

UPI (Integrated Payment Interface) - New Technology of a Digital Payment: A Searching Study

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Abstract: India witnessed a unique Launchpad for digital payment acceptance via demonetization. Huge emphasis is laid by the Government's reforms after demonetization on cashless transactions. The effect of demonetization is that there is a phenomenal surge in digital money payments. Digital Payment Electronic Payment system was not born now from 1980's, since the I did not see any new technology came and became more popular than other for electronic on line payment Lets define them. In this paper the authors have studied the UPI- Unified Payment Interface method of Digital Payment here will discuss its Architecture, Technologies Concept, Operations and Parties involved in using it; also discussed about its Benefits & Challenges and Different existing UPI Apps.

Index Terms: UPI, NPCI, BHIM GPAY, PHONEPAY, TECHENOLOGY

I. INTRODUCTION

India is moving quickly in the direction of digitization. India's digital payment options have greatly expanded since Prime Minister Mr. Narendra Modi's announcement of demonetization on November 8, 2016. Therefore, the digital payment companies seize the opportunity to increase their market share. Demonetization has given Indian consumers a unique opportunity to accept digital payments in place of cash.

As part of government reforms following demonetization, Prime Minister Mr. Narendra Modi has vigorously promoted the adoption of cashless transactions. The ramifications of demonetization have led to a remarkable surge in digital payments. In 2018, the number of digital payment services increased by 115 US dollars, according to a report produced by IAMAI Media.

Many service providers are driving the shift from a cash economy to a cashless one and the expansion of digital payments. These providers include mobile internet access, non-bank financial institutions that enable digital payments, one-touch payments, the growth of the financial technology industry, and government initiatives such as tax breaks or incentives. All of these elements are creating an environment that is favorable to the growth of digital payments in India.

India's adoption of digital payment options has grown rapidly over the past ten years. Digital payments have emerged in tandem with the rise in Internet usage. The payment method initially changed from traditional to electronic, using credit and debit cards, e-banking, and finally mobile payment technologies.

With government support, digital payments are also entering a growing stage. The Indian government's "Digital India-Power to Empower" campaign aims to promote cashless transactions following demonetization.

The Expansion of Cashless India or Digital India is majorly based on four factors:

Cash is costly: Although using cash is thought to have a number of advantages, including immediate settlement, relative anonymity, and the sense of security that comes with having tangible assets, there are also a number of hidden and unstated costs involved.

Technological advancement: To provide reliable, safe, and practical payment solutions, technology has been developing quickly. This makes it possible to quickly provide payment services to sizable portions of the populace.

Economical: Form services can be provided at reduced prices, with more scalability and accessibility thanks to digital payments. In turn, this promotes financial inclusion and economic growth.

Government initiatives: The government has taken steps to foster an environment that is more conducive to the expansion and wider use of digital payments.

II. DIFFERENT DIGITAL PAYMENT STYLE IN INDIA

Prepaid credit cards

- Preloaded into a person's bank account. Similar to a gift card, customers can use the money on the card to make purchases rather than bank credit that they have borrowed and can be refilled up to a specified limit, just like a cell phone.

Debit/RuPay cards

- These are connected to a person's bank account.
- It can be used for e-commerce purchases, online wallets, micro-ATMs, stores, and ATMs.
- In India, debit cards have surpassed credit cards. In December 2015, there were 22.75 million credit cards and over 630 million debit cards.

AEPS

- The twelve-digit unique Aadhar Identification Number is used by the Aadhar card enabled payment system to enable bank-to-bank transactions at PoS.
- AEPS services include Aadhaar to Aadhaar fund transfers, cash withdrawals, cash deposits, and balance inquiries.

Online or mobile wallets

- Online wallets are accessed through smartphone apps and the internet.
- Debit, credit, or net banking can be used to recharge funds on the app.
- The monthly wallet limit for consumers is US\$311 (Rs 20,000) or US\$1,554 (Rs 100,000) following KYC. After self-declaration, the merchant wallet limit is US\$777 (Rs 50,000) per month; following KYC verification, it is US\$1,554 (Rs 100,000).
- Enables peer-to-peer money transfers

USSD

- Denotes Unstructured Supplementary Services Mobile banking using data.

- Connected to a merchant's bank account and used to make daily payments to customers up to US\$77.68 (Rs 5,000) via a GSM-enabled mobile phone.

UPI

- It is anticipated that the United Payments Interface (UPI) will be a system that enables numerous bank accounts on a single mobile application platform (of any participating bank).
- It combines several banking functions and guarantees smooth merchant payments and fund routing.
- It makes peer-to-peer money transfers easier.

