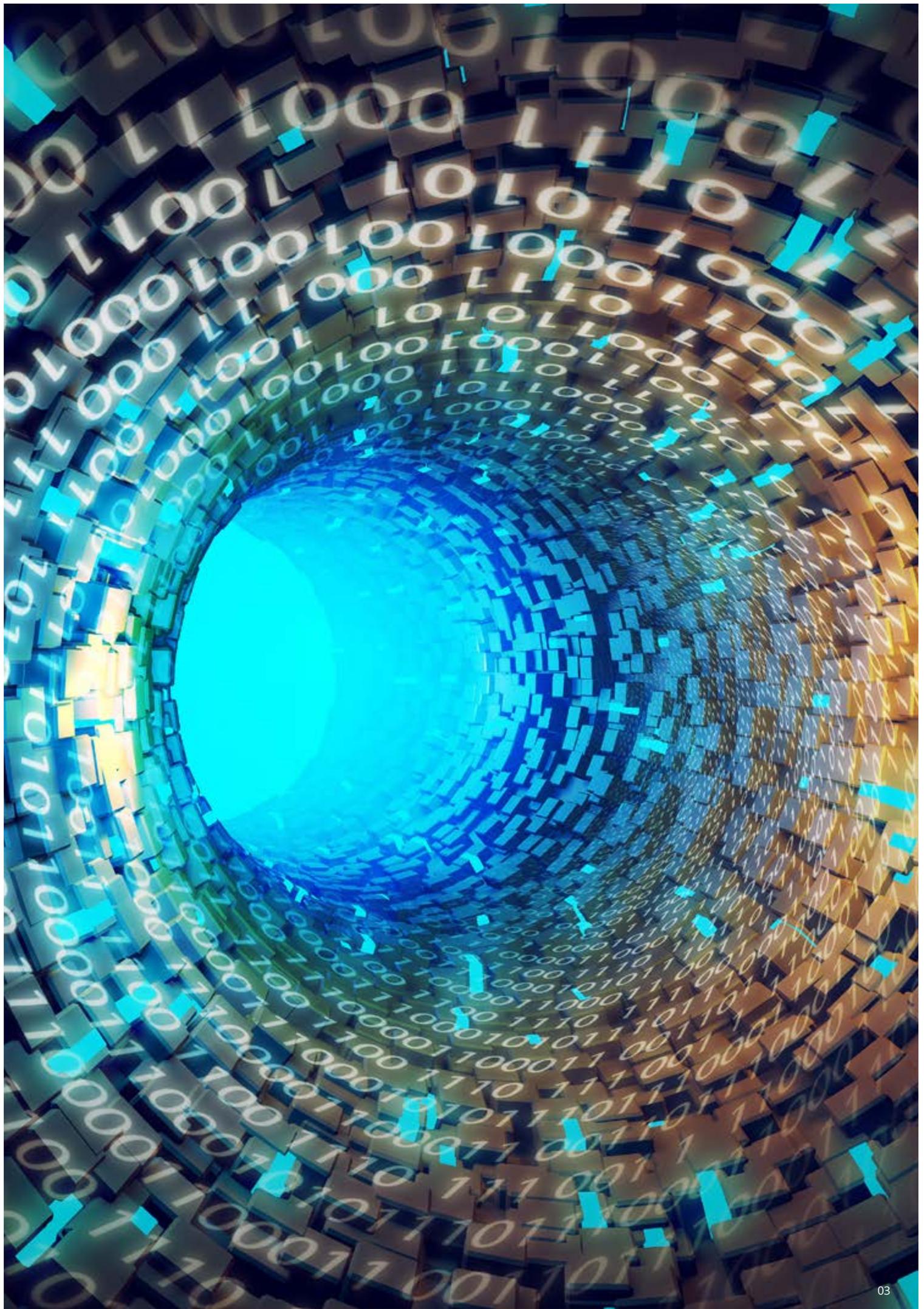




**Understanding the
emerging frontiers in
payments systems**





Foreword

Foreseeing the Unseen!

It was the Whatsapp moment for the banking sector when Nandan Nilekani launched the Unified Payments Interface (UPI) on 11 April to the applause of RBI governor Raghuram Rajan and several leading industry captains in the country. Its originator, the National Payments Corporation of India, then said that this was just a modest beginning and a real revolution is yet to happen in the form of Bharat Bill Payment System (BBPS) and several other innovative payments systems that are being designed and developed. In the domain of banking, payments today is one of the most happening areas in terms of innovation, technology and business.

I remember Vijay Shekhar Sharma of Paytm mentioning that we are now passing through one of the most exciting times in the payments business with a lot of action happening around. A true follower of the banking sector cannot afford to miss this transformation. What is exciting is that the regulator is moving away from traditionalism and is becoming highly supportive of the innovations and offering the innovators a chance to prove themselves. In fact, the regulations are being created around these innovations so that the banking system evolves in the right direction free of security scares, operational inadequacies and in a manner that is conforming to global standards. The presence of fintech entrepreneurs, accelerators and incubators in the regulator's office is sign that the business of payments is getting redefined and it is not any longer a conservative business.

