

# Revolutionizing Digital Payments : A case Study on Unified Payment Interface (UPI)

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## Abstract

*The Unified Payments Interface (UPI) serves as a unique digital payment solution, effectively addressing various challenges faced by Indian users. It facilitates real-time, instant payments between bank accounts through user-friendly applications. This paper delves into the inception, success factors, strengths, weaknesses, opportunities, and potential solutions for challenges associated with UPI. It examines adoption and usage rates and anticipates the future trajectory of UPI in the digital payment landscape. Drawing insights from primary and secondary sources, including online surveys and literature reviews, the research indicates a promising future for UPI in India, marked by sustained growth, innovation, and increased adoption. The study contributes valuable insights into UPI's potential role in realising India's vision of a cashless economy.*

**Key Terms:** UPI, Digital Payments, Growth, Cashless economy.

## 1. Introduction

The integration of digital payments plays a pivotal role in fostering financial inclusivity and unifying people within a structured financial framework. The substantial increase in digital transactions across Emerging Market Economies (EMEs) in recent times can be attributed to several factors. These include government initiatives to establish cashless societies, technological innovations, the strong inclination of younger generations towards adopting technology, the widespread accessibility of fintech services, and improved digital infrastructure facilitating a higher number of merchants engaging in digital financial transactions. Global Data Research reports a global decline in the percentage of

cash within the total transaction volume, decreasing from 90 percent in 2017 to below 60 percent in 2021.

The growing consumer preference for digital payments, coupled with continuous innovations and the introduction of new use cases, positions India on the brink of another surge in digital transaction volumes. The regulatory focus from both the Government and the RBI on overseeing the digital payments ecosystem is a key driver propelling further expansion in the digital payments sphere.

This paper delves into the positioning and significance of the Unified Payment Interface (UPI) within the digital payment ecosystem, aiming to dissect its strengths, weaknesses, opportunities, and challenges. Beginning with an overview of digital payments and the current status of UPI, the analysis critically evaluates UPI data to ascertain its standing in the digital payments realm. The paper concludes by identifying UPI's core strengths and growth potentials, while also highlighting avenues for future research to comprehensively explore the entire e-payment ecosystem in India.

## Objectives

- To study the role and importance of UPI in modern-day transactions and economic systems.
- To assess the major reasons for its success, its scope, opportunities and challenges of this system
- To provide possible suggestions and practical solutions to improve the service
- To explore the potential future of UPI in digital payments.

## 2. Digital Payments

Digital payments encompass transactions conducted through digital instruments, including mobile payment applications, mobile wallets, cryptocurrencies like Bitcoin or virtual currency coins, and various other electronic

payment methods. The integration of technology into financial transactions to facilitate seamless operations is commonly referred to as digital banking or fintech banking. The cumulative volume of digital payment transactions surged from 2,071 crore in the fiscal year 2017-18 to 14,726 crore in the fiscal year 2023-24, exhibiting a Compound Annual Growth Rate (CAGR) of 45 percent. Notably, as of february, 2024, digital payments transactions for the ongoing fiscal year 2023-24 have already reached 14,726 crores.

Table 1

Financial Year	Volume (in crore)
2018-19	3,134
2019-20	4,572
2020-21	5,554
2021-22	8,839
2022-23	13,462
2023-24 (till February, 2024)	14726

(Source: Reserve Bank of India (RBI), National Payments Corporation of India (NPCI) & DIGIDHAN Portal)

### 3 Overview of UPI

The Unified Payments Interface (UPI) serves as a platform that consolidates multiple bank accounts into a single mobile application, irrespective of the participating bank. This integration enables various banking functionalities such as seamless fund transfers, merchant payments, and peer-to-peer collect requests within a unified framework. Users can schedule and execute payments according to their preferences and convenience.