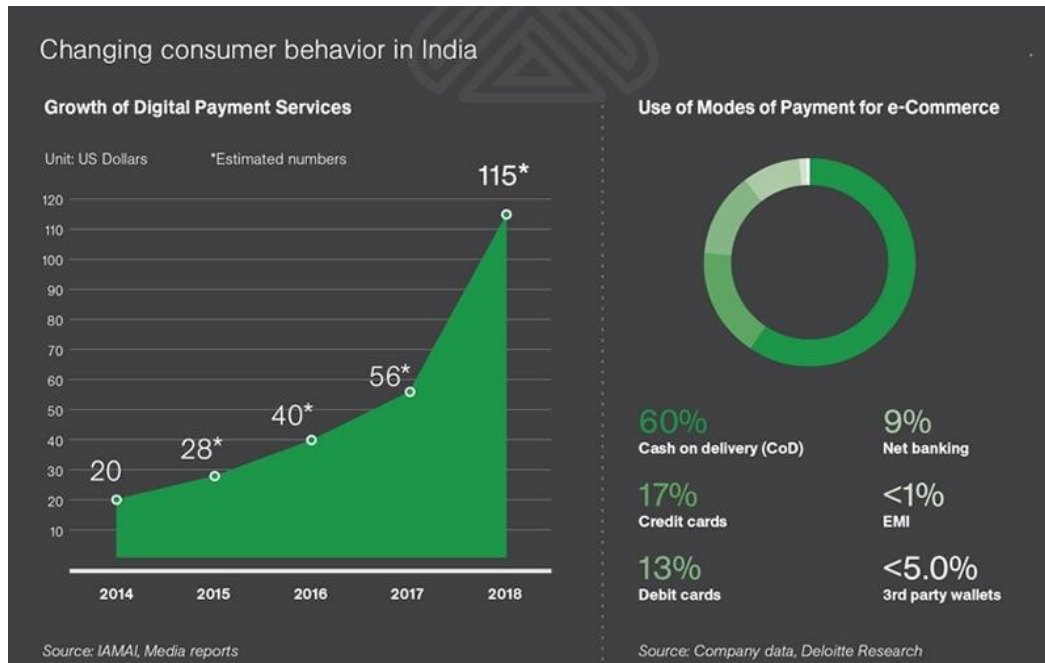


Figure 1: Source: <https://www.india-briefing.com/news/growth-of-digital-payments-systems-in-india14797.html/>

III. INTRODUCTION OF UPI (UNIFIED PAYMENT INTERFACE):

The Unified Payment Interface (UPI) was introduced as Users can send and receive money using a Virtual Payment Address (VPA) via the Unified Payments Interface (UPI), a digital payment system. The client's bank account will be immediately credited with the funds. It's a system that combines various banking functions, smooth fund transfers, and merchant payments into a single mobile application (of any participating bank). Additionally, it handles "Peer to Peer" collect requests, which can be scheduled and paid for according to convenience and need.

Uniqueness of UPI than other digital payment methods:

- Quickly accessible funds via smartphone at any time of day and night, including every hour on the minute throughout all year.
- Single mobile application for accessing different bank accounts.
- A simple two-factor authentication method aligns with regulations while offering an exceptionally secure feature: effortless single-click payments.

- The virtual address offered by Pull & Push ensures enhanced security without customers needing to disclose sensitive information like card numbers, account codes, or IFSCs.
- Bill Sharing with friends.
- Easiest solution for managing COD issues involves using ATMs instead of cash delivery or ensuring precise payment amounts.
- Merchant Payment with Single Application or In-App Payments.
- Payment methods include Utility Bills, Cash Transactions, Barcodes for Scan-and-Pay systems.
- Donations, Collections, Disbursements Scalable.
- Raising Complaint from Mobile App directly.

