

"UPI and Mobile-Based Payments as Drivers of FinTech Innovation in India: Adoption, Challenges, and Future Scope"

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ABSTRACT:

This project focuses on how UPI (Unified Payments Interface) and mobile-based payment systems have helped FinTech innovation grow in India. In recent years, India has seen a major shift from cash to digital payments, especially after the launch of UPI in 2016. UPI has made it easy for people to send and receive money using mobile phones without needing to visit a bank. Mobile payment apps like Google Pay, PhonePe, and Paytm have become popular because they are fast, simple, and convenient. The main aim of this project is to study how people and businesses are adopting these payment methods, what challenges they face, and what the future holds for such technologies. This study is based on secondary data collected from reports, government publications, articles, and research papers. It shows that UPI transactions have grown rapidly over the years, especially during and after the COVID-19 pandemic. However, some challenges remain such as internet connectivity issues, cybersecurity threats, lack of awareness in rural areas, and trust issues among older users. Despite these challenges, UPI and mobile payments are expected to grow even more in the future with the help of new technologies like Artificial Intelligence, voice-based payments, and international UPI linking. These innovations can increase financial inclusion and bring more people into the digital economy. This project helps to understand the current situation, key problems, and future possibilities of UPI and mobile-based payments in the Indian FinTech ecosystem.

KEYWORDS: UPI, MOBILE PAYMENTS, FINTECH, DIGITAL TRANSACTIONS, INDIA, ADOPTION, CHALLENGES, FINANCIAL INCLUSION, INNOVATION, FUTURE SCOPE

INTRODUCTION:

India is going through a big digital change, especially in the way people make payments. One of the biggest changes in recent years is the use of UPI (Unified Payments Interface) and mobile-based payment apps. UPI is a real-time payment system developed by the National Payments Corporation of India (NPCI). It allows users to send or receive money instantly through their smartphones, without needing to enter bank details every time. With just a mobile number or a UPI ID, payments can be made 24/7, even on holidays. Mobile-based payment apps like PhonePe, Google Pay, Paytm, and BHIM have made it very easy for people to do digital transactions. These apps are linked to users' bank accounts and use UPI to process payments. People can use these apps to pay bills, buy groceries, book tickets, transfer money, and more. The COVID-19 pandemic also pushed more people to use contactless payments to stay safe, which helped UPI and mobile payments grow faster. This project is focused on studying how UPI and mobile payments are helping in the growth of FinTech (Financial Technology) in India. It will look at how people are adopting these technologies, what problems they are facing, and what improvements can be made. The study is based on secondary data collected from research papers, news articles, government reports, and online sources. Even though UPI and mobile payments are easy to use and save time, there are some issues like poor internet in rural areas, lack of digital knowledge among older people, security risks, and fear of fraud. Still, the future looks bright. New features like voice-based UPI, offline payments, and global UPI acceptance are being developed. This project aims to give a clear picture of the present situation and the future possibilities of UPI and mobile payments in India. It also tries to show how digital payments are not just making life easier but are also helping the economy by bringing more people into the formal banking system.

LITERATURE REVIEW:

FINTECH IN INDIA – OPPORTUNITIES AND CHALLENGES

January 2019

Authors: C. Vijai

Fintech is financial technology; Fintech provides alternative solutions for banking services and non-banking finance services. Fintech is an emerging concept in the financial industry. The main purpose of this paper accesses the opportunity and challenges in the fintech industry. It explains the evolution of the fintech industry and present financial technology (fintech) in the Indian finance sector. The fintech provide digitalization transaction and more secure for the user. The benefits of fintech services reducing operation costs and friendly user. The fintech services India fastest growing in the world. the fintech services are going to change the habits and behavior of the Indian finance sector.

Fintech Innovation Adoption in the Digital Payments Landscape Amidst the Pandemic: Empirical Evidence and Future Outlook

Authors: Velappan Shalini Devarajulu Sabitha

This research evaluates the adoption of digital payment products launched by the National Payments Corporation of India using the Bass diffusion model. The study contributes to Fintech adoption literature and provides empirical and theoretical insights based on historical digital payments data. The findings show that

imitation plays a significant role in adoption, with a slow initial adoption followed by acceleration. Among several payment products, UPI (Unified Payments Interface) stands out as the most successfully adopted product. The study highlights the relevance of the Bass diffusion model for estimating adoption rates and offers insights for international regions considering UPI-based payment systems. The results indicate varying adoption rates for different payment products and pronounced impact of imitations, with some experiencing slower adoption post-COVID-19 and others yet to achieve widespread adoption. The results aid business planning in estimating market potential, resource allocation, product development and strategic direction. Regulatory authorities can use this insight to enhance financial inclusion and promote lesser paper cash transactions which lead to socio-economic and business transformation.