In line with this objective, the National Payments Corporation of India (NPCI) initiated a pilot launch of UPI with 21 member banks. The pilot launch took place on April 11, 2016, under the auspices of Dr. Raghuram G Rajan, the Governor of the Reserve Bank of India, in Mumbai. Subsequently, banks began uploading their UPI-enabled applications on the Google Play Store, commencing from August 25, 2016, onwards. This initiative marked a significant milestone in enhancing the accessibility and functionality of digital payment systems, thereby promoting financial inclusivity and convenience for users across India

*UPI statistics at a glance (from year 2018-2024)*

Table 2

Month	No. of Banks live on UPI	Volume (in Mn)	Value (in Cr.)
Feb'24	560	12,102.68	18,27,869.33

Feb-23	390	7,534.76	12,35,846.62
Feb-22	304	4,527.49	8,26,843.00
Feb-21	213	2,292.90	4,25,062.76
Feb-20	146	1,325.69	222,516.95
Feb-19	139	674.19	106,737.12
Feb-18	86	171.40	19,126.2

(Source: <https://www.npci.org.in/what-we-do/upi/upi-ecosystem-statistics>)

### 4. Importance of UPI across Various Payment Ecosystems

The advent of open systems has facilitated global giants such as Google, WhatsApp, Walmart, True Caller, Amazon, and Uber to offer UPI services. Moreover, the advantages of UPI extend throughout the payment ecosystem: Person-to-Person (P2P) and Person-to-Merchant (P2M) transactions provide complete coverage for customers' payment needs. It operates as a truly interoperable payment system, functioning 24/7, with participation from both traditional banks and non-bank entities. UPI offers various methods for merchant integration, with QR-based payments being the most widely adopted. Tarun Jain and Anuja Tandon (2017) analyses the impact of UPI on digital payments adoption in India. The study finds that UPI has made digital payments more accessible and convenient for a wide range of consumers and has contributed to the growth of digital financial services in India.

Within just five years, the market has seen over 256 million UPI QRs deployed for merchant payments, a significant increase from the previous 2.5 million devices. It supports multiple sources of funds, including bank accounts, prepaid wallets, and overdraft accounts. Ayushi Rastogi and Madhavi Damle (2020) found that the adoption of digital payments was driven by increased penetration of mobile phones, widespread use of the internet, and rise in bank accounts. The study further highlighted the role played by the COVID-19 pandemic and demonetisation in the uptake of digital payments.

The process of onboarding is entirely digital, eliminating the need for physical branch visits. QR code-based physical acceptance is cost-effective and supported by in-app, web, and intent-based payments. The system is fully compliant with international security standards and certifications, ensuring robust security measures. Payments are based on UPI IDs, enhancing security and confidentiality for users. It enables contactless payments across various channels, including mobile, ATM, internet, and mobile banking. World Bank (2016) highlights the role of UPI in promoting financial inclusion in India. The report states that UPI has facilitated financial transactions for millions of previously unbanked Indians and has contributed to the growth of digital financial services in India.

In essence, UPI's myriad benefits have revolutionized the nation's economy, shifting it from cash-dependency to a digital payments landscape.

### 5. Success Factors of UPI

•**Convenience:** Users appreciate the ease of UPI transactions, eliminating the need to remember account details. A mobile number, UPI ID, or QR code scanning suffices, promoting a rapid and frictionless experience across platforms. Amit Kumar Pandey and Vipul Jain (2021) analyses the impact of UPI on digital financial inclusion in India. The study finds that UPI has made digital payments more accessible and convenient for a wide range of consumers, which has contributed to the growth of digital financial services in India.

•**Execution:** UPI's swift execution played a vital role in its success. NPCI effectively marketed UPI, presenting it as an opportunity for businesses to integrate digital payments, leading to the emergence of various UPI apps like Jio Pay, Amazon Pay, and Google Pay.

•**Demonetisation:** The Indian government's demonetisation move in November 2016 significantly accelerated UPI adoption. This policy shift, just six months after UPI's launch, led to a substantial increase in registered users and transactions, making UPI a preferred alternative to cash. Boston Consulting Group (BCG) (2016) highlights the transformative impact of UPI on digital transformation in India. The report states that UPI has transformed the payments landscape in India and has enabled millions of Indians to access digital financial services, which has contributed to the growth of the digital economy.

•**Security:** UPI's strong security foundation, backed by the Reserve Bank of India (RBI), instilled confidence in the public. The initiative addressed concerns related to potential scams, privacy, and data leakage, reinforcing trust among users.

