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From Demonetization to Digital Dominance: Analyzing UPI's Ascent and the Paradox of Cash Resilience in India

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ABSTRACT

India's digital payments revolution gained unprecedented momentum following the 2016 demonetisation, with the Unified Payments Interface (UPI) emerging as the central pillar of retail digital transactions. Designed as a low-cost, interoperable, and real-time payment system, UPI significantly advanced financial inclusion, reduced transaction frictions, and transformed everyday consumer and merchant payment behaviours. Its rapid diffusion across urban and rural India positioned it as a global benchmark in instant payment systems. However, recent regulatory interventions reveal an emerging paradox in India's cashless transition. The issuance of Goods and Services Tax (GST) notices to small traders in Karnataka, based on UPI transaction data, has triggered a visible retreat from digital payments toward cash among segments of the informal economy. This development underscores growing tensions between digital transparency and the economic vulnerabilities of small merchants. This paper analyses the evolution of UPI in post-demonetisation India and examines how its adoption has reshaped payment practices across socio-economic groups. It further explores the behavioural responses of merchants and consumers, focusing on fear of compliance burdens, working capital constraints, and perceptions of surveillance. The study evaluates the policy dilemma of balancing revenue enforcement with financial inclusion objectives and argues that the long-term sustainability of UPI depends not only on technological innovation but also on regulatory alignment that safeguards small businesses while enabling gradual formalisation of the economy.
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Keywords: Unified Payments Interface (UPI), Demonetisation, Digital Payments, Informal Sector, Financial Inclusion.

INTRODUCTION

India's journey toward a cashless economy gained significant momentum in the last decade, particularly following policy interventions aimed at curbing black money, increasing transparency, and formalising financial transactions. Among these, demonetisation in 2016 played a key role, not only in targeting unaccounted wealth and counterfeit currency but also in pushing citizens toward digital modes of payment (Press Information Bureau [PIB], 2017).

A cashless economy refers to "a system in which the majority of financial transactions are conducted through digital means, such as cards, mobile banking, or online platforms, rather than physical currency." This vision aligned closely with the Government of India's Digital India initiative (Ministry of Electronics & Information Technology [MeitY], n.d.), which aimed to modernise public services and increase digital inclusion across the country. To support this vision, the Reserve Bank of India's Vision 2018 (Reserve Bank of India, 2016) emphasised the "5 Cs": Coverage, Convenience, Confidence, Cost, and Convergence, outlining strategic steps to strengthen digital payment infrastructure. The plan focuses on four strategic initiatives: responsible regulation, robust infrastructure, effective supervision, and customer centricity.

A significant enabler of this transition was the introduction of the Unified Payments Interface (UPI) by the National Payments Corporation of India (NPCI) in April 2016 (National Payments Corporation of India, n.d.). UPI offered a real-time, mobile-first payment system that was easy to use, interoperable across banks, and required no complex hardware, making it accessible to millions. Its role became especially prominent post-demonetisation, when the scarcity of cash led people to adopt digital alternatives even for small, day-to-day transactions. Since its launch, UPI has redefined retail transactions (Mahesh & Bhat, 2021), growing from a nascent platform to processing over 80% of retail payments (Elad, 2025), driven by post-demonetization policy pushes and pandemic-induced contactless payment adoption.

However, the declaration "No UPI, only cash accepted, now plastered across shops in Karnataka, reads as a historical irony. A decade after demonetization catalyzed India's digital payments revolution, small vendors: kirana stores, vegetable sellers, and bakeries, are retreating to cash, spurning the very system heralded as transformative. In July 2025, Karnataka's Commercial Taxes Department issued GST notices to 14,000 unregistered traders (Logical Indian, 2025), alleging their UPI transactions exceeded the ₹40 lakh annual threshold for mandatory Goods and Services Tax (GST) registration. Under the law, businesses must register for GST if their annual turnover exceeds ₹40 lakh for goods or ₹20 lakh for services (IndiaFilings, n.d.). According to reports, many of these traders were issued notices citing tax arrears dating as far back as FY 2021–22, with some facing demands of several lakhs of rupees. These notices demanded GST registration and back taxes. The move, intended to widen the tax net, ignored two critical realities. While the UPI records reflect payment flows, they do not affect the taxability of underlying supplies (e.g., personal transfers, loans, or exempt goods). Also, many recipients, such as vegetable vendors and small kirana stores, qualify for the ₹40 lakh exemption but lack awareness or documentation to contest the notices.

