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R E P O R T





In the omni commerce world Simplify to Amplify

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Foreword by Banking Frontiers

Simplify to Amplify!

The payment industry globally has seen witnessing rapid transformation. We at Banking Frontiers began this journey of tracking the payment trends with 'M-Pay Insights - In search of Tipping Point', which we began in 2014, where we predicted the year of 2017-18 would be the tipping point. It is exciting to see how demonetization in November 2016 impacted the payments systems and facilitated a quantum jump, even as the focused efforts by the government, regulators and the NPCI created an environment for the evolution of a new payment ecosystem.

Globally, the fintechs have disrupted the payments ecosystem. The opening up of the banking systems to APIs has brought in several innovations in payments right from social media based payments to that of deeper engagements with data sciences and analytics to take super leaps. The blockchain has already



made a great headway as shown by the growing number of successful case studies. These studies clearly indicate blockchain would not spare the BFSI sector. The north ward movement of the value of bitcoin has instilled a lot of confidence in crypto currencies. The increasing penetration of digital lending companies all over the world is another interesting trend to watch, which strongly emphasizes the statement of Bill Gates that banking is necessary while banks are not.

The year 2016 was historical for the payment systems in India. Besides the digital taking strong roots, the fintech collaborators have brought in transparency, instant (speed), experience and security into the system. Initiatives such as Aadhaar enabled payments system, Bharat QR and BHIM have facilitated the systems to get deeper into realms like financial inclusion. The UPI already is becoming a de-facto standard for the payments with almost every technology provider and banker evolving strategies and solutions around it. The government's target for achieving 25 billion digital transactions by March 2018 has been seriously accepted by the industry and the entire ecosystem is now strongly working towards it.

The dream of less cash is still not a reality. Though the number of cash transactions has come down, the volume remains more or less at the earlier levels. This calls for lot of efforts on the part of the ATM industry. It has been a tremendous work that ATM operators have done during demonetization.

Though the digital thrust and demonetization overshadowed frauds like the cyber heist that struck the Bangladesh Bank and the number of ATM frauds that happened in India, there can be no slowing down on the security and fraud management domains. These continue to remain the topmost priority.

Well ... overall, the scenario is really exciting and we are probably in the most exciting times.

I would like to thank Deloitte, our partner for this wonderful research, and hope to strengthen this relationship with more and more such joint projects.

I often remember Shakespeare's words in Hamlet: 'We know what we are, but we don't know What we may be." Our aim in organizing PayNext is to unravel what is hidden and what is about to happen.

Best wishes

Babu Nair

Group Publisher- Banking Frontiers

Message from Deloitte

The last 5 years have witnessed an accelerated shift towards a Digital economy which accelerated post demonetization. Digital payments today are multi-device, multi-functionality, ranging from traditional cards, mobile banking to m-wallets, Aadhaar based, NFC based, QR codes, UPI & BHIM.

However, the adoption of digital payments is not consistent across instruments and customer segments. In order to transition to an inclusive digital economy, it is imperative to strengthen the acceptance infrastructure in India. With only 2.5 Mn merchants with a POS, creation of 'acceptance infrastructure', enabling every merchant to accept digital payments will be crucial in moving to a digital economy.



We believe with UPI, Bhim, QR codes, Aadhaar Enabled Payment Systems, there will be shift of digital payment from cards and wallets, which will result in fragmentation in the market in the short run. However, in the long run, options which ensure customer convenience, reduce friction, build trust and reliability will be preferred by the customers. We see platforms and partnerships emerging across traditional and non-traditional players to take ecosystem based offerings to customers, catering to both financial and non-financial needs of the customers. We also see emerging business models and better models to manage financial risks based on digital data.

The current adoption of emerging FinTech – Artificial Intelligence, IoT, Blockchain, Biometrics, API based Banking – is nascent, players have started experimenting with understanding the value of these technologies.

This report covers an analysis of the evolution of digital payments in India, emerging scenarios and key issues relevant for sustaining, simplifying and scaling digital payments in India. The report also covers trends we see emerging, as the lines between banking and technology blur, new and incumbent players experiment with different business models based on digital data.

We present our views on the innovations in the payments ecosystem, challenges and imperatives for sustainability and penetration of digital payments, establishment of a payments ecosystem through partnerships and global revolutions in technology in India's context.

We hope that you find the key insights and findings in this paper relevant and useful.

Monish Shah

Partner

Deloitte Touché Tohmatsu India LLP

Digital payments revolution in India

Introduction and Context Setting

India's Financial Services industry is undergoing a dramatic shift and a combination of forces at play are leading India's transition to a 'less cash' economy (Exhibit 1). Four forces are transforming India's digital economy –

- Digital adoption by consumers and small merchants with close to 1 Bn mobile connections (1/3rd of which are projected to be mobile internet users in 2017) ¹ and 2.6 Mn POS installations ², digital adoption by consumers and merchants is an important force driving the shift to a 'less cash society'.
- Policy measures by GOI and RBI subsequent to the demonetization of INR 500 and INR 1,000 notes in November 2016, both GOI and RBI announced a series of policy measures for the promotion of digital payments. Key actions in this regard were: an expansion of digital payments infrastructure at the merchant establishments; expansion of digital payments in rural areas; reduction in the MDRs on debit card transactions; incentivizing digital payments at fuel pumps, insurance portals, rail tickets, toll plazas etc; budgetary measures (e.g. set the limit of cash based high value transactions at INR 3 Lakh), relaxation in the PPI norms (though new norms could be more stringent), waiver of charges on IMPS, UPI and USSD based *99# platform transactions, launch of BHIM application and launch of Bharat QR codes amongst a series of measures.
- Buildup of a National Payments Infrastructure by NPCI with a number of products and services i.e. BHIM/ UPI, BBPS, AEPS, Bharat QR code, USSD *99#, IMPS and potentially an inter-operability within the PPIs, the payments infrastructure is graduating to a multi-functionality, multi-device, multi-purpose setting up a base platform for growth of a digital economy. Additionally, the with the national broadband highway as part of Digital India initiative covering 250,000 gram panchayats through the national optical fiber network (NOFN) and urban coverage leveraging the virtual network operators (VNO) for service delivery and communications.
- New entrants to the Financial Services Industry the financial services landscape in India is more diverse today with the introduction of payment banks, small finance banks and FinTechs. Diversity in the financial services landscape will enable a better penetration of financial services and drive financial inclusion. At 58.7%³ of Indian households availing banking services, the new entrants, particularly payment banks and small finance banks, will be instrumental in extending financial services to farmers, small savings customers, middle and low income households, micro and small enterprises, across sectors and the migrant labor workforce which remits money to hometowns.

Going forward we believe that Financial Services in India will enable digitalization of cash in business domains that were predominantly cash (e.g. transportation, retail, travel & hospitality, pharma, food restaurants) which will require cross-industry collaboration leading to emergence of ecosystems and emergence of a multi-functionality, multi-dimensional FinTech platform. The purpose of the paper is to discuss in the Indian context, digital payment trends, emerging scenarios due to digital payments, payment innovations and implications and considerations for the regulators, traditional banks and new entrants to simplify to amplify the adoption of digital payments, with an end state goal of a "less cash digital Indian economy". In order to validate our thinking we interviewed Senior Leaders from the Financial Services Industry, and their views are presented in our report.

¹Technology, Media and Telecommunications Predictions 2017, Deloitte

²RBI Payment System Indicators

³https://rbidocs.rbi.org.in/rdocs/Speeches/PDFs/MFI101213FS.pdf

Exhibit 1: Forces impacting payments landscape in India



Source: Internet Reports, Deloitte Analysis

Growth in Digital Payments – an exponential shift to a 'less cash' digital economy

There has been an exponential growth in payment volumes across all instruments in India. As of March 2017, total monthly volume of six payment instruments – RTGS, Paper Clearing, Retail Electronic Clearing, Cards, Pre-paid instruments (PPIs), M-Banking – have touched 2121.61 Mn transactions, with card transactions (debit and credit cards) at 51% of all payment transactions (Exhibit 2). The total volume has grown 2.7 times over a five year period starting April 2011. The growth in the last 5 years has been primarily driven by cards (2x growth), PPI instruments (64x growth), m-banking (38x growth) and electronic banking transactions (8x growth), which constitute 94% of the total payment transactions in 2016-17 (Exhibit 3). Card transactions at ATM and POS constitute 59% of the total payment transactions in 2016-17 and are primarily driven by two factors – growth in issuance of cards (debit & credit) and growth in the acceptance infrastructure of the cards (Point of sale terminals, online websites and ATMs).



Exhibit 2: Payment Systems Indicators

Source: RBI Payment Systems Indicators, Deloitte Analysis



Exhibit 3: Annual Volumes

Source: RBI Payment Systems Indicators, Deloitte Analysis

Note: RTGS (includes only customer transactions), Paper clearing (includes CTS, MICR clearing, Non-MICR clearing), Retail electronic clearing (includes ECS DR, ECS CR, EFT/ NEFT, IMPS), Cards (includes Credit and Debit

cards usage at POS and ATM), PPIs (includes m-wallet, PPI cards, Paper vouchers) and Mobile banking data is from April 2011 to March 2017.