Digital Payments and UPI Innovations: Exploring the Impact of Unified Payments Interface (UPI) on Digital Transactions and Financial Inclusion in India

Authors: Ramdas Lad, Professor Ramkrishna More Arts, Commerce and Science College, Satish Jadhav August 2024

The Unified Payments Interface (UPI) has revolutionized India's digital payment landscape, significantly enhancing financial inclusion and transforming financial transactions. Launched by the National Payments Corporation of India (NPCI) in 2016, UPI provides a unified platform that allows users to link multiple bank accounts to a single mobile application, facilitating seamless, real-time fund transfers and merchant payments. This paper explores the impact of UPI on digital transactions and financial inclusion in India, examining its growth, adoption, and innovative strides in the financial sector. Since its inception, UPI has experienced exponential growth, becoming one of the most widely used digital payment systems in India. Its success is attributed to ease of use, interoperability, and real-time processing capabilities. Government initiatives like Digital India and demonetization have further accelerated UPI adoption. Continuous technological advancements, such as UPI 2.0, have enhanced the platform's functionality and user experience. UPI has significantly increased the volume and value of digital transactions, reducing reliance on cash and enhancing transaction efficiency. Its real-time processing and interoperability have streamlined financial transactions, benefiting both consumers and businesses. The widespread adoption of UPI-enabled QR codes has allowed merchants of all sizes to accept digital payments easily, driving the shift towards a cashless economy. A notable achievement of UPI is its role in promoting financial inclusion. By providing easy access to digital payment services, UPI has brought financial services to underserved and unbanked populations. Its integration with government welfare schemes ensures direct benefit transfers, reducing leakages and enhancing accountability. UPI's penetration into rural areas has bridged the urban-rural divide in financial access. Despite its success, UPI faces challenges such as cybersecurity threats, regulatory hurdles, and the need for continuous technological upgrades. Addressing these challenges and leveraging opportunities will be crucial for sustaining UPI's growth and ensuring its effectiveness in the future.

The Growth Trajectory Of Upi-Based Mobile Payments In India: Enablers And Inhibitors

Authors: Abhishek Kumar, Rajesh Kumar Choudhary, Saroj Kumar Mishra, Sanjay Kumar Kar

Rohit Bansal

Published: 2022-12-09

"Unified Payments Interface" (UPI), an innovative mobile-based payment system, was introduced by the Government of India to support its digitization initiatives. Not just in India, UPI has expanded globally by being implemented in Bhutan and is on the verge of being launched in ten more countries in north and southeast Asia

and, the UAE & Africa. Thus the study examines UPI's growth and significance to the transformation of India's mobile payment systems, its global reach and further expansion. The study consists of two parts, with an initial focus on scholarly literature published in the last five years since the UPI's inception in April 2016. Out of 177 papers, the method yielded 14 notable peer-reviewed publications. Other sources include government policy papers, news materials, and research undertaken by national or international organizations such as Kantar, Statista, ASSOCHAM, Deloitte, Nielson, Ericsson, etc. Despite its early launch, UPI swiftly outperformed all other digital payment methods in India, including mobile wallets. Google Pay, PhonePe and Paytm were early drivers of UPI payments. However, the government-backed Bharat Interface for Money application failed to achieve its potential. Moreover, the Covid-19 pandemic has little impacted the growth of UPI. Another major finding is that transaction failure, and cyber frauds must be addressed for improved UPI uptake, and a greater focus will be on credit and cash withdrawals via UPI. The study concluded that Near field communication-based UPI payments will revolutionize peer-to-merchant payments.