The Karnataka episode epitomizes the duality of UPI's impact. While the platform democratized payments for street vendors and kirana stores, its transactional transparency has become a double-edged sword. The resulting retreat of Karnataka's small traders from UPI, sparked by GST notices, exposes a critical tension in India's cashless transition: the clash between regulatory enforcement and grassroots financial inclusion. This mirrors broader challenges in India's digital economy, where top-down enforcement outpaces bottom-up empowerment. This paper examines UPI's evolution post-demonetization, its capitalization on India's cash vacuum to reshape payment behaviors, and analyzes its impact on merchant-consumer behavior.

This paper seeks to examine:

i. Has cash usage structurally declined post demonetisation, or did India's economy remain hybrid?
ii. The behavioural economics behind both merchants' retreat to cash, fear, compliance burdens, and working capital risks and the consumers' outlook towards UPI.
iii. The policy dilemma on how to balance revenue enforcement with financial inclusion goals.

By interrogating these questions, this paper argues that UPI's success hinges not just on technological innovation but on policy alignment, ensuring that digitalization complements, rather than complicates, the livelihoods of small businesses.

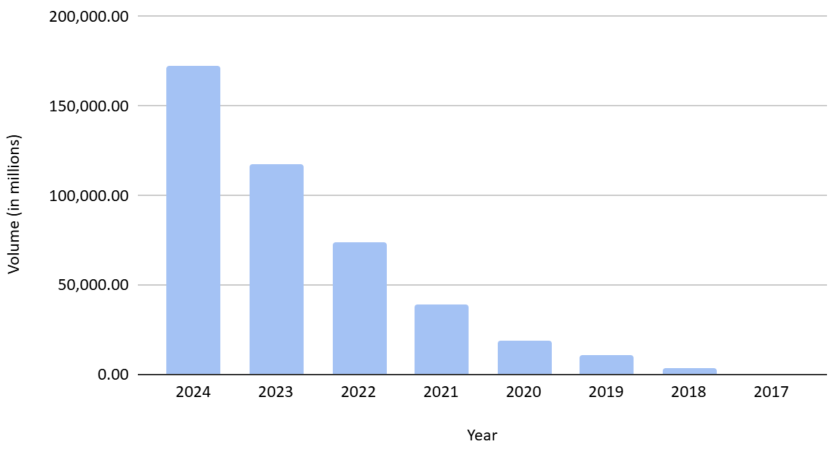
THE RISE OF DIGITAL PAYMENTS IN INDIA

India's digital payments landscape has undergone a radical transformation, evolving from cash-dominated transactions to a globally benchmarked real-time payment ecosystem. At the forefront of this shift is the Unified Payments Interface (UPI), which has emerged as the cornerstone of India's digital financial infrastructure. From its inception in 2016 with just 21 participating banks, UPI has expanded to 684 live banks as of July 2025 National Payments Corporation of India [NPCI], n.d.), reflecting its institutional scalability and widespread adoption. Conducting a transaction manually at a bank branch costs ₹40–45, whereas doing it online costs only ₹7–8, significantly lowering banks' operational costs while offering greater convenience to both bankers and customers.

The demonetisation policy marked a pivotal point in altering consumer payment preferences. It boosted the use of e-transactions, which accelerated the shift towards cashless transactions at a faster rate. The immediate unavailability of cash prompted a behavioral shift, particularly among urban consumers, towards the adoption of digital modes of payment. Over time, this shift evolved beyond compulsion into a gradual preference for digital financial transactions, influenced by factors such as convenience, incentivisation, and increasing smartphone penetration. Following demonetization, card transactions in India surged by 133 percent, with Paytm recording transactions worth ₹120 crore through seven million daily transactions, and 15 lakh new users, mostly adopting debit cards. The use of debit cards doubled during this period. (Balaji et al., 2017).

The transaction volume of UPI surged by 38% in 2025, underscoring its deepening penetration across urban and rural sectors. Notably, over 55% of rural India now utilizes UPI for digital payments, a testament to its role in bridging financial inclusion gaps. The platform's dominance is further evidenced by its 49% share of global real-time payment transactions in 2023, as per the ACI Worldwide Report 2024 (Economic Times, 2025), positioning India as the undisputed leader in digital payment innovation. Moreover, e-banking provides transaction traceability, making it easier to combat money laundering and curb black money circulation. This transparency helps reduce financial scams and promotes healthier economic growth. The shift toward a cashless economy has emerged as a transformative force, redefining traditional financial transactions and challenging conventional ideas of currency exchange.