Post demonetization, a new norm has been established in digital payments, which has laid a strong foundation for India's transition to a "less cash society". The new norm includes –

• An increase in the number of card present point of sale terminals (growth 1.7x post demonetization) and a decrease in the number of ATMs (decline 0.06x post demonetization) (Exhibit 4). The new norm we expect will be an acceleration in the rate of deployment of point of sale acceptance touchpoints due to emerging technologies such as m-POS, Aadhaar based micro-ATM terminals & point of sale terminals, and Bharat QR code.

Exhibit 4: Number of card acceptance points at end of year/ period (Mn)







Source: RBI ATM and Card Statistics, Deloitte Analysis

Post demonetization there were 128 Mn additional debit cards (1.1x growth over October'16) and 4 Mn additional credit cards in circulation (1.2x growth over October'16), and with 898 Mn debit cards and credit cards in circulation as of April'17 (Exhibit 5) there has been a dramatic increase in card usage (debit and credit cards) at the point of sale terminal, a) since April 2011, and b) post demonetization, versus a decline in ATM transactions post demonetization (Exhibit 6). At the same time, there has been an exponential increase in the Aadhar Enabled Payment System (AEPS) transactions over the micro-ATMs (cash withdrawal/ cash deposit) (Exhibit 7). The new norm will being an increase in cards in circulation over time and higher card usage on the point of sale terminals, AEPS micro-ATM terminals and for e-commerce. With the entry of Payment Banks, we believe the e-commerce and AEPS transactions in volume and value terms will increase in the future. It may also happen that the physical card may get marginalized with an increase in the AEPS and m-wallet transactions.



Exhibit 5: Cards in circulation (million)



Number of debit cards in circulation at end of year/ period (Mn) $% \left(Mn\right) =0$

Exhibit 6: Debit card usage at POS and ATM



Source: RBI ATM and Card Statistics, Deloitte Analysis

Number of credit cards in circulation at end of year/ period (Mn)

Exhibit 7: AEPS (Interbank) Transaction over Micro ATM (cash withdrawal/ cash deposit)



Volume of AEPS MicroATM Transactions (Mn)

Value of AEPS MicroATM Transactions (INR Bn)

Note: 2017-18 figures are a linear 12 month projection of April 2017 figures

Post demonetization, the volume of debit card usage at ATM as a proportion of total volume of five digital payment instruments (m-banking, PPIs, debit cards at POS & ATMs and credit cards at POS) has dropped by 19%. On the other hand, the combined volume of card (debit & credit) usage at POS and PPI's volume as a proportion of total volumes of five instruments has increased to 45% followed by mobile banking (7%). Debit card usage at ATMs as a proportion of the five digital payment instruments has declined since April 2011 from 90% to 46% (Exhibit 8). Within card usage at POS (debit and credit) and m-wallets, the proportion debit cards and m-wallet volumes combined have increased to 85% of the total transactions from 73% at the time of the demonetization announcement. Credit card transaction volumes at POS as a proportion of the card at POS and m-wallet transaction volumes have decreased from 51% in April 2011 to 15% in March 2017. The new norm post demonetization has been an increase in the usage of m-wallets and debit cards for retail transactions.

Exhibit 8: Digital Payment Volumes

Monthly digital payment volumes as a proportion of all digital payments (mobile banking, debit card at POS, debit cards at ATMs, PPIs and credit card at POS), %



Source: RBI Database, Deloitte Analysis

Exhibit 9: Retail Payment Volumes



Monthly digital payment volumes as a proportion of all digital payments (debit card, credit card and m-wallets), %

Source: RBI Database, Deloitte Analysis

Given the new norms post demonetization, there are key questions to be answered going forward -

- 1. How to scale inclusion in digital payments?
- 2. What are the key imperatives for scale of digital payments?
- 3. What are the implications for key stakeholders?

Scaling inclusion in digital payments

Despite the significant uptake of digital payments among certain population segments (young, urban, salaried, etc.), a significant portion of the population still prefers to transact in cash, due to unaccounted wealth and/ or issues with digital payments around awareness, access, trust, convenience, poor connectivity etc.

Key to building a digital acceptance infrastructure is addressing digital payment adoption amongst the Micro and small merchants. Micro and small merchants form a large category of the segment which continues to prefer cash transactions. There are two dimensions to solving for growth in the merchant acceptance infrastructure, a) increasing the base of merchants who accept digital payments from 2.61 Mn POS terminals to a 100% coverage, and b) increasing the number of active merchants amongst those who have POS terminals.

In terms of the base, the top five banks which contributed to 54% of the cards in circulation in March 2017, accounted for 88% of the POS terminals (Exhibit 10) where as, other top 13 banks with 300 Mn cards in circulation have only 0.21 Mn POS terminals.



Exhibit 10: Acceptance infrastructure network in India

Source: RBI Database, Deloitte Analysis Note: Data as of March 2017, Size of the Bubble indicates market share of cards in circulation and includes debit & credit cards Though merchant acquiring is an extremely important element in scaling inclusion of digital payments, banks have no incentive to enter into the merchant acquiring business, as the issuer banks get majority of the Merchant Discount Rate (MDR). Additionally, the merchant's size measured in terms of turnover and % of card transactions of the total turnover is an extremely important measure for the acquiring banks to profitably deploy the traditional card present POS terminals. This requires a minimum monthly volume commitment starting from INR 20,000 from the merchants, in order to avoid paying monthly commitment charges to their banks. Additionally merchants incur a merchant discount rate depending on the nature of transaction (debit card, credit card, value, onus and ofus), monthly rentals, installation charges etc. Assuming merchant's card transactions to be between 6% - 10% of their turnover and a minimum commitment volume of INR 20,000 – a target merchant for an acquiring bank would be with a starting annual turnover of INR 30 Lakh - thereby reducing the attractiveness of small and micro merchants (with annual turnovers less than INR 30 Lakh) for the acquiring banks. We believe, with the introduction of Bharat QR codes, mPOS plus entry of payment banks and m-wallet, FinTech's; and with new emerging business models in merchant acquiring such as cash@POS, transaction based lending, value added services such as loyalty, accounting, gift cards etc. - merchant acquiring business will see intense competition going forward both from traditional acquiring banks and new entrants. With this, the base of merchants accepting digital payments should increase from current 2.61 Mn POS terminals.

Additionally, in terms of merchant activation and an active merchant base - there are merchants who have installed POS terminals and are hesitant to accept digital payments, due to perceived risk and dispute management issues, coupled with transaction fees and a perceived higher incidence of tax. With the introduction of GST post July 1, all micro, small and medium merchants will have to digitize. Merchants will have to report every transaction which will create an online trail of goods and services delivered to consumers. While initially it may cause adoption challenges, we believe in the long term, merchants of all size will adopt digitalization including digital payments.

Going forward we believe that a scale in digital payments acceptance network (both issuing and acquiring) will give the large acquirers a competitive advantage from being able to capture a larger share of 'Onus' digital transactions (Exhibit 11), and in the process reduce MDRs while creating new revenue pools from offering banking products e.g. transaction based lending, current accounts, deposits, merchant value added services such as accounting, loyalty, GST compliance etc.



Exhibit 11: Scale matters

Emerging scenarios from digital payments revolution

In order to drive the digital growth, multiple new payments methods have emerged including mPOS, Bhim/ UPI, Bharat QR code, m-wallets, Aadhaar enabled payment systems and Bharat bill payment systems. Digital payments are now multi-dimensional and multi-functional maturing away from a card present/ POS based payment to multi-dimensional options including cards, wallets and other pre-paid instruments. This will lead to new scenarios within the financial services industry which will drive digital adoption and transition to a digital less cash economy in the coming years.

- Consolidation in the payments market as main acquiring banks and large payment players establish large acceptance networks and leverage scale of Onus digital transactions to offer additional value added services.
- A proliferation of payment offerings with varying use cases, will virtually remove the limitations on the number of payment options for a customer and acceptance options for a merchant.
- Transformation of POS terminal from card present to a multi-functional POS enabling additional payment services and value added services.
- Alternatives will emerge to traditional banks and incumbent banks will compete with Payment Banks, Small Finance Banks, PPI providers, FinTechs and NBFCs.
- Players will establish platforms across the value chain and enable a digital eco-system of non-traditional players.
- Platformication of services with an integrated product platform that goes beyond banking and embeds closer into customer's lives.
- Leveraging of transaction and other data by payments players to enable loyalty and decision making for other products.
- Players will establish partnerships which could be horizontal, vertical and diagonal in nature.

These scenarios are discussed in subsequent sections of this report.

Implication for stakeholders

These scenarios will have implications on various stakeholders in the ecosystem, including the government, regulator, quasi regulator, incumbents, new entrants, technology providers, and non-traditional players. Each entity will have a unique role to play in the shaping of the future of the financial services industry in India.

Policy makers need to maintain the focus on playing the role of an enabler in driving digital payments in the country. Policies and efforts around customer awareness, incentivizing and strengthening acceptance infrastructure, active collaboration with IT companies and merchant & trader bodies on digital infrastructure roll out, plus merchant training and awareness, regulations regards security and data, and standards for new technologies will go a long way in providing the required impetus to digital payments. In addition, a focus on stabilising and scaling the host of payment options introduced in the market in the last five years, will create the much needed trust in the minds of the various ecosystem participants, including customers and merchants, towards digital payments.