Players involved in UPI

- Customer PSP (Payment system Player)
- Payee PSP
- Remitter Bank
- Beneficiary Bank
- NPCI
- Bank Account holders
- Merchants

Advantages of UPI Benefits for banks:

- Single click Two Factor authentication
- Universal Application for transaction
- Leveraging existing infrastructure
- Safer, Secured and Innovative
- Payment basis Single/ Unique Identifier
- Enable seamless merchant transactions

Benefits for end Customers:

- Round the clock availability
- Single Application for accessing different bank accounts
- The utilization of virtual IDs enhances security by preventing credential duplication.
- Single click authentication

Benefits for Merchants:

- Seamless fund collection from customers - single identifiers
- There is no danger associated with keeping customer email addresses on cards.
- Tap customers not having credit/debit cards
- Suitable for e-Com & m-Com transaction
- Resolves the COD collection problem
- Click on Single Click 2 Factor Authentication option for customer's effortless access.
- In-App Payments (IAP)

Different Transaction done through UPI:

PULL Requesting money:

- User logs in to his banks UPI application
- Upon completing the authentication process successfully, users choose to request funds by selecting this feature.
- The user inputs their virtual ID for remittances/payments, specifies an amount, and indicates which account should receive credit.
- The user views their transaction information before confirming it by clicking "confirm."
- Upon receiving an authorization request, the recipient's device shall be notified via SMS.
- The payer taps on their device's alert system then launches their Unified Payments Interface application within it for examining an incoming transaction request.
- The payer subsequently opts between accepting or declining the action.
- If you approve the funds transfer, the payee must provide their unique PayUMoney security code for authorization.
- The payment is now finalized; either a success message or an error indicating refusal will be delivered to the payer.
- The recipient/receiver receives an email/short message service alert regarding their bank's deposit in their account.

PUSH sending money using virtual address

- User logs in to UPI application
- Upon successfully logging in, users choose between sending money/payment options.
- The user inputs their Payee's/ID.
- The user views their transaction information before confirming it by clicking "Confirm".
- User now enters UPI PIN
- User gets successful or failure message

Different Apps used UPI Feature in India:

PhonePe	Paytm	BHIM app	MobiKwik
Airtel Payments Bank	Google Tez	Uber	Chillr
SBI Pay	iMobile	Axis Pay	BOB UPI

PhonePe

Many widely used mobile wallets enabling transactions via the Unified Payments Interface. It ranks high as one of the favored applications for UPI technology. Inception occurred in 2015, driven by financial support provided by Yes Bank.

Paytm

The firm behind this mobile payment application now works alongside the UPI system for users to conduct transactions more efficiently. Users may deposit funds in their Paytm accounts using an UPI identifier. In addition to alternative payment methods like credit/debit cards and online banking, various alternatives exist including checks, cash, mobile wallets, and more. UPI belongs alongside others in this group. Individuals may make payment requests using their Unified Payments Interface on the Paytm platform for collection purposes.

Upon receiving the payment funds are deposited into the recipient's Paytm account.

BHIM app

A new money transfer tool called BHIM was created by NCPI. Its intuitive design is both simple yet highly secure, offering an easy-to-use experience. The software includes every necessary function. Transfers of funds may begin via Virtual Payment Authorization (VPA), Quick Response Code transactions, or by providing your bank's account number along with an Indian Financial Services Central Bureau Identification Number (IFSC) code.

MobiKwik

The Indian payment system incorporated into the Unified Payments Interface framework. Any user of Mobikwik has access to Unified Payments Interface for making deposits in their account. Previously offered were multiple types of service including credit/debit card transactions for funds transfers, online banking via internet access, pick-up of cash at designated locations, and deposits into accounts through physical means. A wallet for electronic payments collaborates closely with numerous online retailers.

Airtel payment bank

This payment app has also integrated with the UPI system to allow trouble-free digital payments through its app. The app will enable users to create VPAS and link their bank accounts. The main advantage of this payment bank is that payment can be made both offline and online.

Google Tez

This app has been launched by Google. It is also used many times by separate users to perform UPI function. This app is available in many Indian languages like Telugu, Tamil, Marathi, Kannada, Gujarati, Bengali and Hindi.

Uber

Now, Uber has included UPI as one of the methods of payment. You can pay for your Uber ride with this interface.

Chiller

This payment app has made UPI available as one of its payment methods. This app was providing fund transfer facility through IMPS before joining UPI Band-wagon.

SBI pay

It is a State Bank of India (SBI) app especially designed for UPI requirements. The main advantage of this app is that even those who do not have an account with SBI, they can use the app to send and receive money using VPA. It is very simple to use the app and can easily register for service after downloading any application.

iMobile

The UPI interface can be used through the IMOBLE and Pockets app introduced by ICICI Bank. The app can be downloaded from Google Play Store. To send money through this app, you have to go to the 'Funds Transfer' option and click on the UPI method.

Axis pay

Axis Bank is one of the other banks that have launched a UPI competent platform for their customers. It comes with a very user friendly interface and various other features.

Bob UP

The Bob UPI app has been launched by Bank of Baroda and can be downloaded from Google Play Store. One of the benefits of this app is that it provides some additional FEA to customers.

