The case for Mobile Payments in India
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Executive

Background

Mobile ownership across the world far exceeds that of any other device or platform, and its adoption is increasing rapidly. With the rapid adoption of smartphones over the last decade, improvement in telecom connectivity and declining handset prices, mobile has become the primary device around which our daily lives revolve and it is shaping how consumers search, purchase and pay for goods and services. As commerce is moving to mobile, so are payments. Significant investment and innovation across industries is now focused on using mobile as a delivery channel to bridge the gap of last mile delivery. The capability to store and process payments has further allowed companies to create a seamless delivery and payments experience. The ubiquity of mobile devices overcomes the “chicken and the egg problem” of building issuance and acceptance infrastructure and eliminates significant cost related to hardware and processing associated with traditional card-based payment processing.

Interoperability and ubiquity of mobile devices, fall in prices of data, emergence of mobile-based business models and popularity of mobile wallets among consumers, coupled with lower cost of investment in payment hardware for merchants, have set the stage of rapid adoption of mobile payments across the globe.

Rise of digital payments in India

The payments landscape in India is undergoing a transformation: traditionally a cash-based economy, it has seen an increase in card-based and mobile transactions. In spite of advances made in the recent years by the Government and regulators to popularize cashless transactions, India continues to be a high-cash-usage economy. The value of physical currency in circulation in the country is one of the highest among other emerging economies.

In spite of being present in the country for over two decades, card payments have struggled to scale-up due to the fragmented nature of the retail sector – with its long tail of mom and pop stores – perception of it being expensive for small merchants, high cost of card payments hardware and lack of underwriting data for credit card issuance and merchant on boarding.

Mobile payments: answer to the problem

In such a scenario, mobile as a platform has a unique set of capabilities that can overcome the challenges posed by the Indian payments landscape.

Mobiles offer a low-cost means to create financial access and payments. It can extend the last-mile reach of banking services either through business correspondents (BCs) or directly to the end consumers. Improvements in the telecom infrastructure, access to internet connectivity and low-cost smartphones will eliminate the need for hardware based on fixed line connections. Mobile can be a platform that uniquely combines digital identity, digital value and digital authentication to create low-cost access to financial services – for instance, OTP-based authentication for Aadhaar-linked accounts and biometric authentication for processing transactions.

The flexibility to adopt technologies as varied as USSD and magnetic secure transmission makes it capable of meeting the future needs of customers, merchants and service providers. Since the value itself is digital, exchange of value across various form factors of mobile payments is easy, resulting in an interoperable platform that works on a lowest common denominator. Customers will have the option to use various form factors for mobile payments: one set of customers may choose carrier billing, while another can use mobile-based credits that are delivered to their wallet.

POS terminal penetration in India is low compared to that in similar economies, primarily because banks have built merchant acquiring in India on the 4-party model, which involves a set of fixed and variable costs that are not economically viable for small businesses.

Mobile-based payments can potentially lower the acceptance costs for merchants. Aadhaar can streamline the process of merchant documentation; credit bureaus can provide proxies for merchant risk; and acceptance can be enabled through an application downloaded on mobiles or through specialized SIMs mailed as part of the starter kit. Eliminating the traditional onboarding process, hardware, authentication and connectivity can significantly reduce the cost of acquiring merchants for a bank.

Furthermore, mobile devices can store data securely and also enable the exchange of information besides payments data. A combination of secure hardware, device ID, payment tokens, risk-based authentication procedures and contextual parameters can make mobile transactions highly secure in comparison to mag-stripe cards.
Challenges to mobile-based payments in India

Although mobile payments are on the rise in India, there are challenges in scaling them up. Currently, mobile payments are largely being driven by single program managers that are creating closed loop payment systems. For instance, digital wallet companies in India that have acquired a large customer base are building an acceptance platform by empanelling merchants to accept payments; however, this obstructs the principles of interoperability.

Closed loop payments systems with remittances as the core proposition may work well for small countries with a few large players, but for a country as diverse as India, it is critical to have standards and interoperability among various mobile payment systems.

The speed of mobile payment transactions is still slow, especially at the point of sale, where consumers and merchant look for a quick turnaround. Moreover, in areas of poor connectivity, transactions often fail or time out. This results in poor consumer experience, which discourages them from using mobile payments.

A third challenge is the low digital literacy of consumers. A large segment of the target population is not comfortable with technology.

Consumers are inherently slow to change their habits and trust new service providers, especially when it relates to their payments and transactions. Public and private institutions need to come together to educate consumers on how to use mobile as a banking and payments platform, to help build trust in the system.

Most mobile payments platforms also require customers to have a pre-existing bank account, which is a challenge as segments of the Indian population still remain unbanked. Security concerns around mobile money services need to be addressed. While mobile networks already have encryption on the messages transmitted across the network, mobile transfers require additional tracking and logging for regulatory compliance.

A final set of issues relates to the last mile delivery of services. For consumers to use mobile payment services on a regular basis, it is critical that they are ensured of easy availability of cash whenever they require, especially in the remotest parts of the country. BCs in remote locations are not easily accessible or they become inactive due to low transaction rates. Unless a framework is created at an industry level to ensure the availability of cash at BCs and their viability, consumers are unlikely to use mobile as a store of value. Widespread adoption of Unified Payments Interface (UPI) can potentially solve the problem of cash-out.

