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India's Glorious Success in UPI Adoption: What is Working, What is Not and What Can be Done Better?

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Abstract

This research paper delves deep into the widespread adoption and multifaceted impact of India's Unified Payments Interface (UPI), highlighting its transformative role in the nation's shift towards a digital economy. Launched in 2016 by the National Payments Corporation of India (NPCI), UPI has revolutionized financial transactions by enabling seamless, real-time, and low-cost digital payments. The paper evaluates UPI's implications across four dimensions: microeconomic, macroeconomic, global macroeconomic, and political. At the microeconomic level, UPI has improved financial inclusion, merchant accessibility, and consumer convenience, while also raising concerns around overspending, fraud, and digital literacy gaps. Macroeconomically, UPI has contributed to GDP growth, enhanced tax compliance, and formalized large segments of the economy. Globally, the paper analyzes UPI's replicability in countries such as Nigeria, China, Norway, and France, offering insights into its viability as a cross-border digital payment model. Politically, UPI is framed as a tool for governance visibility, welfare delivery, and soft power projection. While the system's architecture and public-private synergy have enabled its success, challenges such as digital exclusion, security vulnerabilities, and regulatory gaps remain. The paper concludes by proposing policy recommendations focused on infrastructure investment, financial literacy, regulatory refinement, and inclusive innovation to ensure UPI's continued effectiveness and global scalability.

Keywords: Unified Payments Interface, FinTech in India, Economic Impact, Political Impact

UPI is an instant payment system developed in India that allows users to transfer money between bank accounts via a smartphone application. It was developed by the National Payments Corporation of India (NPCI) in 2016. UPI supports and facilitates both peer-to-peer (P2P) and person-to-merchant (P2M) transactions (Shrimali et al.). As a government-backed initiative, UPI plays a crucial role in India's transition towards a digital economy by offering a seamless, real-time, and secure payment solution. The system's ease of use, interoperability across different banks, and integration with multiple financial services have contributed to its widespread adoption.

UPI integrates multiple bank accounts into a single mobile app, simplifying fund transfers for both customers and merchants. It consists of features like automatic payments, personalised QR codes that facilitate payments, simple navigation between various bank accounts, free payments and instant payments. Customers have the ability to pay bills, send and receive money instantly and authorize transactions in one step (Razorpay, 2024).

To begin using UPI, users download a UPI-enabled application such as BHIM, Paytm, Google Pay, Phon

ePe, etc. and create a profile. This gives them their Virtual Payment Address (VPA) which is needed to receive payments. This can be linked to their bank account through the chosen app (Malladi). Users must complete mobile phone number verification, which is then linked to their UPI account for identification. A crucial part of the security process is the 'Know Your Customer' (KYC) verification, which ensures compliance with financial regulations and helps prevent fraudulent activities. UPI requires one of two types of KYC verifications:

1. Minimum KYC: This basic verification process allows users to conduct limited transactions. It typically involves providing basic details such as name, date of birth, and mobile number linked to the bank account.
2. Full KYC: This requires submission of official identity proofs, such as an Aadhaar card, PAN card, or passport. Completing full KYC unlocks higher transaction limits and additional financial services.

UPI has a "push and pull" mechanism, allowing users to both send and receive money instantly. When sending money, the user initiates a transaction on their UPI app by providing the recipient's UPI ID, entering the amount, selecting the account to debit and finally entering their UPI PIN to confirm the payment. The transaction request is then forwarded to their Payment Service Provider (PSP) (Singh & Khan). To receive money, users simply share their UPI ID (which is linked to their phone number or a QR code), and once it is authorized by the PSP, the amount is instantly credited to their account. In order to ensure that this process is secure, a four or six-digit MPIN is required for every transaction to authenticate the user's identity. UPI also incorporates two-factor authentication, end-to-end encryption and to protect user data and transactions.

1.0- Microeconomic Implications

The introduction of UPI has reshaped financial interactions at the microeconomic level, influencing both consumer behaviour and business operations. The digital payment system has boosted financial inclusion, improved business efficiency, and supported the development of technological infrastructure and digitization. An increase in cash flow and liquidity and an improvement in financial accessibility for merchants is observed. While these advancements are beneficial for the economy, substantial guardrails and improvements are required to ensure that these benefits are maximized.

These improvements don't come without challenges. Concerns about overspending and disparities in financial access continue to persist due to barriers such as lack of digital literacy and limitations of the banking infrastructure. For those who lack access to banking services or reliable internet infrastructure, access remains a challenge. Additionally, regulatory concerns, the risk of financial fraud, and the need for greater consumer awareness present ongoing obstacles to the sustainable expansion of digital payment systems.

As UPI continues to evolve, its long-term impact will depend on how effectively its impacts are addressed. Ensuring financial inclusion, fostering responsible consumer behavior, and strengthening regulatory oversight will be key to maximizing the benefits of this digital payment revolution. Relevant economic policies are also required to assure competition in the market.

The subsequent sections will explore these microeconomic factors in greater detail, examining the forces that have shaped UPI's adoption and its implications on market dynamics.

1.1- Financial Inclusion

UPI is known for creating financial inclusion by making digital payments accessible, affordable, and wid-

ely usable. According to the financial inclusion (FI) index published by the RBI the level of financial inclusion in India across the three parameters which include access, usage and quality stood at 64.2 in FY 2023-24, 60.1 in FY 2022-23, 56.4 in FY 2021-22 and 53.9 in FY 2020-21 (RBI) which shows how financial inclusion has only improved in the last few years.

However, UPI's reliance on bank accounts limits its reach, excluding approximately 190 million adults in India who don't have a bank account (Business Standard). While bank ownership has risen from 35% in 2011 to 78% in 2021 (Statista), many accounts remain inactive, with 40% of Pradhan Mantri Jan Dhan Yojana (PMJDY) accounts unused (Axis Bank). Moreover, factors like gender gaps are fairly limited in India as the usage of bank accounts is almost equivalent between men and women.

Therefore, to further enhance accessibility, digital literacy programs and simplified onboarding processes are essential. UPI-linked digital wallets could provide an alternative for unbanked individuals, enabling basic transactions without full banking infrastructure. Addressing these barriers, through either more financial inclusion or alternative banking methods, is critical to making UPI a more inclusive financial tool.

1.2- Business Efficiency & Cost Reduction

UPI has significantly reduced transaction costs for businesses by eliminating the need for expensive point-of-sale (POS) systems and lowering operational costs associated with cash handling. Unlike credit card payments, which charge merchant discount rates (MDR), UPI transactions are often free or incur minimal charges, making them highly cost-effective. The maximum interchange fee for UPI transactions made through prepaid payment instruments (PPIs) is 1.1%; this fee applies to transactions over ₹2,000 (IndusInd Bank). The removal of MDR fees in 2019 further boosted low-value digital transactions, encouraging more merchants to adopt UPI (ORF).

Beyond cost reductions, UPI enhances business efficiency by enabling real-time, seamless transactions, reducing payment processing times, and improving cash flow management. Merchants benefit from instant fund settlements, minimizing reliance on credit and ensuring a more predictable working capital cycle (PIB). Additionally, UPI's widespread adoption has expanded market reach for businesses, including small vendors, as over 70% UPI users now come from outside Tier-1 cities like Mumbai, New Delhi, Bangalore (PIB). This indicates that businesses in non-metro cities are able to better cater to the needs of a wider range of consumers in the digital economy.

However, businesses that lack digital infrastructure or face transaction failures may struggle to maximize these benefits and may have the risk of losing their competitive edge, highlighting the need for continued improvements in reliability and accessibility.

1.3- Technological Integration, Infrastructure Development, and Digital Adoption

UPI's seamless integration with banking apps, e-commerce platforms, and payment services has accelerated digital adoption in India. It has bridged the gap between traditional banking and modern financial technology, enabling a frictionless experience for consumers. The availability of features such as QR-based payments and automatic bill payments has made transactions more convenient and efficient.

The widespread adoption of UPI has driven significant advancements in India's digital infrastructure, particularly in broadband penetration, secure payment systems, and data security frameworks. With over 936 million internet users and 1.19 billion mobile connections in 2024 in India, the technological ecosystem has provided a strong foundation for UPI transactions ensuring smooth internet connectivity. This enables essential features of UPI such as real-time notifications and instant payments (TOI Tech Desk). UPI's rapid expansion has also called for improvements in digital transaction processing, with 632

banks integrated into the platform and digital payment volume growing at a CAGR of 44% from 2017 to 2024 (PIB).

The adoption of this superior technology has led to a boost in efficiency of transactions, as shown by the comparison with other digital payment technologies, such as bank transfers in the form of NEFT or RTGS. Compared to these alternatives, UPI proves to be a superior technology because it provides users with an instant payment process, simplified user interface, 24/7 availability, and instant notifications. Furthermore, UPI processes an impressive 3729.1 transactions per second, a 58% increase from the previous year's rate of 2,348 transactions per second, in 2024. This demonstrates that the technology backing UPI is efficient enough to support extremely heavy work load and still maintain the promise of instant and simple transactions.

However, the dependence on technology also presents barriers for individuals without smartphones or reliable internet access, exacerbating the digital divide. Although, this gap is reducing as over 95% households in India have access to a smartphone (Magazine). Moreover, a new method of payment called the UPI 123Pay allows users who don't have smartphones to pay using UPI. The use of this technology includes the other ~600 million people in India who have feature phones and may not have the best access to the internet.

Government initiatives under the Digital India program have strengthened trust in digital payments while enhancing financial infrastructure. UPI's modern design allows for rapid bank integration, supporting more than 77 mobile applications and enabling new technological features such as voice-enabled transactions in regional languages for accessibility in rural areas (European Payments Council). Moving forward, sustained infrastructure improvements and regulatory oversight will be key to ensuring the long-term stability and scalability of UPI.