A report generated by India in 2017 has shown that about 74 crore debit and credit cards are being used, while about half a billion populations is using the Internet, 102 crore mobile phones, 110 crore mangoes and more than 20 crore public wealth accounts, so the complete ecosystem has already been placed to use digital payments. The number of digital financial transactions made through Unified Payments Interface (UPI) and unaccredited supplementary service data (USSD) mode has increased by 3,574 percent and 10,603 percent respectively as of 18 January 2017.

Comparison table of Transaction value of Different Electronic Payment System up to March 2108

Electronic Payment Systems - Representative Data (Updated as on March 06, 2018)							
<i>Value in Rs. billion</i>							
Data for the period	RTGS	NEFT	UPI*	USSD**	Debit and Credit Cards at POS	Mobile Banking	Total
	value	value	value	value (in Rs. thousand)	value	value	value
Nov-16	78479.2	8807.8	0.9	7302.6	352.4	1244.9	96187.8
Dec-16	84096.5	11537.6	7.0	103718.4	522.2	1365.9	201247.6
Jan-17	77486.1	11355.1	16.6	381760.2	481.2	1206.7	472305.9
Feb-17	74218.8	10877.9	19.0	357055.2	391.5	1080.0	443642.4
Mar-17	123375.8	16294.5	23.9	337962.4	416.2	1499.9	479572.8
Apr-17	88512.2	12156.2	22.0	301650.5	431.4	1443.8	404215.9
May-17	90170.5	12410.8	27.7	316723.7	450.8	1940.7	421724.2
Jun-17	92812.6	12694.2	30.7	313277.0	468.2	1584.7	420867.4

Jul-17	87149.3	12011.6	33.8	302097.8	439.3	1019.2	402751.0
Aug-17	89163.4	12500.4	41.3	294239.4	457.1	1033.0	397434.5
Sep-17	102348.1	14182.1	52.9	323578.5	478.2	1121.6	441761.5
Oct-17	92056.1	13851.3	70.3	299071.8	530.5	1168.7	406748.7
Nov-17	98410.5	13884.0	96.4	287309.6	483.3	848.4	401032.2
Dec-17	100907.8	15779.2	131.4	299367.3	528.7	921.5	417635.9
Jan-18	107488.4	15374.1	155.4	290020.0	521.9	928.7	414488.5
Feb-2018 Total	91765.6	14843.9	191.0	270260.0	465.9	945.0	378471.4

Table :1 ** Source: http://rbidocs.rbi.org.in/rdocs/content/docs/ELECT07022016_A.xls (NPCI reports)

The Table shows the increasing ratio in the transaction of the UPI method with the increasing time. This means that with an increase in the use of UPI apps, the price and quantity transaction also increases. However, the UPI method is still not used often with the overall analysis of the above table from the electronic payment system or is not used in large amounts or value transactions. The UPI method of digital transactions can be considered in the introductory phase from the consumer point of view.

Benefits of UPI:

- Quick transaction occurs i.e. transaction is done on a touch technique.
- 24*7 available for transaction or payment disposal.
- Provide both sender and receiver safe, protected and convenient environment.
- Gives banks a universal platform to transact.
- Use individual mobile phones as a main tool for all transactions.
- Various discounts, offers and cash back schemes are also available for customers on each transaction.

UPI's challenges:

- Both sides wishing to transact the transaction with their UPI -ID or registered mobile no. in their bank account.
- Grievance redressal in case of transaction failure is difficult for the customer.
- UPI app is not software compatible. Currently, it is only working on the Android operating system.
- After demonetisation, Indian citizens make more changes towards digital payments, i.e. e-banking, M-banking etc. Therefore, it takes time for the customer to move towards UPI transactions because technology is not very well known by them.
- Only one or two apps (eg Paytm, PhonePe) are the most popular among urban population citizens, rural areas are still not aware of this current technology.

IV. CONCLUSION

The UPI developed an M-payment technique by facilitating the mobile phone used as the main payment device to pay and accept the payment. Unlike all payment systems, it can be said that UPI is the most advanced payment system in the world. With its API set of standard, UPI is allowed to match each other for diverse banks and allows interpretation between dysmiler bank payment systems. There is no mediator in the card network in UPI, which allows for low transactions cost and quick disposal and also takes days to complete the transaction and disposal process, where UPI pays in seconds. However, each emerging technology has some limitations and challenges. To improve UPI technologies participation and use, banks and government also take initiative.

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