Next steps

In addition to the functional benefits, mobile platforms are also getting an institutional push, such as the UPI from NPCI. Growth in mobile payments marks a significant shift for the entire payments infrastructure of India. There has been a convergence of interest of various stakeholders, which has created an enabling environment for the development of mobile payments – RBI regulation on Payments Banks, the Central Government’s focus on financial inclusion, the near universal coverage of Aadhaar as a digital identity, the innovations in digital payments such as UPI and the rapid adoption of smartphones in India.

While a lot is happening around mobile payments, there is a clear need for a cohesive approach among various stakeholders. Different stakeholders – banks, telecom companies, regulators and other players – are developing platforms independently. As a result, what could emerge is a proliferation of closed user groups for mobile payments tagged to different platforms, rather than a universal interoperable mobile payments infrastructure.

A joint policy-making or go-to-market approach on mobile payments by the industry players, facilitated by payments bodies, can help in expanding the market and increasing adoption. Such policy decisions for facilitating mobile payments can take into consideration the requirements of prepaid operators, banks and telecom operators for building and scaling up the infrastructure and transaction rails required for payments. The success of mobile payments hinges on institutional initiatives, product and process innovation from operators, a supporting regulatory environment and channelized efforts of the industry players toward a common objective.
Mobile ownership across the world far exceeds that of any other device and its adoption is increasing rapidly. There are 997 million mobile phone subscribers and 239 million smartphone users in India. Mobile phones are rapidly shaping how consumers search, purchase and pay for goods and services. Since the invention of smartphones a decade ago, significant innovations have been focused on mobile as a channel, resulting in disruptive business models across industries.

As commerce moves to mobile, so will payments. The volume of mobile money transactions is expected to reach US$780 billion by 2017 globally, and more than 85% of point-of-sale (POS) systems are expected to accept contactless payments by 2016.

The ubiquity of mobile phone overcomes the “chicken and egg problem” of building issuance and acceptance associated with the traditional payments infrastructure. While the underlying capabilities of each phone are different, they are flexible enough to support various communication protocols such as USSD, NFC, SMS and data, making it easier for interoperability to percolate within the payments system. As an open platform, compared to the 4-party model, it has decoupled two critical functions of banks in the payment processing chain. One is to act as a store of value and the other is to process payments. Various intermediaries have stepped in to leverage these two aspects to build payments as a service for merchants, eliminating the need for traditional hardware and merchant onboarding processes. Much like email, the phone itself has become a unique identifier that is standardized across merchants and consumers, obviating the need for bank account numbers or anything that is proprietary in a local ecosystem. Consequently, mobile payments are taking off all over the world in the form of feature phone-based services such as M-Pesa in Kenya and smartphone-based NFC payments.

Until now, the majority of mobile payment solutions have focused on enabling P2P payments. With a change in consumer behavior, there is increased focus on enabling mobile payments at the POS. Mobile has allowed new telecom and technology companies to expand into the offline payments space, especially at small merchants where payments are more of a P2P nature. While card payments went downstream from large to small merchants, the trend is more likely to work in the reverse direction for mobile payments because of the large-scale adoption of mobile among the masses.
2. Emerging trends in mobile payments globally

2.1. Mobile money filling the gaps of delivering low-cost merchant acceptance at the last mile

Estimates indicate that approximately 30% of Kenya’s GDP flows through mobile money services. Since its launch in 2007, M-Pesa is considered to be one of the popular and successful mobile payment service. After the success of M-Pesa, several mobile money programs have been launched in developing economies. There were more than 100 million active mobile money accounts across multiple countries as of December 2014 and the number of mobile money accounts surpassed that of bank accounts in 16 countries. In addition to remittance services and airtime top-ups, merchant payments through mobile money are on the rise as well. Kopo Kopo, a service popular with Kenyan and Tanzanian merchants, enables mobile money acceptance and keeps track of all payments made through its system. By the end of 2014, Kopo Kopo had an estimated 12,500 merchants across East Africa (Kenya, Tanzania and Rwanda). Similarly, as of June 2014 ZAAD, a mobile money service in Somaliland, had 12,300 registered merchants with an active rate of 89%.

2.2. Wallets are taking the center stage with growth in smartphones

With an increase in the adoption of smartphones, mobile wallets that can be accessed through mobile applications are becoming commonplace. A simple way to categorize wallets would be as instruments that act as a store of value or store of credentials. Customers download an app on their smartphone and link their card details or bank accounts to the wallet. Depending on functionality, the value is either charged directly to the linked card or bank account, or debited from the value stored in the wallet itself. Consumers also value the privacy provided by such wallets as their personal or bank information is not shared with merchants.

Mobile phone-initiated NFC payments are becoming increasingly popular, with smartphone manufacturers taking steps to create an acceptance and NFC-enablement infrastructure. This is being done through wallet apps that act as store of credentials and enable seamless payments experience for consumers.
Mobile payments have become one of the preferred modes of transactions in China. Approximately 17% Chinese users today favor paying via online banks, and around 16% prefer to pay using credit cards offline. Alipay has a market share of nearly 50% among online third-party payment providers in China.

Currently, approximately 84% Chinese users access the internet via mobile, and the online shopping spending in the country is expected to hit US$1 trillion by 2020.

### Key statistics

In 2014, mobile payments accounted for 54% of all transactions via Alipay. The Alipay wallet currently has around 350 million registered users.