There have been maximum frauds in the payments realm. In fact, frauds in the corporate banking scene is ten times more in terms of value than those happening in the retail banking scene. The regulator is constantly evaluating the shortcomings in the security infrastructure and suggesting effective counter measures to contain possible frauds. The regulator is also highly sensitive to customer complaints, especially those that are likely to come up against the new genre of banks. In fact, the day is not far off where there would be a regulator for the fintechs, considering the large number of entrepreneurs who are entering this field.

The click revolutionized the commerce, the tap disrupted it and we are awaiting the next level of transformation. I am sure it will be more transparent, safer and easier for one to make payments in the days to come.

We at Banking Frontiers have been trying to be catalysts for this transformation to happen. It has been our endeavor to create a roadmap for the segment. And we are assisted in this effort by Deloitte India. I am thankful to Monish Shah and his team for consistently working with us in this effort and bringing out periodical reports. I must also recall that we have transformed from Mpay Insights to PayNext Insights to match the flavor of the payments business.

We sincerely hope this can be a good yardstick for each one of you reading this report to plan your future business roadmap for it will surely help in foreseeing the unseen and help you strategize accordingly. We welcome your feedback so that we can make it more effective. Please send your responses to publisher@bankingfrontiers.com.

Thank you,

Babu Nair
Publisher
Banking Frontiers



Introduction

India is at the cusp of transformation in disruptive innovations and the notion and benefits of “unscale” are a significant departure from the rule that bigger is always better.

Indian payments industry is undergoing an ecosystem expansion and transformation at the same time. Entry of new banks, acquiring and processing companies, is likely to bring unique business model nuance to the fore. New Payments players are expected to disrupt the market through dramatic technology delivery, shifts in customer servicing, differentiating value propositions thereby competing aggressively with legacy strategy, infrastructure and paradigms.

Aided by growth in “Omni-Access” channels and availability of new payments utility platforms, Indian payments industry is uniquely positioned to leapfrog the trajectory followed by other countries. Despite the din of uncertainty around their viability, new payments and small finance banks have the potential to be hailed as the challenger banks in India. With limited legacy and strong captive customer base, these banks are likely to offer engagement models which are product agnostic and will include products beyond core payments.

These new entrants will also act as a catalyst to shake-up the incumbent banks to improve value proposition, offer better customer experience and adopt engagement models that will go beyond transactional aspects of payments. Both challenger and incumbent banks have started to develop end to end digital value chains starting from user facing applications and interfaces. However, we believe that digitizing the middle office and back office activities will lead to a highest order of sustainable competitive advantage. We are likely to see new partnerships and alliance models emerge in a bid to create customer value propositions.

Customer experience in payments will go beyond the user experience design. Banks and payment companies need to consider service personalization, issue resolution and grievance redressal as an integral part of customer experience. Moreover, building customer trust in electronic payments remains a primary challenge and strengthening of authentication and verification process will go way in advocating user trust and confidence. With the emergence of biometric authentication as powered by Aadhaar, areas of customer frictions can be further streamlined.

Deloitte Thought Leadership Report for Paynext 2016 captures these emerging themes and focusses on three critical areas:

01. Legacy Banks versus Challenger Banks: New age of innovations in payments with entry of new banks
02. Forget the wires, connect the wallets: Putting user experience at the heart of multi-channel payments
03. Building customer trust in mobile payments through improved authentication and verification process

We hope that the readers find this Report useful and insightful.

Monish Shah

Lead Consulting Partner
Financial Services



Challengers versus Legacy Banks

New Age of Payment

The last three years have seen a lot of activity in the Indian Banking space. Some notable developments have been:

- **Liberalization of the issuance of the coveted banking license**, allowing several new players – 2 Universal Banks, 8 Payments Banks (of the 11 licenses granted by RBI, 3 have surrendered it) and 10 Small Finance Banks - to enter the banking space in India and challenge the existing paradigms¹
- **Foreign banks** having an option to enjoy **on par treatment with other banks in India**, if they opt for the Wholly Owned Subsidiary route²
- **Public Sector Banks** grappling with the issue of **rising Non Performing Assets and eroding capital**³

- Announcement on the **merger of the larger state run banks with the smaller and inefficient players**, to salvage their poor performance⁴
- **FinTech** emerging as **strong contenders to banks**, globally, and in India
- National Payments Corporation of India's (NPCI's) **Unified Payment Interface (UPI)**, launched with the aim of achieving electronic payments, reducing cash in the payments system, and financial inclusion⁵

The next phase of banking and payments will be challenging, and with competition inching up, a host of new players will enter and new business models may emerge. These new players will be the 'Challenger

Banks' who will attempt to disrupt the existing paradigms of traditional banking.

All products that a bank offers, are ready for digital disruption and the 'Challenger Banks' are expected to spearhead this change. The business model of these 'Challenger Banks' rests on the requirement that they facilitate a large volume customers or transactions, if they are to be viable, while overcoming the challenges of earning the trust of the customers as a financial partner.