Adoption of UPI among Indian users: Using extended meta-UTAUT model

Author: Mohammad Razi-ur-Rahim, Mustafa Raza Rabbani, Furquan Uddin, Zakir Hossen Shaikh

December 2024

Unified Payments Interface (UPI) has grown rapidly in recent times. It has increased its user base, volume, and transaction value through a variety of mobile applications. Various models have been used to study the reasons for UPI adoption. Earlier studies neither measured 'Use Behavior' (UB) as the outcome variable nor examined the influence of attitude on UPI adoption behavior. This study fills the gap by integrating UB into the model and using the extended meta-UTAUT model to explore the UPI adoption behavior of Indian urban users. The model included four exogenous and three endogenous variables. The data were collected from 894 UPI urban users using the purposive sampling method. Covariance-Based Structural Equation Modeling (CB-SEM) was applied for hypotheses testing. The study explained 82.7 % and 84.1 % of the variance for attitude and use behavior, respectively. The results of this study found that performance expectancy significantly impacts use behavior; attitude significantly affects behavioral intention; and trust affects the attitude. The results of the study will be useful in improving the features of UPI so as to increase customer base. The findings will help in smoothly introducing Central Bank Digital Currency (CBDC) among urban masses in India. The results provide future research scope for moderation and mediation. A future study can also be carried out on Indian rural users.

Unravelling the Dynamics: A Theoretical Exploration of the Role of Unified Payment Interface (UPI) in Digital Inclusion

Authors: Ruchika_Vermani_Neha_Arora

Publication date: 25 March 2025

The Unified Payments Interface (UPI) has emerged as a transformative force within the digital payment landscape, revolutionising how individuals and businesses conduct financial transactions in India. This research paper embarks on a theoretical journey to elucidate the growth trajectory of UPI by delving into secondary data sources. Through meticulous analysis and synthesis of existing literature, regulatory reports and industry insights, this paper constructs a comprehensive narrative that traces the evolution of UPI from its inception to its current status as a cornerstone of the Indian digital payments ecosystem. The theoretical framework

employed in this study draws upon concepts from innovation diffusion theory, network effects and technological adoption models to elucidate the factors driving the adoption and proliferation of UPI. By examining key milestones, regulatory interventions, technological advancements and market dynamics, this paper unveils the intricate interplay of various stakeholders, including banks, fintech firms, government bodies and consumers, in shaping the trajectory of UPI growth. Furthermore, this research delves into the utility of UPI as a payment infrastructure by exploring its implications for financial inclusion, efficiency, security and economic development. By facilitating seamless, real-time and interoperable transactions, UPI has democratised access to financial services, empowered small businesses and catalysed the transition towards a less-cash economy. This paper fills a critical gap in the literature by providing a holistic and theoretically grounded analysis of UPI's evolution and its broader implications. It contributes valuable insights into the mechanisms driving digital payment innovations and their socio-economic impacts, thereby informing policy decisions to foster inclusive and sustainable financial ecosystems.

Fintech – Reshaping Financial Services in India

Author: Parul Nagar Associate Professor – Finance, Indian School of Hospitality, Gurugram

The study undertaken is a descriptive and diagnostic study to analyze the growth and evolution of the fintech industry in India with a changing landscape. The development of regulatory framework, increased adoption of fintech, impact of technology and financial inclusion initiatives, the new age customer, cost advantage have impacted the fast adoption of fintech in India. The adoption of digital technology and roll out of 5 G technology is expected to increase penetration of banking with real time usage of mobile devices for online payments and other transactions. The innovative fintech products provide solutions to growing needs of customers at a lower cost. Adoption of smart phones and real time payments are gaining popularity with usage of UPI, debit cards, credit cards acting as primary driving factors. Bharat Bill Payment System, National Electronic Toll Collection, Travel cards, Prepaid wallets, integration of National Common Mobility Card, Bill Now Pay Later will give an impetus. However, there is a need for the regulatory framework to keep pace with rapid innovations. It is imperative to develop global standard for regulatory framework with cross border coordination for all players and products including crypto assets. Skilled manpower, improved financial literacy, strengthening of cyber security, data privacy laws and infrastructure will address higher digital reach. Keywords: Fintech, Finance Industry, Financial Services, Fintech in India.

Navigating Challenges in Real-Time Payment Systems in FinTech

Author: Rahul Autade Manager Payments Implementation

The rapid growth of real-time payment systems is changing banking services by introducing immediate settlement, 24/7 availability, and interoperability. The latter has come to redefine the FinTech sector by enhancing its effectiveness, security, and catalyzing financial inclusion. This paper examines RTP architecture, considers the main drivers of RTP progress, and delineates its industry challenges, including cybersecurity, compliance, fraud detection, and interoperability. By analyzing four cases: M-Pesa in Kenya, UPI in India, Faster Payments in the UK, and the US FedNow-project, this paper gives an overview of RTP implementation, success and limitation from a global perspective. Thereafter, it offers a preview of what the future might hold by examining different technological trends-trajectories for building future real-time digital payments such as blockchain RTP, AI-powered fraud detection, 5G-enabled transaction processing, and open banking

integrations. Although RTP offers a host of benefits, still some challenges must be addressed in order to take advantage of them regulatory obstacles, security concerns, and developing market barriers. In an attempt to provide an insight into future development, this paper seeks to present a comprehensive, research-grounded view on RTPs in the shaping of the next little while of the digital financial service