1.4- Cash Flow and Financial Liquidity

UPI has significantly increased cash flow in the market by enabling rapid, seamless transactions. The volume of UPI transactions surged from 92 crore in FY 2017-18 to 8,375 crore in FY 2022-23, with a compound annual growth rate (CAGR) of 147% (PIB). The transaction value rose from ₹1 lakh crore to ₹139 lakh crore in the same period, demonstrating a CAGR of 168% (PIB). This rapid growth has improved liquidity by allowing businesses and individuals to access funds instantly, reducing reliance on physical cash and expediting economic transactions.

The increased velocity of money circulation has had broader economic benefits, stimulating spending and enhancing the circular flow of income. UPI has allowed gig economy workers and small merchants to participate more actively in the financial system (WEF) by reducing transaction costs and eliminating intermediary delays. UPI's user-friendly design, affordability, and reach have encouraged frequent and smaller transactions, bringing previously informal exchanges into the formal economy. This broader participation boosts cash flow, stimulates GDP growth, improves tax compliance, and supports small businesses.

1.5- Financial Accessibility for Merchants

The rapid adoption of UPI is closely linked to the growth of new bank accounts, with the Pradhan Mantri Jan Dhan Yojana (PMJDY). Additionally, UPI has facilitated increased credit availability and awareness for small-scale enterprises, microloan accessibility, with lending doubling from 2018 to 2023 (ORF). This is exemplified by the 1.6 lakh MSME (Micro, Small and Medium Enterprise) loans amounting to ₹14,500 crore which were disbursed using APIs from the Unified Lending Interface (ULI) platform run by the RBI (MSME Desk). An added advantage is that since these merchants are already part of the banking system,

their creditworthiness would increase. Hence, it would be easier for them to access funds and grow their business faster than they could through the traditional system.

It is still important to note that transaction failures, delayed settlements, and inconsistencies in merchant discount rates (MDR) remain challenges that can deter smaller enterprises from fully leveraging UPI's advantages. Addressing these barriers will be critical to ensuring UPI remains a sustainable tool for business growth and financial inclusion.

1.6- Educational Awareness and Adoption

Despite the nationwide adoption of UPI, a major gap between awareness and active usage still remains. Though 79% of individuals are aware of UPI's existence, only 68% actively use it; this highlights the need for enhanced educational initiatives (KUEY). Furthermore, awareness levels vary across demographics. While 40% of rural respondents in Karnataka, Maharashtra, and Telangana are unaware of UPI or digital payments (ISB), college students in large cities like Mumbai demonstrate awareness. Many of these students still prefer cash for daily expenses, showing that knowledge alone does not translate into behavioral change (VPM Thane).

Educational initiatives, particularly through government-backed financial literacy programs, have played a crucial role in closing this gap. The Digital India initiative has expanded financial awareness campaigns. Moreover, NPCI collaborates with banks and fintech platforms to promote UPI adoption. Studies indicate that higher education levels correlate with increased UPI adoption, emphasizing the importance of targeted awareness campaigns (JETIR). This is likely because of the technological familiarity that is concomitant with modern education. Addressing these educational barriers through structured campaigns, localized training, and user-friendly onboarding processes will be critical in ensuring broader and more equitable access to UPI.

1.7- Consumer Discipline and Overspending Risks

UPI's impact on consumer behavior can be understood via behavioral economic principles such as loss aversion and instant gratification, and the anchoring effect. Digital payments lack the psychological barrier of physically handing over cash, making spending feel less tangible and increasing the likelihood of impulsive buying (ABP Live). Additionally, incentives like cashback offers and discounts create a perception of financial gain and override loss aversion tendencies, encouraging consumers to spend more frequently than they would with traditional payment methods (IJNRD).

The instant nature of UPI transactions, coupled with targeted marketing strategies, has also contributed to overspending, particularly among younger demographics. Studies show that seamless digital payments reduce spending awareness, leading to more frequent and higher-value transactions (PIB). This is shown in a survey conducted by IIIT Delhi, which revealed that approximately 74% UPI users reported engaging in overspending due to the convenience of digital payments (VARINDIA). This high percentage suggests that many consumers may be unaware of their spending patterns when using UPI because their purchases are driven by impulse buying and instant gratification. The introduction of buy-now-pay-later (BNPL) services within UPI ecosystems exacerbates this trend, allowing consumers to defer payments without immediate financial consequences. This is an example of the anchoring effect, since consumers experience a cognitive bias that nudges them to focus on the purchase for now and worry about the cost later.

To mitigate these risks, UPI has set limitations in spending to a maximum of 1 lakh on most normal transactions and for some specific transactions related to capital markets, collections, insurance, and foreign inward remittances, the transaction limit is up to ₹2 lakh (Chokhawala). For payments towards Initial Public Offering (IPO) and Retail Direct Schemes, the limit is up to ₹5 lakh per transaction. Beyond

transaction value limits, there is also a limitation on the maximum number of transactions per day which is set at 20 transactions per day. Even though the maximum spending limits create inconveniences when trying to pay for essential things that might exceed the limit, such as healthcare bills, taxes, or rentals, it seems imperative to implement these policies in order to curb overspending. It would be beneficial for the government to invest resources into creating financial literacy initiatives which can help promote responsible financial behavior while maintaining the benefits of digital transactions.

1.8- Socioeconomic Disparities

While UPI has expanded financial access for many, there remains a stark difference in its adoption between rural and urban areas. In rural and semi-urban regions, UPI transactions grew by ₹118% in 2023, demonstrating a significant shift towards digital payments (Business Standard). Despite these advances, lower-income groups in rural areas still struggle with digital literacy, lack of trust in digital payments, and infrastructure challenges such as unreliable internet access. The preference for cash still exists due to its tangibility, limiting the potential of UPI to fully replace traditional transaction methods. Only 40% individuals in these areas prefer UPI as their primary mode of payment, compared to much higher adoption rates in urban areas where digital literacy and smartphone penetration are greater (Business Standard).

Government-led financial literacy programs, improved network connectivity, and expanded merchant acceptance of digital payments in rural regions will be critical to bridging this divide. Addressing these barriers will ensure that UPI continues to serve as a key tool for financial inclusion across all demographics.

1.9- Fraud, Misuse and Security

As a technology, UPI has been able to earn the consumer's trust. It is designed with multiple layers of security to ensure safe payment such as two-factor authentication, biometric verification, and encryption protocols (Razorpay). The requirement of an MPIN, combined with real-time notifications, helps users detect unauthorized activities (Financial Express).

Despite these advancements, UPI-related fraud has surged in recent years. Fraud cases rose 85% in FY 2023-24, with reported incidents increasing from 7.25 lakh cases amounting to ₹573 crore in FY 2022-23 to 13.42 lakh cases totaling ₹1,087 crore in FY 2023-24 (Business Today). Although UPI transactions benefit from advanced encryption, the rapid increase in digital payment volumes has led to a rise in scams and unauthorized transactions. UPI-related fraud complaints constituted over 35% of all cybercrime complaints reported to the National Cybercrime Reporting Portal (NCRP) in 2022. Regulatory bodies have pointed out the increasing complexity of fraud tactics, requiring constant updates to security framework and consumer awareness initiatives (Business Today). The most prevalent forms of fraud include phishing attacks, fake UPI IDs, impersonation scams, and QR code fraud (Razorpay).

While RBI and NPCI have implemented stronger KYC norms, fraud detection mechanisms, and transaction limits, fraudsters continue to change their tactics, making ongoing enhancements in security frameworks, regulatory oversight, and user awareness programs necessary in order to ensure the long-term trust and stability of the UPI ecosystem. The government has also established organisations like the Indian Cybercrime Coordination Centre (I4C) and the National Cybercrime Reporting Portal (NCRP), purely for the role of addressing issues related to cybercrime. Long-term trust for UPI demands ongoing enhancements in fraud detection mechanisms, policy interventions, and consumer education to counter evolving cyber threats will remain paramount.

1.10- Competition of Industries

The rapid expansion of UPI has brought up significant challenges regarding regulation and security. The

RBI and the NPCI oversee UPI regulations, ensuring the system remains competitive and secure. To prevent monopolization, the NPCI imposed a 30% market share cap on Third-Party Application Providers, or TPAPs (Business Today Desk). Additionally, UPI has been positioned as a public good, with no transaction fees for merchants, raising concerns about the sustainability of payment service providers in the absence of revenue generation (European Payments Council).

2.0- Macroeconomic Implications

UPI has emerged as a transformative force in India's financial ecosystem, extending its influence beyond microeconomic factors to significantly impact India's macroeconomic landscape. By facilitating seamless digital transactions, UPI has played a pivotal role in enhancing financial inclusion, contributing to economic growth, and increasing government revenue through improved tax compliance.

2.1- Economic Growth

UPI has played a transformative role in expanding financial inclusion in India, aligning with the concept of financial deepening, where greater access to banking and credit leads to higher productivity and economic activity. By integrating over 300 million previously unbanked individuals into the formal financial system, UPI has significantly reduced barriers to financial participation (Bansal, Rohit, et al.). Key mechanisms driving inclusion include the Jan Dhan-Aadhaar-Mobile (JAM) trinity, which has enabled millions to transact digitally, and the Aadhaar Enabled Payment System (AePS), which allows biometric-authenticated UPI transactions even for users without smartphones (Chopra, Chirag, et al.). Additionally, microloan disbursements have doubled from 2018 to 2023, indicating that UPI has facilitated greater access to credit for underserved populations ("UPI and Financial Inclusion: Bridging the Gap for the Unbanked - FasterCapital").

UPI's contribution to GDP growth aligns with the Keynesian multiplier effect[1], where increased digital transactions stimulate consumption, investment, and aggregate demand. A 1% increase in UPI transaction volume correlates with a 0.03% rise in GDP growth (Choudhury). The cost savings from reduced cash dependency—estimated at ₹5.5 lakh crore ($67 billion) since 2016—free up capital for productive investments (PIB). Moreover, real-time transactions added $16.4 billion (0.56% of GDP) in 2021, with projections reaching $45.9 billion by 2026 (Juyal). The widespread adoption of UPI among 50 million merchants has further driven SME growth by expanding market reach and reducing cash flow constraints, strengthening economic formalization and business expansion (Shukla).

