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Unified Payments Interface (UPI): Assessing Growth and Success Factors in India's Digital Financial Ecosystem

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Abstract— This paper investigates the evolution and key success determinants of India's Unified Payment Interface (UPI), emphasising its transformative influence on transaction behaviour, financial inclusion, and the digital payments architecture. Adopting a descriptive-analytical approach, the study utilises secondary data (2017–2024) from authoritative sources, including NPCI, RBI, TRAI, and industry reports. Analytical methods such as Compound Annual Growth Rate (CAGR) and year-on-year benchmarking are applied within the theoretical frameworks of the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), and Network Externalities. Results reveal exponential expansion, with transaction volumes and values increasing at ~147% and ~158% CAGR, respectively, elevating UPI's share to 70% of India's digital transactions by FY 2023–24. The findings identify usability, performance expectancy, social influence, and network effects as pivotal adoption enablers. The study positions UPI as an inclusive, scalable, and resilient digital public infrastructure that fosters fintech innovation and advances financial democratisation.

Keywords— Unified Payment Interface, Digital Payment, Financial Inclusion, Fintech Innovation, Network Externalities, Technology Adoption, Financial Democratisation

I. INTRODUCTION

India's digital revolution has drastically reshaped the way financial transactions are conducted, with the Unified Payments Interface (UPI) emerging as the core driver of this transformation. Introduced in 2016 by the National Payment Corporation of India (NPCI), the UPI facilitates instant, real-time transactions, mobile-based money transfers between bank accounts, eliminating the dependence on traditional banking channels and providing a seamless digital payment experience. Owing to its simplicity, security, minimal transaction cost, and 24×7 accessibility, UPI has become a key pillar in driving India's digital economic growth. Driven by programs like Digital India and government efforts to promote a cashless economy, digital technology has gained extensive acceptance in both urban and rural areas.

As per the 2024 EY–CII report, 38% of people residing in rural and semi-urban regions prefer UPI for financial transactions, highlighting its significant role in advancing financial inclusion. In May 2025 alone, UPI recorded 18.68 billion transactions, amounting to total values of ₹25.14 trillion, reflecting month-on-month growth of 4% in volume and 5% in value, and year-on-year growth of 33% and 23%, respectively—demonstrating its dominance in India's digital payment ecosystem.

The Digital Foundation behind UPI

UPI's success as the world's leading real-time payment system is the outcome of strategic planning and sustained investment in digital infrastructure. India's efforts to expand financial inclusion, provide digital identities, and ensure affordable connectivity created the ideal foundation for UPI's growth. The Pradhan Mantri Jan Dhan Yojana was a major milestone, with over 55.83 crore accounts opened as of July 2025, offering millions access to financial services and government benefits. Similarly, Aadhaar provided a unique biometric-based digital identity to over 142 crore residents by June 2025, ensuring secure authentication and efficient service delivery. Furthermore, India's rapid 5G rollout, with 4.74 lakh active base stations and 116 crore mobile subscribers, combined with reduced data costs—from ₹308 per GB in 2014 to ₹9.34 in 2022—has fueled digital accessibility and UPI adoption.

Impact of UPI

UPI has revolutionized payments for small businesses, vendors, and migrant workers by offering a fast, secure, and contactless medium—particularly vital during the COVID-19 pandemic. Innovations such as voice-enabled payment boxes have built trust among merchants by providing real-time transaction confirmations. Its interoperability across payment apps enhances user flexibility, while the integration of RuPay credit cards with UPI combines the advantages of credit and digital payments, reinforcing UPI's position as the backbone of India's digital financial ecosystem.