Assessing challenges to the mobile wallet usage in India: an interpretive structural modelling approach

Author: Nripendra P._Rana,_Sunil_Luthra,_H. Raghav_Rao

Publication date: 4 May 2023

Mobile-based payment is increasing exponentially but in the developing country like India, consumers' perception is highly positive in daily cash transaction. The purpose of this research is to identify and examine the important challenges for mobile wallet (m-wallet) implementation in India. In the wake of COVID-19, one of the transmission mechanisms of this virus has been the coins and paper money passed between a buyer and a seller. As such m-wallet considered as a convenience of payment has become a necessity in light of the pandemic.

OBJECTIVES:

- 1. To understand the growth trend of UPI and mobile payments in India.**
- 2. To examine the common challenges mentioned in reports and studies on digital payments.**
- 3. To explore future opportunities for UPI and mobile payment systems as discussed in existing literature.**

RESEARCH METHODOLOGY:

This study primarily relies on secondary data, collected from government reports, research journals, industry publications, and trusted online sources such as RBI reports, NPCI updates, NITI Aayog documents, and economic news platforms. The aim is to examine how UPI and mobile-based payment systems are shaping FinTech innovation in India by improving transaction ease, financial inclusion, and digital literacy.

Research Hypothesis:

UPI and mobile-based payment systems have significantly transformed India's FinTech ecosystem by increasing digital transaction volumes, improving financial accessibility, and enabling innovation. However, challenges such as cybersecurity risks, digital illiteracy, rural connectivity issues, and regulatory constraints limit their full potential.

Research Design:

A descriptive research design is adopted to analyze and interpret secondary data. The study uses a qualitative and quantitative approach, involving review and comparison of trends, transaction volumes, usage statistics, and policy changes. Data is presented using tables, graphs, and simple interpretations to explain trends and impacts.

Secondary Data Sources:

This project gathers data from multiple secondary sources to ensure accuracy and credibility. These include:

- Reserve Bank of India (RBI) bulletins
- NPCI transaction data and reports
- Government publications (e.g., Digital India reports)
- Research journals from ScienceDirect and ResearchGate
- Reputed news portals such as Economic Times, LiveMint, and Moneycontrol

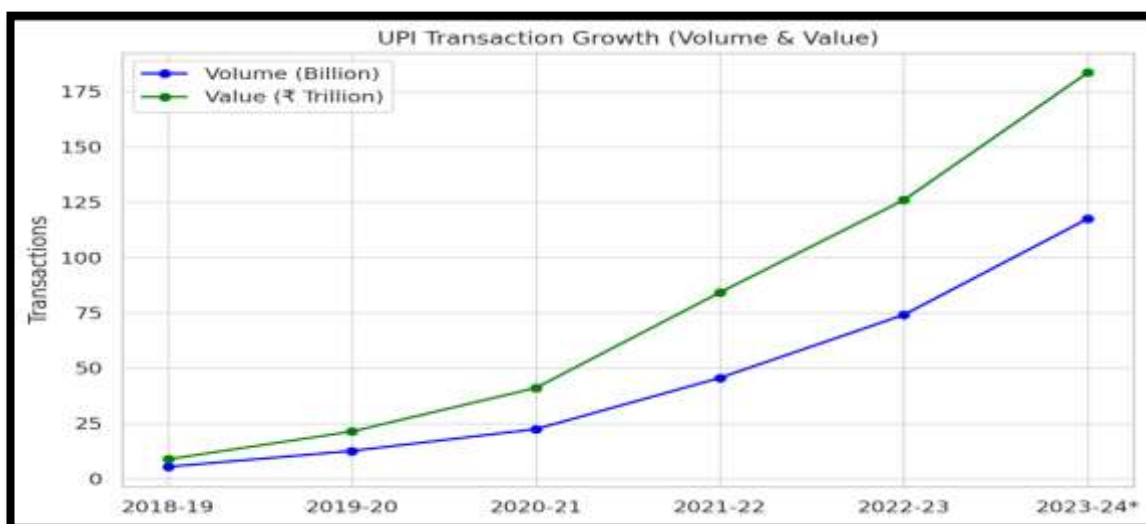
Limitations of the Study:

- **Lack of Primary Data:** No direct user surveys or interviews were conducted. Findings rely solely on secondary analysis.
- **Data Timeliness:** Some sources may not reflect real-time changes or very recent updates.
- **Generalization Limits:** The study may not fully capture region-wise differences in UPI adoption, especially in remote or rural areas.
- **Focus on India Only:** The global comparison or influence of international mobile payment systems is not included.