2.2- Tax Compliance

UPI has a significant macroeconomic impact on indirect tax compliance and government revenue by reducing informal cash transactions. Digital payments have formalized many parts of the economy and the concomitant traceability has reduced tax evasion. Furthermore, the formalization of supply chain interactions, reduction of the shadow economy, enhanced compliance without extra effort and growth of online commerce also benefit India's tax collection efforts.

The traceability of digital payments is a primary reason for improved tax revenue (Joseph and Ramalingam). UPI transactions, unlike informal cash exchanges, leave digital footprints, making it considerably harder for businesses to underreport sales and evade indirect taxes like Goods and Services Tax (GST). Furthermore, the increased usage of UPI has brought millions into the formal banking network

[1] The Keynesian multiplier effect occurs when an initial increase in spending leads to a greater overall increase in national income.

and the formal economy as a whole – increasing the overall tax base. UPI also compels firms to maintain supply chain compliance with GST.

When consumers utilize UPI for payments, they are more likely to demand genuine tax invoices. This consumer behavior compels retailers to accurately record their sales (outward supply), which in turn necessitates the proper recording of their purchases (inward supply) from upstream suppliers, leading to better compliance throughout the GST supply chain (Joseph and Ramalingam). Furthermore, UPI makes it more challenging for businesses to operate off the books and evade taxes, hence reducing the shadow economy[2]. This reduction is evidenced by the fact that the shadow economy in India is projected to decrease from 17.22% of GDP in 2016 to 13.6% by 2025, according to a study by the Association of Chartered Certified Accountants (ACCA).

Moreover, UPI's user-friendly nature encourages digital transactions without requiring additional enforcement efforts, naturally leading to better tax reporting. It has become very common for people to go out without carrying any cash – forcing retailers to accept digital payments. Additionally, there has been a sharp increase in the use of E-commerce which also necessitates online payments.

Nevertheless, UPI cannot completely remove the presence of black money as usage of cash cannot fully be stopped.

2.3- Digital Infrastructure & Cybersecurity Concerns

The reliance on digital infrastructure presents systemic vulnerabilities that could disrupt financial stability. As discussed earlier in the context of microeconomic implications of UPI, cybersecurity threats have escalated alongside UPI's expansion, with frauds, phishing schemes, and social engineering attacks exploiting weaknesses in user awareness rather than the technology itself.

Beyond security threats, UPI's dependence on continuous digital connectivity makes it vulnerable to network failures, service outages, and infrastructural disruptions, particularly in rural regions where internet access remains inconsistent. A major outage or cyberattack on UPI's backend infrastructure could paralyze digital transactions nationwide, causing significant economic disruptions. Furthermore, as a few major platforms dominate UPI transactions, the potential monopolization of the digital payment space raises concerns about market concentration risks, where a single-point failure could have cascading effects on the broader financial ecosystem. To mitigate these risks, ongoing investment in cybersecurity, decentralized transaction processing, and improved regulatory oversight is crucial to ensure the resilience and sustainability of UPI.

2.4- Digital Divide and Exclusion

Significant digital divides persist across various demographics such as age, gender, income and geography, contributing to exclusion in India's digital economy. Younger users, between ages 18 and 30, remain the chief consumers of UPI, while adoption sharply declines among people over the age of 45 due to lower digital literacy and trust issues ("Key Growth Drivers, Volumes, Trends, and User Demographics of UPI | CashBook"). Men make up nearly 70% of UPI users, with women – especially in rural areas – lagging due to lower financial awareness; 18% rural women remain unaware of key financial schemes (Outlook Money). Reports indicate that the richest 60% of Indians are four times more likely to use digital payment facilities than the poorest 40%, highlighting significant disparities in financial access. This exclusion caps the potential for economic growth since a large population is unable to participate in digital transactions and faces barriers to accessing credit, saving, and integrating into the formal economy. Small

[2] The shadow economy is the part of an economy that is not officially taxed or monitored.

businesses in rural areas also struggle with digital payment adoption, further widening economic disparities.

The lack of digital literacy among older populations and low-income groups presents many challenges. Many individuals face difficulty understanding and securely using digital payment platforms, increasing their vulnerability to fraud. Additionally, the shift toward digital finance threatens structural employment in traditional banking roles, as fewer in-person transactions reduce demand for bank tellers and cash-handling services. Business disruptions further compound these issues, as small merchants unable to adopt digital payments face competitive disadvantages. Addressing these challenges requires greater investment in financial literacy, improved rural digital infrastructure, and tailored policy interventions to ensure that the benefits of UPI reach all segments of society.

2.5- Global Influence and Cross-Border Expansion

The global expansion of UPI is reinforcing India's position in the global digital payments landscape, enhancing capital mobility, trade efficiency, and economic diplomacy. UPI's real-time, low-cost transactions are transforming cross-border payments by reducing transaction costs and delays, making it particularly impactful for remittances and international commerce (Maddali). By enabling seamless fund transfers, UPI is helping India integrate more deeply into the global financial system, reducing dependency on traditional banking intermediaries. Agreements such as the UPI-PayNow linkage with Singapore and similar collaborations with countries like France, UAE, Bhutan, Nepal, and Sri Lanka highlight its potential for broader financial integration. Additionally, regulatory reforms, such as the RBI's easing of forex regulations, are further facilitating Rupee-based trade settlements, positioning India as a key player in the global fintech ecosystem.

Beyond trade facilitation, UPI is also a powerful tool for soft power and economic diplomacy. The adoption of UPI-based payment solutions by multiple countries signals India's leadership in financial technology innovation. By establishing direct currency settlement mechanisms and promoting Rupee transactions globally, India strengthens its economic influence and trade relationships. The growing international acceptance of UPI fosters deeper economic cooperation, particularly in regions with strong Indian expatriate communities, such as the Gulf Cooperation Council (GCC) nations. Moreover, UPI's success showcases India's ability to develop scalable, inclusive financial solutions, enhancing its global reputation as a leader in digital payment infrastructure.

3.0- Global Implications

As UPI establishes itself as a pioneering model in digital payments, its global relevance is increasingly coming into focus. The system's real-time, low-cost, and interoperable architecture presents both opportunities and challenges when considered in the context of other economies. By examining countries such as Nigeria, China, Norway, and France—each with distinct financial systems, levels of digital infrastructure, and policy landscapes—this section explores the macroeconomic implications of adopting or integrating a UPI-like framework. These comparisons offer insight into how UPI can serve as a tool for financial inclusion in emerging markets, a competitive disruptor in developed economies, or a partner in global payment interoperability. Analyzing both the potential benefits and risks, this section aims to assess UPI's viability as a cross-border digital payment model and its broader impact on the global financial ecosystem.

3.1- Nigeria

India and Nigeria, though geographically and culturally distinct, share several structural similarities that

make them compelling parallels for exploring digital payment systems like the UPI. India, with a population of approximately 1.43 billion, is the world's most populous country, while Nigeria, Africa's most populous nation, has around 223 million people. Notably, Nigeria's median age is just 18 years—ten years younger than that of India—highlighting a highly youthful demographic that could accelerate the adoption of mobile and digital finance. While India remains predominantly rural (~65%), Nigeria is more urbanized, with over half of its population living in cities, which has implications for digital infrastructure rollout. Economically, India has a GDP of roughly $3.7 trillion compared to Nigeria's $480 billion, but both economies struggle with large informal sectors, estimated to be over 60% of total output in Nigeria and around 50% in India. This makes financial formalization through platforms like UPI especially relevant. Bank account ownership in India stands at 78%, while it remains at approximately 45% in Nigeria. However, Nigeria has made significant strides in mobile money, with over 60 million mobile wallet users, in contrast to India's leapfrogging into UPI—a bank-linked system now processing over 14 billion transactions monthly. Both countries have seen proactive regulatory support: India's NPCI and Nigeria's Central Bank have facilitated fintech innovation, with Nigeria even launching its own central bank digital currency (CBDC), the eNaira. These similarities and divergences lay a rich foundation for assessing UPI's potential role and impact in Nigeria.

Nigeria, like India, faces the pressing challenge of integrating a vast unbanked population into the formal financial system. With only about 45% of Nigerian adults holding a bank account, there remains a significant gap in financial accessibility, particularly in rural and underserved communities. UPI, with its mobile-first and low-cost architecture, presents a compelling solution. By decoupling the need for traditional banking infrastructure and enabling peer-to-peer transactions via smartphones, UPI could democratize access to digital financial services. Its interoperability across banks and fintech apps would reduce the reliance on physical branches, which are often scarce in rural Nigeria. India's success with Aadhaar-enabled payments and Jan Dhan accounts illustrates how a government-backed UPI framework can catalyze inclusion. In Nigeria, UPI could similarly serve as a platform for government-to-person (G2P) transfers, micro-loans, and savings products, helping more citizens access credit, build financial histories, and participate in formal economic activity.

Remittances are a crucial component of Nigeria's economy, accounting for nearly $20 billion in annual inflows—over 4% of its GDP. However, these transactions are often burdened by high fees and delays due to intermediaries in traditional banking channels. UPI could revolutionize cross-border remittances for millions of Nigerians receiving funds from abroad. By partnering with international platforms and integrating UPI rails for remittance corridors—similar to India's linkage with Singapore's PayNow—Nigeria could drastically lower remittance costs, improve speed, and enhance transparency. Moreover, diaspora communities could benefit from direct bank-to-bank transfers using just mobile numbers or unique IDs, making transactions both secure and accessible. This would not only increase the value retained by recipients but also funnel more funds into the formal economy, boosting financial stability and development.