**Key statistics**

- Number of Alipay transactions: 42.3 billion transactions settled during 2004-2014
- 350 million registered users as on June 2015
- 190 million active users
- 900 million Alipay Accounts as on January 2015
- 80 million + daily transactions
- US$50 billion transaction volume processed in 2014
- Approximately 50% share of the third-party online payment market
- Over 54% of daily transactions on Alipay daily transactions came from mobile in 2014

**Source**


**NTT Docomo is the largest mobile operator in Japan and has ~68 million subscribers. It has done successful on-ground execution of NFC through several initiatives in Japan. NFC is widely successful in Japan as compared to other countries.**

- 68 million subscribers
- Offers NFC service dubbed Osaifu-Keitai (wallet phone)
- Successful 5G data transmission trials

In 2011, NTT Docomo along with KDDI and SoftBank created the Japan Mobile NFC consortium to coordinate the adoption of multiple international standards for near field communications technologies incorporated in their mobile devices and service in Japan. NTT Docomo started offering NFC service dubbed Osaifu-Keitai (wallet phone) which uses a contactless-IC smartcard which is known as FeliCa.

Today, more than half of the mobile phones in Japan have the contactless FeliCa chip embedded in it, which was developed by Sony Corp and is provided by Felica Networks Inc. (joint venture of Sony Corporation, NTT Docomo and East Japan Railway Company). The chips and associated secure memory can support a range of payment, ticketing and other applications.

In Japan, close to half a million reader devices are available in various stores to support mobile credit payments where customers can use NTT Docomo’s proprietary ID system to initiate the transaction.

**Source**

2.3. Retailers are seeing more and more of their online traffic coming from mobile

Smartphone adoption has ushered in a new era of consumerism. Improved speed of telecom connectivity, rapid growth of mobile applications, integration with payments and increased processing speeds have led to consumers using mobile as their primary device for search, compare and purchase. Mobile is bridging the divide between online and offline shopping, and consequently transactions in the physical world are increasingly getting acquired online. In India, desktop penetration is quite lower than smartphone penetration. As a result, large e-commerce players in India today get almost 90% of traffic and 70% of their sales through mobile devices.¹

One of the disruptive innovations over the last decade has been the growth of urban logistics services. Urban logistics refers to services such as radio cabs, travel accommodation websites, and restaurant delivery and grocery delivery services. Rapid adoption of such services among consumers has led to the conversion of cash-based offline transactions to online transactions. Consumers are able to order their service through their mobile and consummate the transaction through payment methods directly integrated into the mobile app of the service provider; however, the service delivery happens in the physical world. The migration of services to the mobile platform has made payments an integrated offering. Furthermore, demand aggregators of such services enable small merchants to benefit from the consolidation of demand for payment services, enabling reduced cost of acceptance.

2.4. Emerging mobile technologies that will improve digital payments at the POS

The pace of innovation in mobile payments is faster than ever before. New technologies are emerging that are making mobile payments seamless and compatible with legacy infrastructure. While technologies such as thin SIM have existed for a long time, with falling cost of memory and processing, they are now capable of becoming more mainstream, especially in areas with poor connectivity and no payment infrastructure.

Magnetic secure transmission (MST) enables smartphones to emit a magnetic signal that emulates the magnetic field change that occurs when a mag-stripe card is swiped through the card reader at a POS. This technology is compatible with existing terminals, and payment information is kept secured through tokenization. All that consumers need to do is access an app by entering a pin and select the cards to make the payment. This technology makes phones compatible with most terminals and does not require merchants to upgrade their terminals.

Similarly, host card emulation is another emerging protocol that allows NFC-enabled handsets to communicate with NFC-enabled readers. This is done by emulating a payment card through a payment application that stores the credentials as opposed to traditional NFC, where the payment credentials are stored on the secure element. The advantage of this method is that it obviates the need to access the secure element, and can enable any merchant or banking application to process mobile payments. This technology could potentially make NFC payments a reality, with support from card networks and mobile device manufacturers and mobile operating systems.
The combination of regulatory innovation in the form of Payments Bank, institutional innovation in the form of NPCI and establishment of Aadhaar as a digital identity platform, along with the rapid adoption of mobile phones, have laid the foundation for rapid growth in digital payments in India.

The RBI and NPCI have played a pivotal role in pushing digital payments forward in India through platforms such as RTGS, NEFT, IMPS and RuPay and upcoming initiatives such as Bharat Bill Payments and Unified Payment Interface (UPI) are only expected to accelerate this growth further. However, while the corporate and the government sector has eagerly adopted electronic payment platforms such as RTGS and NEFT for processing high-value business payments, small and medium enterprises have lagged behind. The value of the physical currency in circulation in the country is estimated to be more than 12% of GDP, one of the highest among emerging economies. India continues to be a cash-based economy at POS, with very low digitization of personal consumption expenditure.

3.1. The challenges to card-based payments in India

The share of card payments in personal consumption expenditure is less than 5% for India, but is significantly higher for developed economies. One of the main reasons for this is the large number of unorganized merchants in the Indian market who transact in cash.

In India, less than 5% of spends toward personal consumption expenditure happen through card payments.

Organised retail contributes to about 7% of the overall retail market in India, by revenue.

Online retail contributes to about 8% of organized retail and only 0.5% of total retail market in the country.

Sources:

The fragmented nature of retail – with a long tail of merchants that have low sales volumes and high working capital requirements – and poor connectivity require alternative solutions for digitization of payments that are low on cost and easy to on-board.