Figure 1: *UPI Transaction Volumes Over the Years*



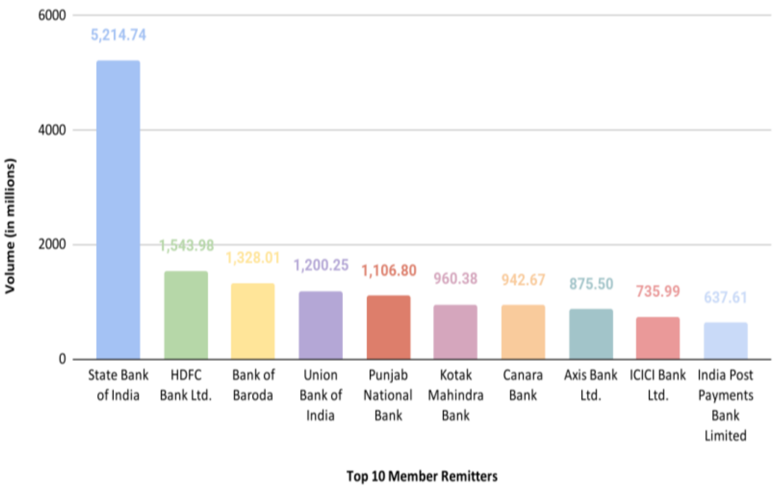
Source: *National Payments Corporation of India*

The growth trajectory of UPI is staggering, from a modest ₹707.93 crore in December 2016 to ₹25.08 lakh crore in July 2025, as reported by the National Payments Corporation of India (NPCI) (National Payments Corporation of India [NPCI], n.d.). This increase in value highlights UPI's rapid normalization as the preferred payment mechanism across demographics, with 80% of users aged 18–356, a demographic that prioritizes speed, convenience, and interoperability.

While UPI dominates retail payments, the Immediate Payment Service (IMPS) remains critical for high-value and interbank transactions. Introduced in 2010, IMPS recorded 448.1 million transactions in June 2025, a nearly 12-fold increase from November 2016, with values soaring from ₹32,480.53 crore to ₹6.06 lakh crore. This growth underscores India's multi-layered digital payments architecture, where UPI caters to micro-transactions, and IMPS supports larger, time-sensitive transfers. As governments, businesses, and individuals embrace this transition, its influence extends beyond finance, reshaping economic structures, societal norms, and technological progress. By enabling digital financial services to reach remote and underserved areas without the need for extensive physical banking infrastructure, cashless systems can enhance financial inclusion. Moreover, this transition fosters continuous innovation in FinTech and payment solutions, driving the creation of more advanced and accessible digital financial services (Malviya, A., 2024).

India's digital payments revolution has extended beyond its borders. UPI's interoperability has facilitated cross-border expansion into countries such as France, the UAE, and Singapore. Further, initiatives like Project Nexus (Venkiteswaran, 2025) aim to link UPI with Southeast Asian payment systems, creating a multilateral cross-border instant payment network. By 2026, Project Nexus is set to connect the Faster Payment Systems of four ASEAN nations: Malaysia, the Philippines, Singapore, and Thailand, along with India. With projections of 1 billion daily UPI transactions by FY27 (IndBiz, 2023), India's model offers a blueprint for emerging economies seeking to transition from cash to digital economies.

Figure 2: *UPI Top 10 Member Remitter Performance (July'25)*



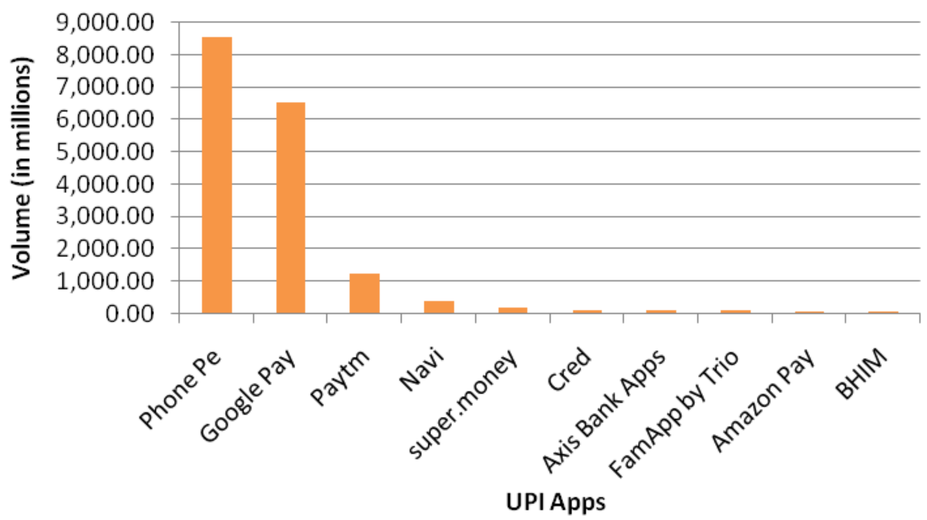
Source: *National Payments Corporation of India*