DATA AND ITS INTERPRETATIONS:

Table 1: UPI Transaction Growth (Volume & Value)

Year	UPI Transactions (Volume in Billion)	Total Value (₹ Trillion)	Year-on-Year Growth (%)
2018-19	5.35	₹8.76	245%
2019-20	12.52	₹21.31	134%
2020-21	22.39	₹41.04	79%
2021-22	45.56	₹84.17	105%
2022-23	74.05	₹125.94	63%
2023-24*	117.50 (estimated)	₹183.58 (estimated)	59%

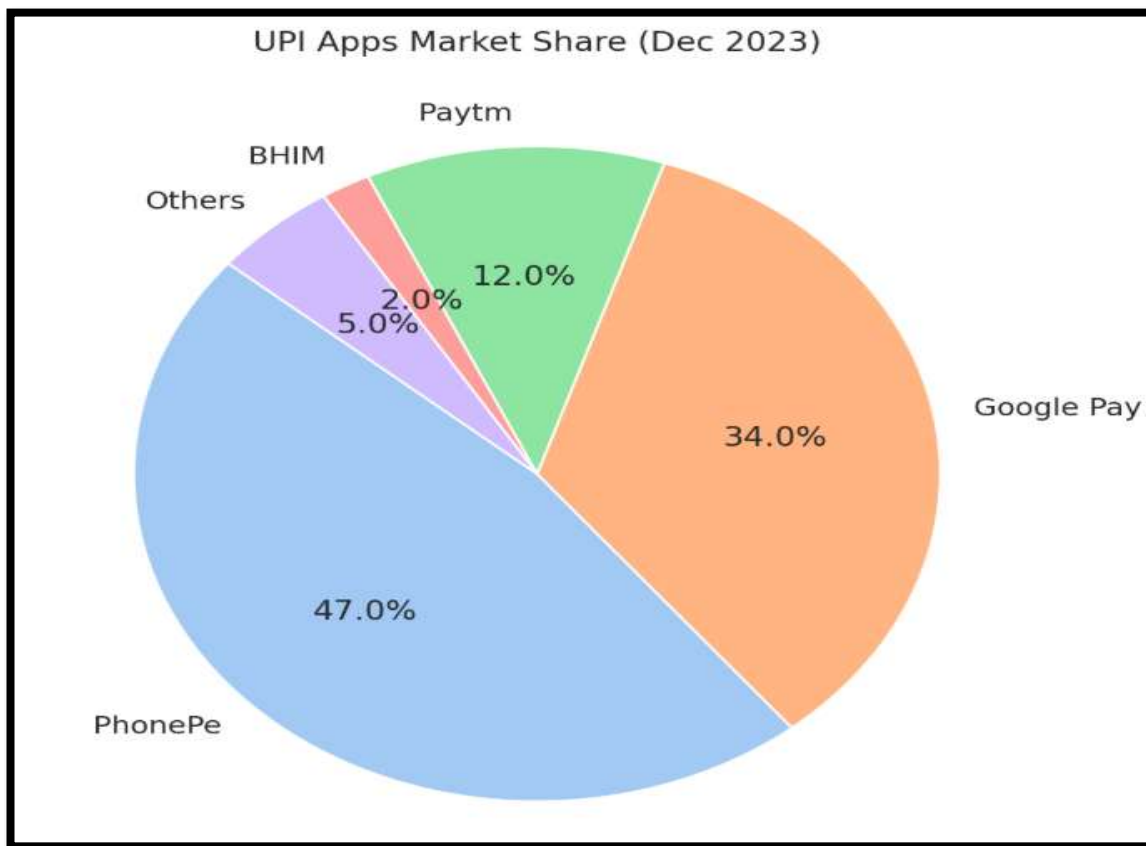


INTERPRETATIONS:

1. UPI usage has shown consistent year-on-year growth in both volume and value since 2018.
2. The number of UPI transactions grew from 5.35 billion in 2018-19 to over 117 billion by 2023-24 (estimated).
3. The total transaction value crossed ₹183 trillion in 2023-24, showing strong adoption across business and retail segments.
4. The highest YoY growth was seen in 2018-19 at 245%, indicating rapid early adoption.
5. While growth is continuing, the percentage increase is slowing down slightly as the market matures.