Some of the challenges to card-based payments in India are as follows:

Alignment of multiple stakeholders to grow the system: The traditional card-based payment system follows a 4-party model, with multiple stakeholders and a long gestation period. It requires all parties to be equally aligned and invested in growing the market. There are frequent demand-supply mismatches between issuance and POS terminal deployment.
Concentration: Card acceptance and issuance in India is largely concentrated in metros, and tier 1 and tier 2 towns. The uptake of card as a payment instrument is mostly prevalent in middle- and high-income consumers in urban and rural areas. The rural-urban divide in India is significant. For personal consumption to get digitized, a ubiquitous payment system is required that is accessible to all. The majority of these spends are concentrated at large merchants and are mostly done at merchants in the travel, entertainment and organized retail segments. Day-to-day household spends are still being done in cash. Less than 4% of households in India do any form of cashless transactions.\[11\]

Access to banking, financial literacy and lack of acceptance infrastructure: In the current scheme of things, access to banking services in the form of savings accounts and credit or debit cards is a prerequisite for cashless payments. Although recent government and regulatory initiatives have created large-scale access to banking and issuance of debit cards, the overall awareness level and financial literacy are yet to increase.

Although the issuance of RuPay cards has increased access to bank accounts in rural and semi-urban areas, there is a significant mismatch on the supply side in terms of POS acceptance infrastructure. Due to high costs of POS terminal deployment and low volume of expected transactions, there is a limited focus from banks in these markets from a merchant-acquiring perspective. As of November 2015, the number of POS terminals installed in India stood at around 1.38 million, with the top five players accounting for 82%\[12\] of the installed base. However, the penetration is very low proportion of retailers (the total number of retailers in India is estimated to be 13 million\[13\]).

**POS density in India (number of POS terminals to million people) is very low compared to similar economies such as Brazil, China and Russia. The total transaction volume processed at the POS is also very low for India.**


High cost of acceptance and liability risks: Due to low transaction volumes, small merchants often end up paying higher charges (merchant discount rates [MDRs]) as compared to large merchants. The monthly rental of hardware and various service fees also significantly increase the cost of acceptance. Small merchants often operate on thin margins, and high acceptance cost and limited usage make upfront investments in hardware unviable.

Furthermore, over the last few years, there has been an increase in the circulation of premium cards that attract higher interchange. This puts additional margin pressure on merchant acquirers as the interchange costs go up.
The case for Mobile Payments in India

Costs of acceptance for merchants in India

Costs of electronic payments are prohibitively high for merchants

Electronic payment form factors

Costs of electronic payments

Merchant discount rate

Monthly rental charges

Late settlement fee

Credit cards

Debit cards

E-wallets

Low transaction charges

Set-up charges

Paper roll charges

Costs of cash payments

Handling costs

Staff salaries

Transportation costs

Risk of loss/theft

Cash vs. Digital transaction costs - Cash wins by huge margins

0.75%-1% MDR for Debit cards

1.6%-2.5% MDR for other cards

Monthly low transacting charges

INR 195/- per terminal

INR 275/- per terminal

Annual maintenance charge

INR 750/- per terminal

Based on schedule of charges from banks for merchant acquiring, EY analysis
In the traditional 4-party model, the transaction fee is divided between the issuer, the acquirer and the network, and the merchant bears the cost of transaction. Typically for the Indian context, the following is the transaction fee break-up for credit and debit cards:

<table>
<thead>
<tr>
<th>Fee</th>
<th>Credit Cards</th>
<th>Debit Cards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transaction fee (merchant discount rate)</td>
<td>1.8%</td>
<td>1% for transactions above INR2,000 and 0.75% for below INR2,000</td>
</tr>
<tr>
<td>Issuer charges (interchange income)</td>
<td>1.2%</td>
<td>0.5% - 0.6%</td>
</tr>
<tr>
<td>Network charges (from the scheme)</td>
<td>~0.15%</td>
<td>~0.15%</td>
</tr>
<tr>
<td>Acquirers fee (income)</td>
<td>0.25% - 0.3%</td>
<td>0.15% - 0.25%</td>
</tr>
</tbody>
</table>

(Based on industry insights)

Standard acquiring involves major fixed cost components such as low or no transacting charges, annual maintenance fee and miscellaneous charges. In addition, the merchant also has to pay an MDR on the total transaction volume. The following table gives an estimate of the costs incurred by a merchant for accepting payments at POS terminals.

### Cost considerations for merchants (low transacting merchants)

<table>
<thead>
<tr>
<th>Charge Type</th>
<th>Amount</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low transacting charges (applicable for the month with volumes below INR25,000)</td>
<td>1,000-1,200</td>
<td>Per annum Calculated on an annual basis considered for six months for a merchant (at INR195 per merchant per month)</td>
</tr>
<tr>
<td>Annual maintenance charge</td>
<td>600-850</td>
<td>Per annum Based on average charges levied by acquiring banks</td>
</tr>
<tr>
<td>Fixed cost per year</td>
<td>~1,800</td>
<td>Per annum</td>
</tr>
<tr>
<td>Fixed cost per month</td>
<td>~150</td>
<td>Per month</td>
</tr>
</tbody>
</table>

### Parameter | Assumptions (Based on industry standards)

- **Number of transactions per month per POS terminal**: 100
- **Average ticket size per transaction on a POS terminal**: INR 500
- **Transaction charges**: 1.1% (assuming 70% of the transactions are processed through debit cards, and 30% through credit cards)
- **Costs per month (transaction costs)**: INR550
- **Total fixed cost per POS terminal per month**: INR150
- **Total fixed charges per POS terminal (as a percentage of volume)**: 0.3%

**Percentage cost of acceptance per transaction on POS for a merchant**: 1.4%

Additionally, acquiring banks may impose charges for paper statements, duplicate statements, delayed settlements, terminal damage and consumables as well as non-transacting charges and monthly rentals, increasing the total cost for merchants. In most cases, merchants are not aware of the penal charges and, once levied, may end up discontinuing the service.

