FINANCE AND BANKING

IJFB VOL 11 NO 1 (2022) P-ISSN 2574-6081 E-ISSN 2574-609X

Available online at https://www.cribfb.com
Journal homepage: https://www.cribfb.com/journal/index.php/ijfb
Published by CRIBFB, USA

THE GROWTH TRAJECTORY OF UPI-BASED MOBILE PAYMENTS IN INDIA: ENABLERS AND INHIBITORS

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ARTICLE INFO

Article History:

Received: 8th October 2022
Accepted: 4th December 2022
Online Publication: 9th December 2022

Keywords:

Digital Payments, Mobile Payments, M-wallets, Unified Payments Interface, UPI

JEL Classification Codes:

C00, C10, C80, G28

ABSTRACT

"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.

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INTRODUCTION

Technological advances have led to a gradual transformation of digital payments in India in the last few years. The advent of smartphones and the internet plays a major role in making India a less-cash society. Indians have been hesitant about adopting the rapidly changing technology due to a lack of trust in themselves (Omidyar Network, 2017). However, the nation has welcomed reforms recently and made massive improvements to simplify payments. A cashless India may still be a distant dream, but once it becomes a reality, one agency will lead the task: The National Payments Corporation of India (NPCI). This organization handles the majority of all digital payment requests in India.

Globally, the volume of non-cash transactions has risen, leading to a change in banking and payment industry dynamics that is witnessing a shift towards digital. The global market for digital payments is expected to reach USD 10.7 trillion by 2026 (Globe Newswire, 2019). The global payment revenue is diverse, but the increasing share is of transactions, i.e. a positive development for financial institutions and payment service providers. Revenue generated through transactions constitutes about 40 per cent of the total revenue of global payments, which was 37 per cent in 2012. This share is expected

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https://doi.org/10.46281/ijfb.v11i1.1855

To cite this article: Kumar, A., Choudhary, R. K., Mishra, S. K., Kar, S. K., & Bansal, R. (2022). THE GROWTH TRAJECTORY OF UPI-BASED MOBILE PAYMENTS IN INDIA: ENABLERS AND INHIBITORS. *Indian Journal of Finance and Banking*, *11*(1), 45-59. https://doi.org/10.46281/ijfb.v11i1.1855

to reach 46 per cent by 2022. The Asia-Pacific region accounts for over 60 per cent of the world's population. Despite recording more than double growth since 2012, it is still behind other regions with only 21 per cent of total electronification (Bansal et al., 2018).

India has emerged as a global pioneer in innovative population-scale payment systems with its unique rich payment ecosystem. The Reserve Bank of India (RBI) and the government have outlined a vision of a "less money society". The banks have primarily led to the growth of financial services in India, and e-banking services have increased in recent years (Jivan Biradar, 2021). The regulator and banks are working on the initial thrust, growth, and support of digital payment systems. The digital payment ecosystem has made significant progress on the supply or issuance side, providing a wide range of payment services. This includes Real Time Gross Settlement (RTGS), National Electronic Funds Transfer (NEFT), Immediate Payment Service (IMPS), Bharat Interface for Money (BHIM) UPI, Card Networks, Point of sale (POS), Bharat QR (BQR), National Automated Clearing House (NACH), M-wallets, Aadhaar Payments Bridge System (APBS) and Aadhaar Enabled Payment System (AePS), via bank accounts, bank branches, business correspondents, wallets, mobile phones, and related tools. There are certain problem areas on the adoption side, such as high-cost structures (i.e., interchange fees) and limited financial services offerings that hinder merchants' acceptance of digital payments. Cash plays a significant role in payments in India because of its universal availability and acceptance, low product prices, and no KYC criteria.

The number of digital transactions per capita is useful for measuring the country's growth in digital transactions. To understand India's performance regarding the number of digital transactions per capita relative to that of the world, annual per capita digital transactions were calculated (Table 1) of selected developing countries that are CPMI members (Committee on Payments and Market Infrastructures).

Table 1. No. of Cashless Transactions per Capita (Global)

	Cashless Transaction/Capita			Growth
Country	**2018**	**2019**	**2020**	(In %)
Singapore	831.22	848.42	662.14	-20.34
Republic of Korea	546.71	607.02	620.74	13.54
Brazil	165.17	195.97	210.87	27.66
China	142.16	225.17	241.66	69.99
South Africa	85.49	93.39	90.94	6.37
Turkey	76.21	87	92.74	21.69
Argentina	53.37	60.87	70.17	31.47
Indonesia	41.26	44.18	46.37	12.38
Mexico	40.16	46.32	49.82	24.05
Saudi Arabia	38.16	58.69	94.19	146.82
India	18.06	23.92	29.44	63.01

Per Capita Digital Transaction Volume (Annual) =
Total Volume of Digital Payments for the Year/Population.
Source: Created by the Author using data from the World Bank and Bank of International Settlements

India has seen a tremendous increase in digital payment measures in the previous three years, rising from 18.06 digital transactions per capita in 2018 to 29.44 transactions per capita in 2020 (Table 1), a 63% increase. Surprisingly, in 2014, there were just 2.4 digital transactions per capita (RBI, 2019c). However, it is still far behind from world ratio; developing nations, such as China, Argentina, Mexico, and Saudi Arabia, have much higher per capita digital transactions. People are increasingly migrating to other digital payment methods due to the resurgence of Covid-19 in the nation; however, there is a steep fall in per capita digital transactions in Singapore. This might be due to Covid restrictions and market shutdown. The RBI and GOI intended to reach an annualized volume of approximately 40 billion (B) digital transactions by FY 2020 and 220 digital transactions per capita by March 2021 (RBI, 2019c). The country surpassed the first target by recording 46B transactions by 2020 (Mishra, 2020), but it missed the second target by a big margin. The RBI's vision is to enhance customer experience, develop the required ecosystem and infrastructure, and empower the service providers by supportive regulations and timely risk-centred supervision to achieve the country's target and make India a less-cash society (RBI, 2019b). A recent report on digital payment is also in line with that of the RBI, which states that the country's digital payments transaction value will show rapid growth and is projected to reach USD 135.2B by 2023 from 64.8B in 2019, with the compound annual growth of 20.2 per cent (ASSOCHAM-PWC, 2019).

