only Half Open



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Paradox of digital finance

India is now the global epicentre of digital payments. In May 2025 alone, it recorded 18.68 billion digital transactions on its Unified Payments Interface (UPI) worth Rs 25.14 trillion (\$ 3.94 billion). This volume exceeded the combined totals for the US and the EU. UPI dominates India's retail digital payments, accounting for 84% of all retail digital transaction volumes.

Yet this remarkable success exists alongside a more troubling reality: other financial services (beyond payments and lending) have a long way to cover. For instance, nearly 60% of India's population remains without basic insurance coverage, and national insurance penetration lingers at around 4%.

India has laid the foundations of one of the world's most advanced digital financial architectures. However, that

architecture remains underutilised. India has built world-class digital rails for finance, but traffic flows unevenly across them. This special issue of the MPI addresses this paradox head-on. It explores how fintech in India, and other emerging markets by extension, can accelerate growth and responsible finance.

UPI, the core innovation

UPI represents more than incremental improvement; it constitutes foundational innovation comparable to blockchain or internet protocols. Unlike traditional payment systems, which require bilateral bank integration, UPI functions as a unified protocol layer, enabling real-time settlement across institutions. This architectural elegance abstracts away inter-bank complexity while maintaining individual ledger integrity.

The numbers tell a remarkable story. UPI volumes have grown from 915 million transactions in FY2018 to over 185.8 billion in FY2025. Transaction costs have plummeted below Rs 0.50, making even Rs 5 micropayments economically viable. This cost structure has democratised digital finance, enabling everything from street vendor transactions to large business transfers. UPI now operates like a public utility: reliable, embedded, and essential to daily commerce.

However, this payments' triumph conceals deeper institutional friction elsewhere in the ecosystem and obscures the vast innovation potential that remains locked.

Innovation desert beyond payments

Step outside payments, and the landscape transforms dramatically. Between 2014 and 2024, Indian fintech attracted approximately \$31 billion in investment. Of this, nearly 68% flowed to payments and lending, while Insurtech received less than 4%. This allocation reflects not investor myopia but fundamental structural constraints that prevent innovation from reaching its full potential.

Insurtech (the use of technology in insurance services and processes, including distribution, underwriting, pricing, and claims management) remains trapped despite significant innovation attempts. Startups like Acko have reimaged direct-to-consumer models, while others experiment with usage-based pricing and AI-driven risk assessment. Yet most companies still function primarily as digital channels for traditional products. The innovative underwriting algorithms, dynamic pricing models, and personalised coverage products that entrepreneurs envision cannot be fully



realised because legacy systems cannot integrate the real-time data these innovations require.

Wealthtech (the use of technology in wealth management and financial planning services) showcases similar innovation blockages. Zerodha democratized stock trading through zero-commission models, and numerous startups have developed sophisticated robotic-advisory algorithms capable of real-time portfolio optimisation and tax-loss harvesting. However, the full potential of these innovations - integration with banking, insurance, and retirement planning - remains unrealised because several financial institutions operate in isolation. Innovative products exist as fragments rather than integrated solutions.

This pattern reveals a crucial insight: the bottleneck is not a lack of innovation but institutional barriers that prevent existing innovations from achieving their intended impact.

The COBOL constraint

The most significant impediment to innovation deployment lies buried in bank data centres: core systems running on COBOL, a programming language from the 1960s. It is not just a technical debt but an innovation chokepoint affecting 60-70% of major Indian banks' critical operations. Qualified COBOL programmers are increasingly scarce, making system modifications expensive and risky.

Consider the Account Aggregator (AA) framework, one of the world's most sophisticated approaches to



customer-controlled financial data sharing. It was conceptualised in 2014, with master direction issued in 2016. But it took until 2021 to be launched. The regulatory architecture enables transformative innovations: real-time creditworthiness assessment, integrated financial planning, and personalised product recommendations. Yet the implementation timeline reveals the constraint clearly. Several large banks have been notably slow in AA integration, officially citing technical complexity. Industry sources suggest the reality is more strategic: legacy systems provide convenient cover for competitive resistance to innovations that threaten existing business models.

This technical bottleneck forces fintech startups to build around rather than with traditional banking infrastructure. The result is innovation that operates at the system's periphery - payments and consumer credit offer access with minimal legacy dependence - while sectors requiring deeper integration cannot realise their innovative potential.

Innovation vs inclusion

Emerging data capabilities present both innovation opportunities and systemic risks. The proliferation of wearables, telematics, and health monitoring apps generates unprecedented individual risk insights, enabling insurance innovations like dynamic pricing, personalised coverage, and predictive health interventions.

However, without careful governance, these innovations risk transforming insurance from risk distribution to risk avoidance.

When algorithms can accurately predict individual health outcomes or driving behaviour, insurance innovation could inadvertently exclude those with genetic predispositions, chronic conditions, or statistically higher-risk profiles. The challenge is harnessing innovation's power for inclusion rather than exclusion. Using data abundance to expand coverage and reduce costs rather than cherry-pick low-risk customers: something that market players may be predisposed to do.