II. LITERATURE REVIEW

The Unified Payment Interface (UPI) has emerged as a key pillar driving India's digital payment transformation, drawing considerable scholarly and institutional attention for its transformative influence on financial transactions, inclusion, and digital adoption. Ramachandran (2018) provides one of the earliest comprehensive evaluations, emphasizing UPI's ability to address limitations of legacy systems in terms of complexity, interoperability, and security while promoting financial inclusion through seamless real-time payments. Nevertheless, the study identifies several obstacles related to infrastructure scalability and the persistent rural-urban digital divide. Building on this foundation, Rastogi, Panse, Sharma, and Bhimavarapu (2021) utilized Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine data from rural regions of Maharashtra. Their findings reveal that UPI plays a crucial role in improving financial literacy, which subsequently fosters financial inclusion and promotes economic growth. Their findings suggest that financial trust and stability act as mediators, fostering confidence in digital platforms among underserved populations. Hase (2025) extends this discourse through descriptive secondary data analysis, illustrating UPI's secure, interoperable infrastructure and its role in reducing cash dependency while catalyzing fintech innovation. The study further acknowledges cybersecurity threats, regulatory challenges, and the digital divide as continuing constraints but concludes that governance and innovation will sustain UPI's pivotal role in India's transition to a cashless economy. At an institutional level, the Reserve Bank of India's (Payment Systems Report, 2024) presents macro evidence of UPI's exponential growth, noting that it accounts for over 80% of India's digital payment volume, supported by regulatory reforms such as tokenization, feature enhancements, and cross-border linkages. Complementing these insights, Verma, Purohit, and Vidani (2024) synthesize secondary data through a qualitative review, emphasizing UPI's evolution via innovations like UPI Lite, Autopay, and international adoption, while identifying concerns around data privacy, regulation, and sustainability. Similarly, Mahesh and Bhat (2021), through a SWOT-based case analysis, recognize simplicity, innovation, and security as primary adoption drivers but caution against risks such as transaction caps and cyber vulnerabilities. Collectively, this body of literature underscores UPI's role as a catalyst for financial inclusion, economic empowerment, and global fintech leadership, while emphasizing that its long-term sustainability depends on strengthening cybersecurity, regulatory coherence, and equitable digital access.

III. OBJECTIVES

- To evaluate the growth of UPI in India.
- To analyse the factors contributing to the success of UPI.

IV. RESEARCH METHODOLOGY

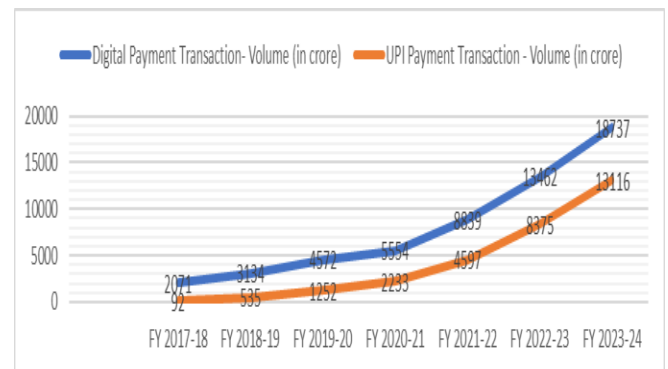
This research utilizes a descriptive and analytical approach to investigate the development and success factors of the Unified Payments Interface (UPI) in India. The analysis relies on secondary data from credible and authentic sources such as the NPCI, RBI, TRAI, government press releases, and government reports (2017–2024), supplemented by academic literature and reviewed journals for theoretical support.

Data Analysis Techniques

Growth trends are assessed using the Compound Annual Growth Rate (CAGR) for UPI transaction volume and value. The findings are interpreted through key technology adoption frameworks: the Technology Acceptance Model (TAM) (Davis, 1989) for perceived ease of use and usefulness, the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) for performance, effort expectancy, and social influence, and the Network Externalities Theory (Katz & Shapiro, 1985) to evaluate how user base expansion influences platform value and adoption intensity.

V. RESULT AND ANALYSIS

Overall Digital Transaction Volume and UPI Transaction Volume



The chart compares the growth of overall digital payment and UPI transactions in India from FY 2017–18 to FY 2023–24.



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Both show steady growth, but UPI exhibits a far sharper rise, highlighting its crucial contribution to reshaping India's digital payment landscape. UPI transactions rose from 92 crore in FY 2017–18 (less than 5% of 2,071 crore total transactions) to 13,116 crore in FY 2023–24, nearly matching total digital payments (19,737 crore).

This rapid expansion reflects UPI's evolution from an emerging innovation to a dominant digital payment channel.