Table 2: Top UPI Apps by Market Share (as of Dec 2023)

App Name	Market Share (%)	Key Features
PhonePe	47%	Bill payments, recharges, UPI Lite, gold savings
Google Pay	34%	Rewards-based system, fast transactions
Paytm	12%	Wallet + UPI, merchant tools
BHIM	2%	Govt. official app with multilingual support
Others	5%	Bank-specific or niche apps



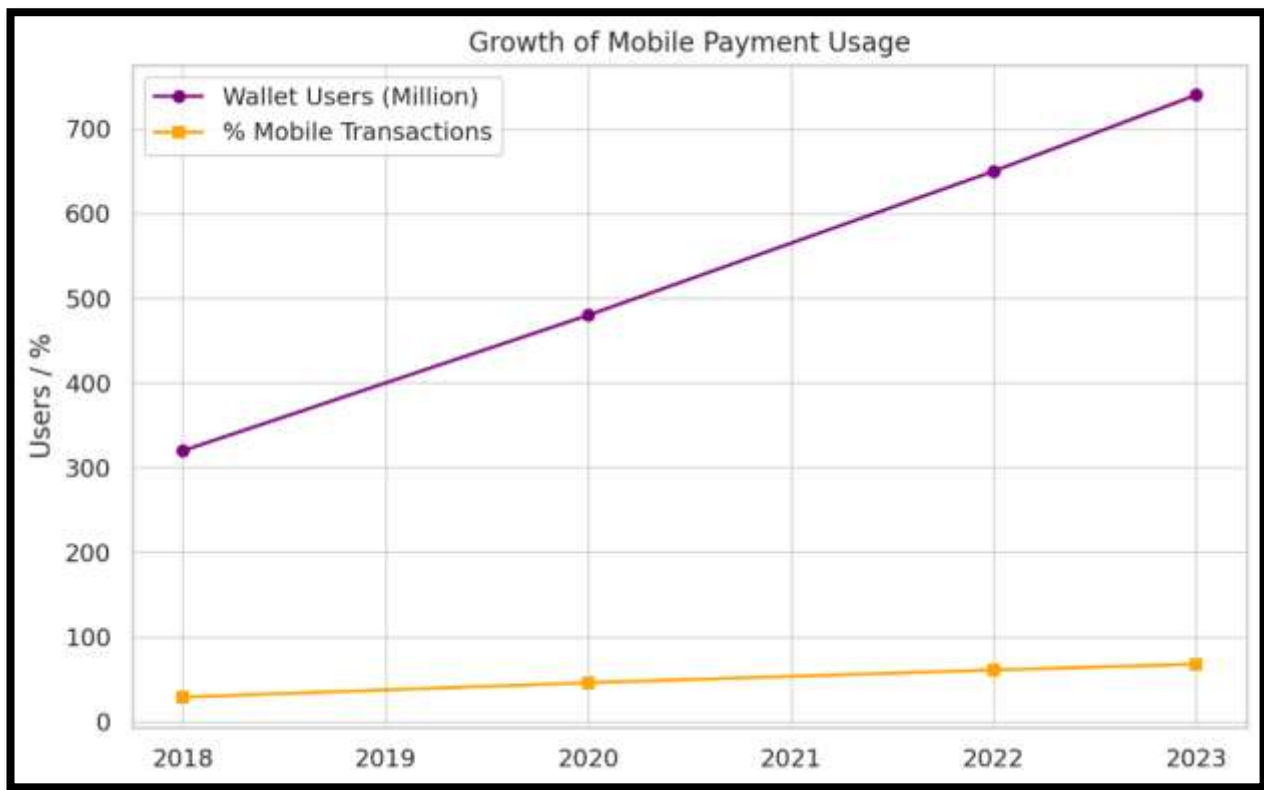
INTERPRETATIONS:

1. PhonePe dominates the UPI market with nearly half the market share (47%).
2. Google Pay follows closely with 34%, preferred for its rewards and speed.
3. Paytm holds a significant 12%, benefiting from its hybrid model (wallet + UPI).

4. BHIM, though a government-backed app, holds only 2%, suggesting users prefer private apps for better UX.
5. Market concentration is high, with 81% of users using just two apps (PhonePe and Google Pay).