Small merchants operating low-margin retail outlets find it difficult to part with transaction charges from their own margins, thereby making the overall proposition very weak.

With an increase in card issuance and transaction volumes, reduction in the cost of hardware and the industry becoming more competitive, fixed charges associated with card transactions at POS terminals may go down and the overall cost of transactions may get reduced.

With alternate ways of accepting merchant payments at the POS, both fixed and variable costs can come down. The following are a few examples of such alternate ways of payments:

- **QR code-based payments**: Merchants are given a QR code to display. Customers can just scan the QR code from their wallet app and enter the amount, which is automatically deducted from the wallet or a linked account and a notification is sent to the merchant.

- **OTP-based payment**: Merchant payments can also be made using OTP authentication. Although this system has been adopted by some providers, widespread adoption is yet to happen.

- **Reduced cost for on-us transactions**: For transactions that happen within the acquirer’s ecosystem such as wallet transactions or within bank account transactions, it is possible to reduce the cost of such transactions significantly.

These methods eliminate the requirement of a physical terminal – making rental and consumables costs near zero – and take care of issues and costs related to merchant setup, installation of terminal and dial-up network connectivity.

EY analysis: Estimates based on market standards such as average ticket size and annual maintenance charges.
The following schedule of charges highlights how replacing the traditional terminal with merchant-owned mobile as the primary form factor for accepting payments can affect the overall cost of transactions for merchant.

<table>
<thead>
<tr>
<th>Illustrative cost considerations for mobile-based merchant payments</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of transactions per month per terminal</td>
<td>100</td>
</tr>
<tr>
<td>Average ticket size per transaction</td>
<td>INR 500</td>
</tr>
<tr>
<td>Transaction charges per transaction on merchant-owned mobile device(^4)</td>
<td>0.84% (Weighted average for debit cards, credit cards and wallets; assuming 70%, 10% and 20% of transactions are paid for through debit cards, credit cards and wallets respectively. MDR for wallets at a large issuance scale at a low cost of cash-in is assumed to be 0.5%)</td>
</tr>
<tr>
<td>Variable costs per month</td>
<td>INR 420</td>
</tr>
<tr>
<td>Percentage cost of acceptance per transaction on a merchant-owned mobile device</td>
<td>0.84%</td>
</tr>
</tbody>
</table>

The overall cost of acceptance transactions can be reduced by driving mobile payments and wallet transactions. As more transactions are done on wallets or within the closed user group of merchants and customers being part of the same payments system provider (or bank), the cost of merchant payments acceptance can be brought down further.

**Complex onboarding of merchants:** Fraudulent merchants can compromise consumer trust in any payments system. To ensure that consumers can safely transact at any card-accepting location, banks often have cumbersome merchant verification and onboarding processes. While these processes are critical for protecting the consumer, they increase the operational cost for banks and can act as a hindrance in building merchant payments at scale.

**QR code-based merchant payments**

Several wallet companies have introduced the feature of QR code payments to drive acceptance of digital payments in the country. This can potentially reduce the cost of merchant set up (POS terminal cost) and cost of regular servicing in addition to making the merchant onboarding process very seamless. Merchants can do a self-onboarding for accepting payments making the overall process very efficient.

The merchant's wallet has an associated QR code that can be displayed at the cash-counter

The customer scans this QR code through the mobile wallet app, specifies the amount and chooses to pay through stored value or stored credentials

Once the transaction is complete, an SMS and in-app notification is sent to the merchant and the customer communicating the same

**Aadhaar-based payments**

Payments can be processed by authenticating a customer using biometric scanners and debiting the account linked to the Aadhaar database. With the reducing cost of biometric devices and mobile phones coming up with iris scanners, this can potentially extend to merchant payments.

The customer scans his/her fingerprints through the biometric scanning device(or enabled phone)

Customer authentication is done through the Aadhaar-associated account number and the transaction is processed for the required amount

Once the transaction is complete, a confirmatory SMS and in-app notification is sent to the merchant and the customer
### UPI payments

UPI intends to provide a unique ID to each customer, acting as the payment address through which the customer can transfer funds electronically through the mobile. This can make digital payments more appealing for the targeted rural customers by eliminating the need to input account details each time a transaction is being done.

- **Push payments through UPI**
  - The customer logs into the UPI application provided by the PSP and enters the amount and the merchant’s handle (e.g., Grocer@ABCD).
  - The customer authenticates the transaction using MPIN.
  - The transaction is processed by the PSP through the UPI network and authorized by the customer’s bank.
  - Once authorized, both the merchant and the customer get a payment notification.

- **Pull payment through UPI**
  - The merchant logs into the UPI application provided by the PSP and requests payment by entering the customer’s payment address (e.g., Customer@XYZBank) and the amount.
  - The transaction is processed by the PSP through NPCI and an authorization request is sent to the customer via the customer’s PSP.
  - Once approved, the transaction is processed by debiting the customer’s account, crediting the merchant’s account and providing a transaction notification to both the merchant and the customer.

#### 3.2 Why mobile is the future of payments in India

Mobile has come a long way in India, from being a luxury to a utility available to all. India leapfrogged landlines and became one of the largest mobile markets in the world. At the end of 2015, there were an estimated 798 million unique subscribers with 997 million connections. Similarly, smartphone penetration in India was estimated to be at 239 million in 2015 and is expected to grow to 702 million by 2020.