Incumbents, who have the advantage of being in the market for several years, need to understand the changed expectations of customers, and align their business and operating models accordingly. New entrants on the other hand, will have the advantage of a strong digital focus, a lean and agile model and capability to provide a superior customer experience.

As lines between competition and collaboration blur, identifying the right partnerships, can prove crucial to the success of both incumbents and new entrants, who have an inherent interdependency in order to survive and excel.

New use cases, are expected to emerge, as players collaborate within and outside their value chain, to find benefit in each other's capabilities and offerings, and reach the customers in newer ways. Payment players and banks are expected to create unique customer engagement models, which not only provide traditional banking and payments services, but help serve a host of other customer needs, both financial and non-financial.

New technologies such as Biometrics, Artificial Intelligence, Blockchain, and Internet of Things among others are expected to aid these players in reaching customers, creating a superior customer experience and creating new models. Technology providers are expected to interact extensively with banks and payment players, to customise the solutions to the specific requirements of the customers and the players.

The customer is expected to benefit hugely from these developments, and frictionless payments will hopefully be the new reality of India.

Payment Innovations - Moving beyond cards and wallets

Market Fragmentation in the short run: Multiple instruments with multiple use cases will marginalize physical cards

Infrastructure challenges have long held back India's digital payments growth. With issues such as poor internet and telecom network connectivity and limited power supply, transacting digitally is a challenge, not just in Tier 2 and 3 cities but even in Tier 1 cities at times. Traditionally used hardware POS devices face issues around supply of devices, merchant training, and purchase and maintenance costs. The digital payments growth story, as a result, has remained restricted to the top cities of the country.

Over the last 5 years, there has been a proliferation of payment models in the Indian market – card present POS, mPOS, NFC based, Aadhaar enabled, m-wallets, other pre-paid instruments, IMPS, NEFT/EFT, UPI/ Bhim, Bharat QR, BBPS, online marketplaces etc.

An expected outcome hence has been increased market fragmentation, with the proliferation of newer low cost payment solutions with varying use cases. The newer options such as Bharat QR code, UPI/ Bhim, m-wallets, are expected to marginalize the physical cards and virtually remove the limitations on the number of payment options for a customer. The increasing preference for newer solutions is highlighted by the fact the number of transactions garnered by PPIs, especially m-wallets is higher than debit cards and credit cards (Exhibit 12).

Exhibit 12: m-wallet transactions

Monthly digital payment volumes as a proportion of all retail digital payments (debit card, credit card and m-wallets), %



Source: RBI Database, Deloitte Analysis

Moreover, a shift from a hardware-based to a software-based POS is expected, wherein a merchant needs to merely download the appropriate software, and can immediately start accepting payments. Traditionally, banks have focused on physical POS terminals, while third parties have driven growth in mobile POS transactions by tying up with banks and becoming offline payment aggregators, and they are expected to drive the growth in the future as well.

A customer will have multiple options for digital payments (m-wallets, digital cards, physical cards, wearables, UPI/ Bhim, IMPS etc.) and for authenticating a transaction (device based, traditional, biometric etc.) and with merchants accepting different payment instruments (Exhibit 13) - Banks and payment players will focus on building platforms that are focused on transactions, need fulfilment and loyalty, in the process offering customers and merchants the most convenient/easy methods of payment. Going forward, we believe there will be a higher interoperability e.g. between m-wallets and also with other payment options which will improve customer convenience, and ensure seamlessness of transactions. It is necessary for customers and merchants to experience that the new payment options are frictionless, that they establish six sigma reliability and fulfillment, at the same time are low cost and simpler to use, compared to cash. "Ease of Paying" will be the key to all future innovations.

Players not in the acquiring business, but with a significant scale in issuing of digital payment options, will have going forward two strategic choices to make – construct their own acquiring business and/or partner or collaborate with 3rd party aggregators and/or acquiring banks. A business model centered on collaboration is expected to emerge. Multiple players (from within financial services and outside e.g. oil marketing companies, FMCGs) will have to come together for creating integrated platforms combining payments, loyalty and other value added services.

As the scalability of these solutions is yet to be tested, it is debatable which of the solutions will lead the market. In the long run, however, it is expected that customer convenience will win and customers will gravitate towards the payments method which is the simplest and most secure and at the same time, offers convenience of transactions with multiple merchants in a single platform. As a result, there will be consolidation and partnerships in the fragmented market.



Exhibit 13: Increasing market fragmentation

Industry Speak - What we heard

"Consumers are classically conditioned to use cash for payments over the years - Cash is a habit. With all the government impetus and support digital payment transactions continue to grow but to become second nature it has to be used for multiple recurring and high frequency transactions including small value in day to day life."

"UPI can be a game changer. It can become ubiquitous and has the potential to have a mass appeal and universal acceptance. This can happen only with the evolution of use cases beyond P 2 P payments as demonstrated by some of the FinTech. UPI has two factor authentication built in which ensures security of financial transactions and has all the elements to drive mass adoption."

"For merchant payments (P2M) to succeed especially unorganized retail the entire supply chain has to adopt digital payments. While new payment systems have been launched (Bharat QR code, UPI, AEPS), merchant training and providing support on processes, reporting and reconciliation will help promote growth."

- Pranay Jhaveri, Chief Business Officer, Euronet Services India Pvt. Ltd.

"The next generation tools will allow banks to create a unique engagement model called Everyday Banking. For example, a customer could use the bank's mobile app for all activities including searching cabs, searching hotels, searching locations, payments, etc. The bank, on its side, could create incentives for the customer for using these services. This can only happen if the infrastructure at the back end is solid"

"There are many use cases which have not yet been explored for UPI. BHIM was one of the simplest use case on UPI. Some new use cases on UPI are required to drive further growth."

- Prasanna Lohar, Head – Digital and Innovation, DCB Bank

"If fintech startups focus on financial inclusion, they have a huge opportunity for enabling digital payments as POS devices have not yet penetrated. Bharat QR code is a significant disruptor for financial inclusion"

- Ajay Subramaniam, Director, Zone startups India

"The consumer wants frictionless transactions. The means of payments where there is the least amount of friction, and highest adaptability will have huge acceptance"

"There have been multiple innovations in the last four years e.g. Aadhaar, UPI, wallets, tap and go etc. The solutions will stabilize over a period of time"

"Acceptance infrastructure is very weak in tier 3 and tier 4. Non-hardware based (mobile app, UPI) model will drive adoption because investment is low"

- Shailesh Pandey, Executive Vice President, FINO Payments Bank

"The core principle to be kept in mind while considering the evolving payments ecosystem is "Customer Convenience". Customers will always gravitate towards the payments method which is the simplest and most secure"

"In the future all forms of payment solutions need to be accepted by one POS terminal or embedded within the merchant systems itself. However, this cannot be an independent hardware device as in the past. Mobile POS is far more convenient for the merchant to deploy and will be preferred"

- Mridul Sharma, EVP Head Technology, IndusInd Bank

Cards marginalized: Emergence of multi-functional POS accepting several payment methods

With 898 Mn cards in circulation and 2.61 Mn POS terminals, card present transactions are a pre-dominant mode in person to merchant (P2M) digital payments today. However, with introduction of new payment models, there is a strong likelihood that P2M transactions via the physical card present POS system will get marginalized going forward and the POS will evolve into a multi-functionality POS with additional capabilities such as NFC for 'tap and pay', Wearables, Aadhaar etc. and also extend to new forms such as m-wallets, UPI/ Bhim, QR code based, mPOS (Exhibit 14).

Exhibit 14: Multi-functional POS



With multiple payment solutions and introduction of Aadhaar enabled in POS systems going forward, there is a very strong likelihood that the 898 Mn physical cards have a potential to be marginalized (Exhibit 15).



Exhibit 15: Multiple P2M transaction options, marginalization of physical card

The POS terminal is expected to become an aggregator for all solutions, removing the need for the merchant to deploy different terminals for different payment modes. It increases the incentive for the acquirer to enter the business, as well as for the merchant to deploy the terminal. As adoption of these solutions increases further, the physical card has the potential to be marginalized.

Exhibit 16: Payments industry transitioning from card present/ POS to multi-dimensional

From 'Card Present/POS'





To a 'Multi-Dimensional'

Source: Deloitte Analysis

Emerging business models and alternatives

Traditionally the Indian Financial Services landscape was dominated by full service universal banks. However, with the entry of Payment Banks, Small Finance Banks and FinTech players in financial services, there will be alternatives to incumbent banks (Exhibit 17). The new entrants with their 'digital first' model that is data led, will create new use cases to penetrate financial services through an intelligent decision making system which will force incumbent banks to compete as well as collaborate with the new entrants. This diversity is good for the Indian Financial Services industry, as it will extend the reach of financial services to the under serviced market segments e.g. micro and small merchants.