The focus of the 'Challenger Banks' would be rapid technology adoption, better customer orientation, and favorable cost-income ratios. At the same time 'Legacy Banks' may be tempted to or even forced to revamp their efforts and refine or change their existing strategies to withstand the new competition. This will lead to players focusing on areas such as product innovation, pricing strategies, usage of digital channels, extensive use of technology, data analytics, new-gen marketing and branding, etc.

'Challenger Banks' are expected to have a near clean slate and a nimble organization with limited legacy issues. They are likely to bring in their learning, expertise & experience from diverse sectors and come up with unique business & operating models, which may prove to be successful, not only in providing last mile connectivity to the rural hinterlands, but also in creating a sustainable and profitable business model across geographies & customer segments.

'Challenger Banks' will have to make the transition from cash to digital and inculcate a behavioral change in the customer. This will need efforts from all players in the ecosystem.

'Challenger Banks' would need an integrated product platform that goes beyond 'banking'. This will be mandatory to create customer engagement. A modular system architecture should be considered to enhance the convenience of partnering with other companies to provide financial and non-financial services, to meet all the customer needs. As these banks would need to cater to a diverse set of customers with varying needs, the platform needs to be flexible enough to be customized; an in-depth understanding of what's desirable from the perspective of each customer segment is critical.

Key strategic choices which will shape the future of the Banks

With the RBI mandating a certain minimum capital requirement, the 'Challenger Banks' have to necessarily inject this capital in their ventures. To combat the new competition, many of the 'Legacy Banks' may also need more capital as a part of their business reorganization or technological up-gradation activities or for chasing new growth avenues. This will put pressure on both the entities, to **create a business model in a capital efficient manner that adds value to its shareholders.**

Banking industry of the future will look very different from today. It is critical that 'Challenger Banks' have a clear picture of

their end state and work backwards, in order to avoid pitfalls later. A few license winners have withdrawn their interest⁷ and this shows that players are grappling with the issues of viability and scale up. At the same time, these players have created a sense of urgency among the 'Legacy Banks', who are trying to determine their approach, which could be reactive or proactive, and range from ignore, partner or compete. All players, new and old, need to reconsider their aspirations, assess the market and their own strengths to define their plan. A key thing to keep in mind would be that customers' underlying financial and payments needs haven't changed dramatically, but the way in which they want to fulfil those needs has. Customers now demand products with high convenience, ease of use and innovative features.

Key Questions every bank needs to answer

Goals and aspirations?	Where to play?	How to win?
<p>What should be our goals and aspirations?</p> <ul style="list-style-type: none"> • Capital • Revenue • Profitability • Number of customers • Better economics of existing business 	<p>Customer segments</p> <ul style="list-style-type: none"> • Urban or Rural • Affluent or mass affluent or mass market (Which age groups/ profession segments?) • Do we target all or select customer segments? <p>Focus offerings</p> <ul style="list-style-type: none"> • Savings or Payments or access to Lending or access to Investments or Non-Financial services • Do we offer all or few of the above? 	<p>Positioning</p> <ul style="list-style-type: none"> • Full-fledged bank or • Select bank offerings with value added services <p>Operating Model</p> <ul style="list-style-type: none"> • Physical or Digital or • Combined <p>Channels</p> <ul style="list-style-type: none"> • Branch or BC or online or mobile (app, web) • Do we deploy all or few of the above <p>Partnerships?</p> <ul style="list-style-type: none"> • Product partnerships or partnerships for customer acquisition or service delivery • Which partnerships do we select?

Winning strategies to build the next Banking and Payments Wave in India

Some of the key challenges facing 'Legacy Banks' today are a traditional approach to banking, lack of a clear digital strategy, and cultures unsuited to rapid change. This is where the 'Challenger Banks' are expected to differentiate themselves to win in this market. 'Challenger Banks' will look at multi-dimensional innovation that goes beyond product innovation, in order to derive sustainable competitive advantage.

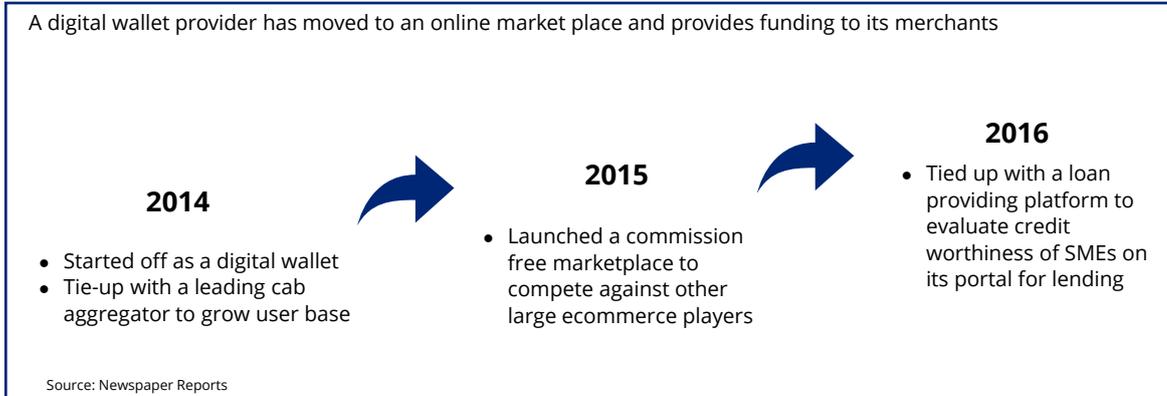


Going beyond a typical bank: Serving financial and non-financial needs of a customer

In addition to offering the usual banking products, both 'Legacy' and 'Challenger Banks', will need to graduate to a one stop institution offering a wider portfolio of basic products or a combination of basic products – credit, investment, protection, plan, money transfer, bill payments, wealth advisory, loyalty rewards, shopping offers and other non-financial products and services – which the banks may provide through third party arrangements, in order to retain and expand their customer base, and to meet their ever expanding financial, payments and non-financial needs.