Despite Nigeria's growing digitization, infrastructural limitations remain a significant barrier to widespread UPI adoption. Internet penetration in Nigeria stands at around 55%, and smartphone ownership is still unevenly distributed, particularly in rural areas where access to reliable electricity and mobile networks is limited. Unlike India, where the JAM trinity laid the groundwork for digital payments, Nigeria lacks a comparable nationwide identity-linked financial inclusion initiative. UPI's real-time transaction model relies on stable internet connectivity and backend server efficiency, both of which face

operational constraints in many parts of Nigeria. These limitations could result in transaction failures, slow user adoption, and trust issues, especially among first-time digital users. Without significant investment in digital infrastructure and last-mile connectivity, the transformative potential of UPI may remain confined to urban centers, exacerbating the digital divide.

Nigeria's financial landscape is governed by complex and evolving regulations, which could present challenges to seamless UPI integration. While the Central Bank of Nigeria (CBN) has supported digital innovation through initiatives like the Nigeria Inter-Bank Settlement System (NIBSS), foreign or external payment frameworks like UPI would need to navigate licensing, data localization, interoperability, and compliance with anti-money laundering (AML) and know-your-customer (KYC) norms. Furthermore, UPI's status as a public digital good in India, operated by a nonprofit (NPCI), may conflict with commercial interests or regulatory frameworks in Nigeria's more fragmented fintech ecosystem. Ensuring alignment between Indian and Nigerian regulatory bodies, establishing secure and compliant cross-border protocols, and fostering public trust would be essential before UPI could scale effectively in the Nigerian context.

While Nigeria presents promising opportunities for UPI's adoption, these must be weighed against the country's infrastructural and regulatory constraints. The parallels between India and Nigeria – in terms of their young populations, sizable unbanked communities, and rising digital engagement – make UPI a potentially transformative tool for advancing financial inclusion and remittance efficiency. Its introduction could significantly reduce transaction costs, expand access to formal financial services, and empower individuals currently excluded from the digital economy. However, the realization of these benefits is contingent upon addressing Nigeria's infrastructural limitations, particularly the gaps in internet connectivity and smartphone access, as well as navigating a complex regulatory landscape that may not yet be fully conducive to seamless UPI integration. If these challenges can be met through targeted investments, collaborative policymaking, and public-private partnerships, UPI could become a cornerstone of Nigeria's financial modernization—much like it has in India.

3.2- China

China and India, the world's two most populous nations and fastest-growing major economies, share broad similarities in scale, ambition, and the momentum of digital transformation. Both countries boast populations exceeding 1.4 billion, yet the nature of their economies, governance models, and financial ecosystems vary widely. China's nominal GDP stood at approximately $17.5 trillion in 2024, compared to India's $3.7 trillion. Urbanization in China is significantly higher (65%) than India (36%), and its per capita income is nearly five times that of India, creating a consumer base with greater average purchasing power. When it comes to digital infrastructure, China leads with near-universal internet penetration and smartphone usage.

In the digital payments space, China's ecosystem is highly mature and heavily privatized, with platforms like Alipay and WeChat Pay controlling over 90% of the mobile payments market and facilitating nearly every facet of economic life including peer-to-peer transfers, retail, public transport, healthcare, and government services. In contrast, India's payment architecture, led by UPI, is publicly managed, open-access, and designed to encourage competition and innovation. UPI currently facilitates over 14 billion transactions per month, representing more than 75% of India's total digital payment volume. These differences frame both the unique challenges and strategic opportunities that UPI's global expansion presents within the Chinese context.

Despite the entrenched dominance of Alipay and WeChat Pay, UPI could provide an avenue for payment

system diversification in China's fintech landscape. China's existing duopoly has been a subject of regulatory scrutiny in recent years, with the government calling for more open platforms and increased competition. In this environment, UPI's interoperable, government-backed model could offer an appealing alternative to regulators seeking to avoid excessive market concentration. UPI's zero-MDR (Merchant Discount Rate) policy and open banking integration stand in stark contrast to the closed-loop, vertically integrated business models of Chinese platforms. By presenting a system that allows seamless transfers across banks and apps without additional user fees, UPI may set an example of how to structure a more inclusive and cost-effective payments ecosystem.

UPI's presence in China could also support deeper India-China fintech cooperation under multilateral settings like BRICS or the Shanghai Cooperation Organisation (SCO). These forums increasingly focus on digital public infrastructure (DPI), and UPI's architecture could be studied or partially adopted as a model for shared payment systems. Furthermore, as India continues to advance its Digital Public Infrastructure (DPI) exports, UPI may be seen not only as a technology but as an ideological shift toward publicly governed digital systems.

Another promising opportunity lies in tourism and cross-border spending. China sees considerable inbound traffic from Indian travelers—including tourists, students, and business visitors. In 2019, over 850,000 Indian nationals traveled to China, contributing to local commerce, especially in urban hubs like Shanghai, Beijing, and Guangzhou. However, Indian travelers often face challenges when navigating China's closed-loop digital payment systems, which typically require a local bank account or national ID to use. Integrating UPI with Chinese merchant systems—particularly in sectors like hospitality, retail, and transportation—would offer Indian visitors a seamless and familiar payment experience, eliminating the need for currency exchange or international credit cards. Piloting UPI QR code acceptance at tourist hotspots or airports could enhance India's global fintech presence while also simplifying commerce for tourists. Furthermore, this integration could pave the way for bi-directional payment corridors, allowing Chinese tourists visiting India to use Alipay/WeChat Pay for transactions, deepening digital ties between the two economies. Such initiatives would not only promote smoother commercial interactions but also bolster bilateral economic diplomacy, reinforcing India's position as a leader in interoperable, low-cost financial technologies.

Despite these potential benefits, UPI's expansion into China faces significant barriers. The first and most formidable challenge is the entrenchment of existing payment platforms. Alipay and WeChat Pay are not just payment apps—they are embedded into the daily life of Chinese citizens, functioning as digital wallets, social networks, credit scoring platforms, and even health tracking apps. These platforms are backed by tech giants Alibaba and Tencent, whose ecosystems span e-commerce, finance, logistics, and cloud services. Over 1 billion Chinese users rely on these platforms for their day-to-day financial needs, and merchant networks are deeply integrated with their proprietary QR code systems. UPI's entry would therefore require either parallel acceptance infrastructure or system-level interoperability, both of which involve significant technological and political complexity. Unlike India, where the government promotes plurality and interoperability in digital payments, China's private fintech sector thrives in a tightly controlled and largely self-contained ecosystem. Convincing merchants to integrate another payment layer—especially one from a foreign jurisdiction—would require strong incentives or government mandates.

China's regulatory environment poses another substantial challenge. Its cybersecurity laws, data localization rules, and restrictions on foreign financial technologies make it difficult for any international

payment service to operate independently within its borders. Multinational companies like Visa and Mastercard have struggled to establish a significant footprint. UPI, being state-owned and foreign, would be subject to intense scrutiny. Furthermore, geopolitical tensions between India and China—particularly in the wake of border disputes and trade restrictions—further complicate collaboration in sensitive areas like payments infrastructure and data sharing. Regulatory compliance for UPI would necessitate a host of security audits, data sovereignty assurances, and potentially localized storage of transaction data—each of which could be politically charged and technically burdensome.

There is also a perceived threat of surveillance or data misuse, with each nation wary of granting the other access to domestic transaction flows. For UPI to gain regulatory approval in China, it would likely need to operate through local partnerships or joint ventures, introducing complexity and limiting the autonomy of NPCI in such arrangements.

While China presents one of the most lucrative and digitally mature markets globally, it also poses formidable barriers to UPI's expansion. The opportunities—such as enabling tourism-related transactions and contributing to open digital payments discourse—are targeted and diplomatic in nature rather than commercial. The threats, on the other hand, are structural, rooted in both market dominance and regulatory rigidity. Unless there is a paradigm shift in China's fintech openness or multilateral frameworks facilitate greater interoperability, UPI's presence in China will likely remain symbolic and limited in scope. Nevertheless, engaging with China through UPI showcases India's aspirations as a global fintech exporter and opens the door for future collaboration in regional digital infrastructure dialogues.

3.3- Norway

Norway, a Scandinavian country known for its high standard of living and technological sophistication, contrasts sharply with India in terms of demographics, economic structure, and financial culture. With a modest population of 5.5 million and a GDP per capita of $87,000, Norway enjoys a vastly different economic profile from India's 1.4 billion people and $2,485 per capita income. While both countries share democratic values and high literacy rates, Norway's aging population (18.9% over 65) and low ethnic diversity reflect a more homogeneous and mature society compared to India's young and diverse demographic. Economically, Norway's wealth is underpinned by natural resources like oil and gas, with a robust social welfare system supported by high taxation (31% of GDP). India's economy, though growing, is marked by wider inequality and lower state capacity. From a payments ecosystem perspective, Norway is among the world's most digitized societies, with internet penetration exceeding 99% and mobile payment platforms like Vipps capturing over 80% of the market. Norway's government is actively pursuing digital transformation goals, including the phasing out of cash by 2025. In contrast, India's digital payments growth has been more organic and inclusive and geared toward bridging access gaps in a vast, heterogeneous population. These contrasts highlight both the complexity and the potential in considering UPI's integration into Norway's advanced digital economy.

Norway presents an ideal technological environment for UPI's potential expansion, thanks to its highly advanced digital infrastructure. With 95% smartphone penetration and nearly universal internet access, the country is well-positioned to adopt real-time payment systems like UPI. The existing use of Vipps as the dominant mobile payment app reveals strong digital engagement among consumers. Additionally, the government's National Strategy for Digitalization, backed by a €90 million investment in 2024, reflects a forward-thinking approach to integrating emerging technologies across sectors. This environment creates a strong use-case for UPI as a complementary payment system that could increase innovation and efficiency. Norway's transition to the Eurosystem's TIPS (TARGET Instant Payment Settlement) and

adoption of ISO 20022 standards further boosts the technical compatibility of its systems with UPI's architecture. These standards make cross-border payments easier and could enable India and Norway to build bilateral payment corridors. UPI's integration with TIPS could also streamline intra-Nordic real-time payments, positioning India as a potential fintech collaborator within the European framework. Another positive indicator is Norway's exploration of Central Bank Digital Currency (CBDC), showing an openness to alternative digital transaction systems. UPI could benefit from this trend by aligning with Norway's ambitions for a more inclusive and resilient payment ecosystem. Its proven scalability and low transaction cost model could serve as a blueprint for further innovation in Norway's financial services sector.

