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UNIFIED PAYMENT INTERFACE (UPI) FOR LESS-CASH INDIA

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ABSTRACT

The study finds out that UPI will serve the three great purposes - universal electronic payments, a less cash society and financial inclusion using latest technology trends, as envisaged in the Payment System Vision Document 2012-15 of Reserve Bank of India. When UPI will be widely used on a mass scale by majority of India's vast population for their routine payments – for payment of a chhota recharge of Rs. 10/- to payments at the local Kirana Store, Sabzi Mandi, or for payments to Rikshawwala or for the payment of Loan EMI of your big house, it will definitely bring a great revolution, truly leading to a less cash economy in India. The way WhatsApp (free SMS as called in rural India) brought a revolution in the messaging system across the world, it is expected that UPI will one day bring similar revolution in India thereby demonstrating UPI as the WhatsApp Moment for India, as appropriately described by Nandan Nilekani, Advisor to National Payment Corporation of India (NPCI). Wider acceptance of UPI may gradually make other modes of payment (Cash, Cheques, even ECS/NACH and even NEFT) redundant or obsolete in few years down the line. Government of India & various State Governments and local bodies (including proposed smart cities in the country) can capitalize on the infrastructure of UPI to collect various taxes and receivables from its citizens in a smart way. We hope that UPI will significantly contribute to make India a less cash economy in the future.

KEYWORDS

Unified Payment Interface (UPI), universal electronic payments, less cash society, financial inclusion.

INTRODUCTION

Unified Payment Interface (UPI) is a mobile app based new generation peer-to-peer instant payment solution. UPI application, once installed on smart phone, can be used to transfer money instantly to any account easily, conveniently and securely. UPI has been designed to enable all bank account holders to send and receive money using the smart phones with a single identifier such as Aadhaar number, mobile number, virtual payment address etc., without providing any bank account information. What is unique about UPI is that the beneficiary can now initiate the payment request. UPI is the advanced version of Immediate Payment Service (IMPS) and it can be used for instant payment on 24x7x365 basis. UPI is a great initiative by the National Payment Corporation of India (NPCI), which is umbrella organization for all retail payment systems in India.

CORE FEATURES OF UNIFIED PAYMENT INTERFACE (UPI)

1. User can use his/her mobile phone as the primary device for all payments – person to person (P2P), person to entity (P2E) and entity to person (E2P).
2. User can pay someone (push) as well as collect payment from someone (pull).
3. User can use Virtual Private Addresses (VPA) which are aliases to account numbers, thereby avoiding sharing of his/her account details.
4. User can send a payment collection request to others with a "pay by date" to allow the payment request to be "snoozed" and paid later before the expiry date.
5. User can use UPI 24x7x365 with instant debit & credit of accounts.
6. User can pre-authorize multiple recurring payments similar to ECS/NACH (to pay utility bills, school fees, insurance premiums etc.) with one-time secure authentication and rule based access.
7. User can make payments using 1-click 2-factor authentication using their mobile phone.

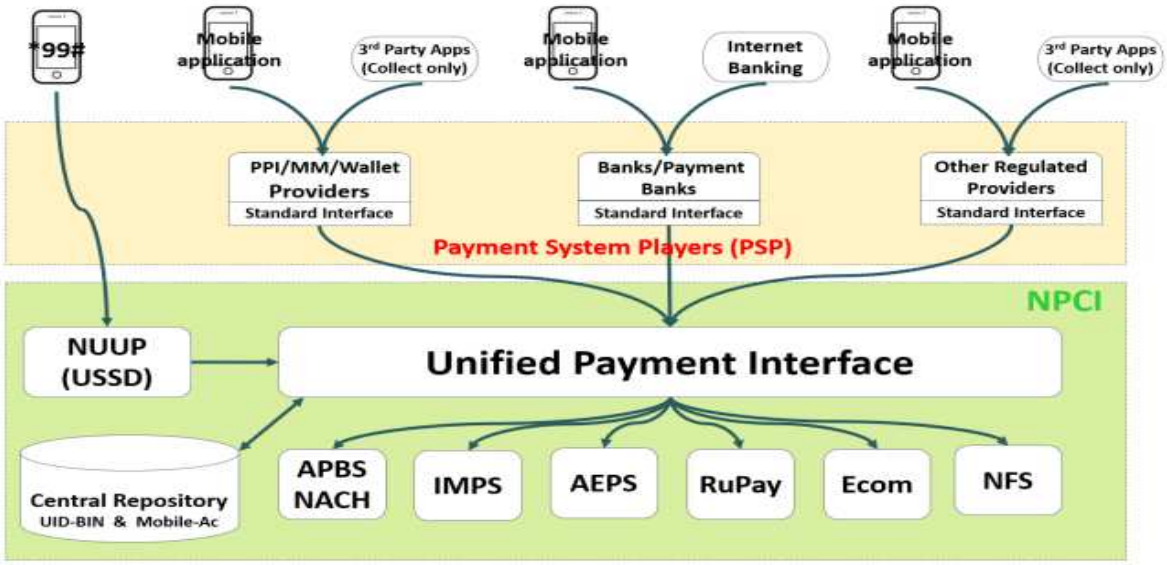
HOW UPI WORK?