Table 3: E-Wallet & Mobile Payment Usage Growth (RBI/NITI Aayog)

Parameter	2018	2020	2022	2023
Active Mobile Wallet Users (Million)	320	480	650	740
Mobile Payment Value (₹ Cr)	40,00,000	75,00,000	1,12,00,000	1,65,00,000
% of Transactions via Mobile	29%	46%	61%	68%

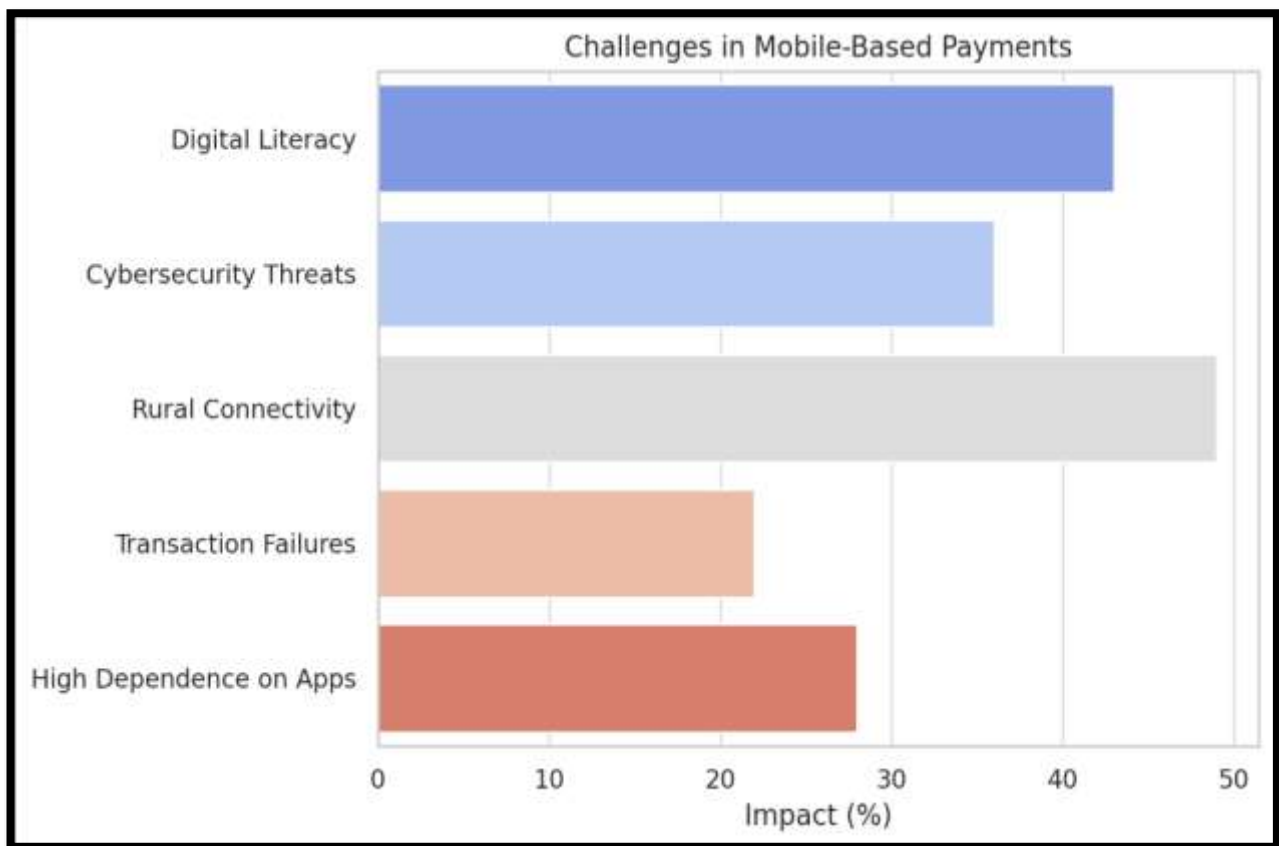


INTERPRETATIONS:

1. Mobile wallet users increased from 320 million in 2018 to 740 million in **2023**, showing rising digital inclusion.
2. Payment value via mobile grew more than 4 times from ₹40 lakh crore to ₹165 lakh crore in 5 years.
3. The share of mobile payments in total transactions rose from 29% to 68%, reflecting a digital shift.
4. COVID-19 acted as a booster for mobile-based payments between 2020 and 2022.
5. The trend suggests increasing trust and reliance on mobile platforms for financial transactions.