Comparative Growth Analysis: Overall Digital Payments Volume vs. UPI Digital Payments Volume | FY 2017-18 to FY 2023-24

• *CAGR (Compound Annual Growth Rate) Analysis*

Metric	Period	CAGR Calculation	CAGR Result	Interpretation
Overall Digital Payment Volume	Full-Period CAGR (FY2017-18 to FY2023-24)	$(18,737 / 2,071)^{(1/6)} - 1$	~43.5%	A robust CAGR indicating strong, widespread adoption of all digital payment modes (including NEFT, RTGS, IMPS, cards, etc.) over six years.
UPI Payment Volume	Full-Period CAGR (FY2017-18 to FY2023-24)	$(13,116 / 92)^{(1/6)} - 1$	~147.4%	UPI's exceptional CAGR highlights its disruptive rise as the main driver of digital payment adoption.
Non-UPI Digital Payment Volume	Full-Period CAGR (FY2017-18 to FY2023-24)	$(5,621 / 1,979)^{(1/6)} - 1$ FY 2017-18: 2,071 - 92 = 1,979 crore FY 2023-24: 18,737 - 13,116 = 5,621 crore	~19.0%	Traditional modes show healthy but slower growth, confirming UPI's role in expanding new users and use cases.



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Year-on-Year (YoY) Growth Trend Analysis

a) Comparative YoY Growth Rates:

Financial Year (FY)	Total Vol. Growth (%)	UPI Vol. Growth (%)	Gap (PP)	Trend Insight
2017-18	-	-	-	Base Year
2018-19	51.3%	481.5%	+430.2 PP	UPI's first full year shows explosive adoption from a small base.
2019-20	45.9%	134.0%	+88.1 PP	UPI growth remains in hyper-drive, far outpacing the market.
2020-21	21.5%	78.4%	+56.9 PP	UPI proves resilient and accelerates during the pandemic.
2021-22	59.1%	105.9%	+46.8 PP	UPI leads the broader market's pandemic-induced hyper-growth phase.
2022-23	52.3%	82.2%	+29.9 PP	UPI continues to grow significantly faster than the overall market.
2023-24	39.2%	56.6%	+17.4 PP	The growth gap persists, though it is narrowing as UPI's base becomes massive.

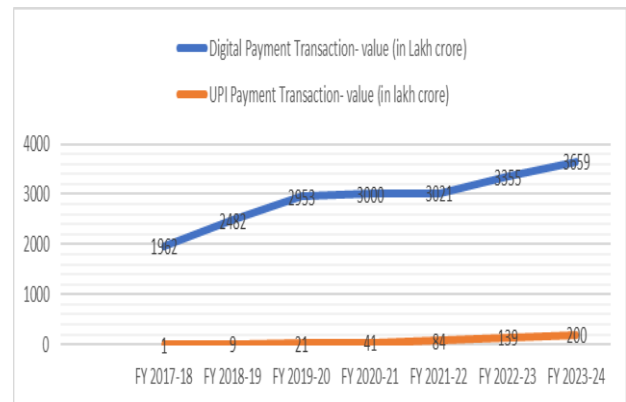
b) Market Share Analysis:

Fiscal Year (FY)	Total Volume (Cr)	UPI Volume (Cr)	UPI Share of Total (%)	Trend Insight
2017-18	2,071	92	4.4%	Niche player at launch.
2018-19	3,134	535	17.1%	Rapid early adoption.
2019-20	4,572	1,252	27.4%	Gains significant market share.
2020-21	5,554	2,233	40.2%	Crosses the 40% mark; becomes a dominant force.
2021-22	8,839	4,597	52.0%	Crosses the 50% mark; UPI becomes the majority of all digital transactions.
2022-23	13,462	8,375	62.2%	Solidifies its majority stake.
2023-24	18,737	13,116	70.0%	Accounts for 7 out of every 10 digital transactions.

Key Observations from the Table

UPI has rapidly captured the digital payment market, expanding its share from 4.4% to 70% in seven years, reflecting massive user migration and onboarding success. While non-UPI payments grew at 19% CAGR, driven by high-value corporate and card transactions, UPI’s 147.4% CAGR stems from digitizing everyday low-value payments. In FY 2021–22, UPI volumes surpassed non-UPI payments, marking its emergence as the core of India’s digital payment landscape.

