

A STUDY ON UPI (UNIFIED PAYMENTS INTERFACE)

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Abstract

UPI is a unique digital payment solution that addresses various pain points of Indian users. It provides Real time instant payment from one bank to another bank account with simple and easy to use applications. In this research paper we have discussed how this payment system came into existence, why it is successful, it's possible strengths and weaknesses, possible opportunities and possible solutions to various challenges.

This current review is useful for scholars, students and various institutions, including those seeking to have a more balanced understanding regarding this emerging form of digital payments.

KEYWORDS

United Payment Interface (UPI), Reserve Bank of India (RBI), NPCI, NIPL, Digital Payments, Debit/Credit Card, Swift Payment, MDR, Business decline (BD), Technical Decline(TD), Startups

1. INTRODUCTION

India is transforming its banking sector and adopting innovative solutions which increase the use of non-cash methods of payment. NPCI is a subsidiary set up by the government that

manages and employs innovative payment solutions in the country. One of the main products of NPCI is the United Payment Interface(UPI), which is a fast and secure digital payment service that allows users to perform a variety of transactions using mobile devices, mainly smartphones. UPI is a simple service as it requires a few steps for initiating a transaction. Anyone who has a savings bank account or current bank account (for merchants) linked with their mobile numbers, can register themselves via any UPI application like Google pay, Paytm, PhonePe etc.

Users are assigned their unique virtual payment address (VPA) by the application/service provider/affiliated banks, through which they can send or receive money. VPA also commonly known as UPI Id, do not require users to enter any additional information like account number, IFSC code, CVV details etc. This makes UPI a unique and transformational digital payment solution whose success has the potential to inspire the world. We will further

2. OBJECTIVES

This study aims to research the role and importance of UPI in modern-day transactions and economic systems. How the system currently works and how it can be used. Here, we will try to assess the major reasons for its success, its scope, opportunities and challenges of this system. Also possible suggestions and practical solutions to improve the service. Another aim of this research is to enrich the current literature, which is very much unexplored in the area of research and have tremendous future possibilities.

3. BACKGROUND

Globally countries are operating with limited options available for doing day-to-day or Peer-to-Peer(P2P) or Peer-to-Merchant(P2M) transactions. Moreover, there has been limited or no innovation in the banking sector which may promote the use of digital technology and ultimately decrease dependence on cash-based transactions. So broadly, Payments can either be done through traditional modes like cash or barter system or through debit/credit cards, cheques or through some old banking facilities. Modern Innovation is limited to electronic wallets, bank transfers or other forms of electronic fund transfer which are either not acceptable to the masses or require complicated registrations and processes.

India has built one exception to this list. National Payments Corporation of India (NPCI) is an initiative of the Reserve Bank of India (RBI) and the Indian Banks' Association (IBA) under payment and settlement infrastructure” in India. It serves as an umbrella organization for operating retail payments and settlement systems in India and brings uniformity to its operations.

Initially, NPCI was limited to certain tasks assigned by RBI. But later on RBI concluded that promoting a safe, inclusive, accessible, interoperable and authorized payment system will not only help the Indian government to fight against corruption and black money but will also help India in developing a favourable business environment for both Indian as well as international companies. Promoting cashless transactions will also help RBI to promote its

Later on, RBI guided NPCI to create more creative solutions for addressing different pain points of customers. Which led to the creation of many solutions like RuPay, UPI, BHIM, E-Rupi, Fast Tag etc. For instance, the Government (2014) launched a scheme called “Pradhan of all households in the country. The plan envisages universal access to banking facilities with at least one basic banking account for every household, financial literacy, and access to credit, insurance and pension facilities. NPCI has issued more than 620 million Ru-Pay cards for such account holders. UPI uses the same expanded network of bank accounts created by NPCI and from other banking firms.

On April 11th, 2016, UPI had 21 member banks and was introduced by Dr Raghuram G. Rajan, Governor of the Reserve Bank of India in Mumbai. A rising number of banks began publishing their UPI-enabled applications to the Google Play/Apple app store as of August 25th, 2016. To date (2022), UPI has become one of the most significant innovations that were applauded globally and have received mass success. Most importantly it played an important factor as a catalyst which amplified the wave of digital evolution in the country. Almost every major bank and payment platform uses this payment method.