Use of data analytics will be the key for growth as it allows players to profile digital transactions data, improve risk management within financial services, increase the efficiency of extending banking products and services, and increase the opportunities for upsell and cross sell. Business models focused on customer-centricity, by leveraging digital transaction data, to enable loyalty and lending decision making are emerging. Data mining digital transactions data will allow banks to establish a predictable pattern into repayment schedules for their loans and also determine the tenor and repayment of loans. For example, a payment company is leveraging the transaction history of merchants on its platforms, and offering loans via its partnership with a FinTech ⁴. Similarly, another FinTech is leveraging its proprietary credit and risk assessment tools to provide working capital loans to micro-merchants and entrepreneurs based on their digital transactions ⁵ (Exhibit 18).

⁴ http://www.livemint.com/Companies/IjKHSmqETWeX8FApEz90NP/Paytm-starts-offering-collateralfree-loans-for-merchants-on.html ⁵ http://bwdisrupt.businessworld.in/article/ftcash-Partners-with-ICICI-Bank-to-Launch-UPI-at-5-000-Merchant-Locations/23-09-2016-106076/



Exhibit 17: Alternatives emerge to universal banks

Source: Deloitte Analysis

Exhibit 18: Leveraging data will enable loyalty and lending decision making



Source: Deloitte Analysis

Sustainability & Penetration of Digital Payments -The key challenges and imperatives

In order to drive the adoption of digital payments, NPCI and RBI in a concerted effort with the Government of India and Banks have introduced various payments products – National Financial Switch, NACH, IMPS, UPI, CTS, *99#, NEFT, RTGS, AEPS, BHIM, BBPS, RuPay and Mobile banking. While each of the payments products have aimed to drive digital adoption by reducing transaction times and improving security,

Industry Speak - What we heard

"Taking an example of e-com transactions via Internet / Mobile Payment Gateways, currently it is 45%-50% success rate. This is because the Payment Gateways are not able to handle the volumes and also there are multiple hops for validation / authorization currently which can be avoided. If the merchant interacts directly with the banks via Payment Gateways like FSSNeT where there are no multiple hops, it will increase the success rates to over 75%."

– Nagaraj Mylandla, CMD, FSS

"The regulator should play the role of a watchdog and decide on policies. For all products other than financial products, the government regulator focuses on malpractices but does not decide on pricing. Similarly, market dynamics should drive the pricing for financial pricing, and the regulators should not mandate prices as it may make things infeasible."

- Payments Banks expert

"Consumer is the KING and needs to be presented with all payment options. ATM is an important channel but the viability is under cloud due to increasing costs, stagnant interchange, complexities of operations, erratic cash supply post demonetization and waning interest from the authorities and banks. Large issuers, acquirers, and regulator have to come together in the interest of the consumer and agree on the way forward to keep this channel viable."

"Cyber security has to be a board level agenda today. It is essential for banks, FinTech to not only protect their applications, data center, network perimeter, and end points, but continue to have an evolving strategy focused on threat prevention and ability to contain damage due to zero day attacks. Secure systems will give lot of confidence to consumers and merchants which is important for the adoption and growth of digital payments."

- Pranay Jhaveri, Chief Business Officer, Euronet Services India Pvt. Ltd.

"Banks need to start working & collaborating with other Banks on security measures for new technologies because if they wait for a few years, then hackers have a much bigger head start and may be able to exploit vulnerabilities."

- Prasanna Lohar, Head - Digital and Innovation, DCB Bank

significant opportunities exist in aspects of user experience, acceptability and security/settlement of these options.

Need for simplification of products to drive adoption

While digital payments have grown significantly, their penetration on an absolute level remains low, with a significant portion of population preferring to transact in cash. The next wave of growth is expected to come from focusing on stabilizing these systems and helping them achieve scale. Ease of usage, strengthening the acceptance infrastructure and ensuring security of transactions will help in driving digital adoption across customer segments. Innovation in digital payments that will allow transactions in remote areas with no internet connectivity, will drive further growth.

- a) Ease of usage: The regulator had introduced Two Factor Authentication to reduce fraud related transactions. While this was a welcome step in providing comfort to customers and supported the adoption of digital payments, it increased the processing time of the transactions as well as at times, disrupted the flow of transactions, due to failures. With a plethora of payment options available to the customer, it may lead to some confusion in the customer's mind. As newer payments platforms are being introduced and the demand for faster transactions have increased, steps are being taken both by banks and non-bank entities to simplify payments by making digital payments easier for the customer (e.g. usage of devices as one of the factors of authentication, tap and go payments like POS transaction, e-toll, no PIN for NFC based payments below INR 2000 etc.)
- b) Network of acceptance infrastructure: A study conducted by NYU ⁶ covering the specific case of automated clearinghouse (ACH) payments observed that ACH experienced network effect which drove further adoption and thus reduced the overall cost involved in payments products. A similar analogy can be extended to other payments channels as well, and it would be safe to assume that as the number of customer/merchants that accept a payment channel increases, the likelihood of other merchants/customer adopting the same payment channel increases even further, which makes the product more affordable.
- c) While the RBI and NPCI have been agile in meeting customer needs, various products need to be tested. UPI and other products have faced issues. NPCI is now securing reports from Banks on UPI transactions, and will also do their own security audits. Robust reconciliation testing is expected to follow in the future.

As the existing systems are not necessarily interoperable, each of the payments solution operators have developed their ecosystems in a silo, and thus the benefits of network effects are not being realized to the fullest extent by all the participants in the value chain. Players have to maintain separate accounts to be able to initiate (POS infra for merchants, user application for customer) transactions. Settlement and dispute resolution may not be standard across players. To promote interoperability, both RBI and NPCI have taken steps to make payments through UPI, AEPS, BBPS, Bharat QR Code inter-operable. RBI has also issued guidelines enabling PPI wallets part of UPI ecosystem by making them inter-operable. Interoperability would benefit the industry on an aggregate level as the same merchants or customers need not be acquired by each of the acquirers. This will reduce the merchant acquisition costs for the acquirer and hardware/POS costs for the merchant.

Need for structural change to drive penetration of payments products

In the past few years, the regulator (RBI), NPCI and The Government of India have taken a host of initiatives to influence customers and merchants to adopt digital payments (Exhibit 19).

⁶http://www.stern.nyu.edu/networks/Gautam_Network_externalities.pdf

Exhibit 19: Regulator & Government Initiatives



Recent initiatives such as converting government transactions (IRCTC, water bill, etc.) and proposal to convert the entire transportation structure into "tap and go" are also being hauled by various stakeholders.

While these initiatives have helped promote digital payments in the country, the usage of cash for transactions still dominates, both in terms of volume and value. Though demonetization forced customers to adopt digital payments/channels, as the economy moved back to normalization, the usage of digital payments dropped, thus reflecting customer's preference for using physical cash.

In order to promote digital payments, the government formed the Watal Committee under Ratan P. Watal, and as part of the recommendations of the committee mentioned the following:

"The existing Payment and Settlement Systems Act, 2007, suffers from major drawbacks which have restricted the reach of digital payments in India,"

The report suggested that structural reforms may be pursued to promote digital payments in the country. Some of these are an independent payments regulator and efforts to improve the merchant acceptance infrastructure.

An independent payments regulator

Currently, payments within India is governed by the Payments and Settlement System Act, under the regulatory purview of the RBI. While the RBI has been proactively working in promoting payments in the country, and is introducing mechanisms that increase customer confidence in using payments (e.g. 2FA), the RBI has a much wider mandate of managing the circulation of notes, interest rates, NPA etc. and payments may be one of the many activities that the central bank is engaged with.

RBI has also taken cognizance of the special and different requirements for supporting and promoting payments, and had established a separate sub-committee "Board for Regulation and Supervision of Payment and Settlement Systems" (BPSS) which acts as the highest policy making body on the payments system in the country.

In order to aggressively push and promote digital payments, going forward, a separate regulator may be introduced who can purely focus on payments and formulate policies and guidelines, introduce and enforce common standards for reporting, reconciliation, dispute resolutions & settlements guidelines, and prevent anticompetitive practices. This can help standardize protocols, which can in turn promote scalability of payment solutions, and in driving down the overall costs of payments.

Having an independent regulator may also address the issues of conflict of interest that may exist with NPCI, acting both as a nodal agency for introducing payment products, consolidating and integrating multiple payments systems in India, and also acting as a parent organization for RuPay.

Ensuring viability of merchant acquiring agencies

Currently the regulator (RBI) has been defining the Merchant Discount Rates (MDR) applicable for debit card and credit card transactions. Based on the feedback from industry representatives and stakeholders, these rates have also being revised to address industry requirements from time to time. While the RBI has been positioning these rates as the ceiling, the industry is allowed to charge lower rates, with the MDR ceiling as defined by the RBI, being taken as the floor. This is being driven by a higher cost of merchant acquisition ⁷ as well as poor revenue from the acquisition business, which may be an indicative of the higher costs incurred by the acquirer in acquiring and servicing the merchants.

In order to address these challenges, RBI had envisioned creation of an Acceptance Development Fund (ADF) to encourage wider deployment of card acceptance infrastructure, by subsidizing the acquirers for various activities performed by them. However, limited progress has been made in funding or operationalizing the ADF⁸. There is a need for looking at the revenue earned by the acquirers to ensure that their business viability is ensured, as the current MDR structure favors the issuer and is not in sync with the cost of setting up and operating card acceptance infrastructure. In order to not meaningfully disturb the status quo, a change in the MDR composition may be implemented only for Tier-3 to 6 city merchants. This would incentivize the acquirers to increase their activities, especially in under penetrated cities and thus promote the creation and maintenance of digital payments acceptance infrastructure.

