Future of Payments - ePayments

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Abstract—In the modern society, no economic activity is possible without payments and settlements. In this sense, it could probably be said that payment systems are one of the most imperative and significant social infrastructures that we have. ePayments are an increasingly important part of payment systems. They allow for quick international connectivity in the payments world. ePayment can be looked as a panacea for most ills in payment world, if not all – financial inclusivity for unbanked, fast across the world transactions, safety and security of payments and cost savings over traditional payment systems.

In this paper, we look at ePayments, what they entail and basic payments infrastructure. We also look at the future of ePayments as well as challenges and recommendations for ePayment systems of tomorrow. In the next paper we will deep dive into the recommendations for ePayments.

Keywords—Payments, Banking, ePayments, bitcoin, mobile payments, digital wallet payments, biometric payments, financial service kiosks, NFC, financial inclusion.

I. INTRODUCTION

Over many centuries, payment system has evolved radically, starting from coins, to paper and to data. Reason of Payment system constant evolution is innovation and adaption of emerging technologies that provide convenience, efficiency and greater value. Human spirit of innovation powered the growth of global electronic payments. Today, we have many international electronic payment systems that provide the secure, sound, economic transparency and consumer empowerment. People around the world accrues the benefits of this payment network. Payments are lifeline of economies. Sale of goods and services has been increased significantly with the widespread adoption of ePayment. ePayment have also reduced the hurdles of immediate liquidity and credit.

Nowadays, financial institutions offer various ePayment opportunities to their customers. Example of such ePayment systems are ATM machines, credit cards, debit cards, on-line banking, mobile banking. ePayment provides significant cost savings over paper based payments.

If we talk about payment systems used, many financial organizations still using legacy applications and facing integration challenges. However, from last couple of years, most of the financial institutions have started implementing what is called a payments hub.

A payment hub is a message and web based technology layer between payment processing system and various finance channels. It provides standard and integrated platform to build new services such as online payments, mobile payments, P2P payments etc.

Any payment system would have to have three broad layers. Namely, channels layer, payment hub and clearing network. These three layers would interact with each other to provide a seamless payments experience to users while having the payment hub interacting very closely with boundary applications such as fraud analysis and detection systems, payment reconciliation systems and payment complaints and dispute systems. The channels layer covers all the ways in which users can access payments infrastructure. These methods include branch banking, ATM, POS, mobile payments, retail online and corporate payments & banking. This layer would need to interact with an underlying payments hub that provides rules and workflow to carry out the payment instructions issued by the channel accessed by a user. Hub also contains necessary instructions for forex transactions as also alerts and messaging infrastructure. The payments hub also interacts with boundary applications that help with fraud detection, complaints & dispute handling and payment reconciliation. The final layer of any payment system architecture is the clearing network layer. This layer takes care of clearing the payment instructions by using networks such as ACH, check clearing, card, wire and interbank networks. Below given diagram depicts high level view of a payment system architecture.

Figure 1 Payment System Architecture
In the modern society, no economic activity is possible without payments and settlements. In this sense, it could probably be said that payment systems are one of the most imperative and significant social infrastructures of which ePayments form a significant part.

ePayment is a subset of an e-commerce transaction to include electronic payment for buying and selling goods or services offered through the Internet. Usually we think ePayments as online transactions on the internet, however, there are many types of electronic payments exist. Following figure shows the most commonly used ePayment methods. New ePayment types are being discovered continuously, so there might be additional payment methods that exist.

NFC payments are growing rapidly in mobile payment space. NFC (Near Field Communication) is high frequency and short range wireless communication technology. It is mainly used for purchases items in physical store and transportation services. In China for example, NFC is being used on public transport.

**Digital Wallet Payments** – Digital wallets/e-wallets are growing rapidly. It provides consumers simple and enhanced payment experience. Digital wallets can be seen as physical wallets and they can contain debit cards, gift cards, credit cards etc. Some of the popular digital wallets brands are PayPal’s wallet, V.me by VISA and MasterPass by MasterCard. There are two types of Digital wallets i.e. Preloaded and Pass-Through Digital wallets. Preloaded Digital wallet is the traditional wallet in which e-money is preloaded before paying for an online transaction. Funds can be added to the wallet through credit / debit cards or alternate payment methods. In Pass-Through Digital wallets, transaction is settled from linked bank account / credit/ debit card. In this method, stored funds in the wallet are not used.