LITERATURE REVIEW

The rapid incorporation of mobile phones in society and their role in development has been one of the most significant technological developments of the last decades (Madan & Yadav, 2016), and it has created enormous growth prospects for payment systems (Jocevski et al., 2020). Technology and its rapidly changing existence influence how businesses work and how countries function and prepare for the future. Governments worldwide are investing heavily in their digital economy to foster value creation and growth. The landscape of digital payments is mainly shaped by unique value propositions, a favourable climate, regulatory support, and high-end technologies. Mobile payment (M-payment), which is a new-age digital payment system, refers to an economic exchange or a transfer of funds for any goods or services from one individual to another through internet-enabled mobile phones or tablets (Mallat & Tuunainen, 2008) or it can be understood as "*Any payment where a mobile device is used in order to initiate, activate, and confirm the payment, can be considered a mobile payment*" (Karnouskos & Fokus, 2004). M-payment allows users to complete their payments anytime and anywhere in a simple, safer, quicker, and more convenient way (Liébana-Cabanillas et al., 2014; Zhou, 2013). M-payment advantages

include ease (Sarmah et al., 2020), location independence (Mallat et al., 2009), and its adoption gets affected by several factors, i.e., visibility (Johnson et al., 2018), perceived transaction speed (Teo et al., 2015), privacy concerns (Thakur & Srivastava, 2013) and effort expectancy (Tak & Panwar, 2017). Millennials are known for their high use of information and communications technologies (Xiang et al., 2015), and they are the centre of tomorrow's consumer spending (Kim et al., 2015). Self-efficacy (Boonsiritomachai & Pitchayadejanant, 2017) and network effects play a significant role in mobile payment adoption for young consumers. There is also a trade-off between perceived security and convenience in the valuation of services (Rehncrona, 2018). Besides these factors, consumer innovativeness (Handarkho & Harjoseputro, 2019) and lifestyle compatibility (Chawla & Joshi, 2019) directly affect mobile payment adoption. Standardization, the nonexistence of interoperability, security, privacy, and incorporating a new payment system into the overall business environment are the key challenges of mobile payment systems (Au & Kauffman, 2008; Mallat & Tuunainen, 2008). Some recent studies have found that gender, relative advantage, compatibility, complexity, and observability affect consumer intention to use and recommend mobile wallets (Kaur et al., 2020). Mobile wallets (M-wallets) are the digital counterparts to traditional wallets, preloading a certain amount of money via credit card, debit card, or internet banking, enabling users to make online and offline payments (Chawla & Joshi, 2019).

Understanding the need and changing consumer behaviour of consumers in India, the Government of India (GOI) developed and supported a specific mobile phone app called the Unified Payment Interface (UPI) to improve people's ability to use digital money and banking services (Seranmadevi et al., 2019). The UPI was introduced in 2016 by NPCI to streamline digital transactions to a text message level. This allows users to transfer money through an app without needing bank account information. Not surprisingly, UPI has left far behind other online payment systems. Thereby, India has taken a step closer to becoming a cashless economy with the introduction of UPI. With this new payment system, smartphones have become electronic debit cards, and people can send and receive money immediately. UPI is a considerable improvement compared to the current payment system in terms of cost, user-friendliness, settlement times, and strong user acceptance (Gochhwal, 2017). It is comparatively more secure than m-wallets (Lakshmi et al., 2019). Transaction costs in UPI are much less than in m-wallets, and the added advantage is that users need not transfer money in wallets for any transaction (Bhardwaj & Kaushik, 2018a). It is widely accepted for small payments and can make India a digitized economy (Kapur et al., 2020). Mobile payments are divided into three categories: mobile proximity payments, peer-to-peer transactions, and remote mobile payments (Forrester, 2014). The UPI incorporates two categories, i.e., peer-to-peer and remote payments. From the discussed literature, it was found that researchers have explored the intention and adoption behaviour towards digital/mobile payments, more particularly the m-wallets. It was also evident that more work needs to be done so far to understand the evolution and progression of the new-age payment system of India, i.e., 'UPI.' So, the authors in this study have shed light on the overall digitization of payments in India to that of the world, focusing on UPI through available secondary data.

MATERIALS AND METHODS

This research is separated into two parts. First, we conducted a conceptual study of the idea of UPI, concentrating primarily on scholarly material published in the previous five years since its establishment in April 2016. Several peer-reviewed publications were included, indicating a growing scientific work on mobile payments. Scopus, a popular database, was utilized to do internet searches for the phrases "Unified Payments Interface" and "UPI." Initially, the search yielded 177 items in Business Management and Social Sciences categories. We started by reviewing all the articles' titles and abstracts to find the relevant ones. The preliminary screening revealed that most results are irrelevant to the research. After removing duplicate and unrelated items, the process produced about 14 noteworthy peer-reviewed publications (Table 2).

Table 2. Screening Results (Previous Studies on UPI)

Authors & Year	Focus Areas
Rastogi et al. (2021)	Financial literacy/Inclusion through UPI
Kumar et al. (2020). Lakshmi et al. (2019); Malladi (2021)	Security aspects of UPI
Anjali & Suresh (2019)	Consumer satisfaction with BHIM
Gupta et al. (2020). Gupta et al. (2019); Kapur et al. (2020); Mallik & Gupta (2021)	Consumer Intention/Adoption of UPI
Khanra et al. (2020)	Barriers towards the adoption of UPI
Bhardwaj & Kaushik (2018b); Dhamija & Dhamijia (2017); Gochhwal (2017)	Basic model/feasibility of UPI

The screening of the papers made it clear that most of the studies have focused on security, financial inclusion, and the basic model of UPI, and some on consumer adoption of UPI. However, we found very minimal literature focusing on the growth and advancement of UPI and the reasons that contributed to this. As a result, it became clearer that the review needed to be widened; therefore, we looked at non-academic literature. The authors reviewed official policy documents, public reports, press releases, and research conducted by national and international organizations. The study's data was gathered from various publicly accessible government-owned websites/platforms such as RBI, NPCI, etc., and non-government national and international research firms such as Kantar, Statista, ASSOCHAM Deloitte, Nielson, Ericsson, and others.

RESULTS

Growth of UPI

In the past few years, a strong base has been created for mobile payments, and the next few years are expected to see high growth and contribute to digital India. The ease of payment and round-the-clock accessibility are the factors that have

resulted in increased UPI adoption, and its popularity has grown exponentially. Based on current growth estimates, transactions via UPI could surpass other cashless payments within a few years. UPI has amassed more than 32B transactions in 2021 (Figure 1). The number of banks offering UPI services has increased from 21 banks in 2016 to over 282 in 2021 (NPCI, 2021c). Transaction values have risen from Rs. 31 million (M) to more than Rs. 5 trillion by March 2021 (NPCI, 2021c). Compared to March 2020, the transaction volume increase is over 120 per cent, and transaction value growth is approximately 144 per cent, far above any other form of digital payment. UPI's 'growth spurt' is driven by ease of use, a combination of consumer-facing fintech activities, and an aggressive push by GOI. The key catalysts for the growth of P2P UPI payments were Google Pay, Phone Pe, Paytm, Amazon Pay, and WhatsApp in its introductory stage. The NPCI, RBI and the Indian Banks Association (IBA) research predicts that the annual number of UPI transactions may reach 60B by 2023.

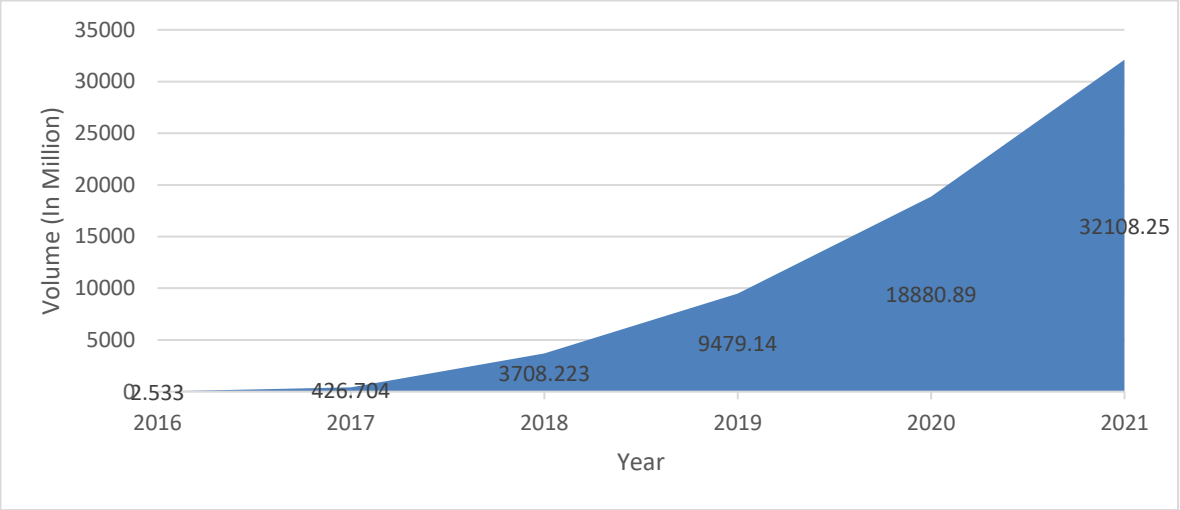


Figure 1. Growth of UPI (Created by Author); Transactions up to November 2021
Source: NPCI