Let us imagine that you place order online for a new iPhone on an e-commerce site (or mobile app) for your spouse. You select "UPI" as the mode of payment & provide your virtual private address for the payment, then a pop-up/push notification is received on your UPI app requesting for a confirmation of the payment. You enter your secret MPIN to authenticate the payment. Immediately you get the confirmation of payment being successful and confirmation of the online purchase from the merchant.

When you select the mode of payment as UPI and provide your virtual address, the transaction request hits merchant's server, it is immediately passed on, to the acquiring bank's server. This transaction is then pushed, through NPCI, to your bank, where the actual account details are fetched up against the mapped virtual ID and the credentials are validated and your account is debited. The confirmation is again pushed back to UPI servers (at NPCI) and in turn it initiates a credit message to the merchant's acquiring bank and the credit to the merchant happens in real time.

The Architecture of Unified Payment Interface (UPI) - how various parties/players/applications communicate with UPI, is described below in Figure-1:

FIGURE-1: UPI ARCHITECTURE, *Source-NPCI*



HOW IS UPI DIFFERENT FROM OTHER PAYMENT METHODS?

UPI is having some distinctive features which make it special and different from other modes of payments. Features like Virtual Private Addresses, Payment Collect Facility and a lot of scope for innovations for making payments & collecting payments based on QR Code etc can revolutionize the retail payment system in India and wider acceptance of UPI for routine payments by the common man can lead to less cash economy in the future.

1. VIRTUAL PRIVATE ADDRESS

UPI has a unique feature to identify a bank customer by an email like address called "Virtual Private Address". For example, an Oriental Bank of Commerce customer named Raj can have a virtual private address raj@obc. A customer can also choose to use the Aadhaar number or mobile number as the name instead of the short name for the virtual address like 123456789012@obc or 9898989898@obc. A customer can have multiple virtual private addresses for multiple accounts in various banks. In order to ensure privacy of customer's data, there is no account number mapper anywhere other than the customer's own bank. This allows the customers to freely share the virtual address with other parties. Unlike current payment methods – Internet Banking, Debit Card or Credit Card - wherein one needs multiple credentials in the form of customer id, account number, IFSC Code, card no etc., UPI allows customer to send or receive payments on the basis of a 'Virtual Private Address'(VPA). Thus, the feature of VPA is very significant from security point of view. Virtual Private Addresses provide innovative mechanisms for customers/merchants to create virtual private addresses with attached rules for amount, time/frequency and payees.

2. COLLECT PAYMENT

With the unique feature of "Collect" to request for payment from other parties, UPI is very different from all other modes of payment. With "Collect" feature, the beneficiary can initiate the request for payment from the sender (called pulling the transaction). Imagine you hired an auto for your journey and you need to pay Rs. 200 to the auto driver. Now the auto driver asks you your virtual address and initiates the request of payment of Rs. 200/- through UPI. Now you receive the payment request in your UPI app & you confirm the payment using your MPIN. Then the auto driver gets the payment and gets a confirmation message also. Using this collect feature, Insurance companies can now request for insurance premium from customers before due date & customer can confirm the payment using UPI and thus insurance premium is paid. UPI also has the ability for sending collect requests which can be "snoozed" and paid later before expiry date without having to block the money in the account until the customer is ready to pay.

3. SINGLE APP- MULTIPLE BANK ACCOUNTS

Customer can link multiple bank accounts in the UPI app. Bank accounts may be from different banks. Now any bank customer can use UPI of any bank and link all his/her accounts of different banks. Following table illustrates examples on how any bank customer can use any bank's UPI & link his/her accounts as detailed in Table-1:

TABLE 1: CUSTOMER USES ANY BANK UPI & LINKS ALL ACCOUNTS IN VARIOUS BANKS

Sl no	Customer of	Using UPI App of	Has linked Accounts of
1	Union Bank of India	Union Bank of India	Union Bank of India, ICICI Bank, SBI
2	SBI	ICICI	Uco Bank, HDFC Bank, SBI
3	Citi Bank	OBC, Axis Bank	Axis Bank, Citi Bank
4	Canara Bank	Axis Bank	Canara Bank

4. SAFE & SECURED PLATFORM

UPI allows banks and other players to innovate and offer superior customer experiences to make online payments and collect payments in a convenient, easy and secured manner. It conforms to the guidelines of Reserve Bank of India on two factor authentication for carrying out UPI transactions. Customer's mobile phone essentially becomes a "what you have" credential (first factor authentication), while MPIN (something you know) serves the second factor authentication to complete the UPI transaction. In the future, scanning of iris or fingerprint (from Aadhaar database), in place of MPIN, can be used as the 2nd factor authentication.