**Financial Services Kiosks** – Financial Services Kiosks are self-services banking kiosk that facilitates the customer to carry out financial and non-financial transactions in more convenient ways. Financial transactions can be done through these Kiosks are account opening, purchases of financial products, money transfers etc. Non-financial transactions include bill-payments, e-commerce transaction (online purchases) etc.

**Biometric Payments** – ePayments through Biometrics is an area still quite nascent. Biometric payments involves authentication using body markers that are hard to cheat on, such as finger prints. Some financial organizations such as VISA are working on voice recognition and retina scan as an authentication mechanism. Biometric payments could replace plastic cards and more securely authenticate the transactions. Biometrics are already quite popular in the field of security.

**Person-to-Person (P2P) Payments** – P2P payments allows users to transfer funds from their bank accounts or credit cards to others accounts or credit cards through internet or mobile channels. There are two approaches for initiating payments in P2P mode, in first approach, sender and receiver are members of same payment network. In this method, users are generally identified by e-mail address. In second approach, receiver need not to have relationship with the bank of the sender.
In this approach, after initiating the transfer by sender, recipient is notified via e-mail or phone to provide his/her bank account or credit card details via online interface to receive the funds.

**Bitcoin Payments** – Bitcoins are digital currency which works without an intermediate authority. Cryptography is used to record and control transactions in Bitcoin payments. All transactions are recorded in public ledger. Bitcoins became more popular during the Cyprus financial crisis in 12-13 when government started seizing people’s bank accounts. Many people saved their assets by converting them into Bitcoins. Bitcoins are slowing coming of age.

### III. WHY ePAYMENTS

ePayment systems can act as a low cost banking channel for the unbanked so as to provide coverage, there are not many payment related transactions that cannot be performed using ePayment channels, so it is a good way to ensure banking services reach people with no access to traditional banking. More than half of world’s population is still unbanked which offers huge potential of growth to payment card products. Financial inclusion and capital accumulation are the foundation of a strong economy. Banking improves the money management and enhances financial empowerment of an individual. This works as a powerful engine of growth for economies. Governments emphasize on savings, deposits and reserves that can be used for lending to kick start victorious circle of business activity that can improve the GDP significantly leading to improvement of overall living condition and so on.

ePayment has the potential of substantial cost savings over paper based payments to both businesses and customers. No need to draft the checks, cash transmission and invoices, for example. ePayment transactions are very fast as compare to paper based ones. Paper and postage expense reduction cut down the cost. Businesses save significant time spent on executing the personal transactions which eventually leads to cost savings. Also, customers don’t need to wait for long in queues for personal transactions. Imagine how much effort and cost can be saved using ePayments for any cross country transactions.

There are security risks with traditional payment systems which involves sending confidential information via post. Confidential information may be lost or get into wrong hands. Physical financial transaction may also target for criminal attacks. ePayment systems offer significantly improved security via encrypted information transfer that protects customers’ financial and personal information.

ePayments are very critical factor of growth for all type of economies. Continued innovation in ePayments options is playing powerful role in improving efficiency, creating transparency in economies and in analytics, which can be used in various areas such as liquidity analysis and assist with risk management.

### IV. FACTS AND TRENDS

According to World Payment Report 2014, global non-cash transactions volume growth de-accelerated in 2012 due to slower growth in North America and Europe. However, Central Europe, Middle East and Africa (CEMEA) and Emerging Asia led the growth in non-cash transactions. It needs to be noted that growth deaccelerated, however, overall volume of non-cash transactions grew significantly as shown below. Non-cash transaction growth was slightly lower in 2012 as compared to 2011. 2013 showed significant growth in non-cash transactions and reached to 365.6 billion transactions. Debit and credit cards will continue to drive the growth. Developing markets are taking various initiatives to upgrade the infrastructure to boost non-cash transactions. All industry stakeholders will have to adopt electronic payments and mobile payments channels as these channels are continuously driving growth of non-cash transactions. Following figure shows the Global number of non-cash transactions for last five years.