•**The Jio Factor:** The launch of Reliance Jio's 4G services in September 2016, offering competitive pricing and sparking a digital revolution, significantly influenced UPI's success. The affordability of 4G data by Jio led to a substantial increase in digital service usage, complementing the surge in UPI transactions post-demonetisation.

•**Consistent Interaction:** UPI ensures a consistent user experience, irrespective of the mobile payment platform in use. The uniformity of UPI, including a shared UPI PIN across different UPI Payment Service Provider (PSP) apps, enhances user convenience and familiarity.

### 6. Challenges for UPI In India

•**Digital Illiteracy:** UPI faces challenges in reaching a significant portion of the population due to widespread digital illiteracy, limiting accessibility and adoption.

•**Language Barrier:** The use of English in UPI apps acts as a barrier, making them less acceptable to a diverse population. Language preferences may hinder broader acceptance.

•**Limited Internet and Smartphone Access:** A substantial part of the population lacks internet access and smartphones, posing a challenge to UPI transactions as the service heavily relies on digital platforms.

•**Sustainability Concerns Without MDR(Merchant Discount Rate):** Experts express concerns about the sustainability of UPI in the long term, as the absence of Merchant Discount Rate (MDR), charged from merchants for accepting digital payments, raises questions about the financial viability of UPI's infrastructure. Presently, neither clients nor businesses incur additional fees.

•**Preference for Cash Transactions:** Despite a decrease in the frequency of cash transactions since UPI's launch, a significant portion of the population still favors cash due to its wider acceptance and perceived threats of tax-related issues, contributing to the persistence of cash transactions

### 7. SWOT Analysis of UPI

#### STRENGTHS (TABLE 3)

Ideal Digital Payment System	*Digital transactions with zero charges *Backed by the RBI *Fast process, no need to enter account number *Interoperability across various platforms and applications
Digital Financial Inclusion	*Aligns with India's vision of "Antyodaya" *No minimum transaction limit and zero charges
Wide Acceptance	*Widely accepted across digital platforms and applications *Availability of a robust digital infrastructure
Transparency	*Reduce cash dependence *Allows the government and agencies to track income records, reducing corruption and tax evasion
Accounting Expenditure & Proper Financial Planning	*Reduce accounting costs for merchants, businesses, and government organisations, enabling accurate financial planning

Self-Reliance (Indigenous Payment System)	*Makes India less dependent on major foreign entities like VISA and Mastercard *Robust alternative to restrictions imposed by foreign countries
Growth of Businesses	*Being a fast, hassle-free, and secure payment system, is preferred by merchants and MSME businesses
Supporting Banking Sector	*Enhances the lending capacity of banks
Pay & collect	*Conveniently "pay" and "collect" money using their mobile devices *Recurring payments through UPI Autopay
Multiple Payment Options	*Various identifiers, including VPA, bank account number, Aadhar number, IFSC, QR codes, and BHIM-Interface

**WEAKNESSES(TABLE 4)**

Barriers	*Requirement of mobile phones *Owning a bank account
Business Decline (BD)	*Transactions declined for reasons like exceeding daily limits, invalid beneficiary account entries, or pin issues Average of 8.49% BD
Technical Decline (TD)	*Technical reasons like system unavailability and network issues, averages 2.84% TD
Transaction Limit	*Daily limit of 20 UPI transactions with a cap of ₹1,00,000 restricts operations in high-volume businesses
Unsustainable Economic Model	*Operates as a not-for-profit government model, not charging users for transactions
Scams	*Scams involving unverified SMS/email links or sharing sensitive information, such as

	mobile OTP or UPI ID passcodes
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**OPPURTUNITIES (TABLE 5)**

International Acceptance	*NIPL partnering with multiple nations, expanding international acceptance
Linking Credit Card	*In order to increase peer-to-merchant transactions in semi-urban and rural areas.
Improving Credit Worthiness	*Implementing sustainable schemes, such as providing credit cards with limits to rural farmers or merchants
Revenue through MDR and Other Charges	*Contribute to the financial sustainability of UPI, generating potential revenue for the Government of India.
Leasing Out Model and Collaboration	*NPCI can lease its product and technology to other nations *Generate additional revenue and soft power influence
Substitute for SWIFT	*International payments and financial telecommunication
Foreign Remittance	*Economically viable, fast, and real-time mode of payment for Indians residing outside the country