Alternatively, another methodology that may be explored is that of taking the pricing/fee out of the purview of the regulator and allowing market forces to discover optimum fees that may be charged from the merchants While this may promote better price discovery, distribute better incentives across the value chain, it may also lead to situations where urban areas have lower fee due to existing competition and a large number of merchants, and non-urban non-tier I/II cities experience higher fee due to limited merchants, lower volumes.

Bharat QR for payments has the potential to disrupt the traditional MDR model (Under UPI, the MDR is 0.25% for payments below INR 1,000 and 0.65% for all other charges), as well as serve as a platform for the accelerated adoption of digital payments at micro and small merchant outlets (Exhibit 20).

⁷ https://www.rbi.org.in/Scripts/PublicationReportDetails.aspx?UrlPage=&ID=840

⁸ http://www.thehindubusinessline.com/money-and-banking/acceptance-development-fund-may-remain-on-paper-say-bankers/ article9443512.ece

Exhibit 20: Bharat QR code for payments



Source: Deloitte Analysis

How to balance innovation and customer centricity with cyber-security concerns

Emergence of new payments channels have led to the creation of digital identities (e.g. VPA for UPI, mobile number for PPIs, Aadhaar etc.). The creation of such a large number of digital identities is driven by a rising user base, new payment channels, pace of technology innovation and obsolescence of hardware. Service providers have transitioned from buy and own packages to a cloud computing solution, wherein the service provider owns the technology and the hardware and software solutions are provided by third parties via integrations supported by technology ⁹.

Traditional payment systems in India follow global norms such as PCI DSS. Payment systems that have been made specifically for India, such as UPI, BHIM etc., have not been tested in the PCI environment and their security can be a concern.

Due to multiple integration touchpoints, the payments systems and linked digital identities have become susceptible to cyber security attacks across the customer touchpoints such as:

- Account Takeovers Unauthorized transfer for USD 1 Bn from Bangladesh Bank¹¹
- Unauthorized transactions Transfer of USD 171 Mn from Union Bank's nostro account ¹²
- Payment Systems Malware attack on Hitachi Payments system affecting 3.2 Mn debit cards ¹³
- Mobile Application Bug in Bank of Maharashtra UPI led to loss of INR 25 Crore¹⁴
- Leakage of personal identifiable information Leakage of Aadhaar data of 130 Mn citizens¹⁵

¹¹ http://economictimes.indiatimes.com/tech/internet/as-india-braces-for-digital-payments-future-how-secure-are-banks-from-cyberattacks/ articleshow/56073576.cms

⁹ https://www2.deloitte.com/content/dam/Deloitte/in/Documents/risk/in-risk-cyber-risk-noexp.pdf

 $[\]label{eq:constraint} $12 http://www.livemint.com/Industry/xuBJNapRGBrt105iEAvsYO/How-Union-Bank-was-hacked-and-got-its-money-back.html $12 http://www.livemint.com/Industry/xuBJNapRGBrt105iEAvsYO/How-Union-Bank-was-hacked-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-its-money-backed-and-got-i$

¹³ http://economictimes.indiatimes.com/tech/internet/as-india-braces-for-digital-payments-future-how-secure-are-banks-from-cyberattacks/ articleshow/56073576.cms

¹⁴ http://economictimes.indiatimes.com/industry/banking/finance/banking/bug-in-upi-app-costs-bank-of-maharashtra-rs-25-cr-in-one-of-indiasbiggest-financial-frauds/articleshow/57921505.cms

¹⁵ http://indiatoday.intoday.in/technology/story/aadhaar-data-of-130-millions-bank-account-details-leaked-from-govt-websites-report/1/943632.html

- Digital impersonation Unauthorized access of bank accounts of Axis Bank customers by Business Correspondents through the Aadhaar platform ¹⁶
- Defrauding by customers Paytm defrauded by 48 customers leading to losses of more than 6 Lakh ¹⁷

Middle and back end software infrastructure adopted by banks varies from one organization to the next. This is primarily dictated by the maturity of the organization. And hence their preparedness for cyber-attacks may vary.

However, startups with a focus on acquiring as many customers as possible while focusing on customer experience and ease of usage, have largely ignored the security aspects ¹⁸ leaving customers vulnerable to attacks. Growing integrations (e.g. movement of customer details from bank's systems to payment provider's systems, linking of payment accounts with merchant platforms, storing of card information on merchant sites), can expose the customer credentials across any of the five stages of a transaction – origin, transmission, transaction, settlement, and reconciliation.

Some banks have been proactive and have started taking steps to ensure that their systems are well protected from such attacks (e.g. DCB Bank conducting exercises with Israeli companies to increase the level of cyber security preparedness).

Taking cognizance of the risks posed by such cyber-attacks, the regulator (RBI) and government have proactively taken multiple steps to minimize such attacks:

- 1) RBI released the Cyber security framework guidelines asking banks to have a cyber security policy, continuous surveillance, a cyber crisis management plan, cyber security preparedness indicators etc.¹⁹
- 2)Setting up of Reserve Bank Information Technology Pvt. Ltd. (ReBIT) to take care of IT requirements, including the cyber security needs of the RBI and its regulated entities.
- 3)Draft regulations for wallets on cyber security
- 4)Setting up of "Cyber Swachhta Kendra" under CERT-In by the MeITY and forming tie-ups with security solutions providers (e.g. Quick Heal ²⁰) with an aim to create a secure cyber space by detecting botnet infections

In order to minimize the occurrences and impacts of such attacks, payment services providers need to put in place strategies and solutions that are addressing both, the preventive, as well as reactive part of the cyber security issues.

Regulators in India can leverage best practices in cyber security from their global counterparts in countries such as Singapore, Israel, and Europe. Development of infrastructure security solutions for banking, needs to be given the desired thrust.

Parameters surrounding an organizations cyber security protocols need to be revised on a frequent basis and calibrated to ensure the same logic holds, in the face of ever evolving threats.

While payment service providers need to take preventive and reactive steps to minimize occurrences and impacts of cyberattacks, players must continue to raise awareness of such cyber risks through Phishing, Pharming, Vishing, Smishing etc. among the end-users/ customers, as almost 70-80% instances of online frauds arise due to lack of awareness and education among customers.

¹⁷ http://indianexpress.com/article/india/paytm-claims-48-customers-cheated-it-of-more-than-rs-6-lakh-cbi-registers-case-4430068/ ¹⁸ http://indianexpress.com/article/technology/tech-news-technology/digital-payment-start-ups-unaware-of-high-security-risks-

fireeye-4433461/

¹⁶ http://www.livemint.com/Politics/poeRx6xesHcUn6WpOJuJjN/Aadhaar-data-base-fully-safe-and-secure-says-UIDAI.html

¹⁹ https://rbi.org.in/scripts/NotificationUser.aspx?Id=10435&Mode=0

²⁰ http://www.quickheal.co.in/press_release/cat/news/post/quick-heal-cert-in-collaboration

Establishing a Payments Ecosystem - How are players addressing this via partnerships?

Why are partnerships so crucial today

Financial services is undergoing a transformation due to FinTech across the financial services domains i.e. payments, credit, insurance, personal finance, wealth management, investments etc. FinTechs from payments, lending, insurtech, banktech, investment tech and personal finance have been at the forefront of driving disruptive change in customer's expectations in their interactions with traditional banks and financial institutions. Amongst these, FinTechs have been payment and telecom companies, some of whom now have a Payment Bank License. These players, are expected to have a significant impact on the overall penetration of financial services to under serviced segments, as they will leverage strong digital first capabilities to from the starting day of their operations.

There are, however, some concerns around the viability of a standalone business model for Payment Banks. This is due to restrictions on the scope of offerings, and perceived inability to create customer stickiness. Viability concerns also exist around other incumbents who may be digital laggards to their peers, and have been reactive to disruptions by the digital entrants.

As a result of this, collaboration and co-competition is expected to be the way forward in the Indian financial services space. Partnerships are not a new concept in the Financial Services space. "Bancassurance" as a model has seen good traction in India, with major banks entering into partnerships with insurance companies. Models such as "Bank in a box", whereby the entire technology of the Bank is handed to a specialist technology vendor, have also seen traction, especially with new banks. For example, IDFC has partnered with FSS ²¹, and Ujjivan Small Finance Bank has partnered with CRMNEXT ²². Payment Banks have entered into a strategic arrangement with leading banks, such as Reliance and SBI, Fino and ICICI, Airtel and Kotak Mahindra Bank, etc.

In an environment of heightened disruption, incumbents and emerging payments players are naturally interdependent. Thus, it is comes as no surprise that payment players are entering into partnerships, ranging from strategic to ecosystem or cluster arrangements, depending on the motivation behind the partnership.

These partnerships can provide two types of disruptions- they help harness network effects and/ or transform the price/ value equation (Exhibit 21).