Effect of UPI on M-wallets

The GOI announced the momentous 'demonetization' of all Rs. 500 and Rs. 1,000 currency notes on 8th November 2016 (The Hindu, 2020a). The government's reasons back then included curbing black money, eliminating fake currency, and reducing the economy's cash circulation. Data shows that electronic transactions, especially from mobile wallets, four years later, had increased significantly from before demonetization (Figure 2). However, the introduction of UPI, stringent rules of physical KYC verification, and imposition of a maximum amount limit by the RBI have narrowed its year-on-year growth. This decline in m-wallet transaction volume may be attributable to the increasing popularity of UPI. Very recent data for FY 2020-21 shows that UPI has continued its momentum, whereas, despite an improved performance, m-wallet is way lesser than UPI (Figure 2).

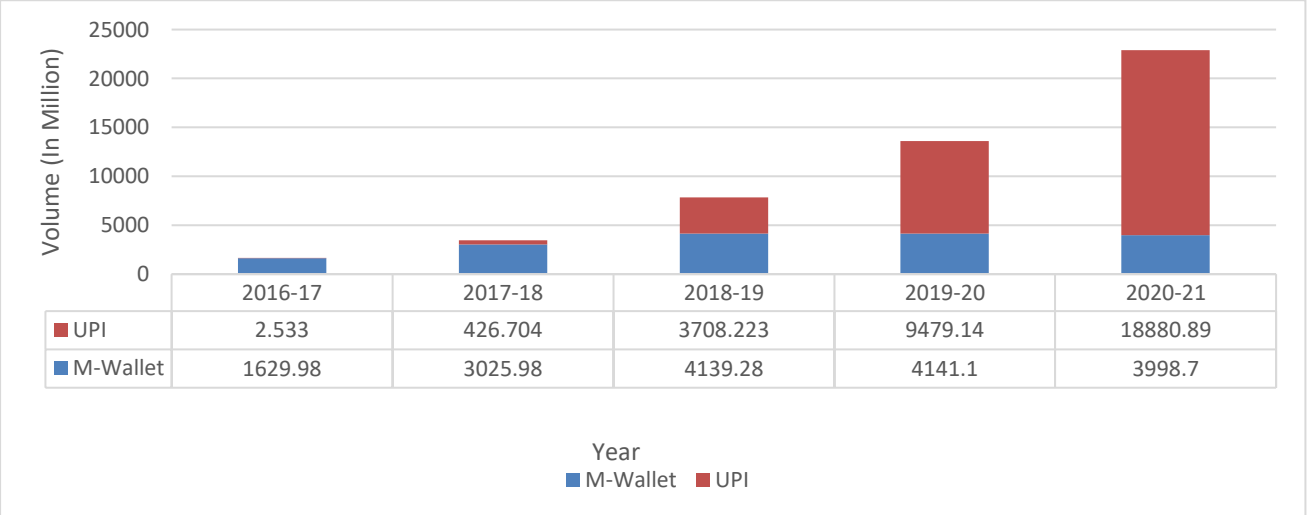


Figure 2. Comparative Analysis of UPI & M-Wallet (Created by Author)
Source: RBI, NPCI

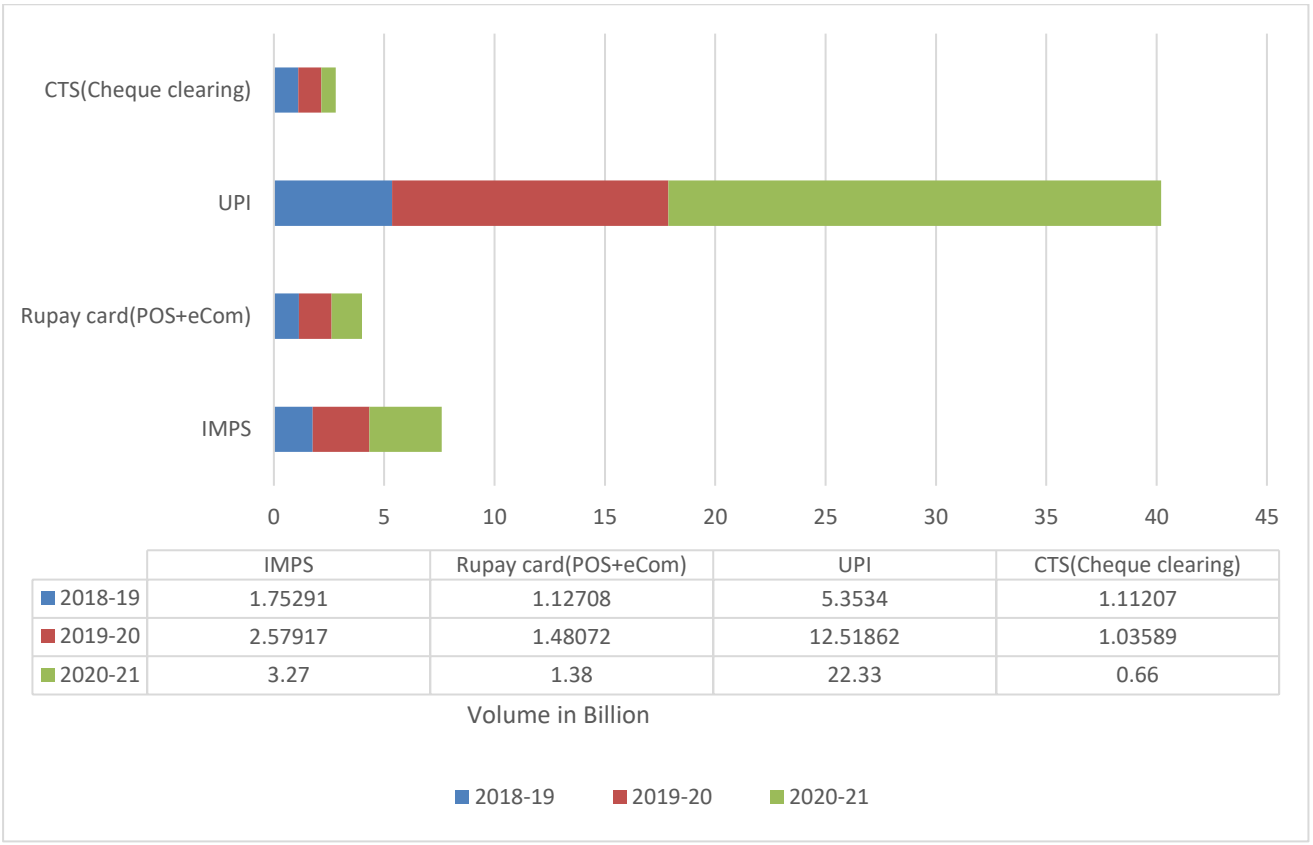
There has been speculation that the growth of UPI will end the m-wallet era. Nonetheless, this could be a relatively intuitive and uninformed claim, as India's mobile wallet companies have more users than any of the current bank-supported

applications. UPI would be an additional source for wallet companies to further integrate with the banking system and incorporate more merchants.