Despite the potential, UPI's adoption in Norway faces considerable challenges. The most pressing is market saturation. Vipps processes more than 80% of mobile payments in Norway, making it the dominant player in an already competitive landscape. The system is deeply embedded into everyday life, and consumers see little reason to switch or adopt a parallel payment system. Furthermore, cash usage is already under 4% and declining, indicating a mature digital payment market with limited room for disruption. Additionally, the Norwegian regulatory environment is among the most stringent globally. UPI would need to comply with both the EU's General Data Protection Regulation (GDPR) and Norway's national data protection laws, which enforce high standards for user data encryption, privacy, and transparency. UPI's model, which involves collecting metadata such as device fingerprint, location, and Aadhaar (in the Indian context), would need to be significantly adjusted to meet European privacy norms. Norway's adoption of the Digital Operational Resilience Act (DORA) and evolving legislation around AI and digital services adds further compliance burdens. DORA mandates that digital service providers—including fintech platforms—demonstrate resilience against cyberattacks, maintain backup systems, and ensure secure cross-border data transfers. Integration costs would be significant due to the need to align with Norway's strict contingency frameworks and existing payment infrastructure.

Norway offers a technologically advanced and financially stable environment for UPI integration, yet its very strengths pose some of the greatest obstacles. On one hand, UPI could thrive in this ecosystem by riding on existing infrastructure, leveraging ISO 20022 compatibility, and contributing to real-time cross-border payment systems. On the other hand, the dominance of Vipps, saturation of digital payment services, and complex regulatory frameworks create formidable barriers to entry. For UPI to succeed in Norway, strategic partnerships with domestic financial institutions and regulators will be essential. These collaborations can ensure interoperability, data compliance, and user trust. Additionally, UPI would need to differentiate itself—not as a replacement, but as a value-added option that enhances Norway's already sophisticated payment landscape. In sum, while Norway may not require UPI for domestic transformation, the platform still holds strategic value for global interoperability, cross-border trade facilitation, and advancing India's fintech diplomacy. Its implementation would symbolize the maturity and adaptability of India's digital public infrastructure, offering a model for cooperation with other high-income, technologically advanced nations.

3.4- France

France, a key player in European politics and culture, presents a compelling contrast to India, a rapidly growing economy in South Asia. With a population of approximately 68.2 million compared to India's 1.43 billion, France's demographic scale is much smaller, and its growth rate of 0.29% is also more stable relative to India's 0.81%. France's population density (123/km²) is significantly lower than India's (473/km²), and its population is older on average, with 22% aged 65 and above. France also has a higher

life expectancy of 83 years, reflecting better healthcare and living standards compared to India's 70 years. Economically, France's GDP of around $3 trillion places it among the top global economies, though it still trails India's $3.55 trillion GDP. However, France's GDP per capita of $44,460 highlights a much higher standard of living than India's $2,485. France's service-driven economy contrasts with India's still largely agrarian workforce. These differences extend to taxation and welfare; France has one of the world's highest tax-to-GDP ratios (31%), funding a robust social safety net, while India's is closer to 12%. These foundational differences frame the challenges and opportunities UPI may face in integrating into the French economic ecosystem.

France is one of the most visited countries in the world and a popular destination for Indian tourists. The 2023 agreement allowing UPI usage at the Eiffel Tower marks a significant step toward enhancing the travel experience for Indian visitors. Accepting UPI payments enables seamless transactions in Indian rupees, reducing currency exchange hassles and potentially boosting tourist spending. This convenience can lead to increased patronage of local French businesses, especially in retail and hospitality sectors situated near major tourist destinations. By supporting Indian payment methods, these businesses stand to gain from a more comfortable and familiar user experience for Indian tourists.

The introduction of UPI in France also offers a strategic platform for financial collaboration between Indian and French institutions. Partnerships between the NPCI and French firms like Lyra Network open up pathways for co-developing financial technologies that cater to both markets. UPI's integration with French systems could simplify cross-border B2B and B2C payments, improving trade efficiency and reducing transaction costs. This can be especially beneficial for SMEs engaging in cross-national trade, streamlining their cash flows and improving transparency. The symbolic value of such cooperation also strengthens diplomatic and economic ties, showcasing India's fintech capabilities on the global stage.

One of the main challenges facing UPI's expansion in France is consumer inertia. The French are accustomed to using existing digital payment solutions, including credit and debit cards, contactless payments, and regionally dominant platforms. The introduction of UPI requires consumers to shift from familiar interfaces to a new ecosystem, which can be met with skepticism and reluctance. Building trust and encouraging usage would necessitate comprehensive awareness campaigns and onboarding incentives. Without a clear value proposition for French users beyond Indian tourists, the widespread adoption of UPI might remain limited.

Navigating the European Union's regulatory environment is another major challenge. UPI must comply with stringent data protection laws such as GDPR, which necessitates robust encryption, data residency protocols, and strict privacy standards. Additionally, France is bound by EU-wide legislation covering payment system interoperability, anti-money laundering rules, and digital security standards. Ensuring compliance with these complex legal frameworks could require considerable adaptation of UPI's backend architecture. Moreover, potential cybersecurity concerns—especially regarding cross-border data flows—might deter full-scale integration unless preemptively addressed through bilateral agreements and regulatory alignment.

France represents both an attractive and a challenging frontier for UPI's international ambitions. On one hand, France's tourism appeal and openness to fintech collaboration offer real opportunities for UPI to serve Indian travelers and foster cross-border financial innovation. On the other hand, entrenched consumer behaviors and complex regulatory requirements present non-trivial obstacles to adoption and scale. While initial rollouts, such as those at the Eiffel Tower, show promise in enhancing tourist convenience, UPI's long-term success in France will depend on its ability to offer unique value propositi-

ons that appeal beyond the Indian diaspora. Strategic alliances with local financial entities, coupled with compliance-focused technological adaptations, will be essential to fully realize the potential of UPI in the French digital economy.

4.0- Political Implications

By the introduction of UPI by Prime Minister Narendra Modi, India has advanced leaps and bounds by becoming the most prevalent user of online payment systems as it has both the highest volumes and values on the online payment ecosystem. As a result, the political landscape domestically as well as internationally has been affected majorly since the government has had a huge role in the imposition of this revolutionary technology. The innovation of this technology has both positive as well as negative implications for the government as it achieves major economic goals for the government, improves their global soft power and is a great tool for domestic visibility for the government, however, it does also come with its downsides.

One of the Indian government's largest goals over the last decade has been widespread financial inclusion. UPI has played a large role in achieving this goal as 171 million Indians have been pulled out of extreme poverty in the last decade (PIB Delhi, "India's Triumph in Combating Poverty"). This achievement isn't only credited to UPI but also key government initiatives like the PMJDY, PM-KISAN, the JAM trinity, MGNREGA, etc. However, UPI has played a significant role in the successful application of these schemes as Direct Benefit Transfer (DBT) systems streamline these schemes and make it much more reliable and efficient for beneficiaries around the world to receive money from government welfare schemes. Another key aim of the Modi government was to cut down on corruption, which was done successfully, especially in the case of government welfare schemes, as middle-men were omitted by putting DBT systems in place. Moreover, this achieves one more goal of the government, which is widespread technological innovation and adoption that makes India a modern economy and a developed nation by 2047, which is when it celebrates 100 years of independence. This is achieved by UPI as it encourages the use of technology equitably, since UPI is accessible to people in rural locations as well as remote places. Ultimately, this is beneficial for the government as it uplifts various communities such as small scale businesses, people living in rural areas and most importantly the middle class of India, which accounts for a massive chunk of the population.

Another major goal of the government, as well as the current ruling party – the Bharatiya Janata Party – would obviously be to increase the visibility of its agenda and its leaders. This is done by pushing their political agenda of nationalism which is done by boosting India's soft power as well as hard power in a strong manner as this technology can be implemented on a global scale and has been getting eyeballs from countries and leaders all over the world. Moreover, this has been a major driver for economic growth as spending has increased immensely and it has become much easier and safer for business in general, due to the transparency that UPI brings. Most importantly, by making the BJP and Prime Minister Modi the face for this revolutionary technology, the government and the ruling party benefit immensely as the effects of their welfare schemes are more evident, small and micro scale businesses have been increasingly more uplifted and the middle class as well as the people under the poverty line have gained immensely.

However, this does come with some cons as the diversity and enormous population of the country means that it is inevitable that some people are left behind in this progress towards economic development through technological advancements. As a result, this could be quite detrimental for the government as it is unavoidable that some people are left without internet and access to UPI due to which they are not able

to keep up with the economic development that is taking place at a rapid scale in the rest of the country. Moreover, this could lead to market complications in the UPI payment industry as companies like PhonePe and Google Pay have a large control over the market. As a result, it becomes the government's job to regulate the industry and make sure that this technology, which was meant for welfare and inclusive development does its job well.

In sum, UPI is both a symbol and a substance of India's political and economic transformation. While it reinforces the Modi government's narrative of inclusive development, digital empowerment, and anti-corruption, it also amplifies India's global image as a leader in fintech innovation. However, its success also places the responsibility on the state to ensure that no one is excluded from this progress and that regulatory mechanisms are strong enough to prevent market concentration or inequality. As UPI continues to evolve, its political significance will lie not only in its innovation but in its ability to truly deliver equitable growth across India's diverse population.