²¹ http://www.fsstech.com/news-events/idfc-ltd-partners-with-fss-for-bank-in-a-box-hosted-solution/

²² http://www.crmnext.com/press-releases/ujjivan-goes-for-crmnext-s-assisted-bank-in-a-box-solution/



Exhibit 21: How partnerships disrupt

For the payments player, the partnership helps to -

- Harness the network effects of the ecosystem by expanding the market reach and acquire new customers, unlock product adjacencies (e.g. insurance and personal finance), jointly cultivate product opportunities at the edge (e.g. cash management, loyalty, 3rd party services), create payment platforms from which it can offer 3rd party products and services (including non-financial products), foster peer to peer connections (e.g. remittances), distribute product development by embedding payment products and loyalty in the partner's existing product offering
- Transform the price-value equations by providing greater personalization to customers on pay as you go
 models, increase the possibilities for the customer to return to the payment platform (e.g. insurance, personal
 finance management, bill payments, mobile recharges, e-commerce, rail tickets, flight tickets, hotel bookings,
 fuel payments etc.), shortening the product (including 3rd party) value chains, removing the barriers to usage
 by offering integrated loyalty programs, and combine the power of an ecosystem to offer customers value.

Partnerships reduce customer acquisition and servicing costs, and at the same time, increase upsell and cross sell opportunities, creating additional revenue streams for ecosystem partners and increase customer stickiness. For the incumbent partners, the partnership allows them to overcome legacy issues around their culture and technology, while capitalizing on the agility of the nimble partner, and helps gain access to a larger customer base due to the digital focus. A partnership with a digital player helps change the traditional business model from a capex based one to an opex based one, which brings operational benefits to both players. Identifying new use cases leads to significant synergies between players who have traditionally not partnered, and helps provide a holistic offering to the customer.



What are the types of partnerships emerging

Payment players are partnering with other entities at the same stage in the value chain, along their value chain but at a different stage, and across industries (Exhibit 22).

Exhibit 22: Types of partnerships



Horizontal partnerships

Horizontal strategic alliances, formed between payments players and banks, are one of the primary forms of partnerships. New Payment Banks who possess a well-established customer base with a wide product offering are partnering with banks to successfully reach the unserved and underserved customer segments using their digital first advantage.

Table 1: Examples of Indian and Global horizontal partnerships

Player	Value add for players
Paytm ²³	Serve customer's varied needs and improve cross sell opportunities Paytm, by tying up with entities such as IndusInd Bank, is able to offer a gamut of financial service offerings including liquid FDs and two-wheeler loans to its customers IndusInd Bank can gain access to the large distribution network and customer base of Paytm.
FINO ²⁴	Serve customer's varied needs and improve cross sell opportunities FINO has partnered with ICICI back for its Payments Bank foray, to provide a holistic offering to its customers. ICICI can gain access to the FINO's wide distribution network that has developed through its unique low cost BC model, and its customer base.

²³ http://www.thehindubusinessline.com/money-and-banking/indusind-bank-paytm-in-pact-for-twowheeler-loans/article9130871.ece

 $^{^{24}\} http://economictimes.indiatimes.com/industry/banking/finance/fino-paytech-inks-deal-with-icici-group-companies-to-distribute-insurance-products/articleshow/58103657.cms$

Vertical partnerships

Vertical strategic alliances are formed between financial services players and FinTechs in different stages of the product value chain (e.g. payments, lending, insurance, personal finance). Such partnerships allow the ecosystem players to better manage financial risks (e.g. credit decisions based on payment transaction data), lower transaction costs by leveraging innovative technology and provide more holistic solutions to targeted segments, thus generating competitive advantage.

Additionally, banks have entered into partnerships with FinTech players and technology companies to build scalable, robust platforms that deliver payment services to customers and merchants at a fraction of the previous costs. In the past few years, mobile POS transactions have been driven by third parties which have partnered with banks, and become offline aggregators.

Going forward, vertical partnerships between FinTech and financial institutions are expected to emerge in areas such as personal finance, insurtech, banktech (e.g. chatbots, data analytics etc.) as specialized vendors can reduce the time to market.

Payments Player	Value add for players
Paytm ^{25,26}	Serve customer's varied needs and improve cross sell opportunities Paytm, by partnering with multiple companies such as Lendingkart and Capital Float, is able to fulfill working capital requirements of sellers listed on the platform, conveniently and at cost-effective rates. It has also tied up with entities such as HDFC MF, and Reliance MF to offer a gamut of financial service offerings such as money market funds to its customers. The partners gain access to the large distribution network of Paytm.
FreeCharge ²⁷	Providing e-wallet insurance to customers By tying up with Reliance General Insurance, FreeCharge offers e-wallet protection plan for all its users (customers and merchants) when e-wallet balances up to ₹20,000, when the phone is stolen or lost Reliance gains access to the large network and customer base of FreeCharge.
Ingenico ²⁸	Enabling merchants and retailers to benefit from a seamless mPayment system Ingenico can access the massive reach of Samsung devices Samsung, in turn, can provide its customers, a safe & secure system for accepting mobile payments.
IndusInd Bank ²⁹	Enabling merchants and retailer to transact digitally through POS terminals IndusInd Bank, by partnering with ATOS Worldline India, can provide POS acquiring services to its existing customers. ATOS Worldline India gains access to IndusInd Bank's customer base.

Table 2: Examples of Indian and Global vertical partnerships

 $^{^{25}\} http://www.thehindubusinessline.com/money-and-banking/indusind-bank-paytm-in-pact-for-twowheeler-loans/article 9130871.ece$

²⁶ http://www.livemint.com/Companies/IjKHSmqETWeX8FApEz90NP/Paytm-starts-offering-collateralfree-loans-for-merchants-on.html
²⁷ http://www.thehindubusinessline.com/info-tech/freecharge-to-offer-ewallet-insurance/article9436303.ece

²⁸ https://www.ingenico.com/press-and-publications/press-releases/all/2014/02/ingenico-and-samsung-team-up-to-offer-global-mobile-payment-solutions.html

²⁹ http://www.business-standard.com/article/finance/indusind-ties-up-with-atos-for-pos-acquiring-services-111060900213_1.html

Payments Player	Value add for players
Ripple Labs ³⁰	Allowing customers to instantly transfer money in any currency at a lower cost Ripple Labs, by entering into partnerships with multiple banks such as Fidor
	The partners replace intermediaries, thereby passing on savings to partner institutions, and by extension, their clientele.

Diagonal partnerships

Diagonal partnerships between financial institutions (banks, Payment banks) and players from other industries, to leverage the combined network effect of the ecosystem partners and offer an integrated value proposition to the customers, leading to improved customer experience and customer loyalty. As the partner systems become more inter-connected, loyalty based consumers are expected to shift toward providers offering integrated products, increasing the importance of ecosystem plays.

Expanding payment offerings across the ecosystem by capturing payment workflows across underlying processes within the networked ecosystem, has immense potential. This improves cross-sell opportunities and leverages the combined power of ecosystem partner brands and customer data.

This potential can be clearly seen in industries that have been traditionally dependent on cash and are now ripe for digitalization of cash. For example - the tourism industry, offers a relatively untapped opportunity for the payments industry, as a large number of tourists look to spend on hotels, attractions, and retail outlets. Since tourists are often from different countries and possess different currencies, this presents a unique challenge for businesses, who need to ensure that they have the ability to accept payment from their foreign customers, and that the payment process is as seamless as possible. Payments players have realized this opportunity and are entering into diagonal partnerships with players in the tourism industry, in order to process transactions, and leverage up-sell and cross-sell opportunities. Another example is the transportation industry in India, where the truck owners pay in cash for the fuel purchase, insurance, tyre changes, driver salaries, toll payments, vehicle maintenance etc. Payment players by partnering with oil marketing companies, transportation and logistics companies, auto OEMs, insurance providers, NBFCs can offer integrated value propositions to the truck owners.

Payments Player	Value add for players
PayPal ³¹	Enabling foreign travelers in India to book hotels in a safe and seamless manner By partnering with portals like Vistarooms.com, PayPal is able to process transactions at multiple touchpoints while enhancing cross sell opportunities. Vistarooms is able to enhance customer convenience by automatically sending invoices to customers and provide an all-inclusive travel experience.
FINO ³²	Increasing market penetration and cross sell FINO will be able to process payments for BPCL's large customer base and onboard these customers on its platform, enabling it to cross sell financial products and services from other strategic alliances.

Table 3: Examples of Indian and Global diagonal partnerships

³⁰ http://www.coindesk.com/fidor-becomes-first-bank-to-use-ripple-payment-protocol/

³¹ http://economictimes.indiatimes.com/small-biz/startups/paypal-sharpens-focus-on-travel-tourism-partners-with-vistarooms-com/ articleshow/57895512.cms

³² http://www.livemint.com/Companies/Ws94iCieEl729zjwbFfbEK/BPCL-retail-outlets-to-market-financial-products.html

Payments Player	Value add for players
	BPCL will be able to offer a complete payments solution which could help it increase customer loyalty and make payments simpler.
Printemps ³³	Introducing retail offerings to users of Alipay Printemps gains access to 450 Mn customers of Alipay. Alipay can process payments for Printemps and related products

What does the future hold

It is expected that players will establish platforms, enabling an eco-system of non-traditional players. An integrated product platform that goes beyond banking and embeds closer into customer's lives will be the preferred option (Exhibit 23 and Exhibit 24). Players have begun this trend with Kotak Bank launching its Kotak 811 Application which is a full service, zero balance account with zero charges on all digital transactions, and allows customers to book movie tickets, airline tickets etc.,^{34 35} Similarly, Paytm's platform offers a host of financial and non-financial services including digital and utility bill payments, traffic challans, insurance, digital gold, and travel bookings (IRCTC, airlines, bus), and plans to expand into several new areas including digital wealth management ³⁶.