Contribution of UPI to Retail Payments

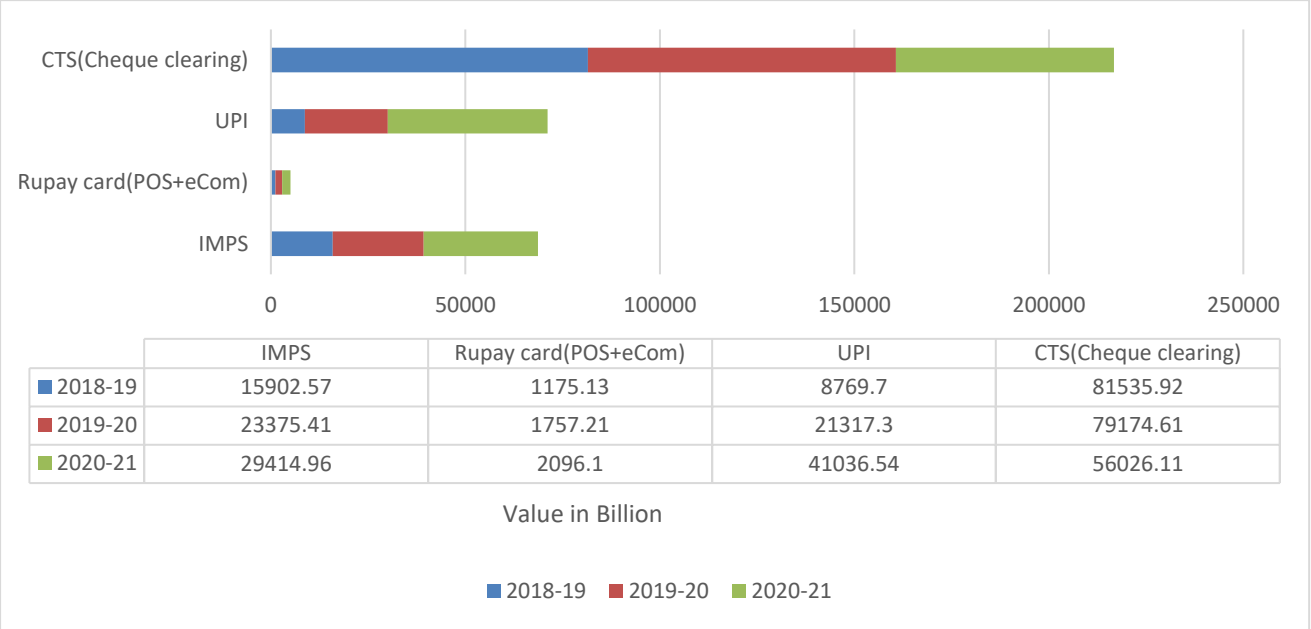
UPI used mainly for P2P payments is now gaining broader acceptance in merchant transactions, a significant change as companies drift away from providing incentives for P2P payments and make it more viable. The retail volume data of UPI transactions have significantly increased in the last few years, but it still holds a minimal portion of total retail payments in terms of value (Figure 3 & Figure 4). The significant variation between the volume and value of transactions shows that people still prefer cheques over digital payments for large-value transactions in India. However, it is also observed that there is a downfall in the value of transactions from cheques compared to other digital modes of payment in FY 2020-21, as it may be the effect of the pandemic and the closure of markets. Most small Indian retail outlets and independent shop owners operate in a cash-driven informal economy. They generally do not generate the financial records required to apply for bank loans, thereby restricting their growth potential. Electronic transactions produce financial records that testify to buyers' and sellers' creditworthiness, making the business less costly. It can foster transparency and accountability, lower transaction costs, and lower the size of the grey/informal economy. It can also enhance the effectiveness of a business and be used as a tool to meet competition. A recent study indicated that digital retail is expected to increase its share from 5 per cent to 15 per cent by 2025 (McKinsey, 2019). A study by PayPal claims that 88 per cent of consumers in India use mobile devices to make payments or pay online (ETBr & Equity, 2019). These changes have paved the way for increased digital transactions and shaped the payment behaviours of a consumer. The UPI is generally preferred for low-ticket transactions, but the growth pattern indicates that the system can expand and evolve as a popular and preferred merchant payment method. UPI members have jointly developed an approach to get small merchants or vendors with a low-ticket size into the digital system to accomplish this dream. In addition to the other two existing categories, P2P and P2M, UPI has introduced a new 'P2PM' category catering to the needs of small merchants and the unorganized retail sector (NPCI, 2019a). The price and other fees related to purchases made in this class are the same as P2P.

Offline opportunities are enormous, so major online payment service providers like Paytm, PhonePe, and Google Pay vigorously expand their networks and focus on acquiring offline merchants for payments through UPI. Small merchants with estimated inward UPI transactions of less than or equal to Rs. Fifty thousand per month shall be graded as P2PM, and no Merchant Discount Rate (MDR) will be charged under this category (NPCI, 2019a). The GOI has also taken various steps to encourage homegrown UPI and RuPay cards by exempting them from MDR fees from January 1, 2020. The Department of Revenue, GOI, has also mandated all companies with a turnover of Rs. 500M or more to provide customers with a payment facility through a RuPay debit card and UPI QR code (The Economic Times, 2019). These changes have increased merchant transaction volume and boosted India's digital footprint.



	IMPS	Rupay card(POS+eCom)	UPI	CTS(Cheque clearing)
2018-19	1.75291	1.12708	5.3534	1.11207
2019-20	2.57917	1.48072	12.51862	1.03589
2020-21	3.27	1.38	22.33	0.66

Figure 3. Retail Payments (Transactions Volume)
Source: NPCI



	IMPS	Rupay card(POS+eCom)	UPI	CTS(Cheque clearing)
2018-19	15902.57	1175.13	8769.7	81535.92
2019-20	23375.41	1757.21	21317.3	79174.61
2020-21	29414.96	2096.1	41036.54	56026.11

Figure 4. Retail Payments (Transactions Value)
Source: NPCI

UPI as a Business: Public and Private Players

In 2016, NPCI introduced UPI in India by introducing BHIM. BHIM is a payment application developed by the NPCI which allows users to use the UPI to make simple, easy, and quick transactions. After some initial growth, it could have achieved its full potential. Merchants' cashback offers provided by other UPI-based payment apps led to a continuous reduction in the market share of BHIM. Private firms-backed UPI apps introduced their innovations, but NPCI's limited scope did not allow the Govt. owned BHIM to match the other players. The NPCI changed this when it introduced the BHIM 2.0 platform in October 2019 (PTI, 2019), which allowed donations and automatic bill clearing, increased transaction limits, and provided exciting offers from the merchants' side in the same way as other apps. In BHIM 1.0, consumers faced a per-transaction cap of Rs. 20 thousand. This hampered both online and offline big purchases of customers. Now, BHIM 2.0 has increased the cap to Rs. 100 thousand for verified merchants as well as for some other retail stores. However, the payment cap for transfer to an individual remains the same at Rs. 40 thousand. BHIM has also launched an option for equity investors who subscribe to initial public offerings (IPOs) on the National Stock Exchange (NSE) and Bombay Stock Exchange (BSE). This unique feature is not available on other UPI-based platforms. It facilitates UPI's instant fund transfer experience while users subscribe to IPO, creating an instant mandate that ensures applications are submitted in real-time and customer support for issues related to transactions. Despite these changes, BHIM lags way behind its private counterparts. NPCI statistics show that BHIM has recorded 251.68M transactions in FY 2020-21, accounting for only 0.96 per cent of the total market share.