'Challenger Banks' will need to identify a profitable pool of customers and monetize these relationships. They can look to significantly enhance the value proposition for customers by drawing insights from customer data to recommend best products/ services for customers, connecting customers to financial/ non-financial products/ services that enhance convenience and bringing relevant offers, discounts, and loyalty rewards to customers.

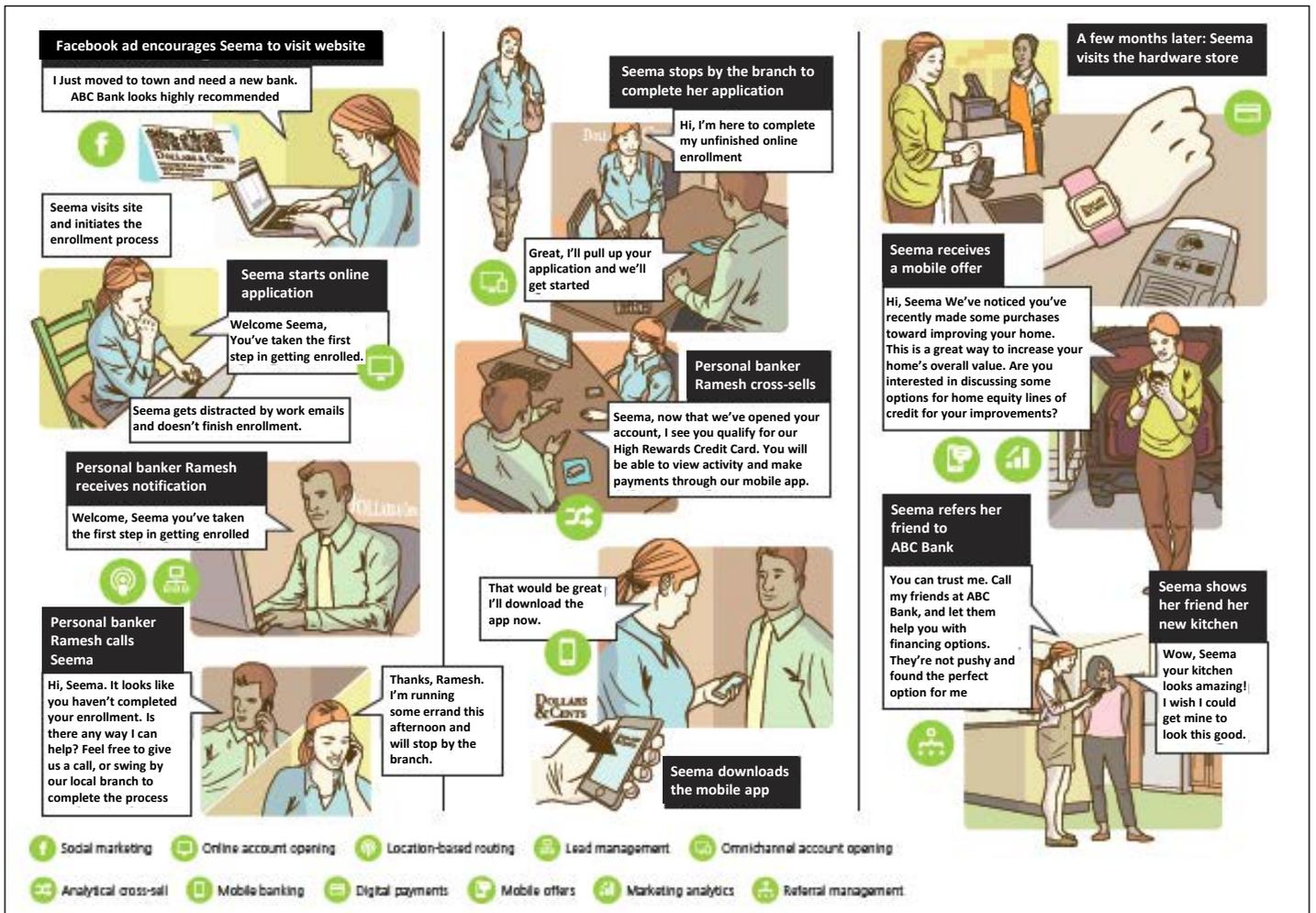
Changing Indian Financial Landscape: Niche Offerings by a Non-traditional Player



This digital wallet provider has also tied up with offline merchants such as Kirana stores for processing small value payments⁶.