**Smartphone adoption trends in India**

<table>
<thead>
<tr>
<th>Year</th>
<th>Smartphone connections (million)</th>
<th>Smartphone penetration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>157</td>
<td>17%</td>
</tr>
<tr>
<td>2015</td>
<td>239</td>
<td>24%</td>
</tr>
<tr>
<td>2016</td>
<td>340</td>
<td>32%</td>
</tr>
<tr>
<td>2017</td>
<td>451</td>
<td>40%</td>
</tr>
<tr>
<td>2018</td>
<td>544</td>
<td>46%</td>
</tr>
<tr>
<td>2019</td>
<td>629</td>
<td>51%</td>
</tr>
<tr>
<td>2020</td>
<td>702</td>
<td>55%</td>
</tr>
</tbody>
</table>

**Source:** “Mobile Subscriptions and Revenue Forecast: 2015-20”, Ovum Knowledge Centre, November 2015

### Growth in e-commerce:

- **Online retail transactions:** Online retail transactions are estimated to reach INR 500 billion by the end of 2016.
- **The mobile internet subscriber base is expected to be around 1 billion by 2020.**
- **Mobile wallets 7x number of credit cards:** Wallet companies in India have around 140-150 million users – almost seven times the number of credit cards.
- **India is likely to become the second largest internet user base next to China by the end of 2016.**

**Source:**
- Ovum Smartphone Connections Forecast 2015-20, February 2016
3.2.1. Mobile-initiated transactions are gaining traction

Mobile-initiated payments are gaining traction in India, especially among urban customers who have started using mobile wallets for services such as topping up airtime and paying for food delivery and taxi services. The RBI has been innovative in permitting non-banks to provide financial services through pre-paid instruments and more recently by issuing Payments Bank licenses. New entrants are not encumbered with legacy infrastructure and cost.

Lower presence of branch infrastructure, thin margins and micro transaction value will push them to look for the lowest cost of service delivery and the lowest common denominator to service customers at scale. Establishment of BCs as cash-in points, innovation in handheld devices that are always connected and interoperable service such as IMPS and card payments have decoupled traditional banking processes from legacy infrastructure.

Mobile-based prepaid wallets have captured basic use cases such as recharges and bill payments and are now expanding their footprint in the online and offline worlds by collaborating with Fintech companies to enable acceptance at supermarkets, restaurants and retailers. As commerce itself has moved to mobile, consumers have found these services convenient to make everyday payments and have rapidly adopted them.

As the entire ecosystem comprising of hardware manufacturers, merchants, governments, telecom companies, payment companies and banks focus on mobile as a means of service delivery, mobile payments in India are expected to grow exponentially.

3.2.2. Mobile is creating financial access at a low cost

Majority of the Indian population requires access to basic financial services that can be availed at low cost anytime and anywhere. Although initiatives such as Pradhan Mantri Jan Dhan Yojana (PMJDY) have led to the creation of 220 million bank accounts in the country and Aadhaar has created a digital identity highway for more than 1 billion people in India, financial services are still being delivered through traditional branch and BC models. As a result, the cost of servicing still remains high and the account activity rate remains low.

BCs majorly function as a point of cash out and cash usage is high. For India to move to a cashless society, it is critical to bring on board the masses that reside in rural and semi-urban areas and not just focus on urban markets. Although there is growth in mobile banking transactions and volumes, the real impact would be realized when mobile is adopted for day to day transactions and becomes the preferred channel for the delivery of financial services.

For payments to happen digitally, the cost of onboarding, funding, servicing and authorizing has to be near zero. While Aadhaar has created a digital identity, it still relies on biometric-based e-KYC that requires expensive hardware and for customers to travel to a location where they can authenticate themselves.

With manufacturers adding features as fingerprint scanner in devices, mobile phones can easily eliminate the need for customers to be physically present for KYC. Customers could open a new account and perform all banking activities without having to go to a branch or a BC. Furthermore, this could be extended to transaction authentication and payments as well.

With the decreasing cost of smartphones, it is easy to imagine a scenario where consumers self-authenticate using a biometric sensor on the phone, iris scan using the phone’s camera or Aadhaar + OTP. Authentication confirmation and the e-KYC are then pushed to the financial service providers. Cash-in happens through BCs next door or through another customer who can transfer value in exchange for cash. The electronic value loaded in the customer’s wallet or bank account could then be used for making purchases at a nearby store or at an e-commerce site.

3.2.3. Mobile has the potential to be a one-size-fits-all platform

In a country as diverse as India, there is a reliance on traditional ways to make financial services accessible. To create large-scale financial access in the near term, India will need a complimentary approach that leverages technology to deliver services along with the traditional banking infrastructure to provide the necessary controls.

Mobile phones can extend the reach of banking services to the last mile either through BCs or directly to the end consumer. The flexibility of technologies such as USSD and magnetic secure transmission makes them capable of meeting the future needs of customers, merchants and service providers.
### The case for Mobile Payments in India

#### Employment-related services

<table>
<thead>
<tr>
<th>Business</th>
<th>Agriculture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary payments for unorganized industry segments (SME/MSME)</td>
<td>Agri-procurement payments</td>
</tr>
<tr>
<td>Relevant financial products such as crop insurance</td>
<td></td>
</tr>
</tbody>
</table>

#### Government payments and mobile financial services

<table>
<thead>
<tr>
<th>Mobile Financial Services</th>
<th>Government Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro-credit, insurance and mobile-led distribution of investments and savings</td>
<td>Tax collection</td>
</tr>
<tr>
<td>Welfare and subsidy payments (DBT)</td>
<td></td>
</tr>
</tbody>
</table>

#### Retail payments (Consumer to Business)

<table>
<thead>
<tr>
<th>Merchant payments</th>
<th>Bill payments and recharges</th>
<th>Transit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online payments (e-commerce)</td>
<td>Water, electricity payments</td>
<td>Payments for local transportation (Metro/ Rail/Bus/Taxi)</td>
</tr>
<tr>
<td>Physical retail (proximity payments)</td>
<td>Telecom and DTH recharges</td>
<td></td>
</tr>
</tbody>
</table>

3.2.4. Mobile can lower the cost of merchant acceptance

Merchant underwriting and onboarding is a complex process that requires physical verification and documentation of the merchant. Aadhaar can streamline the process of merchant documentation: credit bureaus can provide proxies for merchant risk and merchant acceptance can be enabled through a mobile app.