**Figure 3 Payment Trends**

*Source: World Payments Report 2014, Capgemini and Royal Bank of Scotland

As per World Payments Report 2014, in next ten years, there will be a major shift in payments industry - banks may not be at the centre of payment governance. Non-bank organizations and retailers will be encouraged more to participate in the payment chain. Total number of non-cash transactions are predicted to touch 800 billion by 2024.
Till date, payments market has been dominating by North America and Europe, however, in the coming years this trend could change as developing markets share could be half of total non-cash transactions by 2021. In the coming years, key areas where changes will continue are clearing & settlement, processing, with some level of fragmentation and consolidation. Regulators will focus more on consumer protection with more anti-fraud measures. Data policies at national level in more countries might be applied which could affect payment processing.

Addition of new currencies such as mobile air time, digital currencies (bitcoin) and reward points could change the way payments are being made. Identification methods used in other industries could also be adopted by payment industry to secure the consumers. These identification methods could include the sharing of single database across industry (banks, payment processors and retailers) and use of biometric methods. We shall discuss this a bit more in the next section.

V. FUTURE OF PAYMENTS

The future of payments is here. There is total disruption in payment space – there are so many newer trading and payments systems coming up that allow payment in trust, online currency, crypto currency, commodities, social currency etc. that it’s not difficult to envisage a world which will allow payments using almost everything you can think of including iris, fingerprints etc. This disruption is also levelling the payments playing field and creating opportunities and space for players that have innovation to offer – this is a marked & phenomenal movement from a world where payments have been historically dominated by banking industry. Mobile wallets are now rather old, Apple pay has arrived, Facebook is likely to offer peer to peer payments, bitcoin is gaining ground, wristbands that allow payment are being tested and more exciting innovations are on the way.

The primary driver here is the millennials’ ready acceptance and adoption of newer payment methods, and also the easy availability of technology. It’s probably going to take a very long time to eliminate paper currency, if at all, but as we see with cheques, we will see a decline in paper currency usage in time to come. This adoption on newer payment methods will, however, be impacted by the concerns of fraud and data breaches. Consumers will, however, embrace systems that break the shackles of issues with paper currency. A very good example here would be Vodafone’s m-pesa in Kenya that now moves more than 40% of the nation’s GDP.

It’s also been adopted by over two-thirds of Kenyans since its launch in 2007. Vodafone also uses airtime as a form of currency in Egypt. Both these initiatives have been very successful. This success appears to have prompted move of T-Mobile and Sprint into payments space in US.

Another driver for acceptance of newer payment methods is the ease and speed with which money can be transferred across the globe without any cost arbitrage forced by intermediaries like banks. This however has pros and cons that demand discussion.

For the unbanked, innovation in payments space has been a blessing. NFC, Bluetooth and bar codes form a major part of new solutions; and allow for a wider coverage of population into the banking space. Bitcoin, for example, is now accepted by more than 80000 businesses worldwide that include the likes of Expedia and Dell.

Payments are also moving into the wearable space. So settling your bill at a restaurant with your mobile is now old news. You could, possibly, issue an instruction to google glass or tap your wristband or watch to make a payment. Eaze, with google, is promoting a concept called “Nod to Pay”, links to two bitcoin payment systems (currently in public beta stage). Samsung Galaxy S5 allows fingerprint payments through use of PayPal’s app and that we believe is only the beginning. Person to person payment is going to see a lot of action. Payments via messages and tweets are already seeing activity. French bank group BPCE is working with twitter to allow “tweet payments”. We are already aware of incentives offered by businesses for Twitter follows and Facebook likes. This is also a form of payment system as these incentives can translate to freebies and discounts etc. Businesses of repute use loyalty programs that can be used for purchasing goods and services, including exclusive merchandise and previews.

Very soon, we should be able to see vending machines that accept social media currency, and also ATMs that dispense bitcoins. There are already over 250 bitcoin ATMs worldwide.

We will also see the sheltered world of banking shatter which non-financial challengers like PayPal, phone companies like Vodafone, technology giants like Apple and Google gaining ground in a big way. Online and cross border commerce as also lower entry barriers will see a lot of new non-financial players join the race. In a connected, fast, digital, efficient and smart world, payments are an exciting area for innovation that will see a lot of action in near future.