³³ https://www.wirecard.asia/newsroom/press-releases/newsdetail/news/printemps-partners-with-wirecard/

³⁴ http://www.kotak.com/kotak811/

³⁵ https://www.atmmarketplace.com/news/kotak-mahindra-bank-joins-march-to-cashless-india-with-811-mobile-banking-system/

³⁶ https://paytm.com/





Exhibit 24: Platformification of banking



Source: Deloitte Analysis

Establishing successful partnerships requires a well calibrated model covering partner business model, joint operating models, leveraging digital assets, a strong corporate development function and establishes a strong business case for partnership by developing profit models, network effect models, joint solutions and value propositions, product system design, service architecture and customer engagement models.

Global Payments Revolutions -Is India "Glocal" yet?

Current state of adoption of new technologies in India

With a strong focus on innovation to differentiate in the market, banks have started focusing on emerging technologies such as biometrics, blockchain, artificial intelligence, etc. The adoption of these technologies is expected to provide a competitive edge to players by reducing costs, enhancing revenues, and improving customer experience. Current adoption of these technologies is at a nascent stage, with players across the industry looking at specific use-cases. A key concern to scale these technologies beyond a PoC is integrating them with the bank's current operating models, risk frameworks and bank's infrastructure.

Industry Speak - What we heard

"Banks need to start focusing on newer technologies & innovation today in order to make themselves more competitive in the long run & meet needs of customer"

"Banking as a service will be the future model for banking, and may lead to the emergence of digital only banks in the country"

- Prasanna Lohar, Head – Digital and Innovation, DCB Bank

"As APIs open up in India, more innovations will take place, leading to increased customer experience"

- Ajay Subramaniam, Director, Zone startups India

"Full functionality of Aadhaar is yet to be explored. While Aadhaar has a biometric function, chip enablement would allow access of multiple applications which would empower citizens and banking customers. In order to fully avail the benefits of Aadhaar based digital identity in the payments space, acceptance infrastructure needs to be built"

- Ajay Kumar, Regional MD-Asia Pacific, Entrust Datacard

"IndusInd analyses every transaction in real time to check for money laundering, fraud etc. Machine intelligence is used to supplement human intelligence."

- Mridul Sharma, EVP Head Technology, IndusInd Bank

"FINO has introduced paperless transactions through Aadhaar authentication which makes the account opening possible in only 4-5 minutes"

- Shailesh Pandey, Executive Vice President, FINO Payments Bank

Biometrics for authentication and digital identity management

"Invisible" payments have the promise to make transactions more efficient for banks and merchants and simpler for consumers. Mobile devices have built-in features that enable biometric capture-microphone for voice, camera for retina, and fingerprint capture.

The focus of the government and RBI in promoting a biometric payment application to go with the country's existing national identity platform, Aadhaar which is expected to be the backbone for biometric authentication in India. Aadhaar system in India is now accessible to more than 1.1 Bn people.

Player	Description
Delta ID ³⁷	The company's active IRIS technology is already being used in a mobile device by Samsung - the Samsung Galaxy Tab Iris. The tablet was designed for Aadhaar compatibility (approved by UIDAI) in particular, and launched in India.
DCB Bank ³⁸	DCB Bank has set up ATMs that use fingerprints to withdraw money which link a customer's fingerprint data with his Aadhaar biometric details.
HDFC Bank ³⁹	In an endeavor to reach out to rural areas that do not have ATMs, HDFC has tied up with Gramin Banking Officers (GBO) to provide an instant KYC facility through biometric verification in Punjab. It uses Aadhaar card and fingerprints for biometric verification.
MasterCard	MasterCard is identified as an early leader in this space through its Identity Check Mobile capability. Informally known as "selfie pay", this allows users to scan their fingerprints to validate identities and make payments. It is expected to leverage this technology to expand its investment in India as part of the Digital India initiative.

Table 4: Examples of biometrics in India

Blockchain and distributed ledgers

Blockchain, along with its underlying Distributed Ledger Technology, is one of the most talked about technologies in the Indian payments industry. With multiple potential applications – trade finance, automated compliance and regulatory efficiency improvement, counterparty risk reduction, global payments, clearing and settlement time reduction, asset rehypothecation, liquidity and capital improvement, fraud minimization, syndicated loans, loyalty and rewards and digital identity - it is expected to simplify and streamline the payments infrastructure, resulting in reduced costs, increased efficiency, and higher transparency. Blockchain is primarily in the PoC stage in India, with banks actively exploring potential use cases.

While the Reserve Bank of India has no specific regulations for Blockchain, it has shown keen interest in understanding the technology. The Institute for Development & Research in Banking Technology (IDRBT), RBI's research arm, created a working group with experts from consultants, regulators, banks, financial institutions, and clearing houses . Basis the inputs of this working group, IDRBT conducted the first ever end-to-end test of the technology in January 2017, which was followed by a publication on applications of Blockchain technology, wherein IDRBT concluded that it is the right time for adoption of the technology, and suggested a roadmap for its adoption⁴².

³⁷ http://mobileidworld.com/delta-id-india-national-id-109265/

³⁸ http://economictimes.indiatimes.com/industry/banking/finance/banking/dcb-bank-launches-aadhaar-enabled-atm-in-bengaluru/ articleshow/52730882.cms

³⁹ http://www.cio.in/feature/indian-banking-sector-bets-big-biometrics

⁴⁰ http://www.dnaindia.com/scitech/report-master-selfie-pay-facial-recognition-online-authentication-banking-payment-transactions-2261844

⁴¹ http://timesofindia.indiatimes.com/business/india-business/rbi-arm-tests-tech-behind-bitcoin/articleshow/56575335.cms

Table 5: Examples of Blockchain and distributed ledgers in India

Player	Description
ICICI Bank ⁴³	ICICI Bank executed India's first banking transaction on Blockchain in October 2016. It executed transactions in international trade finance and remittance, using a custom-made Blockchain application, and is currently looking to operationalize it.
Kotak Mahindra Bank ⁴⁴	Kotak Mahindra Bank, in partnership with a few international banks and a technology provider, is conducting pilot transactions in cross-border remittances and trade settlements, using Blockchain.
Axis Bank ⁴⁵	Axis Bank became the first bank in India to partner with Ripple Labs in order to provide Blockchain solutions for cross-border remittances.
Bankchain ⁴⁶	Bankchain, a consortium of major banks including ICICI Bank, SBI, DCB Bank etc., is collaborating to build Blockchain use cases. The first project, Clear-chain, currently in testing phase, is focused on integrated and shared KYC, AML and CFT.

Artificial Intelligence and cognitive technologies

The use of Artificial Intelligence (AI) in the payments industry is expediting its evolution. Some artificial intelligence technologies include Machine Learning, Deep Learning, NLP Platforms, Predictive APIs and Image and Speech Recognition.

Player	Description
HDFC Bank ⁴⁷	HDFC Bank launched an electronic virtual assistant (EVA), an artificial intelligence- driven chatbot, for customer services
YES Bank ⁴⁸	Yes Bank, in partnership with Payjo, is expected to launch a Pay Bot, the first AI- driven Bot for a wallet, on social media channels
ICICI Bank ⁴⁹	ICICI Bank deployed 'Software Robotics' in over 200 business processes across various functions of the bank. 'Software Robotics' emulates human actions to

Table 6: Examples of Artificial Intelligence and cognitive technologies in India

⁴² "Applications of Blockchain Technology to Banking and Financial Sector in India", IDRBT, January 2017

⁴³ https://www.icicibank.com/aboutus/article.page?identifier=news-icici-bank-executes-indias-first-banking-transactions-on-blockchain-inpartnership-with-emirates-nbd-20161210162515562

⁴⁴ http://www.livemint.com/Industry/Ioztj0R98Ea6m58Ng8jUzM/Blockchain-technology-catches-Axis-Kotak-Mahindras-fancy.html ⁴⁵ http://www.bankingtech.com/695651/axis-first-bank-in-india-to-use-ripples-blockchain-network/

⁴⁶ http://timesofindia.indiatimes.com/business/india-business/first-blockchain-project-clear-chain-is-underway/articleshow/58901149.cms
⁴⁷ http://timesofindia.indiatimes.com/business/india-business/hdfc-bank-launches-artificial-intelligence-driven-chatbot-eva/

articleshow/57481168.cms

⁴⁸ https://www.yesbank.in/media/press-releases/yes-bank-partners-with-payjo-to-launch-artificial-intelligence-led-digital-initiatives
⁴⁹ https://www.icicibank.com/aboutus/article.page?identifier=news-icici-bank-introduces-software-robotics-to-power-banking-operations-20160809103646464

Player	Description
	automate and perform repetitive, high volume and time consuming business tasks cutting across multiple applications.
DBS Bank ⁵⁰	DBS Bank has unveiled Digibank, India's first mobile-only bank with inbuilt features of artificial intelligence. Customer service enabled with AI-driven virtual assistant that has learning ability, and is able to respond to customer queries in real-time

API based banking and Payments

API based banking and payments is transforming the payments experience for Indian businesses and consumers. Banks, by allowing 3rd party partners to interact with their systems directly from their ERP or Legacy systems, are able to provide instant banking facility and improved operational efficiency. Wallet players are also opening up their APIs to retailers for easier integration and higher success rates of transactions.