Digital Transaction Value and UPI Transaction Value





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The chart shows a sharp surge in India’s digital payments from ₹1,962 lakh crore in FY 2017–18 to ₹3,659 lakh crore in FY 2023–24, driven mainly by UPI’s explosive growth from ₹1 lakh crore to ₹200 lakh crore.

UPI’s share in total digital value rose from under 0.1% to about 5.5%, reflecting its rapid adoption, user trust, and the shift from traditional payment modes to real-time digital transactions.

Comparative Growth Analysis: Digital Payment Value vs. UPI Payment Value (FY 2017-18 to FY 2023-24)

- *CAGR (Compound Annual Growth Rate) Analysis*

Metric	Period	CAGR Calculation	CAGR Result	Interpretation
Overall Digital Payment value	Full-Period CAGR (FY2017-18 to FY2023-24)	$(3,659 / 1,962)^{(1/6)} - 1$	~11.0%	This steady CAGR reflects the mature and consistent growth of high-value digital payment systems that form the backbone of India's formal economy (e.g., RTGS, NEFT, large-ticket card payments).
UPI Payment value	Full-Period CAGR (FY2017-18 to FY2023-24)	$(200 / 1)^{(1/6)} - 1$	~157.6%	This extraordinary CAGR highlights UPI's disruptive role in capturing a new segment of the economy—the high-frequency, low-value transactions that were previously conducted primarily in cash.
Non-UPI Digital Payment value	Full-Period CAGR (FY2017-18 to FY2023-24)	$(3,459 / 1,961)^{(1/6)} - 1$ FY 2017-18: 1,962 - 1 = 1,961 Lakh Crore FY 2023-24: 3,659 - 200 = 3,459 Lakh Crore	~9.9%	Traditional high-value payment systems show healthy yet slower growth, implying UPI’s expansion is adding new value to the digital ecosystem instead of replacing existing channels.



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Year-on-Year (YoY) Growth Trend Analysis

a) Comparative YoY Growth Rates:

Fiscal Year (FY)	Total Value Growth (%)	UPI Value Growth (%)	Gap (PP)	Trend Insight
2017-18	-	-	-	Base Year
2018-19	26.5%	800.0%	+773.5 PP	UPI's value growth is astronomical from a tiny base.
2019-20	19.0%	133.3%	+114.3 PP	UPI continues to grow at a hyper-growth rate.
2020-21	1.6%	95.2%	+93.6 PP	Critical Divergence: Total value stagnates (likely due to economic slowdown), but UPI thrives, highlighting its role in essential, everyday payments.
2021-22	0.7%	104.9%	+104.2 PP	UPI value doubles while the broader market remains flat, cementing its disruptive impact.
2022-23	11.1%	65.5%	+54.4 PP	Traditional systems recover, but UPI still grows over 5x faster.
2023-24	9.1%	43.9%	+34.8 PP	Growth rates converge but a significant gap remains.

b) Market Share Analysis (Value)

Fiscal Year (FY)	UPI Value (Lakh Cr ₹)	Total Value (Lakh Cr ₹)	UPI Share of Total Value (%)	Trend Insight
2017-18	1	1,962	0.05%	Negligible share at inception.
2018-19	9	2,482	0.36%	Begins its ascent.
2019-20	21	2,953	0.71%	Steady increase in share.
2020-21	41	3,000	1.37%	Share more than doubles as UPI grows during the pandemic.
2021-22	84	3,021	2.78%	Continued strong growth in share.
2022-23	139	3,355	4.14%	Crosses the 4% mark.
2023-24	200	3,659	5.47%	Accounts for ~5.5% of total digital payment value.

Between FY21 and FY22, digital payment growth stagnated, rising only ₹21 lakh crore, while UPI alone added ₹43 lakh crore—indicating it contributed over 100% of the net growth, with traditional systems declining. This highlights UPI as the primary growth driver during economic uncertainty.