CONSUMER BEHAVIOR TRENDS

The Unified Payments Interface (UPI) offers consumers several key advantages that have driven its widespread adoption. First, it provides 24/7 availability, enabling transactions at any time without banking hour restrictions. The platform consolidates multiple bank accounts through a single application interface, eliminating the need to manage separate banking apps. Security is enhanced through virtual payment addresses (VPAs), which remove the risk of sharing sensitive account details during transactions. The single-click two-factor authentication process simplifies payments while maintaining robust security standards. Additionally, UPI's integrated grievance redressal mechanism allows users to raise complaints via mobile apps directly, ensuring prompt resolution of transaction disputes.

The demonetization decision significantly accelerated the adoption of cashless transactions in India. Beyond addressing operational challenges, it also aimed to drive a behavioural shift, encouraging people to adopt electronic payment methods for both receiving and making payments. This transition required two key changes: first, moving from tangible payment methods to less tangible or intangible forms; and second, developing trust in technologically advanced tools. Following demonetization, prepaid orders rose by 20 percent, while cash-on-delivery sales declined by 30 percent, ultimately leading to an overall 8 percent drop in retail sales. Digital wallets such as Paytm, PhonePe, and Google Pay have further augmented this trend, offering simplified user interfaces and promotional incentives such as cashback, discounts, and loyalty rewards.

Figure 3: *Top 10 UPI Apps (Volume-wise)*



Source: *National Payments Corporation of India*

Regardless, the penetration of digital payment modes reveals significant regional and socio-economic disparities. Urban and semi-urban populations have demonstrated higher levels of adoption due to better access to digital infrastructure and financial literacy. In contrast, rural areas continue to face constraints related to digital literacy, inadequate Internet connectivity, and limited access to smartphones. However, targeted government interventions such as the Pradhan Mantri Gramin Digital Saksharta Abhiyan (PMGDISHA) have begun to address these gaps by promoting digital awareness and skill development in underserved regions.

Demographically, younger cohorts, particularly individuals in the 18–35 age group, exhibit higher rates of digital payment usage (EY India, 2024). This trend reflects a generational divide in payment preferences, with younger populations more familiar with technology and inclined toward mobile-based solutions. In contrast, older generations often rely on cash due to security concerns, the perceived complexity of digital tools, and long-standing habits. While cash use is steadily declining among youth, it remains essential for many poorer and elderly individuals who have limited knowledge of digital payment systems. This raises concerns about their ability to adapt in a fully cashless society, especially given barriers such as a lack of bank accounts, poor Internet connectivity, and limited IT skills.

In terms of usage patterns, digital payments have diversified into multiple domains, including bill payments, online and offline retail, transport, food services, and peer-to-peer transfers. The “Scan & Pay” functionality associated with UPI has facilitated its widespread usage even for micro-transactions, thereby expanding the reach of digital payments beyond the formal sector.

MERCHANT BEHAVIOR TRENDS

The adoption of digital payment systems among merchants in India has followed a trajectory shaped by both external compulsion and adaptive opportunity. The demonetisation of 2016 acted as a catalyst for merchant digitalisation, forcing businesses, particularly small and informal enterprises, to reconsider their reliance on cash-based transactions. In the aftermath, digital payment mechanisms such as UPI and QR code-based solutions have increasingly been integrated into everyday business operations. The Unified Payments Interface (UPI) offers merchants several strategic benefits that address longstanding pain points in digital transactions. First, it enables seamless fund collection through simplified single-identifier payments (UPI IDs), eliminating complex account details. Unlike card systems, UPI removes the risk and compliance burden of storing customers' sensitive payment information. The platform significantly expands market reach by tapping into India's vast underbanked population, who lack credit/debit cards but own smartphones. For digital commerce, UPI provides an ideal solution by facilitating instant settlements that resolve cash-on-delivery (COD) collection challenges and associated fraud risks. The system's two-factor authentication (2FA) requires just a single click from customers, creating a frictionless pull payment experience while maintaining security standards. Additionally, UPI's In-App Payment (IAP) functionality allows seamless integration within merchant applications, creating a closed-loop ecosystem that enhances customer retention and reduces payment drop-offs. These features collectively explain UPI's rapid merchant adoption despite recent GST-related setbacks in certain segments.