An appropriate mix of various types of channels, both virtual and physical, staffed with the right roles will be critical to ensure a high quality channel experience to customers

The various channels offered to customers will be designed to enable seamless transition irrespective of the type of service needed



2 Building 'Digital' as an end-to-end solution, a way of life for customers

Customers are increasingly moving towards customized services and unique

experiences. There are a number of banking products which address their needs but they are fragmented, opaque and cumbersome. Each successive channel and offering has been layered onto an ageing core infrastructure that is no longer able to integrate and respond to customer needs. This often leads to higher cost to serve across channels, data existing in siloed systems and multiple customer friction points.

While much of the efforts of the legacy banks may be constrained due to traditional models being expensively built to last generations, 'Challenger Banks' are expected to offer new blood with their innovative models and a fresh 'hi-tech and hi-touch' digital approach.

'Challenger Banks' will need to look beyond just facilitating financial transactions. Health

Check Tools such as bill payments alerts, savings balance alerts, expenditure alerts, loyalty points and related offers alerts will help them engage with customers in a meaningful manner.

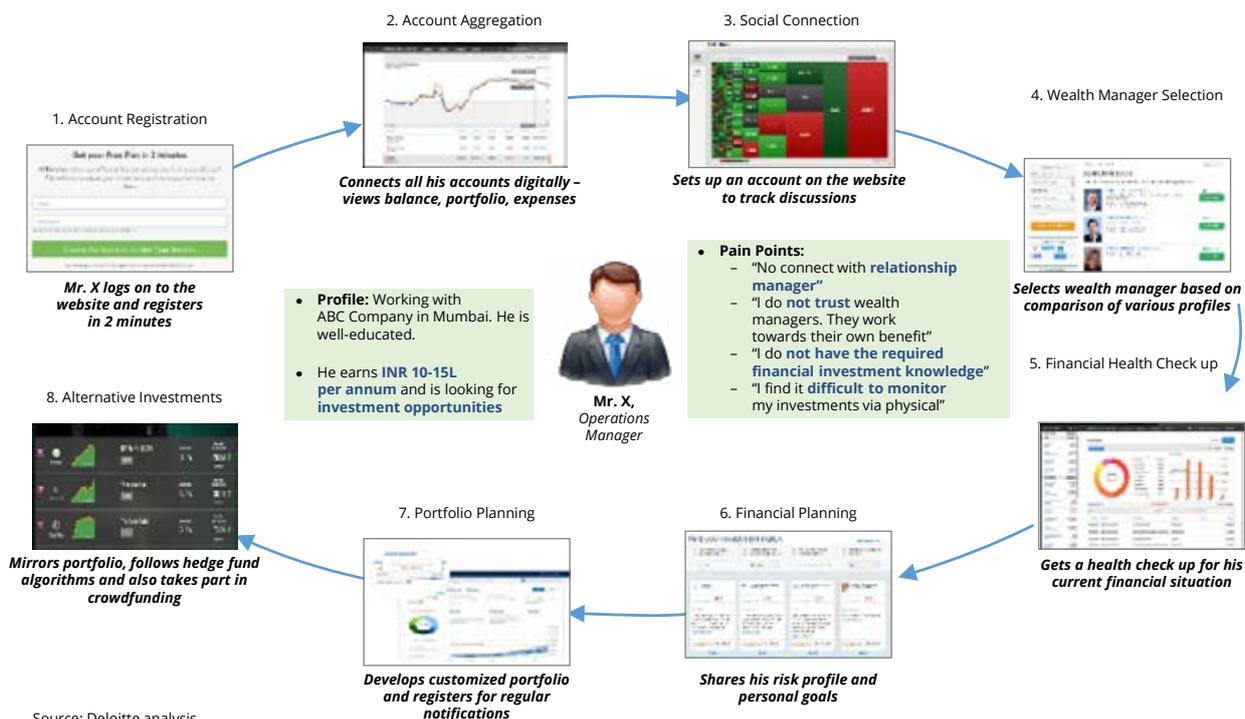
Technology will be a key differentiator for these 'Challenger Banks'. Challenger Banks will look to build strong analytics/ data capabilities to drive targeted acquisition, build credit scores using surrogate methods and determine next best action, etc. In order to achieve this, these banks need to break from orthodoxies around why people bank and ask a more fundamental question on how does money and value flow in and out of a customer's life across communities, where does money go and what is it being used for and what problems can they solve for these customers. This demands an understanding of:

- **Smart products that self-optimize around customer goals such as savings, spends**
- **Predictive analytics** that anticipate what lies ahead and helps customers plan

- Understanding user models that helps **customers build better habits**
- **Total transparency** so customers know what they are paying for and get what they pay for

'Challenger Banks' may have fund constraints and would be cautious about their technology investments. Models such as 'bank in a box' mode¹⁸, can help these players access a wide range of technology solutions with all technology management and support services. These are available at prices based on usage and will enable players to quickly enter the market, without taking a huge dig on their funds, but at the same time helping them be competitive and also compliant from a regulatory perspective. Options such as full cloud model or a fully on premise model are also available in the market. These options help reduce transition time and enable players to offer technology led banking in a cost effective manner. Extensive usage of digital mediums and focus on low-cost delivery channels shall lead the players to rationalize their costs and pass the benefits to the customers.