In contrast, Flipkart-owned PhonePe has shown tremendous growth by recording the highest number of transactions, followed by Google Pay, Paytm, and Amazon Pay (Figure 5). The competition is expected to intensify as WhatsApp has recently integrated the UPI platform in its message/voice chat app, facilitating users to transact through their WhatsApp messenger application. With more than 400M subscribers, India is WhatsApp's primary market (Statista, 2021b). WhatsApp would only allow some users to use the newly launched payment feature immediately. NPCI has asked WhatsApp to start its service in a phased manner beginning with a limit of 20M users (NPCI, 2020).

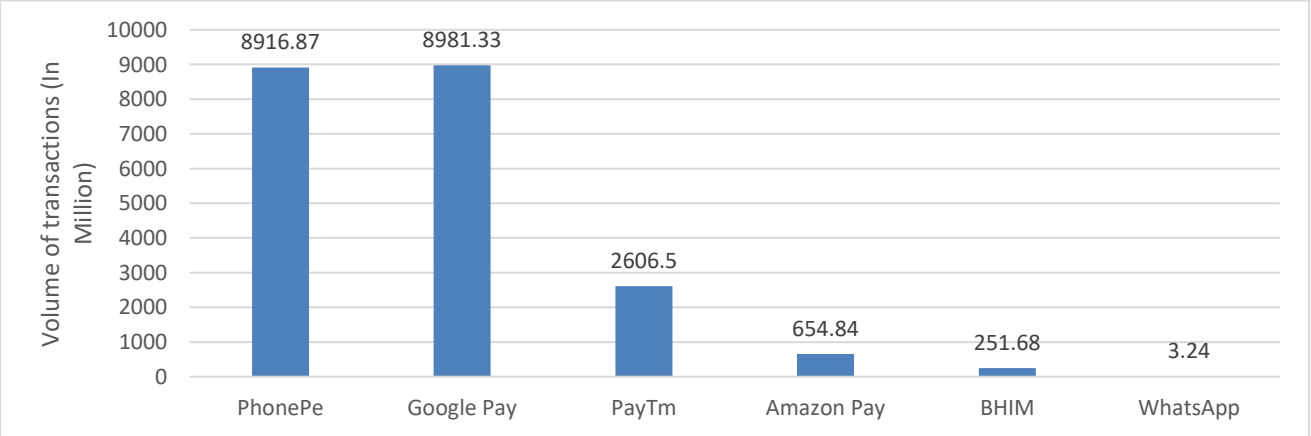


Figure 5. UPI's Transactions Volume through Different Platforms for FY 2020-21
Source: NPCI

Impact of Covid-19 on Digital Payments

Digital payments have seen a significant drop during the public lockdown to control the Covid-19 spread, carrying the economy to a stop and requiring non-essential organizations all through the nation to halt. The data from NPCI shows that UPI transaction volume had declined by about 19 per cent in April 2020 to less than a billion transactions for the first time in several months. Although overall payment volumes have fallen, the supermarket segment, payments at medical stores, has experienced growth, says Praveena Roy, COO, NPCI (Bose, n.d.). During the 100 days of the lockdown between 24th March 2020 and 2nd July 2020, Razorpay (A payment gateway channel) saw spending on online education rise by 23 per cent, medical transactions by 20 per cent, and social commitments like counselling, dating, and marriage websites increase by 32 per cent (The Economic Times, 2020b). The RBI and GOI also emphasized encouraging digital payments to decrease social contacts. With the shutdown, critical goods and services were the only supply chain moving. As noted, there was a significant increase in digital payments in many areas as people stayed away from cash and ATM use because of the risk involved. During this lockdown, Bharat Pe, which provides one QR code for all UPI-based payment apps, recorded twofold growth in offline digital payments through QR codes (ETBFSI, 2020).

India Transact was surveyed to understand the lockdown effect on millennial payment behaviour in India. The study found that approximately 57 per cent of respondents used digital payments five to six times a week, while 21 per cent used them three times a week (The Economic Times, 2020b)**.** The data from NPCI shows that even a pandemic like Covid-19 has minimal effect on UPI payments. From October-March 2020, on average, 1250M exchanges were being done through the UPI platform. In April 2020, when markets were shut because of the lockdown, it tumbled to around 999M exchanges. However, when the market opened, and individuals were acclimated to the new normal, UPI exchanges recorded substantial growth, even higher than before the pandemic. In August 2020, it recorded over 1600M transactions, about 25 per cent higher than in January 2020. The second covid wave in India has had little impact on UPI, with transaction volume falling by 7 per cent between March and May 2021 (NPCI, 2021c).

DISCUSSIONS

UPI has seen rapid growth in the last few years, and it can be attributed to its increased ubiquity, ease of use, and security features. UPI has become the preferred payment method for many users and businesses in India. A renewed version of UPI was launched in 2018 by NPCI with some new features that supposedly aimed to make it more attractive and secure for users. The new additions were intended to increase the user base and satisfy merchant needs. Some of the key features of UPI 2.0 include UPI Mandate with Block Facility in which consumers can pre-authorize a payment and block the funds in their account for a later debit with this option. This can be used when the money is paid later after the service has been obtained; however, the money in the account is withheld immediately. Users have the option to create the payment mandate to be done later. This new advancement benefits both the customer and the merchant. So, UPI shall be useful for several market players, which was not this way possible before. Hotels, e-commerce companies, subscription-based services, healthcare, cab-booking, food delivery services, etc., shall be able to block advance amounts on their customers' cards as protection. Earlier, linking only savings and current accounts was possible in UPI 1.0. In the newer version, the client can connect an overdraft account (OD) if their bank considers the user eligible to take advantage of an OD. P2P and P2M transactions are permitted from a secure OD account. However, for unsecured OD accounts, only P2M transactions are allowed. Merchants could borrow money even though their accounts had a cash deficit.

Thus, the business will not have to stop because of a short-term insolvency issue. In the updated UPI, the focus has been on reducing fraudulent activities. Signed Intent was introduced through which the user can gain additional protection in the form of signed QR/intent while making payment using the intent or scanning QR. With the QR signed, issues relating to QR manipulation and non-verified entities are reduced. It facilitates the client about whether or not the merchant is a certified UPI. This gives added security, as customers will be notified if the QR is not secured. In the case of signed Intent, no app passcode is required, making fast transactions possible. In the last few years, the government has focused on the universal applicability of the UPI payment system to provide ease and convenience to the citizens. It also focuses on its internationalization. There have also been several other developments with regard to UPI, like changes in government laws and specific enablers and inhibitors that affect the growth and development of the UPI payment system.