Demonetization impacted India’s retail sector, where the rise in card-based sales was insufficient to offset the sharp decline in cash transactions. Paytm supported the Prime Minister’s decision, calling it a firm stand and even advertising it in newspapers as “the boldest decision in the financial history of independent India.” Non-Banking Financial Companies (NBFCs), which primarily provide loans to small traders and local communities, faced significant challenges in collecting repayments, as much of their dues were received in cash, making them particularly vulnerable to the effects of demonetization. A prominent feature of this transformation has been the widespread deployment of QR codes, particularly among micro and small enterprises. The minimal cost of adoption, ease of setup, and zero Merchant Discount Rate (MDR) for UPI-based transactions have made QR codes an accessible and attractive option for a diverse range of merchants, from formal retailers to informal vendors such as fruit sellers and tea stall owners. In an effort to promote digital transactions, the Government of India waived MDR charges on UPI and RuPay transactions for transactions below ₹2,000 starting in January 2020, under a directive by the Ministry of Finance. The cost burden was instead absorbed by the Reserve Bank of India (RBI) or the National Payments Corporation of India (NPCI).

Larger, formal enterprises had already begun integrating electronic point-of-sale (POS) systems and card-based transactions prior to demonetisation. However, it is the informal sector that has demonstrated remarkable digital adaptation, largely driven by the proliferation of low-cost smartphones and rising consumer demand for digital options. The interoperability of QR systems and integration with mobile wallets and banking apps have further enhanced the viability of such systems for small-scale merchants. Government-led initiatives have also played a pivotal role in this shift. Measures such as zero MDR for small transactions, digital onboarding assistance, and tax incentives contributed to merchant digitalisation. However, the gradual withdrawal of these incentives and the lack of sustained support mechanisms have, in some cases, hindered long-term adoption and scalability. Digital payment adoption among merchants has also contributed to increased financial formalisation. By maintaining digital transaction records, merchants gain access to formal credit systems, such as microloans and working capital financing, particularly from fintech platforms. This transition enhances creditworthiness and broadens financial opportunities.

However, notable challenges remain. Many small-scale and rural merchants exhibit reluctance to fully transition to digital systems due to concerns about taxation, compliance under the Goods and Services Tax (GST) regime, fear of data surveillance, and continued preference for cash liquidity. Additionally, limited digital skills, infrastructure deficits, and apprehensions related to transaction failures contribute to resistance. A cashless economy can generate significant cost savings for businesses and governments by eliminating expenses associated with printing, distributing, and safeguarding physical currency. Digital transactions create an auditable trail, making it harder to engage in illicit activities such as tax evasion, money laundering, and corruption. The data generated from these transactions enables businesses and policymakers to make better-informed decisions, supporting economic planning and development. Furthermore, e-commerce and digital payment systems facilitate international trade by streamlining cross-border financial transactions. 14 There is also evidence of a hybrid model emerging among merchants, wherein both cash and digital payments are accepted. This dual-acceptance strategy reflects the necessity to cater to a diverse consumer base while managing operational flexibility.

CHALLENGES TO A CASHLESS INDIA

Cashless transactions generate valuable data that can be analyzed to understand consumer behavior, spending habits, and broader economic trends.17 Digital payments thrive only when they are perceived as safer and more efficient than cash. When compliance risks outweigh benefits, merchants often revert to informal channels. This aligns with behavioral economics theories (e.g., loss aversion), where the fear of tax penalties outweighs incentives such as cashback rewards.

Despite advancements, several consumer concerns persist. Commonly cited issues include transaction failures, cybersecurity threats, limited grievance redressal mechanisms, and app downtime. These factors continue to influence trust in digital financial systems, particularly for high-value transactions, where many consumers still prefer traditional cash modes.