5.0- Conclusion

India's adoption of the United Payment Interface (UPI) marks one of the most ambitious and successful digital financial transitions ever undertaken by a developing nation. Since its inception in 2016, UPI has revolutionized the way Indians transact – replacing cash with convenience, opacity with traceability, and exclusion with opportunity. The journey has been nothing short of revolutionary, though it is far from flawless. This research looked to dissect the design, efficacy, impact and future of UPI through microeconomic, macroeconomic, global and political perspectives.

At the microeconomic level, UPI has restructured consumer behaviour by enabling instant, seamless transactions that have significantly improved financial liquidity. Transaction volume soared from 92 crore in FY18 to over 8,375 crore in FY23, with a concomitant rise in value from ₹1 lakh crore to ₹139 lakh crore in the same period of time. These numbers clearly indicate that the people of India are increasingly embracing the digital economy. Simultaneously, UPI has helped merchants by cutting down on their costs, eliminating intermediaries and facilitating real-time settlements. Each of these factors help in bolstering efficiency and ease of doing business. UPI has democratised merchant access to formal banking, particularly for MSME businesses, enabling them to access credit and financial services. Over 70% of UPI users now come from outside tier-1 cities of India, indicating that UPI has made a significant penetration into the semi-urban and even rural regions of India.

However, the ease that UPI brings has triggered overspending and impulsive consumption among younger demographics, with 74% of users reportedly spending beyond their means. A behavioural recalibration – via financial literacy and app-based nudges – has shown dire demand to combat this issue. Transaction failures, inconsistencies in settlements and cyber fraud continue to pose a threat to UPI's reliability and consumer trust. Regulatory bodies like the NPCI and RBI have responded with caps on monopolisation of third-party providers, stronger KYC norms, and initiatives like UPI 123PAY for feature phone users, but these responses must be worked on at a much larger scale in order to actually see a significant impact.

The macroeconomic implications are equally extensive. UPI has catalyzed financial inclusion by integrating more than 300 million previously unbanked individuals into the formal economy. The significant role it plays in supporting the JAM trinity, DBTs, and AePS has helped lift millions out of poverty while reducing corruption through disintermediation. UPI's multiplier effect on GDP is measurable: a 1% rise in UPI transactions corresponds to a 0.03% increase in GDP growth. Moreover, it has enhanced tax compliance and helped shrink India's shadow economy – from 17.2% of GDP in 2016

to an estimated 13.6% by 2025.

Still, the digital divide persists and emerges as the largest challenge that UPI faces to widespread adoption. Rural users still face infrastructural barriers, such as intermittent connectivity and lack of smartphones, though efforts like UPI 123PAY aim to bridge this gap. Demographic divides with regards to age, sex, education and income underscore this challenge: men account for a majority of users, while older populations and low-income, rural women remain underrepresented. As the Financial Inclusion Index climbs from 53.9 in FY21 to 64.2 in FY24 India must remain committed to targeted interventions: awareness campaigns, vernacular interfaces and simplified onboarding.

UPI's influence extends globally, reflecting India's rising stature as a digital infrastructure exporter. Its cross-border interoperability initiatives with Singapore, France, UAE and Bhutan show how digital diplomacy can drive financial cooperation. For countries like Nigeria, UPI holds promise in transforming remittance flows and financial inclusion. For China, its relevance lies in offering an open source, government-backed alternative to a fintech duopoly. In Norway and France, UPI showcases India's ability to offer scalable, low-cost solutions even in saturated, high-income and high-tech markets. However, regulatory hurdles – especially the GDPR in the EU and data localisation norms in China – mean that expansion must be strategic and collaborative.

On the political front, UPI has become both a flagship of Prime Minister Narendra Modi's digital India vision and a strong tool of soft power. Domestically, it strengthens the BJP's image as a modernizing force and gives credibility to welfare schemes by making their outcomes more visible and traceable. Internationally, UPI serves as a symbol of technological self-reliance and innovation leadership. However, political ownership of a public-good infrastructure like UPI comes with accountability. Regulation oversight must remain neutral, competition fair and access universal – lest the system become a vehicle of exclusion and monopolization.

So what is working? UPI's real-time architecture, low-cost model, inclusive design and public-private collaboration have made it a global benchmark.

What is not working? Persistent fraud, digital exclusion, lack of financial discipline, lack of financial literacy and weak regulations in some aspects threatens its continued success.

What can be done better? First, reinforce user education through widespread, multilingual financial literacy campaigns. Second, invest more in rural digital infrastructure to ensure 100% participation and seamless connectivity. Third, refine regulatory frameworks to combat fraud and prevent market monopolization. Fourth, promote innovation that caters to underserved segments – be it voice-activated payments, biometric verification, or AI-driven fraud detection.

Ultimately, UPI's story is not just about financial transactions – it is about transformation. It is a leap toward a more transparent, efficient and inclusive economy. But for it to be a truly successful revolution, UPI must transcend demographics, bridge divides, and uphold user trust without compromise. India has built the railroads and now it must ensure every citizen, regardless of age, gender, geography, or income, has a seat on the train.

References

1. Aanchal. "95% of Households Have Phone in India, Only 9.9% Own Computer." *The Indian Express*, 9 Oct. 2024, indianexpress.com/article/business/commodities/95-of-households-have-phone-in-india-only-9-9-own-computer-9612625/. Accessed 18 Feb. 2025.

2. Abenaya Gunasekaran. "UPI Frauds: Common Types of UPI Frauds & Preventions Methods." *Razorpay Blog*, 15 Dec. 2024, razorpay.com/blog/upi-frauds-types-tactics/. Accessed 19 Feb. 2025.
3. ABP News Bureau. "From Cash to Tap: How UPI Is Shaping Consumer Purchasing Behaviour." *Abplive.com*, ABPLive, 11 Sept. 2024, news.abplive.com/business/from-cash-to-tap-how-upi-is-shaping-consumer-purchasing-behaviour-1716595. Accessed 19 Feb. 2025.
4. Ajinkya Kawale. "About 4 out of 10 Individuals in Rural, Semi-Urban India Prefer UPI: Report." *@Bsindia*, Business Standard, 17 Dec. 2024, www.business-standard.com/economy/news/about-4-out-of-10-individuals-in-rural-semi-urban-india-prefer-upi-report-124121701029_1.html. Accessed 19 Feb. 2025.
5. Amin, Muhammad Caesar. "Bridging the Divide: Empowering Rural India through Financial Inclusion and Digital Payments." *Modern Diplomacy*, 13 Dec. 2023, moderndiplomacy.eu/2023/12/13/bridging-the-divide-empowering-rural-india-through-financial-inclusion-and-digital-payments/. Accessed 12 Mar. 2025.
6. Anjum, Amaan. "The Impact of Unified Payments Interface (UPI) on the Indian Economy." *2025 IJRTI* , vol. 10, no. 1, 2025, p. 656, ijrti.org/papers/IJRTI2501080.pdf. Accessed 11 Mar. 2025.
7. Axis Bank. "UPI for Current Account: Importance, Requirements & Steps | Axis Bank." *Axisbank.com*, Axis Bank, 29 Jan. 2024, www.axisbank.com/progress-with-us-articles/digital-banking/upi-for-current-account. Accessed 19 Feb. 2025.
8. Bansal, Rohit, et al. "Decoding India's UPI Phenomenon: A Digital Revolution with Global Implications." *Orfonline.org*, OBSERVER RESEARCH FOUNDATION (ORF), 5 Sept. 2024, www.orfonline.org/expert-speak/decoding-india-s-upi-phenomenon-a-digital-revolution-with-global-implications. Accessed 18 Feb. 2025.
9. BCG, Omidyar Network. *Credit Disrupted Digital MSME Lending in India*. media-publications.bcg.com/Credit-Disrupted-Digital-MSME-Lending-in-India.PDF. Accessed 19 Feb. 2025.
10. Bhardwaj, Naina, Melissa Cyrill. "Unified Payments Interface (UPI) from India: Tracking Global Acceptance." *India Briefing News*, 17 July 2023, www.india-briefing.com/news/global-acceptance-of-india-unified-payments-interface-upi-tracker-26183.html/. Accessed 27 Mar. 2025.
11. Bhavya Dilipkumar. "India's UPI Enters France: Who Stands to Benefit and What's Ahead." *Moneycontrol*, 14 July 2023, www.moneycontrol.com/news/business/announcements/indias-upi-enters-france-who-stands-to-benefit-and-whats-ahead-10962091.html. Accessed 27 Mar. 2025.
12. Bose, Kuhu. "A Study on Awareness of UPI Payment -Students' Perspective." *Journal of Emerging Technologies and Innovative Research*, vol. 10, no. 11, JETIR, 2023, www.jetir.org/papers/JETIR2311349.pdf. Accessed 19 Feb. 2025.
13. BS Reporter. "In India's Goal of Financial Inclusion, Banks Make 'Remarkable Progress.'" *Business Standard*, Business Standard, 26 July 2024, www.business-standard.com/finance/news/in-india-s-goal-of-financial-inclusion-banks-make-remarkable-progress-124072600188_1.html. Accessed 18 Feb. 2025.
14. BS Web Team. "UPI Transactions up 118% in Semi-Urban, Rural Retail Stores in 2023: Study." *@Bsindia*, Business Standard, 20 Dec. 2023, www.business-standard.com/finance/news/upi-transactions-up-118-in-semi-urban-rural-retail-stores-in-2023-study-123122000604_1.html. Accessed 19 Feb. 2025.