4. United Payment Interface(UPI)

Unified Payments Interface (UPI) is a digital payments gateway system that powers multiple bank accounts into a single mobile application (of any participating bank), merging several banking features, seamless fund routing & merchant payments into one hood. Further, it also requirement and convenience. One of the most powerful features of the Unified Payments Interface is that it provides immediate money transfer through mobile devices round the clock 24*7 and 365 days. A single mobile application can access different bank accounts, which can be used for paying Utility Bill Payments, Over Counter Payments, and QR Code (Scan and pay) based payments among others. The introduction of QR scanning for making digital payments has also contributed to increasing the number of digital payments over the last few years because of the added ease and flexibility.

It can be used for a variety of purposes such as raising donations, collection of payments and Disbursements, utility bill payments, over-the-counter payments, QR code (scan and pay) based payments, Merchant payment with a single application, for in-app payments etc. Apart from that it also proves to be a great alternative for Cash on Delivery payment options.

4.1 KEY FACTS

1. There are over 26 crore unique users and 5 crore merchants on UPI platforms
2. UPI transactions jumped from .09 million transactions worth Rs. 3.09 crores in August 2016 to 6,579.63 million transactions worth Rs. 10,72,792.68 Crores in August 2022.
3. Out of total transactions (by value) in Aug '22, P2P transactions were 77.68% while P2M were only 22.32% of total value. Both segments were dominated by transactions valued above Rs. 2000.
4. There were 21 banks affiliated with upi services initially in April 2016 which have now increased to 346 banks.
account for more than 90% market share.
5. UPI is accepted by over 12 nations including Singapore, Bhutan, Maldives, UAE, France, Nepal etc. through collaborations, in the form of pilot projects etc.
6. UPI is an Open Application Programming Interface that can be used by Any registered Payment Service Provider(PSP) that promotes the use of this service.

	P2P		P2M	
	Value (in Crores)	Value (%)	Value (in Crores)	Value (%)
0-500	29,471.87	3.53	34,124.57	14.24
500-2000	84,152.01	10.10	42,050.38	17.56
Above 2000	7,19,746.98	86.37	1,63,246.86	68.28
Total (Volume)	8,33,370.86	77.68	2,39,421.82	22.32

4. UPI transactions (by volume) in Aug '22 were equal for P2P and P2M Segments.

	P2P		P2M	
	Volume (in Mn)	Volume (%)	Volume (in Mn)	Volume (%)
0-500	1,882.67	57.24	2,695.27	81.91
500-2000	691.80	21.03	414.15	12.59
Above 2000	714.79	21.73	180.95	5.50
Total (Volume)	3,289.26	49.99	3,290.37	50.01

4.2 SUCCESS FACTORS

Some of the major factors responsible for its success are as follows :-

1. **Convenience:-** There is no need to remember any details like account number, IFSC codes or any other details. Users just need a mobile number attached to the receiver's download multiple apps as it works across platforms. It is therefore easy, rapid and frictionless.
2. **Execution:-** Faster execution of UPI was another important factor. NPCI successfully Marketed UPI and its possible benefits to the general public. Combined with the booming startup wave in India, it was also perceived as an opportunity for new-age businesses or startups to either build a business around Digital payments or integrate and expand their current businesses with this service. This led many companies to come up with their own UPI app services like Jio Pay, Amazon Pay, Google Pay etc.
3. **Demonetisation:-** On 8th Nov. 2016, just 6 months after the launch of UPI, the Indian from public circulation. This move influenced many Indians to look for alternatives to

cash and thus UPI saw a major jump in registered users and transactions both in terms November 2016 to 1.99 million transactions worth 707.93 crores in December 2016. Later on, there was a multifold increase in UPI transactions such that by March'17

4. Security:- Since the whole initiative was backed by the central bank of India (RBI). The general public was assured about security regarding transactions and was free from any fear of potential scams or problems regarding privacy or data leakage

5. The Jio Factor:- On 5th Sept 16, Reliance Jio Info COMM, backed by one of the wealthiest businessmen of India Shri Mukesh Ambani who is also MD of Reliance Industries, commercially launched its 4G services in India. Although India had many Existing telecom players providing 4G to customers Jio shockingly offered free 4G mobile data and voice services unit 31st March 2017 and even after that they brought a digital revolution where the price for 4G data was so competitive and affordable that Indians have increased their average per capita data consumption (per month) by 100 times from just 154Mb (before the launch of Jio) to 15.8GB (in 2022). This factor enabled Indian youth and the working class to explore and use different digital services. This factor coupled with demonetization transformed the digital payment sector of India of course majority of which benefitted UPI.