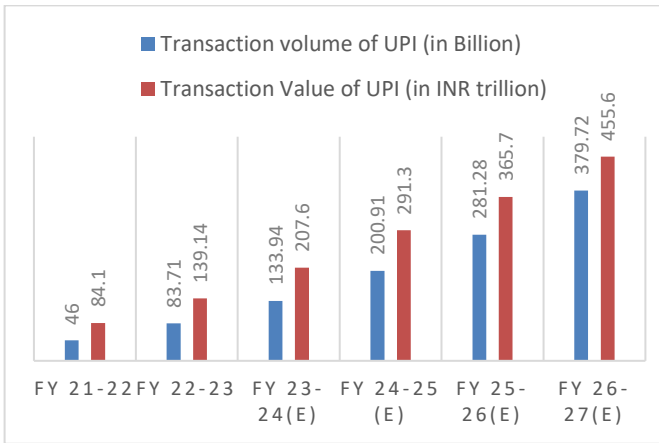
**THREATS(TABLE 6)**

Data Misuse	*Potential data misuse exploitation or *Monetization by larger companies or MNCs
Digital Cyber Crime	*Hacking of mobile phones and various scams
Inflation and Recession	*During such a period there is a risk that Indians might revert to cash transactions
Complaint Mechanism	*Failure to provide robust grievance redressal mechanism can lead to user migration
GST Implications	*The government's imposition of GST or

	other forms of taxes on transactions poses a threat to UPI
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### 8. The future of digital payments(UPI)

The Reserve Bank of India (RBI), in close partnership with the Government and the National Payments Corporation of India (NPCI), is actively working on expanding the global presence of the Unified Payments Interface (UPI). RBI has engaged with other central banks, highlighting UPI's efficiency and security features. To facilitate UPI's entry into international markets, NPCI has established its dedicated international subsidiary, 'NPCI International.' As an example, UPI services are now operational in Singapore, UAE, and Bhutan. Additionally, NPCI is in talks with over 35 countries to enable the acceptance of remittances through UPI adoption. UPI holds significant potential for fostering stronger bilateral business and economic ties with other nations, thereby enhancing India's soft power. PwC's analysis predicts that UPI is poised to achieve 1 billion transactions per day by the fiscal year 2026–2027. As users increasingly choose UPI for smaller value transactions, there has been a reduction in the average transaction size.



( Source: RBI, NPCI, PwC analysis)

### 9. Recommendations

There are various potential avenues for utilizing UPI to bolster India's soft power globally, enhancing technical expertise sharing and thereby increasing international influence. Furthermore, UPI shows promise in improving the creditworthiness of marginalized communities by facilitating microloans linked to UPI and Ru-Pay cards, paving the way for access to larger loans in the future.

The government could potentially generate revenue through international API licensing, monetizing user data, and imposing fees such as MDR. However, it's crucial to avoid imposing excessive charges on transactions for UPI's success. If necessary, NPCI could explore implementing a tiered fee system based on transaction values and the spending capacity of specific users.

In addition to the tiered system, NPCI might consider introducing additional charges for users who exceed the daily transaction limit. Furthermore, exploring the option of eliminating the current daily limit of ₹1,00,000 to facilitate higher-value transactions and imposing a corresponding service charge could also be considered.

### 10. Conclusions

At the end we can say that this research paper fulfil its aims to furnish readers with foundational insights into UPI, covering its background, benefits, success factors, and an exhaustive SWOT analysis. Amidst the array of innovations spearheaded by NPCI under RBI and Government guidance, UPI stands out as an exceptional, simple, secure, and user-friendly mode of digital payment. Registration is effortless, requiring only a linked bank account and registered mobile number, eliminating paperwork. Being an open API, UPI encourages Payment Service Providers (PSP) to adopt this technology. Its ease of use, devoid of intricate details like account numbers and IFSC codes, enables payments through VPA/UPI ID, mobile numbers, or QR code scanning. Dominated by popular apps like PhonePe, Google Pay, and PayTm, UPI, however, grapples with weaknesses such as a high rate of Business Decline and Technical Decline, demanding attention.

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