Customers can either push tokenized payments through unique merchant identifiers or merchants can request payments by delivering the invoice from their mobile devices. This transaction could be done at the merchant outlet for real time face-to-face transactions or as payments presentment for online transactions. Eliminating traditional onboarding, hardware and authentication and strong connectivity will result in reduced cost of payment acceptance for merchants.

3.2.5. Mobile can enable exchange of information along with transactions

Historically, payment systems have been designed to carry financial messages specific to the transaction from point to point. Consequently, host systems were designed process financial messages in a structured manner and have limited ability to process non-financial information. In the current scheme of things, payments are increasingly becoming local, contextual and secured with risk-based authentication algorithms built on a variety of information parameters. Mobile phones provide the capability to seamlessly exchange additional information related to transactions and process the payments.

Furthermore, various adjacencies can be explored along with mobile payments. For example, a merchant is more likely to use digital payments if they eventually facilitate the merchant in securing credit by creating a credit history. Similarly, customers are more likely to use digital payments if the transactions are convenient and they are rewarded for spends through a merchant loyalty program.

**Digitizing payments at quick service restaurants (QSRs)**

Leading coffee chains and QSRs are integrating menu, ordering, payments and loyalty within the mobile apps. This not only leads to quick turnaround at the stores, but also engages the customers better.

3.2.6. Mobile payments can be as secure as card-based payments

To ensure continued adoption of digital payments, it is critical to protect consumers against fraud, especially in a developing ecosystem such as in India. Fraudsters have become extremely sophisticated and hence it is critical that the future payments systems are capable of meeting such threats. While chip-and-PIN-based payments have added an additional layer of security over the less-secure mag-stripe cards, a similar level of security layer can be built on mobile-based payments as well. In addition to the secure element embedded in phones, which is analogous to the chip on cards, mobile phones are also capable of securing consumer information through the use of tokens, device ID and biometric authentication.
In spite of the significant advantages of using mobile payments, they are yet to become a reality in most countries. Unless timely action is undertaken in India to overcome these challenges, it is unlikely that they will take off at scale and their benefits will not accrue to the goal of a cashless society in India.

### 4.1. Closed-loop payments

Currently, outside of NFC devices that ride the rail of the existing card-based payment system, mobile payments are largely being driven by single owners that are creating closed-loop payment systems. Closed-loop payment systems with remittances as the core proposition may work well for small countries with a few large players but for a country as diverse as India, it is critical to have standards and interoperability among various mobile payment systems. In this regard, initiatives such as UPI and IMPS will be critical in creating a mobile payments network that is interoperable across banks, payment companies, devices and channels.

### 4.2. Speed of transaction

The speed of mobile payment transactions is still slow, especially at the POS, where consumers and merchant look for a quick turnaround. Moreover, in areas of poor connectivity, transactions often fail or time out. This results in a poor consumer experience, which dis-incentivizes them from making mobile payments.

### 4.3. Digital literacy of consumers

A large segment of the target population is not comfortable with the use of technology. Service providers will need to invest in simplifying the technology and interface, and in educating customers.

Indian consumers are in the process of going online to access basic mobile phone services. Because there is no standard platform around which mobile payments are evolving, there is a lack of understanding among consumers and merchants on how they can use mobile payments services. When transactions fail or are stuck at a certain point, they are unsure of the alternative available to them and its timeliness. Moreover, in a country such as India, mobile as a platform has to be multi-lingual and should be capable of eventually enabling voice-based transactions.

### 4.4. Trusting non-banks as financial service providers

Rural India has largely remained excluded from mainstream banking, to the extent that some of the people believe that banking is not for them. In the process, they hoard cash or resort to informal methods of credit such as money lenders. There is a long history of unscrupulous money lenders in India taking advantage of the rural poor in India. Consumers are inherently slow in changing their habit and trusting new service providers, especially when it relates to their finances. Public and private institutions need to come together to educate consumers on how to use mobile as a banking and payments platform to help build trust in the system.

### 4.5. KYC process

The KYC process in India is still cumbersome. Most banks and telecom companies require proofs of identity and address in the physical form to open bank accounts. Opening a full KYC-compliant mobile money account can take upward of three to four days. While e-KYC has solved the problem of real-time authorization, it requires investment in biometric devices, which are currently expensive. However, with smartphones getting embedded with biometrics (fingerprint and iris scanners), the cost challenge of large-scale procurement of hardware for biometric authentication for KYC or payments is expected to be resolved.

Mini KYC accounts with reduced limits have also helped in overcoming this problem, as evidenced by the rapid scale-up of mobile wallet companies. To create improved access, ideas such as KYC portability, shared KYC among institutions and shared procurement of biometric devices at the BC level should be explored.