The ecosystem shows clear segmentation: UPI dominates transaction volume (about 70%) through low-value, high-frequency payments (P2P, small merchants), while non-UPI systems like RTGS and NEFT hold 94.5% of total value, handling large corporate and government transfers. UPI’s average transaction size rose from ₹1,087 in FY18 to ₹1,525 in FY24, while overall digital ATS fell from ₹947,000 to ₹195,000.



VI. FACTORS CONTRIBUTING TO THE SUCCESS OF UPI.

- 1. Government Push for Digital Payments:* Post-demonetization reforms and initiatives like Digital India, PMJDY, and DBT accelerated digital adoption. Under PMJDY, over 50 crore beneficiaries were banked with deposits of ₹2,03,505 crore, a 3.4× rise since 2015. About 56% of account holders are women and 67% belong to rural/semi-urban regions. Moreover, 33.98 crore RuPay cards enhanced digital access nationwide.
- 2. Interoperability and Real-Time Transactions:* UPI enables instant, bank-to-bank transfers via mobile numbers or VPIAs, ensuring true interoperability unlike digital wallets. By June 2025, UPI achieved a record ₹24,03,930.69 crore transaction value in a single month, reflecting its mass adoption for P2P and merchant payments.
- 3. Technological and Mobile Support:* With 1.2 billion mobile connections and 825 million broadband users, India's affordable internet (17 GB per user/month) and 4G expansion fostered UPI's rural outreach and ease of mobile payments (TRAI, 2023–24).
- 4. FinTech–Bank Collaboration:* Over 400 banks and 100+ FinTech apps (e.g., Google Pay, Phone Pe, Paytm, BHIM) powered UPI's spread. Phone Pe and Google Pay alone handled 86% of total transactions (BCG, FY24).
- 5. Zero MDR Advantage:* UPI's zero Merchant Discount Rate made transactions cost-free, boosting small-business participation. Consequently, UPI constituted 75% of India's retail digital payments (FY 2023–24, RBI).

VII. FINDINGS

- UPI showed exponential growth from FY 2017–18 to FY 2023–24, with transaction volume and value recording CAGRs of 147.4% and 157.6%, surpassing overall digital payment growth of 43.5% (volume) and 11% (value).
- Its market share expanded from 4.4% to 70%, making it the core of India's digital payment ecosystem.
- UPI effectively digitised low-value, high-frequency P2P and P2M transactions through interoperable, QR-based, and voice-enabled payments and RuPay credit card integration, benefiting small and rural merchants.
- Despite the FY 2020–21 slowdown, UPI's value grew by 95%, contributing over 100% of the net new digital payment value the following year.

- Adoption aligned with the Technology Acceptance Model and UTAUT, driven by ease of use, usefulness, and social influence, while Network Externalities Theory explained reinforcing growth.
- Supported by initiatives like Jan Dhan Yojana, Aadhaar, 5G, and Zero MDR, UPI propelled India toward a cashless economy.

VIII. CONCLUSION

The study concludes that the Unified Payments Interface (UPI) has fundamentally transformed India's digital financial system, emerging as the core framework of the country's payment infrastructure. Between FY 2017–18 and FY 2023–24, UPI witnessed remarkable expansion, with transaction volume and value growing at an impressive (CAGR) of about 147.4% and 157.6%, respectively, far exceeding overall digital payment growth rates of 43.5% (volume) and 11% (value). UPI's market share expanded from 4.4% to 70%, accounting for seven out of every ten digital transactions in FY 2023–24. This unprecedented growth was enabled by strong government initiatives like Digital India, PMJDY, Aadhaar, and Zero MDR policies; robust digital infrastructure with 142 crore Aadhaar enrollments and 55.8 crore Jan Dhan accounts; and rapid mobile penetration with 116 crore subscribers and low data costs. Supported by over 400 banks and 100+ fintech apps, UPI's interoperability, real-time processing, and cost-free nature enhanced user convenience and inclusion. Theoretically underpinned by TAM, UTAUT, and Network Externalities, UPI's adoption was driven by perceived ease of use, performance expectancy, and social influence. Overall, UPI has transformed access to financial services, making them more inclusive, while also establishing India as a global frontrunner in digital payment innovation and fintech development.

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