We are going to have a frenzy!
VI. HOW ePAYMENTS CAN ELEVATE

ePayments can be elevated in many ways, some of the key areas where financial institutions and customers need to focus more are as follows:

- Accepting payments through cards, online, mobile etc. channels enable merchants to increase revenues and reduce charges of cash handling. It also save merchants and customers from exposing to fraud and security risks. ePayment helps merchants to increase sales, better business management, improve customer services etc. However, many merchants and customer still don’t use electronic payments and missing opportunities to increase sale and save cash handling charges. By educating merchants and customers, we can elevate the usage of electronic payments.

- Most of the financial organizations nowadays offers more touch points to customers to automate payments. Financial institutions can reduce delinquency rate of their lending portfolio by offering various payments options such as online, IVR, mobile etc. For example, when a customer is approached for due payment and after explaining the various payments options that are available, agent connects customer to an IVR system to make a payment as against to get a promise to pay later. However, if IVR is also programmed to make calls to customers directly rather than connect them to an IVR by agent it reduces the delinquency rate as many customers may feel uncomfortable to discuss their situations with an agent. A judicious use of technology can boost the recovery rates and usage of ePayments.

VII. RECOMMENDATIONS FOR IMPROVING ePAYMENTS & ePAYMENTS USAGE EXPERIENCE

So, a good question at this point would be, “Is it all rosy or are there any challenges with ePayments?” Well, as with any area, there are some challenges with ePayments as well. These challenges are getting addressed at various levels, such as consumers, financial organizations and regulatory authorities etc. We have some recommendations, based on our experience and study of the field. Here we list some of the recommendations we have which follow from the challenges we see in the ePayments industry.

Recommenations to improve ePayments:

1. Providing ever enhanced operational user experience to users of ePayment channels
2. Ensuring faster UI response times for seamless transactions, and improved experience
3. Using artificial intelligence (AI) based analytics and reportage - reports that get used, not just to add to the number, and not static
4. Creating a common user interface to manage worldwide payment middleware to provide a worldwide infrastructure for managing payments
5. Centralized and secure international financial messaging gateway to seamlessly work with accepted standards such as SWIFT, SEPA, CHAPS, BACS etc. for quick payment closure and managing fraud & risk.
6. Improve stability and availability of systems to reduce downtime and dropped transactions
7. Improve throughput while ever improving the volume handling capacity
8. Remove / reduce manual intervention to provide faster transactions
9. Lowering cost of assurance services to payments while ensuring zero defect tolerance
10. Improved and more intuitive infrastructure for one time payments, standing orders, bulk payments, corporate payments and bulk payments
11. Newer focus in countries like India on government to person payment transactions (like aadhar linked LPG subsidy payment) to ensure inclusivity
12. Focus on reducing dropped payments while using payment solutions on ecommerce sites by improving ePayment infrastructure

Some other challenges in ePayments that need to be addressed are:

Fragmentation - The online payment market needs to consolidate and a standard way of making payments needs to emerge.

Eavesdropping - There are some concerns around eavesdropping, especially around NFC devices. Eavesdropping is when a criminal “listens in” on an NFC transaction.

Data Corruption and Manipulation - Data corruption and manipulation occurs when a criminal manipulates the data being sent to a reader or interferes with the data being sent so it is corrupted and useless when it arrives.

Theft - No amount of encryption can protect a consumer from a stolen phone. If a smartphone is stolen that doesn’t have adequate security for monetary transactions that can be made using the phone, the thief could theoretically wave the phone over a card reader at a store to make a purchase.
VIII. CONCLUSION

ePayments is an exciting field that is awash with opportunities. These opportunities are for financial organizations to provide better and low cost services, improve turn-around time for transactions and ensure financial inclusion for a vast majority of our population. ePayments is also an opportunity for governments in countries like India for better and quick coverage of populace with respect to the welfare schemes and government to person transactions. It is an opportunity for people to conduct business where it was hitherto difficult, if not impossible. It is also an opportunity for innovators, to come out with newer ePayment products and services. It is also an area of opportunity for technology solution companies to improve upon the architecture and various components of payment systems based on various recommendations we have listed above. There are challenges as well, which we believe, will act as propellers for improvement of ePayments. ePayments a harbinger of growth, and victorious circle of economic activity and financial inclusion.

REFERENCES

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