15. Business Today Desk. "NPCI Extends 30% UPI Market Share Cap Deadline on 3rd Party Apps to December 2026." *Business Today*, 31 Dec. 2024, www.businesstoday.in/tech-today/news/story/npci-extends-30-upi-market-share-cap-deadline-on-3rd-party-apps-to-december-2026-459171-2024-12-31. Accessed 19 Feb. 2025.
16. Chokhawala, Mohammed. "Income Tax on UPI Transactions and How Does It Work?" *Cleartax*, ClearTax, 23 Mar. 2023, cleartax.in/s/tax-on-upi-transactions. Accessed 29 Apr. 2025.
17. Chopra, Chirag, et al. "India's Unified Payment Interface's Impact on the Financial Landscape." *World Economic Forum*, 26 June 2023, www.weforum.org/stories/2023/06/india-unified-payment-interface-impact/. Accessed 18 Feb. 2025.
18. Choudhury, Gaurav. "UPI Is More than Ease of Payments. It Is Adding to GDP Too." *Moneycontrol*, 15 Jan. 2024, www.moneycontrol.com/news/opinion/upi-is-more-than-ease-of-payments-it-is-adding-to-gdp-too-12051961.html. Accessed 11 Mar. 2025.
19. Christensen, Jan. "Norway | Facts, Points of Interest, Geography, & History." *Encyclopædia Britannica*, 26 Apr. 2019, www.britannica.com/place/Norway. Accessed 27 Mar. 2025.
20. Cornelli, Giulio, et al. *The Organisation of Digital Payments in India - Lessons from the Unified Payments Interface (UPI)*. 2024, www.bis.org/publ/bppdf/bispap152_e_rh.pdf. Accessed 18 Feb. 2025.
21. DH Web Desk. "UPI in France: How It Will Work, All You Need to Know." *Deccan Herald*, 14 July 2023, www.deccanherald.com/business/upi-in-france-how-it-will-work-all-you-need-to-know-1236966.html. Accessed 27 Mar. 2025.
22. "Digital Payments Driving the Growth of Digital Economy | National Informatics Centre | India." *Www.nic.in*, 2016, www.nic.in/blog/digital-payments-driving-the-growth-of-digital-economy/. Accessed 30 Mar. 2025.
23. Editorial Team. "Unified Payments Interface: Revolutionising Digital Payments in India." *Bharti Institute of Public Policy*, 11 May 2023, blogs.isb.edu/bhartiinstitute/2023/05/11/unified-payments-interface-revolutionising-digital-payments-in-india/. Accessed 19 Feb. 2025.
24. "France Becomes First EU Country to Launch India's UPI Payment System | Digital Watch Observatory." *Digital Watch Observatory*, 5 Feb. 2024, dig.watch/updates/france-becomes-first-eu-country-to-launch-indias-upi-payment-system. Accessed 27 Mar. 2025.
25. "France vs India - Country Comparison | World Statistics." *Globalstatcompare.com*, 2023, globalstatcompare.com/compare?countries%5B%5D=FRA&countries%5B%5D=IND. Accessed 27 Mar. 2025.
26. Ghani, Muskan, et al. "Identifying the Major Demographic Factors Determining Unified Payments Interface Usage: A Study Based on West Bengal." *Asian Journal of Managerial Science*, vol. 12, no. 1, Centre for Research and Innovation, Mar. 2023, pp. 1–5, https://doi.org/10.51983/ajms-2023.12.1.3364. Accessed 5 May 2025.
27. Ghosh, Nilanjan. "India's UPI Market: Projections for Growth under Various GDP Scenarios." *Orfonline.org*, edited by Renita D'Souza, 25 Sept. 2023, www.orfonline.org/research/indias-upi-market. Accessed 18 Feb. 2025.
28. Gupta, Priti. "India's Wildly Popular Payments System Attracts Scammers." *Www.bbc.com*, 12 July 2024, www.bbc.com/news/articles/c288m1km01po. Accessed 19 Feb. 2025.

29. "Increased UPI Payments in India Encourage Overspending." *Https://Www.facebook.com/VARINDIAMagazine*, 13 May 2024, www.varindia.com/news/increased-upi-payments-in-india-encourage-overspending. Accessed 18 Feb. 2025.
30. "India vs Norway - Country Comparison | World Statistics." *Globalstatcompare.com*, 2023, globalstatcompare.com/compare?countries%5B%5D=IND&countries%5B%5D=NOR. Accessed 27 Mar. 2025.
31. "India's UPI : A Global Front-Runner in Digital Payment Systems." *Pib.gov.in*, 30 Oct. 2023, pib.gov.in/PressReleaseIframePage.aspx?PRID=1973082. Accessed 18 Feb. 2025.
32. IndusInd Bank. "What Is the UPI Transaction Limit per Day?" *Indusind.com*, IndusInd, 24 Jan. 2025, www.indusind.com/iblogs/savings-account/upi-transaction-limit-per-day/. Accessed 19 Feb. 2025.
33. Jain, Anusha, Kushagra Harshvardhan. "India's Digital Divide Threatens the Progress of Financial Inclusion." *Findevgateway.org*, 19 June 2024, www.findevgateway.org/blog/2024/06/indias-digital-divide-threatens-progress-of-financial-inclusion. Accessed 12 Mar. 2025.
34. ---. "India's Digital Divide Threatens the Progress of Financial Inclusion." *Findevgateway.org*, 19 June 2024, www.findevgateway.org/blog/2024/06/indias-digital-divide-threatens-progress-of-financial-inclusion. Accessed 12 Mar. 2025.
35. Joseph, Jerome, N. Ramalingam. *Digital Payments and GST Revenue: An Empirical Analysis*. 2022, nipfp.org.in/media/medialibrary/2022/12/JJ.pdf.pdf. Accessed 11 Mar. 2025.
36. Karkera, Kavitha. "Going Cashless: A Study on Awareness and Usage of UPI Digital Payment among College Students in Bengaluru North." *ResearchGate*, Mar. 2024, www.researchgate.net/publication/385072278. Accessed 19 Feb. 2025.
37. Kaur, Simran, et al. "Cyber-Security in UPI Payments." *Ijraset.com*, 13 May 2023, www.ijraset.com/research-paper/cyber-security-in-upi-payments. Accessed 30 Mar. 2025.
38. "Key Growth Drivers, Volumes, Trends, and User Demographics of UPI | CashBook." *CashBook*, 2016, cashbook.in/blogs/inside-upi-examining-the-key-growth-drivers-volumes-trends-and-user-demographics/. Accessed 5 May 2025.
39. Kimura, Hideaki, et al. "UPI." *Proceedings of the VLDB Endowment*, vol. 3, no. 1-2, Association for Computing Machinery (ACM), Sept. 2010, pp. 630–37, https://doi.org/10.14778/1920841.1920922. Accessed 18 Feb. 2025.
40. Klapper, India, et al. *COUNTRY BRIEF the Global Findex Database 2021*. 2021, thedocs.worldbank.org/en/doc/4c4fe6db0fd7a7521a70a39ac518d74b-0050062022/original/Findex2021-India-Country-Brief.pdf. Accessed 18 Feb. 2025.
41. Kumar, Apoorva. "How to Spot and Stop UPI Frauds: Your Complete Guide - Decentro." *Decentro*, 11 Mar. 2024, decentro.tech/blog/upi-frauds/. Accessed 18 Feb. 2025.
42. Maddali, Murthy. "Cross-Border Payments and UPI Revolution in India | the Payments Association." *The Payments Association*, 13 Feb. 2025, thepaymentsassociation.org/article/cross-border-payments-and-upi-revolution-in-india/. Accessed 11 Mar. 2025.
43. Malhotra, Gursheen Kaur. "Impact of UPI Based Payment Applications on Impulsive Buying Behaviour amongst GenZs in Bangalore under the Guidance Internal Guide." *International Journal of Novel Research and Development*, vol. 8, no. 11, Nov. 2023, pp. 2456–4184, www.ijnrd.org/papers/IJNRD2311367.pdf. Accessed 19 Feb. 2025.

44. Mediawire. “The UPI Effect: Transforming India’s Economy and Job Market.” *The Times of India*, 28 Mar. 2024, timesofindia.indiatimes.com/business/india-business/the-upi-effect-transforming-indias-economy-and-job-market/articleshow/108842067.cms. Accessed 11 Mar. 2025.
45. Meganathan, Niyaa. “To What Extent Has UPI Contributed to Increasing the Penetration of Digital Financial Services in Rural India, and What Challenges Remain?” *International Journal of Scientific and Research Publications*, vol. 14, no. 9, 2024, p. 122, https://doi.org/10.29322/IJSRP.14.09.2024.p15323. Accessed 30 Mar. 2025.
46. ---. “To What Extent Has UPI Contributed to Increasing the Penetration of Digital Financial Services in Rural India, and What Challenges Remain?” *International Journal of Scientific and Research Publications*, vol. 14, no. 9, 2024, p. 122, https://doi.org/10.29322/IJSRP.14.09.2024.p15323. Accessed 30 Mar. 2025.
47. MSME Desk. “How Much Loan RBI’s UPI-like Lending Platform Has Disbursed in Its Pilot?” *Financialexpress.com*, Financial Express, 30 Dec. 2024, www.financialexpress.com/business/sme-how-much-loan-rbis-upi-like-lending-platform-disbursed-in-its-pilot-3703358/. Accessed 19 Feb. 2025.
48. “Norway Payments Market Size by Payment Methods (Credit and Debit Cards, Mobile Payments), by Transaction Type (In-Store Payments, Online Payments), by Geographic Scope and Forecast.” *Verified Market Research*, 6 Feb. 2025, www.verifiedmarketresearch.com/product/norway-payments-market/. Accessed 27 Mar. 2025.
49. O’Dwyer, Gerard. “Norway Bolsters Digital Transformation Drive.” *ComputerWeekly.com*, 2024, www.computerweekly.com/news/366584001/Norway-bolsters-digital-transformation-drive. Accessed 27 Mar. 2025.
50. Outlook Money. “‘UPI for Her’ Brings 200 Million Women within Reach of India’s Digital Economy.” *Outlook Money*, 1 May 2025, www.outlookmoney.com/banking/upi-for-her-brings-200-million-women-within-reach-of-indias-digital-economy. Accessed 5 May 2025.
51. Pai, Arvind. “A Comprehensive Study of UPI and Modern Digital Financial Transactions – IJSREM.” *Ijsrem.com*, 2024, ijsrem.com/download/a-comprehensive-study-of-upi-and-modern-digital-financial-transactions/. Accessed 18 Feb. 2025.
52. Panda, Subrata. “Over 600K Loans Worth Rs 27,000 Cr Disbursed on ULI Platform: RBI Report.” *@Bsindia*, Business Standard, 26 Dec. 2024, www.business-standard.com/economy/news/over-600k-loans-worth-rs-27-000-cr-disbursed-on-uli-platform-rbi-report-124122600872_1.html. Accessed 19 Feb. 2025.
53. Pandit, Sharwari. “Unified Payments Interface: India’s Digital Highway to Speedy Financial Inclusion.” *Cornell SC Johnson*, 11 July 2023, business.cornell.edu/hub/2023/07/11/unified-payments-indias-digital-highway-to-speedy-financial-inclusion/. Accessed 19 Feb. 2025.
54. PIB Delhi. “India’s Triumph in Combating Poverty.” *Pib.gov.in*, 26 Apr. 2025, pib.gov.in/PressReleasePage.aspx?PRID=2124545. Accessed 2 May 2025.
55. ---. “UPI: Revolutionizing Digital Payments in India.” *Pib.gov.in*, 1 Dec. 2024, pib.gov.in/PressReleasePage.aspx?PRID=2079544. Accessed 19 Feb. 2025.