Table 4: Key Challenges in Mobile-Based Payments (Survey-based Reports)

Challenge Area	Description	Impact (%)
Digital Literacy	Many users still unfamiliar with mobile payments	43%
Cybersecurity Threats	Phishing, fraud, app cloning risks	36%
Rural Connectivity	Weak or no internet in rural regions	49%
Transaction Failures	Delay or failure in payment processing	22%
High Dependence on Apps	Limited access without smartphones	28%








INTERPRETATIONS:

1. Digital illiteracy (43%) and rural internet issues (49%) remain major roadblocks to full adoption.
2. Cybersecurity concerns (36%) still deter many users from using UPI or mobile apps.
3. Limited smartphone access (28%) restricts participation in the digital economy.
4. Transaction failures, though lower (22%), affect user experience and trust.
5. More awareness and digital training programs are needed to improve participation, especially in Tier 2/3 areas.

Table 5: Future Scope and Government Initiatives

Initiative/Trend	Year Launched	Goal/Impact
UPI 123PAY	2022	UPI for feature phone users (no internet required)
International UPI Link (UAE, Singapore)	2023	Cross-border payments, NRI support
Digital Rupee (CBDC Pilot)	2022-23	Integration with UPI for wholesale/retail payments
UPI Lite	2022	Offline small-value transactions
ONDC Payments Integration	2023	Enabling UPI in open digital commerce network

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INTERPRETATIONS:

- UPI 123PAY enables payments through feature phones, increasing rural accessibility.
- International UPI links in UAE and Singapore allow NRIs and global users to transact easily.
- The Digital Rupee (CBDC) could blend with UPI to modernize retail and wholesale transactions.
- UPI Lite allows for offline small-value payments, useful in low-connectivity areas.
- Integration with ONDC can open new opportunities in digital commerce for small sellers using UPI.

FINDINGS:

1. UPI transactions in India have grown rapidly over the past five years, showing strong user adoption.
2. The total value of UPI payments has reached very high levels, indicating trust in digital payments.
3. PhonePe and Google Pay dominate the UPI market, with most users preferring these apps.
4. The number of mobile wallet users in India has increased significantly between 2018 and 2023.
5. Mobile-based payments now account for more than half of all digital transactions in India.
6. Internet connectivity issues are still a major barrier for users in rural and remote areas.
7. Many people, especially in rural areas, face challenges due to lack of digital knowledge.
8. Cybersecurity threats such as fraud and phishing reduce trust in mobile payment systems.
9. New UPI services like UPI Lite and UPI 123PAY are helping users with limited technology access.
10. India is expanding UPI services to other countries, making it a global digital payment leader.

SUGGESTIONS:

1. Conduct digital literacy workshops to help users understand how to use UPI and mobile payments.
2. Improve internet and mobile network access in rural and remote regions.
3. Strengthen security features in mobile payment apps to protect users from fraud.
4. Promote awareness about UPI 123PAY for users without smartphones or internet.
5. Encourage small businesses and local shops to accept UPI payments.
6. Offer incentives or cashback to first-time users to build confidence in using digital payments.
7. Provide customer support in local languages to help rural users.
8. Introduce financial education in schools to prepare future users for digital finance.
9. Reduce UPI app overload and transaction failures through better infrastructure.
10. Support innovation in FinTech to create more user-friendly and secure payment solutions.

CONCLUSION:

This project has explored how UPI and mobile-based payments have become strong drivers of FinTech innovation in India. With the launch of UPI and the rise of apps like PhonePe, Google Pay, and Paytm, people across the country are now able to make quick, safe, and easy payments using their mobile phones. The data shows that UPI transactions have grown rapidly in both volume and value over the last few years. More people are using digital payments for daily needs, which shows a big shift toward a cashless economy. The study also looked at the challenges that users and businesses face while using UPI and mobile payments. Many users in rural areas still struggle due to poor internet access and lack of digital skills. Cybersecurity issues and online fraud also make some people hesitant to use these services. However, new steps like UPI Lite, UPI 123PAY, and global UPI linking are helping to make the system more accessible and secure. Based on secondary data, this project clearly shows that UPI and mobile payments have made financial services easier, faster, and more inclusive. Still, there is a need for better digital education, stronger security, and wider infrastructure, especially in rural parts of India. With the right support and innovation, mobile payments will continue to grow and help more people join the digital economy. This study highlights both the progress and the areas where more work is needed to ensure that digital finance benefits everyone in India.

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