Internationalization

Another recent development is the internationalization of UPI. The BHIM UPI app has gone global; it was first launched in Bhutan (PIB, 2021), and a pilot demo was introduced in Singapore (ETBFSI, 2019). Things are also underway to link Singapore's Pay Now with UPI by July 2022 (MAS, 2021). To further promote UPI in the global market, NPCI established a wholly-owned subsidiary, NPCI International Payments Limited (NIPL), in April 2020 to promote the RuPay card and UPI globally. NIPL formed multiple alliances with Discover Financial Services (DFS) in the United States, Japan Credit Bureau (JCB) in Japan, Union Pay International (UPI) in China, Royal Monetary Authority (RMA) in Bhutan, and Network for Electronic Transfers (NETS) in Singapore (NPCI, 2021a). NIPL has also collaborated with Singapore-based Liquid Group', a leading cross-border digital payments provider, to facilitate QR-based UPI payments services in 10 countries spanning north and southeast Asia, including South Korea, Malaysia, Thailand, Cambodia, Philippines, Vietnam, Singapore, Hong Kong, Taiwan and Japan (The Times of India, 2021). The cooperation will expand UPI's reach to over 2 million merchants in these nations. To increase its reach in the middle east and Africa, NIPL has partnered with a multinational digital commerce facilitator, 'Network International'(The Economic Times, 2021).

Government Reforms

The government is playing a significant role in UPI by removing fees from UPI transactions and capping the market share of UPI players.

Removing PSP Fees and UPI Charges for Customers

The government has eliminated transaction fees, MDR, and PSP fees. In August 2020, the Central Board of Direct Taxes (CBDT) issued a notification instructing all banks to stop charging for UPI transactions and reimburse any costs collected on or after January 2020 (The Economic Times, 2020a). Previously, banks charged Rs. 2.5 for transactions worth less than Rs. 1,000 and Rs. 5 for transactions worth more than Rs. 1,000 (Razorpay, 2020). From January 1, 2020, the NPCI removed PSP commissions for P2M UPI transactions, terminating one of the PSPs' primary revenue streams.

Though the above reforms are increasing consumer acceptance of UPI, they have resulted in the loss of a significant revenue source for banks and PSPs. The elimination of the PSP charge would make it impossible for businesses such as Google Pay, PhonePe, and Paytm to generate any money on UPI transactions. On average, they earn Rs. 0.30-0.35 for every P2M transaction through PSP fees (ENtrackr, 2020). Third-Party Apps (TPAs), which have been investing millions each year to gain a significant market share in the UPI ecosystem, will not be able to profit from it. TPAs refer to any private application that provides UPI. There is no future revenue model for TPAs in the merchant-based UPI ecosystem.

Although the number of UPI transactions has increased, a free-market model in which market forces decide pricing and charges is better suited for market stability and continued exponential growth. Regulators must encourage rivalry among players while also protecting the interests of customers. Furthermore, a market-driven cost structure enables banks and TPAs to update and maintain their infrastructure to sustain the growing volume of UPI transactions.

Capping the Market Share of UPI Players

The NPCI has set a market cap of 30 per cent for UPI transactions from TPAs from January 2021 (The Hindu, 2020b). UPI services provided directly by banks are free from this restriction. The change is intended to prevent the UPI digital payments system from being overburdened and prevent a few players from monopolizing the digital payments environment. It will also allow new FinTech companies to enter the industry and accelerate creativity by introducing new use cases. This move also prevents emerging players with a substantial market share from the possible challenge of new entrants taking a considerable portion of the UPI transaction market share. However, this change may create some other challenges for probable new users. According to news estimates, there are about 120M unique UPI users (Money Control, 2021) and 696M smartphone users in India as of June 2021 (Statista, 2021a), which means only 17 per cent of smartphone users have been using UPI. Suppose a total number of UPI users be mapped according to Roger's product adopters' model 1962. In that case, UPI has now crossed the early adopters' stage and entered into the early majority stage. For any products/services to succeed, the early adopters and the early majority stages are essential. This rule may affect UPI product satisfaction if users are forced to use any other app against their choice due to the market cap. However, by the deadline of December 2023 for compliance with this rule, top players like PhonePe and Google Pay (Figure 6) are expected to increase their market share by acquiring more and more users to sustain in the market.

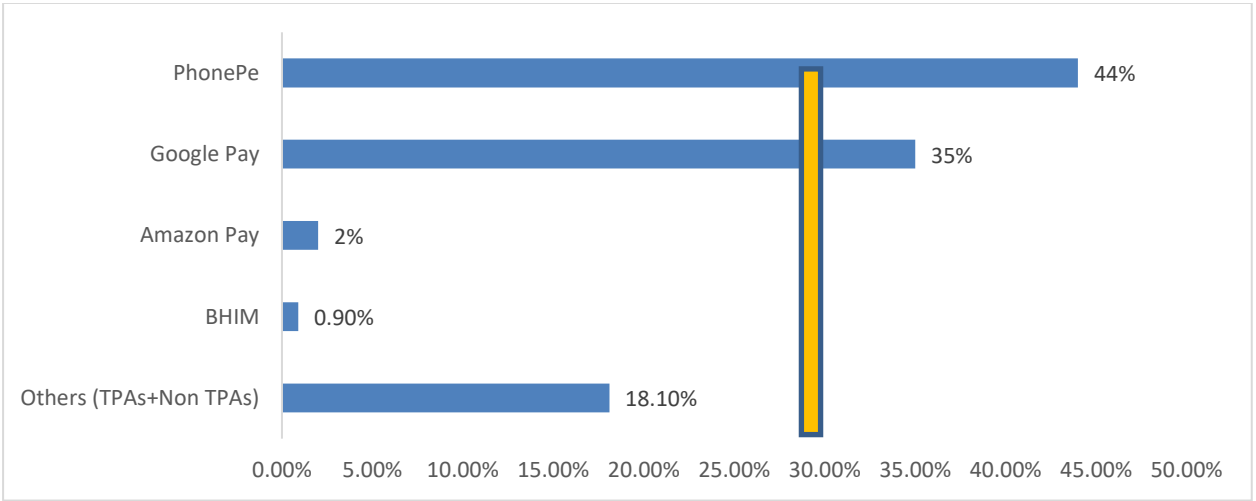


Figure 6. Third-party app market share in UPI transactions (March 2021)

Source: NPCI

Enabling Factors

Smartphone Penetration

With ever-lower data tariffs and increasing smartphone penetration in the country, UPI shall benefit as people use smartphones as their prime device (ASSOCHAM, 2019). As per the joint study (ASSOCHAM-PWC, 2019), the number of smartphone users in the country is projected to double to 859M by 2022 from 468M users, rising at a compound annual growth rate (CAGR) of 12.9 per cent in 2017. The study also points out that non-smartphone ownership in India will decline from 701M in 2017 to 504M in 2022 at a rate of -6.4 per cent as more and more people will prefer smartphones.