The customer journey will be designed in a manner where the bank can service all his / her needs via a single platform



3 Striking the right partnerships

A variety of robust external partnerships for customer acquisition and retention (FMCGs, Ecommerce Merchants, MFIs and BCs), access to products and services (e.g. government agencies, cash management services etc.) and service delivery, along with operational tie-ups to reduce time to market, will be considered by these 'Challenger Banks'. Challenger Banks have the opportunity to outsource technology and other functions to managed services providers to keep their investments low and to gain the benefit of the expertise of these providers.

'Legacy Banks' bring expertise in the critical fields of regulatory compliance and risk management, and new players can look up to them for guidance on these aspects. In addition 'Legacy Banks' can use some of these 'Challenger Banks' to offer loans and other such services in places where they cannot reach.

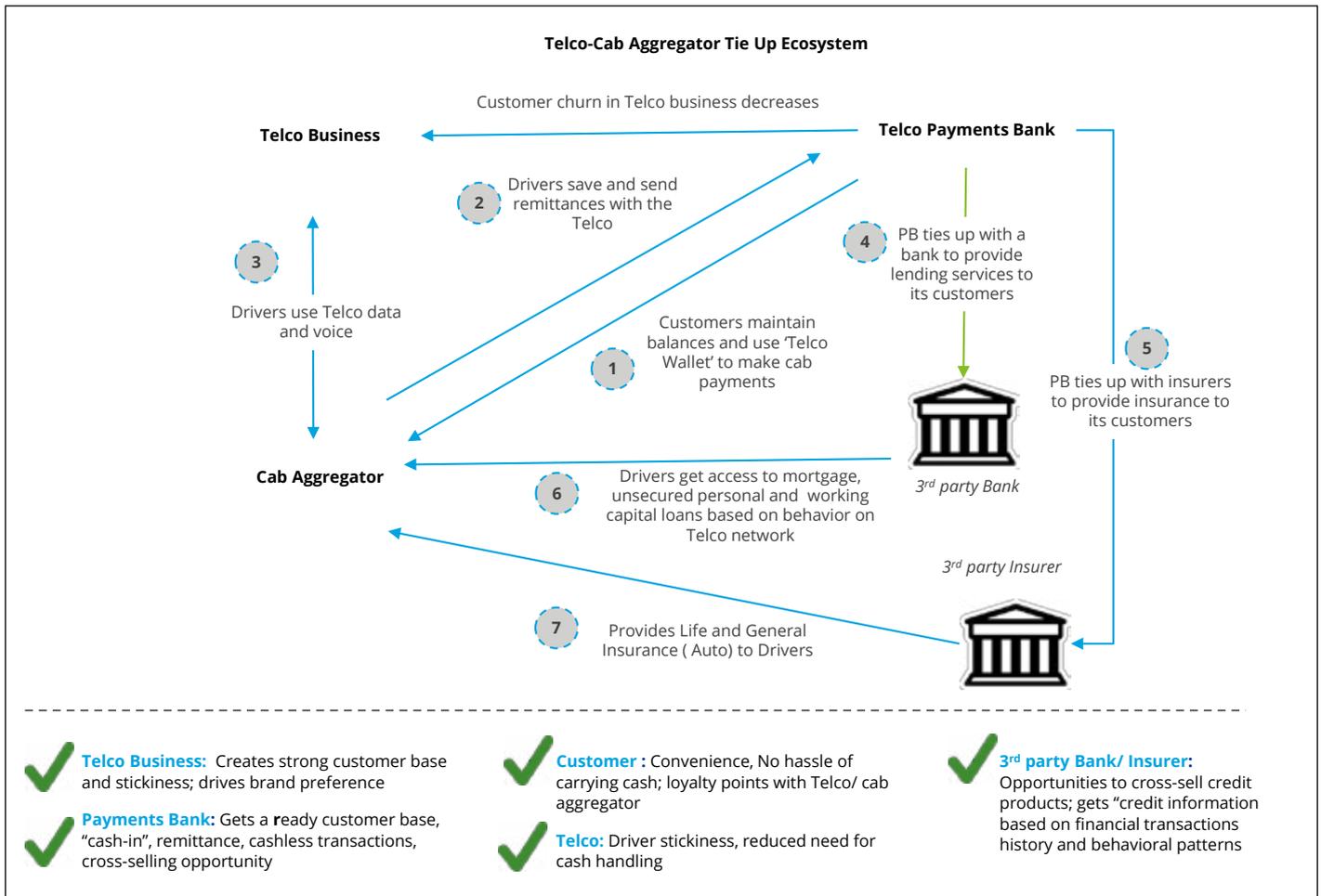
Some 'Legacy Banks' have tied up some of these 'Challenger Banks'. For instance, SBI, is expected to take up to 30% in RIL's proposed⁹ bank while Bharti Airtel, India's largest telecom operator, is expected to give 19.9% stake in the bank to Kotak Mahindra Bank Ltd⁹. Meanwhile, Aditya Birla Nuvo Limited has tied up with Idea Cellular which will have 49% stake in the Payments Bank joint venture⁹.