### 4.6. Easy availability of cash

For Indian consumers to use mobile payment services on a regular basis, it is critical that they are ensured that the stored value can easily be converted into cash if required, even in the remotest parts of the country. For instance, even the most financially literate and digitally initiated people in India prefer to carry cash while traveling. Having the comfort of being able to convert stored value to cash is very critical to the Indian context for widespread adoption of mobile payments. UPI can potentially solve this problem by simplifying P2P transfers so much that a person can transfer money to anybody in exchange of cash.
BCs in remote locations are not easily accessible or they become inactive due to low transaction rates. Unless there is a framework at an industry level to ensure the availability of cash at BCs and their viability, consumers are unlikely to use mobile as a store of value.

4.7. Security concerns

Security remains an important issue that needs to be addressed for the success of mobile money services. While mobile networks already have encryption on the messages transmitted across the network, mobile transfers require additional tracking and logging for regulatory demand. As services become NFC-based, additional security issues may crop up with stored value applications on the NFC chip.

4.8. Regulatory barriers

The regulatory framework for financial transactions via mobile phones is currently not well developed in most countries. As regulations evolve, mobile banking service providers may have to comply with strict controls such as KYC requirements to prevent money laundering, terrorism funding and so on, which may add costs and slow down the pace of adoption.
5. The way forward

Growth in mobile payments marks a significant shift for the entire payments infrastructure of India. There has been a convergence of interest of various stakeholders, which has created an enabling environment for the development of mobile payments – the regulations on Payments Banks, the Central Government’s focus on financial inclusion, the near universal coverage of Aadhaar as a digital identity, the innovations across payment systems and the rapid adoption of smartphones in India.

A lot is happening in the mobile payments space; however, there is a clear need for a cohesive approach among the various stakeholders – banks, telecom companies, regulators and other payments companies – which are developing platforms independently. While closed loop platforms with remittances as the core proposition have worked successfully in other parts of the developing world, similar attempts in India have had limited success. A standardized, interoperable system is a necessity for a multi-stakeholder ecosystem such as India.

Mobile should be the preferred payments form factor for urban transit

Urban transit is an important use case that can have mobile as the primary form factor for payments. For use cases such as metro transit, bus ticketing and toll collection, commuters prefer to transact in a seamless way – e.g., the high usage of preloaded metro cards instead of single-journey tokens. Therefore, it is a significant development area for mobile payments that needs to be jointly explored by banks, payment service providers and civic bodies.

Securing transactions will lead to a seamless payments experience

Triangulating information from multiple data points (such as customer and merchant transaction analysis, location, device fingerprinting and value-volume thresholds) can help in developing algorithms to contain risks and pre-empt frauds. This will help build consumer and merchant trust in the system. Based on transaction data, customers and merchant can be profiled and rated: high transacting merchants or customers that demonstrate preferred behavior (no chargeback claims for merchants or high transaction frequency along with no dispute history for customers) can be offered one-tap payments.

Mobile-based payment models can be cost effective and easily scalable

The traditional 4-party model of merchant payments is cost-prohibitive in terms of both transaction costs and the associated hardware and service fee. Therefore, mobile-based payment models need to be developed that can reduce hardware and service costs to near zero, innovate the processes to facilitate self-onboarding by merchants to reduce costs, and explore alternate revenue streams instead of focus on transaction fee. These solutions should also be asset-light and rapidly scalable, considering the scalability and adoption challenges of the traditional merchant payments infrastructure involving POS terminals and telephone connections.

A universal mobile payments infrastructure would benefit the industry

Over the last few years, non-banks – especially prepaid platform operators – have focused on building an acceptance network for physical merchants using wallets as the primary form factor. While it is a good initiative toward the digitization of cash transactions, it could lead to multiple closed user groups for mobile payments tagged to different platforms, rather than a universal mobile payments infrastructure. At a system level, the same merchant will be acquired by banks for POS terminals and by multiple prepaid operators for wallet acceptance. Hence, a common platform for acquiring merchants for multiple payment modes that enables interoperability could be a prudent approach for the industry.

Policy and industry focus will be a key driver for the mobile payments space

A joint policy-making or go-to-market approach on mobile payments by the industry players, facilitated by payments bodies can help in expanding the market and increasing adoption. Such policy decisions for facilitating mobile payments can take into consideration the requirements of prepaid operators, banks and telcos for building and scaling up the infrastructure and transaction rails required for payments. The Government can possibly bring in restrictions that limit transactions done in cash beyond a defined threshold. The regulators and payments bodies also need to act as facilitators by taking initiatives such as standardizing merchant acceptance norms to simplify the merchant onboarding process.

Apart from focusing on the regulatory and operational aspects, the stakeholders also need to put in significant efforts in educating customers considering the low digital literacy in the country. Cash transactions continue to be the dominant form of payments, and users – especially from low-income groups – prefer cash to digital forms of payments. Getting customers informed about and comfortable with the new platforms will be pivotal to the widespread uptake of mobile payments in the country.

The success of mobile payments hinges on institutional initiatives, product and process innovation from operators, a supporting regulatory environment and channelized efforts of the industry players toward a common objective.
Endnotes

1 Mobile Subscriptions and Revenue Forecast: 2015–20, Ovum Knowledge Centre, November 2015

2 “Mobile Payments to Continue Showing Strong Adoption Rate”, http://fintechranking.com/2016/04/14/mobile-payments-to-continue-showing-strong-adoption-rate/, 14 April 2016


12 RBI POS statistics data: November 2015


14 The merchant discount rate has been assumed as 0.8%, 1.8% and 0.5% for debit cards, credit cards and wallets, respectively.


16 Ovum Knowledge Center: Smartphone Connections Forecast 2015-20


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