Internet Penetration

In its ICUBE 2019 report (Figure 7), Kantar, which monitors digital adoption and use patterns, noted that India's number of internet users has reported annual growth of 24 per cent in 2019 and is estimated at 573M as of 2019. The report predicts a steady increase in the coming years, and internet users in India are expected to reach 900M by 2025**.** The fascinating part of this report is that internet users in urban India have increased by 11 per cent, reaching 264M users in 2019. However, rural India is now driving digital growth, reporting a rise of 45 per cent in internet users over the past year. Another assessment from the government-owned Telecom Regulatory Authority of India (TRAI) indicates that the country's Internet users increased from 795.18M in December 2020 to 825.30M in March 2021 (Business Standard, 2021).

In recent years, increased bandwidth availability and cheap data plans have narrowed the digital gap between urban and rural India. It indicates that the digital revolution is now reaching small towns and remote areas of the country. The internet and, more specifically, mobile internet penetration can be understood by recent data from the Department of Telecommunications (DoT), GOI, which stated that in June 2021, India had one of the highest average internet usages on smartphones in the world, hitting 14 gigabytes (GB) a month (Financial Express, 2021).

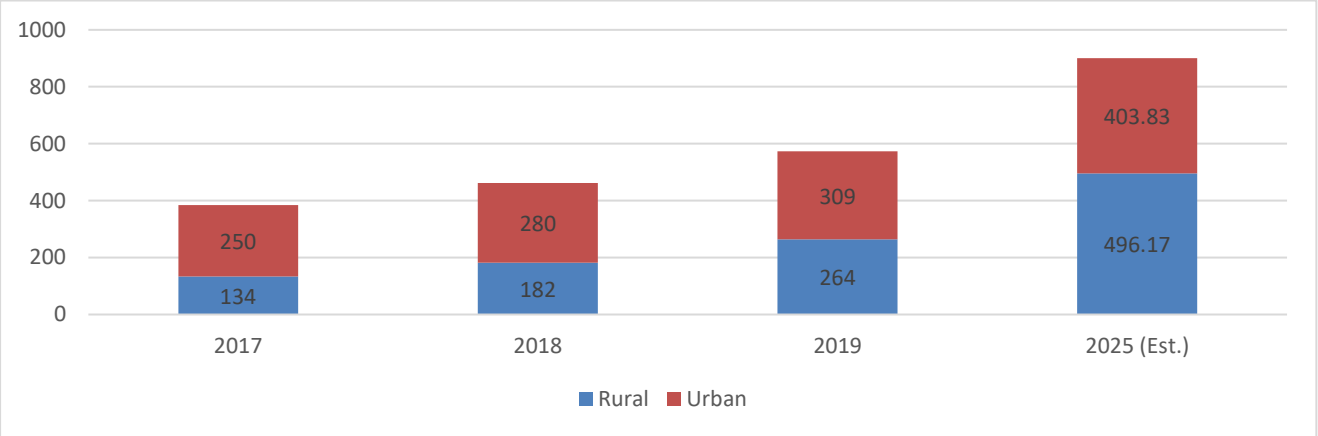


Figure 7. Internet Users in India – Rural and Urban

Source: Kantar

Digital Literacy

GOI has initiated several schemes and programs to increase digital awareness and literacy among the people of India, including The Pradhan Mantri Gramin Digital Saksharta Abhiyaan (PMGDISHA). The Scheme seeks to address the digital divide, targeting the rural population, including the disadvantaged sections of society. The target was to make 60M people digitally literate in rural areas across the country, reaching approximately 40 per cent of rural households by selecting one member from each qualified household by 31 March 2020 (PMGDISHA, 2020). However, As of March 2021, about 40M people have completed their digital training. A new educational channel called "Digi Shala" and a dedicated website named www.cashlessindia.gov.in was also launched to raise awareness about various electronic payments.

Change in Consumer Demographics and Usage Patterns

India, after China, has the world's second-largest population. Due to the significant population growth of the last years, the age distribution remains skewed toward the younger age group. The young Indian consumer, with a median age of 28.4 in 2020 (Figure 8), are tech-savvy and have high digital demand, reflecting the recent growth in digital payments. The 400M millennials born after 1982 constitute India's one-third population and 46 per cent of its workforce (Morgan Stanley, 2020). The Millennials are generally known for their tech-savvy nature (Parment, 2013) and have a significant role in spurring growth. They are young and are the prime earners in many households. Millennials are leading India's smartphone revolution, with 84 per cent of them reliant on mobile broadband and spending an average of 17 hours/per week online (Deloitte, 2017).

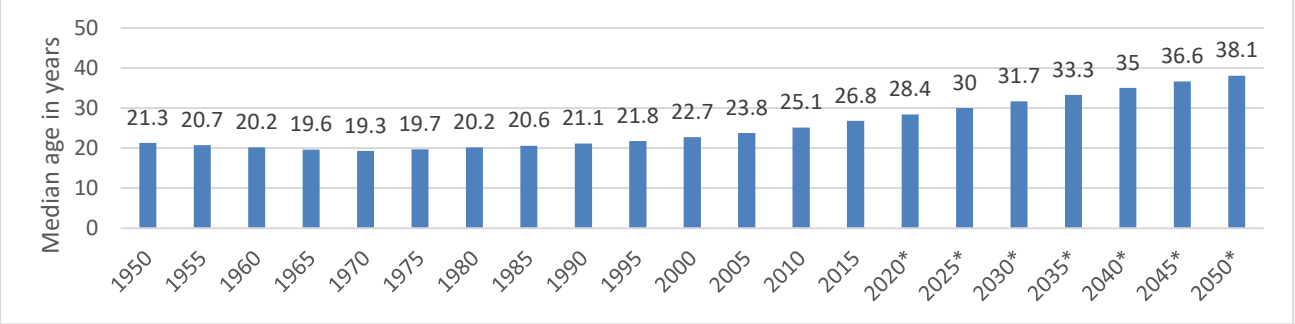


Figure 8. Average Age of Population (India)

Source: Statista

There is also a strong correlation between how long people use their handsets and their usage evolution. The study on the habits of Indian smartphone users indicates that an average user spends more than 90 minutes on online activities, while the advanced segment usage is up to 130 minutes a day (Nielsen, 2018). The changed behaviour has affected the digital payments landscape in the country in recent years.

Challenges

Digital Literacy

The need for digital literacy is crucial in a country as populated and diverse as India (Sane & Biradar, 2021). Using technology, the difference between limited resource availability and vast requirements could be resolved to a large extent. The Standing Committee on Information Technology (SCIT) was formed in 2018-19 to review the National Digital Literacy Mission. The report stated that the government's three digital literacy schemes, named 'National Digital Literacy Mission (NDLM), 'Digital Saksharta Abhiyan' (DISHA), and PMGDISHA, aimed at reaching a total of about 65M individuals. As a proportion of India's population of about 1.2B, all three digital literacy schemes cover a minuscule 1.67 per cent (SCIT, 2019). The scheme states that the requirement to include only one person per household is too restrictive. The major hurdles in implementing digital literacy schemes were a need for more awareness of digital literacy benefits and the required training infrastructure and resources available at several locations in the country. Internet connectivity and language barriers are also major challenges. The Committee also discovered that the government's Digital Literacy programs emphasize numbers rather than training quality or qualitative parameters. (SCIT, 2019).