56. Prakasha, Dr. M. N. "A Study on Unified Payment Interface (UPI) among University Students in Madikeri City." *International Journal of Management (IJM)*, vol. 14, no. 2, 2023, pp. 1–8, https://doi.org/10.17605/OSF.IO/HTMU6. Accessed 19 Feb. 2025.
57. Press Trust of India. "190 Mn Indian Adults Don't Have Bank Account, Says World Bank Report." *Business Standard India*, 19 Apr. 2018, www.business-standard.com/article/finance/190-mn-indian-adults-don-t-have-bank-account-says-world-bank-report-118041900972_1.html. Accessed 19 Feb. 2025.
58. Priyanka Juyal. "UPI Transactions Soar: ₹20.64 Trillion in July, 45% Yearly Growth." *A Comprehensive Guide to Money Transfer, Recharges, Bill Payments and Other Digital Payments | Paytm Blog*, Paytm Blog, 16 Oct. 2024, paytm.com/blog/news/upi-transactions-soar-45-percent-growth-july/. Accessed 11 Mar. 2025.
59. PTI. "Financial Frauds Accounted for over 75% Cyber Crimes since 2020: Study." *The Economic Times*, Economic Times, 18 Sept. 2023, economictimes.indiatimes.com/tech/technology/financial-frauds-accounted-for-over-75-cyber-crimes-since-2020-study/articleshow/103756565.cms?from=mdr. Accessed 18 Feb. 2025.
60. ---. "Indian 'Shadow Economy' to Shrink to 13.6 per Cent of GDP by 2025: ACCA." *The Economic Times*, Economic Times, 2 July 2017, economictimes.indiatimes.com/news/economy/indicators/indian-shadow-economy-to-shrink-to-13-6-per-cent-of-gdp-by-2025-acca/articleshow/59410776.cms. Accessed 11 Mar. 2025.
61. Rahul Tadiparthi. "Paytm." *A Comprehensive Guide to Money Transfer, Recharges, Bill Payments and Other Digital Payments | Paytm Blog*, 20 Oct. 2023, paytm.com/blog/loan/repo-rate/rbi-guidelines-for-upi-frauds-in-banks/. Accessed 19 Feb. 2025.
62. "Recent Blog." *Tuljalegal.in*, 2022, tuljalegal.in/blog/exploring-the-opportunities-of-upi-in-france--uae--and-beyond. Accessed 27 Mar. 2025.
63. Reserve Bank Innovation Hub. "Unified Lending Interface." *Reserve Bank Innovation Hub*, 14 Oct. 2024, rbihub.in/unified-lending-interface/. Accessed 19 Feb. 2025.
64. Routaray, Sipra, Rashmi Agnihotri. "Phalanx: A Quarterly Review for Continuing Debate a Study on Awareness and Usage of UPI as a Mode of Digital Payment among College Students of Mumbai University." *Phalanx: A Quarterly Review for Continuing Debate*, vol. 18, no. 1, 2023, vpmthane.org/jbcapp/upload/m6/595.pdf. Accessed 19 Feb. 2025.
65. Shrimali, Monika, et al. "A Research Paper on 'Unified Payments Interface: Emergence, Growth and Where It Is Headed.'" *ShodhKosh: Journal of Visual and Performing Arts*, vol. 5, no. 6, June 2024, https://doi.org/10.29121/shodhkosh.v5.i6.2024.2103. Accessed 18 Feb. 2025.
66. Shukla, Ritesh. "UPI: Revolutionising Real-Time Digital Payments in India." *European Payments Council*, 26 June 2024, www.europeanpaymentscouncil.eu/news-insights/insight/upi-revolutionising-real-time-digital-payments-india. Accessed 19 Feb. 2025.
67. Singh, Mahendrapratap, Azizullah Abdullah. "Unified Payments Interface." *International Journal of Advanced Research in Science Communication and Technology*, vol. 4, no. 3, Shivkrupa Publication's, June 2024, pp. 661–67, https://doi.org/10.48175/ijarsct-18976. Accessed 18 Feb. 2025.
68. Singh, Ritu. "A Third of Digital Payment Users from Rural India, Merchant Adoption Rate Higher than Consumers: RBI Report." *CNBCTV18*, 29 July 2024, www.cnbctv18.com/business/finance/a-third-of-digital-payment-users-from-rural-india-merchant-adoption-rate-higher-than-consumers-rbi-report-19451084.htm. Accessed 5 May 2025.

69. Statista. "India: Bank Account Ownership Rate 2017 | Statista." *Statista*, Statista, 2017, www.statista.com/statistics/942795/india-financial-institution-account-ownership-rate/. Accessed 19 Feb. 2025.
70. *Success Factors for Integrating Digital Technologies in the Norwegian Banking Industry: A Case Study of Sparebanken Vest*. 2024, uis.brage.unit.no/uis-xmlui/bitstream/handle/11250/3147191/no.uis:inspera:237470718:246225133.pdf. Accessed 27 Mar. 2025.
71. Sun, Shingliao. "Number of Smartphone Users in India 2015-2022 | Statista." *Statista*, Statista, 18 Sept. 2023, www.statista.com/statistics/467163/forecast-of-smartphone-users-in-india/. Accessed 18 Feb. 2025.
72. tmsonali. "India's Financial Inclusion Index Hits 64.2 in FY24." *Teji Mandi*, 19 July 2024, tejimandi.com/blogs/feature-articles/indias-financial-inclusion-index-hits-64-2-in-fy24. Accessed 19 Feb. 2025.
73. TOI Tech Desk. "India Now Has 936.16 Million Internet Subscribers: TRAI." *The Times of India*, 23 Apr. 2024, timesofindia.indiatimes.com/technology/tech-news/india-now-has-936-16-million-internet-subscribers-trai/articleshow/109537789.cms. Accessed 19 Feb. 2025.
74. "UPI 123PAY Safe & Secure Instant Payment System | NPCI." *Www.npci.org.in*, www.npci.org.in/what-we-do/upi-123pay/product-overview. Accessed 18 Feb. 2025.
75. "UPI and Financial Inclusion: Bridging the Gap for the Unbanked - FasterCapital." *FasterCapital*, 2024, fastercapital.com/content/UPI-and-Financial-Inclusion--Bridging-the-Gap-for-the-Unbanked.html. Accessed 11 Mar. 2025.
76. "UPI Ecosystem Statistics | NPCI - National Payments Corporation of India." *Www.npci.org.in*, Jan. 2025, www.npci.org.in/what-we-do/upi/upi-ecosystem-statistics. Accessed 19 Feb. 2025.
77. "UPI Security: Safeguarding Transactions in the Digital Age." *Financialexpress*, 16 Oct. 2023, www.financialexpress.com/money/upi-security-safeguarding-transactions-in-the-digital-age-3273361/. Accessed 18 Feb. 2025.
78. "UPI Transactions Grew from ₹ 1 Lakh Crore in FY 2017-18 to ₹ 139 Lakh Crore in FY 2022-23 in Value, at a CAGR of 168%." *Pib.gov.in*, 18 Dec. 2023, pib.gov.in/PressReleasePage.aspx?PRID=1987764. Accessed 18 Feb. 2025.
79. Varier, Aathira. "RBI's Financial Inclusion Index Printed at 60.1% in March 2023, Shows Data." *Business Standard*, 15 Sept. 2023, www.business-standard.com/finance/news/rbi-s-financial-inclusion-index-printed-at-60-1-in-march-2023-shows-data-123091501037_1.html. Accessed 19 Feb. 2025.
80. Vijay, Gunti, Dr Sowmya Kethi Reddi. "A Study on Enhancing the Securities on UPI Payments: Exploring the Measures and Technology for Secure Transactions." *International Journal of Research Publication and Reviews*, vol. 5, no. 6, Genesis Global Publication, June 2024, pp. 822–35, https://doi.org/10.55248/gengpi.5.0624.1422. Accessed 18 Feb. 2025.
81. "Web Report Financial Infrastructure 2024." *Norges-Bank.no*, 2024, www.norges-bank.no/en/news-events/news-publications/Reports/Financial-Infrastructure-Report/financial-infrastructure-2024/web-report-financial-infrastructure-2024/. Accessed 27 Mar. 2025.
82. "What Is UPI (Unified Payments Interface) and How It Works?" *Razorpay*, 18 Oct. 2024, razorpay.com/blog/what-is-upi-and-how-it-works/. Accessed 18 Feb. 2025.