6. Consistent Interaction:- Even if any user is operating different mobile payment platforms, UPI service will work consistently and uniformly across devices. Even the UPI Pin is the same regardless of the UPI PSP app.

5.0 SWOT ANALYSIS

Here, we will discuss possible strengths , weaknesses of UPI and possible opportunities and challenges.

5.1 STRENGTHS

A. IDEAL DIGITAL PAYMENT SYSTEM

UPI is a complete system if we consider these factors such as: -

- a) Unique and innovative way of doing digital transactions with zero charges
- b) Whole process is fast as it shortens various unnecessary steps like entering a bank account number and various other banking details.
- c) Since it is backed by the RBI, which is the sole banking regulator of India, it makes the whole process not only reliable but secure too.
- d) It is interoperable which means that it can be used easily among different platforms and for different applications.

B. Digital financial inclusion

pyramid. Since UPI service has no minimum transaction limit and zero charges, it enables every individual from all sections of society to use this service.

C. WIDE ACCEPTANCE

- a) Upi is accepted across various digital platforms and applications like Gpay, PayTm, PhonePe etc. and has numerous uses, like payment of - electricity/telephone/water bills , food/cab delivery services etc.. and for other forms of payments.
- b) Also, availability of a wide digital infrastructure setup in forms of QR codes, it is a widely accepted medium of payment.

D. TRANSPARENCY

Digital transactions reduce cash dependence and help the country to limit its parallel economy. Even digital transactions helps government and other agencies to track income records of a particular person/party/organization and thus helps in lessening corruption and tax evasions.

E. ACCOUNTING EXPENDITURE & proper financial planning

Digital transactions reduce accounting expenditure of merchants, businesses and government organizations as now rather than working on rough estimates or expensive softwares, they can easily get accurate estimates and finally it will enable them to do proper financial planning.

F. DIGITAL ECONOMY

Upi will fasten India's need for a digital economy as it encourages various digital economic activities.

G. SELF RELIANCE (INDIGINEOUS PAYMENT SYSTEM)

Due to the availability and success of indigenous payment system , India is not dependent upon major American MNC's like VISA, Mastercard etc.

It also provides a full proof alternative for future economic sanctions or restrictions if imposed by Foreign Countries or Organizations.

H. FAVORABLE GOVT POLICIES AND INFRASTRUCTURE

- a) Indian government developed infrastructure by distributing Millions of RUPAY debit cards with many lucrative benefits to the general public at zero costs and then followed by introducing UPI service so that they can be included in the digital economy.
- b) Also government policies and initiatives like Digital India, Startup India, Bharat-Net etc. played an important role.

I. GROWTH OF BUSINESSES

Upi revolutionized Indian business environment

- a) Use of upi and digital payments led to growth in the ecosystem that revolves around digital infrastructure such as digital payment solutions, payment service providing companies like paytm etc., cloud storage and server-based businesses etc..
- b) upi is a fast , hassle free and secure payment system due to which it is preferred by merchants and MSME businesses. This system helps them to grow and remotely transfer money 24*7*365 days to anyone at any point of time.

J. SUPPORTING BANKING SECTOR

UPI is based on digital transfer of money among bank accounts. So contrary to the old cash-

based payment system, money resides with banks and hence their lending capacity also increases manifolds.

K. PAY & COLLECT

Users may "pay" (push) and "collect" (pull) money from others using their mobile devices. Even they can set up various recurring payment up to Rs..2000 through UPI Autopay

L. MULTIPLE PAYMENT OPTIONS

Payments can be made using a variety of identifiers, including a Virtual Payment Address (VPA), a bank account number, a 12-digit AADHAR number issued by the Unique Identification Authority of India (UIDAI), or the Indian Financial System Code (IFSC). Other options include payment through QR codes and BHIM Interface. UPI payment can also be done without any need of smartphones, UPI 123 Pay is a service that enables 400 million feature phones to transfer payment through two factor authentication protocol.