Transaction Failure

UPI's flagship digital payments platform is struggling on one front; data published by the NPCI reveals a significant rise in transaction failures. In September 2020, the State Bank of India (SBI), which processes the most significant number of UPI transactions, saw failures leap to more than 5 per cent. This figure was 3.8 per cent in August 2020. For private sector banks like Axis Bank, the failure rate is about 1.5 per cent of total transactions in September 2020, compared with 0.6 per cent in August. The number of failed transactions for HDFC Bank has increased to 0.8 per cent from 0.2 per cent during the same time (Money Control, 2020). However, SBI has improved its position; the transaction decline volume now stands at 0.90 per cent of total transactions in March 2021, whereas other public sector banks such as Punjab National Bank, Union Bank, Central Bank of India, and Andhra Bank have transaction failure rates ranging from 1 to 5 per cent (NPCI, 2021b). The main reasons for failure are an increased volume of transactions, connectivity problems, and no response from banks' servers. Addressing this, RBI released a circular on 20 September 2020 on the harmonization of Turnaround Time (TAT) and customer reimbursement in the event of failure of transactions. In case of transaction failure, payment service providers are liable to pay Rs. 100/- per day if the delay is beyond T+1 days in case of funds transfer, whereas the T+5 days rule is applicable in merchant payments (RBI, 2019a). However, the challenge remains almost the same: users need to know where to reach out to get their money. NPCI needs a proper reporting mechanism as such.

Merchant's Infrastructure

Merchant acceptability is critical, and the supplier side must be everywhere. A partial tale will not reduce cash transactions. There are around 20M UPI QR codes in India (Bhalla, 2020); what happens is that the user notices it in one place but not in another. As a result, a consumer still requires the funds, and when cash is available, the consumer prefers no other mode of payment.

Cyber Frauds

A spike in cyber fraud is greater than other forms of bank fraud. The alert notification by RBI to all the banks indicates that fraudsters are now targeting UPI platforms by installing an application to gain unauthorized access to mobile phone users (Business Standard, 2019). Covid has been a significant driver of digital payment use and growth in India, but transaction growth has been followed by the proliferation of payment-focused scams, with an increased number of users being targeted by scammers. There has been a rise in digital fraud during the covid pandemic as people increasingly used digital payment during the nationwide lockdown in India. Cyber fraud increased by about 190 per cent in Delhi during the March 2020 national shutdown; 62 per cent of these complaints were about digital financial fraud (The Print, 2021). Cyber fraud on e-wallet transactions and digital payments has also increased in Mumbai. There was a 70 per cent rise in cybercrime-related complaints from January to May 2020 compared to the same five-month period of the previous year (ETGovernment, 2020). Recent research by YouGov and ACI Worldwide found that consumers in India are more concerned about digital payments fraud and are progressively becoming more cautious when making digital payments than a year ago. 49 per cent of customers are most worried about bogus UPI payment links that request money transfers through text or email. According to the findings, consumers consider NET banking the safest form of payment, followed by UPI (Business wire, 2021).

CONCLUSIONS

UPI enables the day-to-day transactions of an individual by providing the ability to manage personal finances safely and efficiently, transfer funds and purchases and make other transactions electronically. It allows businesses to increase their competitiveness by offering their customers a convenient and safe digital payment mode and thus makes it a coherent and natural choice. Major UPI players are now focused on increasing their merchant tie-ups to capture the market share. Considering different reports and growth patterns, UPI will continue its rapid growth while playing an essential role in digital payment space transformation. The digital payment space has seen tremendous growth, innovation, and regulatory

support over the last few years. The developments have made India one of the fastest-growing nations in digital payments. However, the new regulations, like a 30 per cent market cap on TPA and restricting PSP fees, may impact the balanced growth. The increased transaction failure and cyber fraud must be looked upon. The emphasis should be on keeping the momentum going with more government support with clear policy measures. The focus should be on increasing digital literacy among the masses, especially in rural India, creating digital infrastructure and new use cases for UPI.

Digital payments in India are likely to see robust growth over the next 5 years at a compound annual growth rate (CAGR) of 52 per cent (Mint, 2019). Another research from Crisil shows that digital payments in India can reach Rs. 4055 trillion in FY 2024 with a CAGR of 20 per cent in five years (SabPaisa, 2020). The study also found that UPI payments, with 59 per cent of transactions, would dominate the payment space. The UPI has been one of the most significant fintech innovations that transformed the Indian digital payment market. If this momentum continues, UPI will permanently overtake cards and internet banking to become the most popular payment app. Unlike before, Indian consumers have become more comfortable using UPI, and increased consumer trust would increase high-value transactions through UPI. The adoption may also rise in Tier 3 and Tier 4 cities. NPCI, the parent organization for UPI, is also considering the following advancements to push UPI in the digital space:

Near-Field Communication (NFC)

NPCI focuses on increasing the UPI footprint in the retail segment by incorporating an NFC facility in the UPI payment system. Although mobile-based NFC payments are available worldwide, it was just recently launched in India. Several private players, including Samsung pay, Google Pay, ICICI, and Paytm have started providing mobile-based NFC payment services in India (Firstpost, 2020; Mint, 2022). NPCI is reportedly planning to launch this feature on a larger scale, enabling consumers to make contactless payments from their preferred UPI app to the point of sale (PoS) device. The corporation is talking with payment aggregators to incorporate this technology into the PoS devices. It would result in a multi-fold increase in merchant payments through UPI, further developing the overall payment market.

Credit on UPI

Credit facility on UPI can be the next big thing. As of now, there is no way to get credit through UPI. The credit availing system based on a UPI will help increase P2P and P2PM transactions regardless of the amount of money in the account. A credit cap can be set up to the credit limit of UPI for verified users and merchants. It will help businesses and vendors who engage in large payments as it helps in using UPI credit for making payments without having a load on their working capital.

Cash Withdrawal

Apart from merchant payments and direct transfers, customers will have the option to utilize UPI for cash withdrawals. In collaboration with Mumbai-based payment firm AGS Transact Technology, the public sector bank 'Bank of India' has already launched this service for its clients. The NPCI is now exploring the feasibility of this new development and may quickly open up interoperability, enabling a new UPI usage case. As of now, this service can only be accessed by the bank's clients, but if interoperability is opened up, this will also help other bank customers. Interoperability allows clients to borrow money from any bank ATM.

Author Contributions: Conceptualization, A.K. and R.K.C.; Methodology, A.K., S.K.M. and R.B.; Software, R.B.; Validation, S.K.M. and S.K.K.; Formal Analysis, A.K. and R.K.C.; Investigation, A.K. and R.K.C.; Resources, R.B.; Data Curation, A.K.; Writing – Original Draft Preparation, A.K. and R.K.C.; Writing – Review & Editing, S.K.M. and S.K.K.; Visualization, A.K. and S.K.M.; Supervision, S.K.M.; Project Administration, S.K.M., S.K.K. and R.B.; Funding Acquisition, A.K. and R.K.C. Authors have read and agreed to the published version of the manuscript.
Institutional Review Board Statement: Ethical review and approval were waived for this study because the research does not deal with vulnerable groups or sensitive issues.
Funding: The authors received no direct funding for this research.
Acknowledgements: Not applicable.
Informed Consent Statement: Not applicable.
Data Availability Statement: The data presented in this study are publicly available, and all the sources are mentioned in the manuscript.
Conflicts of Interest: The authors declare no conflict of interest.

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