The Government, under the Digital India initiative, has mandated an open API policy for five key programs, commonly known as India Stack, in order to drive financial inclusion and reduce transaction complexity. One of these key programs is UPI API which can be used to develop applications for peer to peer, peer to merchant, and business to business transactions. While the adoption of these programs is currently low, the opening of APIs has provided a platform for FinTech to disrupt the payments industry.

Player	Description
Yes Bank ⁵¹	Yes Bank has introduced API based banking for inward remittance, domestic partner payments through NEFT/ IMPS, electronic collections, salary payments, prepaid cards, expense management accounts, and cardless cash withdrawals.
MobiKwik ⁵²	MobiKwik has opened up its Power Wallet API to retailers. The API which can be integrated across a retailer's website, mobile website, applications, and offline POS terminals, provides a near 100% success rate for transactions.
Eko ⁵³	Eko, an innovative FinTech company, has launched easy to implement wallet based remittance and money transfer APIs.
PayZippy ⁵⁴	PayZippy offers three REST based APIs – charging API for processing the payment, refund API for refunding an existing successful payment, and status query API for verifying the status of an existing payment or refund transaction.

Table /: Examples of API based banking and payments in India

IoT and Wearables

⁵⁰ http://cio.economictimes.indiatimes.com/news/strategy-and-management/dbs-bank-becomes-indias-first-mobile-only-bank-uses-ai-based-virtual-assistant/52006419

⁵¹ https://www.yesbank.in/corporate-banking/product-and-services/digital-banking/api-banking

⁵² http://gadgets.ndtv.com/apps/news/mobikwik-opens-power-wallet-api-to-retailers-785847

⁵³ http://eko.co.in/enable-remittance-services-using-eko-apis/

⁵⁴ https://www.payzippy.com/apidoc

Internet of things will play a significant role in the field of payment infrastructure. It creates a system of interrelated computing devices and provides a wide range of payment methods through devices such as NFC chips, sensors, tracking devices, etc.

Table 8: Examples of IoT and wearables in India

Player	Description
PayPal ⁵⁵	PayPal payment applications for wearable devices (featured on Samsung's Gear 2 and Gear 2 Neo wearables) allows consumers to make mobile payments, store and utilize rewards, and transfer money to other app users.
Ingenico ⁵⁶	Intel has partnered with Ingenico to combine Intel's technology and Ingenico Group's secure payment technology to develop a mobile tablet that supports EMV and NFC payment functionalities which will pave the way for other worldwide devices like intelligent vending machines, kiosks and digital signage.
Amazon ⁵⁷	Amazon's Wi-Fi-enabled Dash buttons are configured to order specific products from Amazon, with payment made through the user's chosen online mode. While human intervention is still required, this approach offers a glimpse of how IoT works.
Axis Bank ⁵⁸	Axis bank partnered with GOQII to launch NFC payments on GOQII's fitness wearable devices for accepting payment on NFC enabled POS terminals

Challenges to adoption of these technologies

While the adoption of these technologies is on the rise, they face multiple challenges

Table 9: Challenges for adoption of new technologies

Security

 With the technologies handling encrypted digital identity data which may be accessible to everyone, it may become a potential security issue

Robustness

• Early deployment of technologies such as biometric access control applications, fall short on 'robustness' with regard to actual performance in the target operating environment

Scalability

- There is a lack of seamless scalability and augmentation of systems with frequent downtimes.
- In blockchain, high velocity or frequent transactions are difficult, making scalability an issue

Infrastructure

Weak acceptance infrastructure, poor mobile connectivity, and low internet penetration

Regulatory requirements

• Technologies need to satisfy regulations before widespread adoption

Integration with legacy systems

• In order to realize the full potential of operational benefits of the technologies, they must function in close collaboration with other peripheral systems

⁵⁵ http://www.tizenexperts.com/2014/04/1404-paypal-announces-fingerprint-based-payment-support-galaxy-s5-dedicated-apps-gear-2/

 ⁵⁶ http://blogs.intel.com/iot/2015/04/13/intel-ingenico-announce-secure-payment-agreement-for-internet-of-things-at-transact-15/
 ⁵⁷ http://www.pymnts.com/amazon/2016/amazon-dash-powered-devices-qo-live/

⁵⁸ http://economictimes.indiatimes.com/small-biz/startups/axis-bank-launches-nfc-payments-on-goqii-devices-opens-innovation-lab-forstartups/articleshow/53885014.cms

Cultural resistance

 As banks have made large investments in their legacy systems, they are hesitant to adopt newer technologies. For example, banks are allowing only a few companies to access their APIs, and are not making them completely open.

Common industry standards

• For widespread adoption, there needs to be industry alignment on underlying architecture, protocol, governance processes, roles and responsibilities etc.

In conclusion - What does the future hold?

The adoption of these technologies is expected to make financial institutions customer-centric and provide a secure and seamless customer experience. Players are expected to leverage emerging technologies and reach out to the underserved and unserved population, as well as increase wallet share of existing customers. While new technologies will continuously evolve, players need to look at their adoption level, capability, and how they can be used to improve business models.

Initiatives such as Acceptance Development Fund (ADF) to enable creation of merchant acceptance infrastructure in India, and regulatory sand box environments to drive innovation in FinTech, where they can test innovative products, services and business models without the usual regulatory consequences will go a long way in allowing these technologies scale up in India.

Biometrics

Biometrics such as fingerprints and iris scans are expected to be integrated into POS devices, as they have low susceptibility to fraud. Biometrics will provide customer data to the payment players and aid in offering customized products and services such as instant loans, approved credit schemes, etc.

Blockchain and DLT

Increasing industry experiments in Blockchain are expected to result in a higher number of Blockchain use-cases and solutions. To drive adoption, the regulator is expected to play a key role, with IDRBT expected to roll-out pilots to develop applications for banks ⁵⁹. The regulator, is also expected to develop industry standards and interoperability requirements.

Artificial Intelligence and cognitive technologies

Al is predicted to disrupt the way businesses integrate their services, both online and offline. Automation is expected to lead to better accuracy and can be used to predict behaviors, along with speeding up back office process.

API based banking and payments

As payment players open their APIs, their products will be incorporated by third party partner's applications, providing opportunities for new revenue streams. Additionally, data collected through APIs may be used for customizing offerings for customers.

Despite the increasing demand for real time transactions and anytime access to payments services, banks are expected to take some time to open up their APIs to the market. However, they are expected to expose their APIs to startups and companies working closely with them, in order to develop next generation products, and reduce time to market.

⁵⁹ http://www.thehindubusinessline.com/money-and-banking/article9461728.ece

IOT and wearables

Banks will be able to enhance their customer facing activities by introducing IoT into their payment offerings. Banks can leverage the data received from a huge mesh created by devices, which also extend beyond mobiles and wearables, to further improve customer experience by providing customized offerings.

Glossary

2FA	Two Factor Authentication	NACH	National Automated Clearing House
ACH	Automated Clearing House	NBFC	Non Banking Financial Company
ADF	Acceptance Development Fund	NEFT	National Electronic Funds Transfer
AEPS	Aadhaar Enabled Payment System	NFC	Near Field Communication
AI	Artificial Intelligence	NPCI	National Payments Corporation of India
AML	Anti-Money Laundering	OEM	Original Equipment Manufacturer
API	Application Programming Interface	P2M	Person to Merchant
ATM	Automated Teller Machine	P2P	Person to Person
BHIM	Bharat Interface for Money	PoC	Proof of Concept
Bn	Billion	POS	Point of Sale
BPCL	Bharat Petroleum Corporation Limited	PPI	Prepaid Instrument
BPPS	Bharat Bill Payment System	QR code	Quick Response Code
CFT	Combating the Financing of Terrorism	RBI	Reserve Bank of India
ERP	Enterprise Resource Planning	REST	Representational State Transfer
FD	Fixed Deposit	RTGS	Real Time Gross Settlement
FMCG	Fast Moving Consumer Goods	UIDAI	Unique Identification Authority of India
FX	Forex	UPI	Unified Payments Interface
GOI	Government of India	USSD	Unstructured Supplementary Service Data
GST	Goods and Services Tax	VPA	Virtual Payment Address
IDRBT	Institute for Development and Research in Banking Technology		
IMPS	Immediate Payment Service		
IoT	Internet of Things		
JV	Joint Venture		
KYC	Know Your Customer		
MDR	Merchant Discount Rate		
MF	Mutual Fund		
Mn	Million		
mPOS	Mobile Point of Sale		

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