India currently lacks comprehensive frameworks for algorithmic fairness in financial services. This regulatory gap constrains beneficial innovation while failing to prevent harmful applications. Without such guardrails, well-intentioned innovation may also risk creating digital exclusion rather than digital inclusion.

Innovation vs integration

Understanding this uneven development requires examining how institutional friction affects different ecosystem actors' innovation strategies:

Regulators have demonstrated remarkable innovation in infrastructure creation. India's central bank (RBI) and its apex insurance regulator (IRDAI) have delivered innovation sandboxes such as the UPI and Account

Aggregator frameworks, while maintaining financial stability. Their next innovation frontier involves governing AI in financial services, creating frameworks that encourage beneficial innovation while preventing algorithmic bias. However, they cannot force institutional cooperation or mandate innovation adoption.

Legacy banks face a complex innovation calculus. Progressive institutions and banks have invested heavily in digital transformation and achieved relatively smooth AA integration, enabling innovative customer experiences. Others struggle with core system limitations that make innovation implementation prohibitively expensive. Many view fintech innovation partnerships as threats to competitive positioning rather than opportunities for mutual benefit.

Fintech startups possess abundant innovative capacity but face integration barriers that limit their impact. They excel in developing user experience innovations and data analytics capabilities, but their innovations cannot reach full potential without seamless integration with traditional financial infrastructure. This constraint explains their concentration on standalone products rather than comprehensive financial solutions.

Special issue – responsible fintech

This special issue addresses the paradox outlined above through ten focused essays examining the structural barriers constraining Indian fintech and the strategic pathways to unlock its full potential. The essays are organised around four interconnected themes that move from macro ecosystem considerations to specific implementation challenges. Consistent with the aims and scope of MPI, all essays in this issue are inspired by recent top-tier journal articles.

Ecosystem Foundation & Strategy provides the conceptual framework for understanding how opportunities are created rather than merely discovered in India's fragmented fintech landscape. Fintech Opportunities Knock: Are You Ready to Build The Door? tackles the issue of India's declining startup formation rates in the fintech world. The essay applies a novel strategic framework to argue that proactive action, rather than passive discovery, would drive sustainable innovation. Precision Partnerships – Fostering Fintech Ecosystem and Innovation in India directly addresses the integration barriers highlighted in our editorial analysis, examining how startups, regulators, incubators, and technology partners can collaborate to navigate the institutional friction that constrains innovation deployment. Smart Merger

Strategies: Balancing Fintech Growth & Competition focuses on the market concentration risks emerging from rapid consolidation, exploring how policymakers and industry leaders can balance growth with healthy competition.

Financial Inclusion & Access confronts the core challenge of transforming India's digital infrastructure into genuine financial empowerment. Democratising Credit using Artificial Intelligence and Alternative Data explores how artificial intelligence can leverage unconventional data sources to expand credit access while managing the algorithmic fairness concerns, as identified in the data dilemma section. Financial Access Accelerants: Strategic Investment Opportunities for Fintechs examines why a large section of Indians remain unbanked despite advanced digital architecture, proposing targeted investments in technology, digital literacy, and inclusive regulation. Fintech for Small Businesses: Unlocking Responsible Growth with

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Alt.Data addresses how fintech innovations can bridge the credit gap that traditional banks' reliance on formal documentation creates, particularly relevant given the COBOL constraints and legacy system limitations discussed in our editorial.

User Empowerment & Engagement focuses on ensuring that innovation serves genuine financial well-being rather than creating new forms of exclusion. Fintech Win-Win: How Digital Financial Literacy Drives Stable Growth directly responds to our editorial's concern about algorithmic fairness by examining how combining financial knowledge with digital skills can empower users to navigate AI-driven financial services responsibly. Points, Prizes, and Games: Positive Influence on User Financial Behaviour analyses how behavioural design can foster lasting financial inclusion, particularly for underserved populations who remain outside the innovation benefits highlighted in our payments success story.

Risk Management & Governance addresses the systemic challenges that could undermine fintech's inclusive potential. Proactive Crisis Management: Can New Tech Predict Financial Crashes? extends our analysis of institutional friction to systemic risk, examining how network analysis and machine learning can improve

financial resilience in volatile global markets. Navigating the Dark Side of Fintech: A Developer Perspective provides practical guidance for addressing the technical implementation challenges, emphasising secure technology development and ethical governance.

Together, these essays provide both diagnostic analysis and actionable solutions for the challenges outlined in this editorial. They recognise that India's fintech paradox - spectacular success alongside persistent structural barriers - requires coordinated responses from entrepreneurs, regulators, investors, and

technology leaders. The goal is not merely to celebrate UPI's remarkable achievement but to replicate that success across insurance, wealth management, and core banking innovation. The special issue ultimately argues that India's digital financial architecture is indeed sound. The challenge now is ensuring its gates open fully for all participants in the financial ecosystem.

We would also like to take this opportunity to acknowledge the editorial contributions of Dr. Varun Yadav.

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