Conclusion

There have been instances from several other countries, where a new category of player has created a new and successful business model and changed how banking was being done before.

We hope that this new era will result in an even larger impact on the financial landscape of the country, from the last round of the licenses in 1994 and 2002, and may prove to be a game changer for the entire ecosystem, benefitting customers, players and the regulator

Illustrative benefits of a partnership between a Telco led Payments Bank and a Cab Aggregator





Forget the wires, connect the wallets

Putting user experience at the heart of multi-channel payments

Payments have historically been viewed as utility products; fundamentally transactional and tactical in nature, undifferentiated and volume-driven. In fact, payments were often perceived as merely the final step in a transaction, with limited opportunity to provide value-added services or solutions.

Today, the evolving payments landscape is in a state of fundamental transformation. Leveraging on ever increasing mobile penetration with 2 billion smart phone users¹⁰ and seamless data connectivity, several digital innovations are emerging to transform wired payment methods (cash, credit cards, cheques etc.) to digital (mobile wallets, NFC-based card payments, QR code payments etc.)

With these innovations, 'new age' players are redefining consumer experience and expectations in today's world. Mobile smartphone and tablet technologies

– with their rich functional capabilities are supporting the development of sophisticated applications and payment platforms that cater to diverse customer requirements. Newly developed payment and mobility platforms are becoming data rich, using not only transaction information but also geo location information about each customer. This is helping them to develop new services and value propositions for deeper customer engagement.

In the underdeveloped and developing world, where traditional financial services have not been able to reach the last mile customers, digital payment providers are increasingly playing vital role in delivering financial services to the excluded population. Incumbent players are increasingly looking to tie up with these 'new age' players to deliver broader bouquet of financial services through digital platforms.

While digital platforms are transforming the retail financial services landscape, disruptive technologies such as blockchain is set to radically transform the traditional 'wired' process for B2B payments such as international funds transfers and trade settlements.

The convergence of technology, mobility and payments, will result in several key benefits to the entire ecosystem ranging from – movement to a less cash economy, greater customer convenience, better customer engagement, reduced costs of service delivery, greater data availability for proper risk assessment, etc.

In this paper, we have identified **4 key themes** emerging from rapidly changing digital payments landscape, the differentiated user experience they bring and their implications for financial services industry. ➔

Mobility and Payment integration are turning 'mobile apps' into flagship stores

The integration of digital wallets and mobility is enhancing customer experience and engagement to an altogether newer level.

With greater proliferation of smart phones, players are now attempting to integrate smartphone capabilities with host of other features to deliver a ubiquitous experience that eliminates friction from the customer buying journey turning mobile applications into their 'flagship stores'

These 'flagship app stores' are going a step ahead of physical stores by continuously interacting and engaging with the consumer to deliver a unique shopping experience – by enabling instantaneous payments through digital wallets, earning and tracking loyalty points, comparing prices, receiving spot discounts, assisting in selecting optimal payment method etc. A comprehensive in-app experience is helping players build better and deeper relationships with their customers by understanding their purchase behavior and response to discounts and offers. The differentiated user experience that players are achieving by developing an integrated in-app experience is:

- **Integrated user experience** which connects discrete services into an integrated mobile application
- **Instant and Seamless payments solution** where customer remains invisible to entire process and transacts seamlessly
- **Faster Processing** leading to reduction in transaction time and enhancing overall customer experience
- **Personalization** of offers suited to customer profile



- **Apple's** purchase and pay platform¹¹, one where its customers can easily purchase music, movies and their favorite television shows, all in one location



- Users simply open the **Uber** frictionless app¹¹ on their smartphone, input their destination of choice, and a series of ready-made solutions and routes are provided
- An Uber driver is reaches to pick the customer within few minutes. Users can pay for the ride through the app using wallet



- **Flipkart** app¹² engages consumers with innovative features like chat, offer zone, discount alerts

Retail banks and other financial services companies can also emulate some of the best practices implemented by players in other sectors such as e-tailors, taxi aggregators, hotel aggregators etc. They should bring the "flagship branch" virtually on mobile apps servicing customer 'on the go'. Apart from account opening or purchase of insurance policy, such mobile applications should also support a host of customer servicing aspects ranging from cheque book requests, address change request etc. In addition, the apps can also deliver value added services like expense management which helps in financial planning.

Some of the banks have already began taking steps in this direction e.g. some of the global banks such as Bank AmeriDeals⁴ leverages location to pinpoint reward offers, while Barclays¹³ provides an integrated borrowing calculator within its mobile app. In India, ICICI Bank¹⁴ has added a host of services on its mobile banking application e.g. tagging transactions as favorites. This helps customers in doing repeated transactions instantaneously. With expanding potential of 'connected' apps and wallets, it will be an imperative rather than choice for financial services firms to deliver broader range of services through the mobile apps.

Physical stores are integrating digital payments (contactless NFC and QR-code based payments) with in-store value added services to provide a seamless consumer experience

Despite digital revolution transforming online and mobile commerce rapidly, offline commerce still continues to dominate consumer buying for many of the purchase categories.