5.2 WEAKNESS

A. Barriers

There are mainly two barriers of entry in the UPI ecosystem namely requirement of having mobile phones to operate and initiate transactions and owning a bank account.

B. BUSINESS DECLINE(BD)

UPI has a high rate of BD, which refers to transactions that may be declined for a variety of reasons, including exceeding transaction limits per day in terms of value or volume, invalid beneficiary account entries by the client, invalid pin entries, or other business reasons. Top 50 remitter banks (Aug '22) have an average BD of around 8.49% which accounts for more 486 million transactions in total.

C. Technical Decline (TD)

TD are transactions that are declined due to some technical reasons, such as unavailability of systems and network issues on the bank or NPCI side. Top 50 remitter banks have an average of 2.84 % of TD which accounts for the decline of more than 99.6 million transactions in total.

D. Transaction Limit

There can be 20 daily UPI transactions with a daily limit of 1,00,000 rupees. Which restricts its operation in high volume businesses and organizations.

E. Unsustainable Economic model

UPI service is considered as a tool for public service and acts as a not for profit government model and thus it does not levy any charges on transactions. Therefore, to support the whole banking ecosystem, the government directly pays Merchant Discount Rate (MDR) and other charges to NPCI who further compensate it to concerned banks and organization's. As per RBI MDR for debit cards is around an average of 0.25% and for this government has allocated 1500 crore rupees for the current Financial Year. So as the value of transactions will

increase, losses incurred by the government will multifold.

F. Scams

illiterate or unaware customers can be scammed through UPI in numerous ways such as clicking unverified sms/email links , sharing of sensitive information like mobile OTP, UPI ID passcode or PIN etc.

5.3 Opportunities

A. International acceptance

NPCI International Payment Limited (NIPL) have partnered with multiple nations including Nepal, Bhutan, France, UAE, Malaysia, Singapore, Russia etc. to facilitate Indian tourists to make payment using UPI service directly. NIPL usually works with other nations and widens areas of application to make UPI internationally accepted.

B. Linking Credit card

NPCI is planning to link credit cards with UPI. This step can be revolutionary since credit cards usually carry more value per transaction and it will ultimately increase peer to merchant (P2M) transactions in semi urban as well as rural areas.

C. Improving credit worthiness

If NPCI can link UPI services with credit cards, it can further help the government to employ sustainable schemes for providing direct economic assistance to underprivileged sections of society. For example, the government can provide credit cards with a limit of RS.2000 to rural farmers or merchants and accordingly increase their credit limit if they are successful in repayment. This can help in improving their CIBIL Score and enable them to take bigger loans in future.

D. Revenue through MDR and other charges

Currently NPCI does not charge any MDR on transactions from its customers which make it financially unsustainable. So, if NPCI incur cost of Rs.2 on transaction value of Rs. 800 (as per RBI data), they can charge RS. 2 initially and charge UPIs own convenience fees. In this way NPCI can generate potential revenue for the Government of India.

E. Leasing out model and working with collaboration

NPCI can lease out its product and technology to numerous nations and help them come out with their own versions of payment systems. This collaboration can either be done on Government-to-government level or by partnering with respective private entities or companies. This can generate a separate revenue stream and influence of soft power in other countries over the period of time.

F. Substitute for SWIFT

The SWIFT system is mainly used for international transfer of payments and financial telecommunication. UPI, if developed accordingly, can also be used as an alternative for SWIFT.

G. Future growth in mobile phone penetration

With increase in spending power, population , mobile phones accessibility and supportive

policies by the government, UPI will grow tremendously.

H. Cash lite economy

UPI has the potential to fulfill India's dream of becoming a cash-lite economy initially, where majority of economic transactions will be done via digital modes and then to ultimate dream to become a cashless economy.