While demonetisation aimed to inspire curiosity and excitement about a cashless future, it also triggered anxiety. Individuals without bank accounts feared being compelled to open one and pay associated fees, particularly if wages were deposited electronically instead of in cash. Retail consumers, meanwhile, had their own expectations for a cashless society. Their concerns were less about ownership or governance and more about preserving familiar benefits offered by cash and paper checks, such as anonymity, transactional freedom, and the ability to stop payment in cases of fraud or defective goods (Bátiz-Lazo, B. et al, 2014).

As India pursues public-private partnerships to expand its digital infrastructure, it must acknowledge that the impact of emerging cybersecurity threats differs for the public and private sectors. For instance, public administrative offices, unlike private firms, may find it either financially or politically unviable to meet ransomware demands. Therefore, India should be selective and strategic in adopting technical and outreach practices from the private sector when designing public service platforms. Beyond ensuring the integrity and security of these platforms, attention must also be given to the processes by which they are developed. Procedural transparency and robust grievance redressal mechanisms are essential to fostering public trust and encouraging widespread adoption of digital transformation initiatives.

While India continues to expand its digital infrastructure, equal emphasis must be placed on fostering public trust in these systems. Without such trust, people may hesitate to access public services or engage in digitally coordinated responses during pandemics or emerging cybersecurity threats. Strengthening digital literacy is equally important, enabling citizens to distinguish between legitimate and fraudulent applications and to actively and effectively contribute when collective action is required (Bansal, R., et al, 2020).

Eliminating cash would represent a radical shift, and behavioral theories suggest that individuals often resist such major changes when uncertain about their impact. While the rise of digital society has fueled growth in electronic payments—with mobile phones increasingly functioning as digital wallets and more services accepting only electronic payments—low financial literacy remains a significant obstacle to the wider adoption of cashless methods (Fabris, N., 2019).

CONCLUSION

India's journey toward a cashless economy, catalyzed by demonetization and propelled by UPI, presents a complex narrative of success punctuated by systemic challenges. The Unified Payments Interface has undeniably transformed the financial landscape, driving financial inclusion, enabling seamless transactions, and positioning India as a global leader in real-time payments. With over 55% rural penetration and 80% adoption among youth, UPI has democratized digital payments in unprecedented ways. However, as the Karnataka case illustrates, this revolution remains incomplete. The coercive application of GST regulations on UPI transactions has revealed critical fissures in India's digital transition, where top-down enforcement clashes with ground-level informality.

The retreat of small merchants to cash underscores a fundamental tension: while digital payments offer efficiency and transparency, their integration with tax compliance frameworks must be carefully calibrated to avoid alienating the very users they aim to empower. Behavioral barriers: trust deficits, fear of scrutiny, and working capital constraints, continue to shape merchant resistance, even as consumers embrace UPI's convenience. This paradox highlights that technological adoption alone cannot guarantee a cashless future; it must be complemented by policy sensitivity, financial literacy, and infrastructural inclusivity.

The risk of cybercrime is significantly higher in a cashless economy, as most transactions take place over the Internet. Therefore, it is essential to raise public awareness about safeguarding debit and credit card information and ensuring the secure use of Internet banking and digital wallets. To effectively deter and penalize cybercriminals, a well-structured cyber police force equipped with advanced forensic laboratories and cutting-edge technology must be established. 10.

Privacy concerns and the risk of increased surveillance underscore the need to balance technological innovation with the protection of individual rights. At the same time, the unbanked population may struggle to access financial services, making it crucial to bridge this gap through targeted initiatives such as the Pradhan Mantri Jan Dhan Yojana, which promotes financial inclusion by providing basic banking services to underserved communities.

Moving forward, India's digital payment ecosystem must strike a delicate balance. On one hand, it must sustain UPI's growth through innovation (e.g., cross-border expansions, credit-linked features). On the other hand, it must address structural gaps, simplify GST compliance for micro-enterprises, enhance digital infrastructure, and foster through transparent enforcement. The Karnataka episode serves as a critical lesson: a sustainable cashless economy cannot be built on enforcement alone but requires collaboration between regulators, businesses, and citizens.

As India aspires to a $1 trillion digital economy by 2030, the resilience of cash reminds us that inclusivity must remain at the heart of this transformation. The true measure of success will lie not in the decline of currency but in the creation of a system where digital and informal economies coexist, adapt, and thrive, bridging divides rather than deepening them. UPI's legacy, therefore, will be determined not just by its transaction volumes but by its ability to harmonize innovation with equity.

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