5. OPPORTUNITY FOR CUSTOMERS TO COMPARE FEATURES IN UPI APPS

Since a bank customer can use any bank's UPI (not just his/her own bank UPI), this will throw a new challenge for the banks to provide best features in their UPI, else no user will use that bank's UPI. Since today's customers are tech-savvy & use social media to get knowledge on which bank UPI is best (as reviewed by the other users), only the best UPI apps will be used by the customers. In other words, that particular bank's UPI which has more features, easy to use Interface and best customer support will be more popular among the UPI users, irrespective of bank he/she has account with.

6. PAYMENT THROUGH SCANNING OF QR CODE

To make the payment to the grocery shop in the Mall, all you have to do is to scan the QR Code printed on its Invoice using your UPI Application which will display the amount to be paid, you confirm the payment using your UPI MPIN and the payment is made instantly. To receive such payments even the vegetable vendor on the street or the auto driver can display the virtual private address or even a QR Code.

UPI - THE ROAD AHEAD

Smart phones have penetrated deep into our lives. India has already crossed 1 billion mark in mobile subscription. With introduction of affordable smart phones and call/data tariffs that are world's cheapest, mobile phone user base is set to grow exponentially in the near future in India. Unprecedented growth in smart phone users along with availability of high speed (3G/4G) mobile internet at very affordable costs is expected to further push the growth of UPI usage in India.

UPI offers a huge scope for merchants, e-retailers, insurance companies, educational institutes, Governments etc to offer very innovative methods of collecting payments. Payment collection by using the QR Code scanning will be widely used by merchants & e-commerce companies (particularly for Cash-on-delivery payments). Confirmation of payments through voice commands, 2nd factor authentication using biometric (Iris or fingerprint of Aadhaar) will be widely used in the future. More innovative methods will be used for various merchant payments as an alternative to POS transactions and in-app payments (like Ola, Uber etc.).

Banks may also offer support of local languages or payment instructions using voice commands in local languages in UPI. This will bring a revolution in rural India, where people can do mobile recharge by making the payment using voice commands. A father can send his son money by saying "please send 2000 rupees to Son Kapil" in UPI app. (It will search "Son Kapil" in Contacts & send the money to his Mobile number, authentication can be through scanning of Iris).

UPI is a significant part of the so called *"India Stack".* India Stack is a part of Nation's ambitious Digital India program aimed at treating information as a utility. It is a complete set of API (Application Programming Interface), made available under the Open API Policy, which can enable development of payment-enabled Apps. It includes:

a) Aadhaar for biometric authentication through scanning Iris or fingerprint.
b) DigiLockers (safe deposit locker for issue, storage and use of electronic documents),
c) e-Sign (digital signature acceptable under the laws of the land)
d) *Unified Payment Interface (UPI)* for financial transactions

The India Stack enables Apps that could open up many opportunities in financial services, healthcare and education sectors of the Indian economy. India Stack has the potential to revolutionize the way government services of the future will be delivered in a country like India with huge population. This provides great business opportunities for the tech-savvy start-up companies to solve the problems in financial transactions, healthcare and education through very innovative solutions.

CONCLUSIONS

UPI will serve the three great purposes - universal electronic payments, a less cash society and financial inclusion using latest technology trends, as envisaged in the Payment System Vision Document 2012-15 of Reserve Bank of India. When UPI will be widely used on a mass scale by majority of India's vast population for their routine payments – for payment of a chhota recharge of Rs. 10/- to payments at the local Kirana Store, Sabzi Mandi, or for payments to Rikshawwala or for the payment of Loan EMI of your big house, it will definitely bring a great revolution, truly leading to a less cash economy in India. The way WhatsApp (free SMS as called in rural India) brought a revolution in the messaging system across the world, it is expected that UPI will one day bring similar revolution in India thereby demonstrating UPI as the WhatsApp Moment for India, as appropriately described by Nandan Nilekani, Advisor to National Payment Corporation of India (NPCI).

Wider acceptance of UPI may gradually make other modes of payment (Cash, Cheques, even ECS/NACH and even NEFT) redundant or obsolete in few years down the line. Government of India & various State Governments and local bodies (including proposed smart cities in the country) can capitalize on the infrastructure of UPI to collect various taxes and receivables from its citizens in a smart way. We hope that UPI will significantly contribute to make India a less cash economy in the future.

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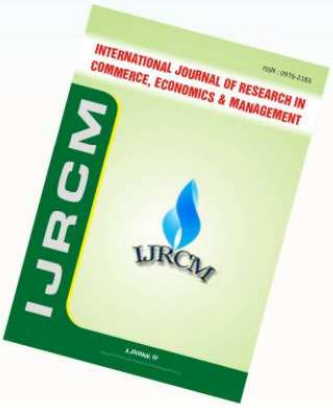
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