I. Foreign remittance

Remittances can redefine UPI. With more than \$80 billion in yearly remittances received and \$20 billion sent overseas, India is one of the leading receivers of these transfers. Banks, money transfer operators (MTOs), and foreign currency traders control the majority of the remittance sector. It is estimated that 32 million Indians reside outside of their country. Using

UPI for remittances can be a game changer as internationally Indians will be able to use this economically viable, fast and real time mode of payment.

J. POLICY MAKING

NPCI can do a proper data analytics from all the transactional history and financial positions on the basis of profession (farmers, doctors, students), educational qualification, age, segment of societies, nature of organizations, firms, etc.. This analysis can help government to do pin point planning and ultimately help them to frame public policies accordingly.

5.4 THREATS

A. DATA MISUSE

India currently does not have any data protection authority. so, customer data can still be misused, and the government can potentially monetize it to larger companies or MNCs to book higher profits. Mismanagement in handling customers' data can affect their privacy and interests.

B. DIGITAL CYBER CRIME

Hacking of mobile phones and various other scams are a potential threat to UPI service.

C. NATIONALIZATION OF CARD NETWORK

Card network companies like visa and Mastercard can find difficult to operate their business in India due to policies like wide scale distribution of Ru-Pay debit/credit cards by government, zero MDR policy etc.. for example, Government operated card network Ru-companies can wind up their respective businesses and thus this sector will get monopolized by government entities which might be unfavorable for the public.

D. INFLATION AND RECESSION

In times of high inflation and recessions, Indians might switch back to cash and halt UPI payments.

E. COMPLAINT MECHANISM

NPCI needs to work on building a proper Grievance redressal mechanism which satisfies customers' complaints regarding scams, unnatural transactions, refund in case of wrong VPA etc. People may migrate to different forms of payments if proper working platforms are not developed.

F. GST

Government can levy a GST or any other form of tax on transactions which can demotivate users to use UPI.

6. CONCLUSION AND SUGGESTIONS

This research paper aims to provide basic knowledge to readers about the background of UPI, its benefits, what are the reasons for its success and a thorough SWOT analysis.

Among a series of innovations done by NPCI under the guidance of the RBI and Government of India, UPI proved to be exceptional. UPI is a simple, easy to use, safe and secure mode for doing digital payments. It is easy to register and doesn't require any paperwork. You only need a working bank account linked with a registered mobile number. Since UPI is an open UPI it encourages more Payment Service Providers (PSP) to employ this technology. It is easy to use as it does not require remembering various details like bank account number, respective branch details, IFSC codes etc. Users can make payment by either knowing a VPA/UPI ID or receiver's mobile number or they can simply scan a QR code linked with UPI ID. Popular apps like PhonePe, Google Pay, PayTm dominate this segment. UPI also have various weaknesses like High rate of Business Decline and Technical Decline which need to be addressed and worked upon.

UPI has various opportunities that can be utilized in future. UPI can be used to improve India's soft power and influence in other nations by sharing technical expertise and know-how. It also has a potential to improve credit worthiness of the underprivileged section of society through micro loans linked with UPI and Ru-Pay cards which can help them to take loans of larger amounts in future. UPI also has a potential to create revenue for the government through international licensing of API, Monetization of user data and Charging of MDR and other fees from users. NPCI also has a massive opportunity by onboarding foreign remittances that are received by Indians worth \$80billion.

UPI also faces threats of mismanagement both within the NPCI or within the government through inconsistent policies. Cyber-crimes are another important threat. NPCI should bring regular security updates to UPI and should constantly work to make it more secure and reliable.

Also, the government should refrain from adding any unviable charges on UPI transactions. If necessary, NPCI can charge convenience fees from selective users according to their spending capacity. For example, NPCI can build a tier system, where charges will be levied on the basis of the value of transactions.

fees

Max Charges (upto) 0-500 ,500-2000

0.25%

0.30%

Above 2000

0.50%

0.75%

Further charges can also be applied if a user surpasses the daily limit of the number of transactions. Apart from the tier system mentioned above NPCI can also drop their daily limit accordingly.

UPI is an innovative solution to many pain points faced by the masses. Its successful implementation and execution have transformed digital payment infrastructure and environment in India. NPCI should work with more stakeholders and constantly improve UPI Payment service to promote digital transactions and help India to become a Cashless Digital Economy.

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