Superior in-store shopping experience remains a key success factor for the physical establishments. Digital payments are augmenting this experience by providing faster and efficient check-outs. Leveraging on the use of smartphones, retailers are developing their own proprietary mobile wallet and payment platform to accept mobile payments. Latest technology innovations such as NFC capabilities and QR code scanning technology are helping retailers integrate shopping and payments. The one example being that customers scan the goods they want to purchase while walking in the stores. At the time of checkout, the payment is automatically deducted through customer's wallet or can be paid at the counter through scanning of a QR code or NFC enabled payment method.

The differentiated user experience that players are achieving by developing an integrated in-store experience is:

- **Faster check out** - no queues at the counters enhancing customer experience
- **Convenient payments** - no requirement to keep the change at counters for customer as well as for the store
- **Reduced costs** for merchants with reduced FTE requirements at check-out counters



- Customers at US retail giant **Walmart** will soon be able to pay for purchases by scanning a QR code at the point of sale using Walmart Pay¹⁵, the retailer's own mobile payment service
- Walmart Pay will be integrated into the Walmart app and introduced in selected stores this month, with a nationwide launch expected in the first half of next year



- **Paytm**¹⁶ plans to double its in-store merchant acceptance to four million. Paytm users can complete in-store transactions by scanning a code with their mobile phone
- Paytm is also currently trialing sound-based payments



- More than 20% of the **Starbucks**'s¹⁷ in-store transactions use the mobile app for payment. It works in a closed-loop system with a barcode that's essentially a virtual gift card
- Using the app has become a habit for loyal customers who stop for their daily caffeine fix

There is significant opportunity for financial services firms to develop suitable solutions for in-store payments. They can consider typing up with technology companies, handset manufacturers, and retailers etc. to develop solutions which would be tailored to customer requirements. This could help them in to remain 'service provider of choice' in the offline world as well.

Some of the banks and digital payments players are pioneering initiatives in this area e.g. ICICI Bank¹⁸ recently launched a contactless mobile payment solution to enable its credit and debit card customers make in-store payments by just waving their smartphones near an NFC-enabled merchant terminal. Mobile Wallet player MobiKwik¹⁹ has exclusive tie-ups with Big Bazaar, Café Coffee Day (CCD), Archies, and Mobiliti World etc. to gain easy access to offline customers. Similarly Paytm⁷ allows its e-wallet users to transact at Pizza Hut, KFC and Costa Coffee outlets. While enabling seamless payments is an important aspect of the in-store payments, going beyond transactional relationship and building solutions which bring in purchasing and payments experience together will be a winning concoction in the market.

Mobile payment service providers are going beyond the realm of P2P and P2M payments to help build affordable and easy-to-access financial services ecosystem

Traditional approaches to bottom-of-the-pyramid (BoP) financial delivery have relied on cash-dependent transactions with retail banks driving financial inclusion attempts, albeit with minimal impact.

Driven by a rapid increase in smartphone penetration, internet and the emergence of new-age technology companies in the payment space, digital financial inclusion is gathering steam, as it looks to improve accessibility and availability of formal financial services to unserved and underserved customers.

Digital financial inclusion model is leveraging a collaborative fin-tech and traditional financial services ecosystem. Keeping payments at the core, digital payment players are partnering with other financial services providers (banks, non-banks, insurance companies etc.) to extend broader financial services such as credit, savings, insurance, and even investments to the underserved.

This is a win-win situation for both since incumbent players can provide a bouquet of products ranging from savings, insurance, investment management etc. to customer hitherto unserved while digital payment players deepen relationship with their customers by delivering host of products 'in their handset'



- **M-Pesa**²⁰, a Kenyan money transfer platform, launched health insurance in partnership with an insurance company; Premium to be deducted directly from M-Pesa wallet
- Launched credit products in partnership with Kenya Commercial Bank; M-Pesa transaction history to help with credit appraisal.



- **Payments Banks**²¹ in India (India Post, Paytm etc.) are already exploring partnerships with host of banks and insurance companies to deliver their products and services to their customers

Further, digital wallet providers help the financial services providers with customer transactions history which helps them in understanding the customer and spending pattern. Banks are leveraging this data to aid in credit appraisal process and develop customized repayment schedules while insurance companies are leveraging it to develop customized offerings based on customer's lifestyle.

The differentiated user experience that players are achieving through partnerships for furthering financial inclusion are:

- **Easy, hassle-free and affordable** access to financial services for financially excluded customers
- **Quicker loan disbursements** basis availability of customer transaction history
- **Customized product offerings** tailored to customer financial needs

Alternative payment rails are helping drive efficiencies in the value exchange process

Alternate payment protocols like bitcoin and the associated enabling blockchain technology are gaining traction over traditional transfer mechanisms for their ability to radically streamline the process. Blockchain is a digital public ledger or a database, where transactions are verified and securely stored on a network of connected blocks without a governing

central authority. Advantages of the ledger-based record keeping include traceability, security, controlled access, immutability and indelibility.

Alternate payment rails offer scope for streamlining existing legacy intra-institutional systems and bring in significant benefits for individual customers and businesses. Some of the key benefits of alternate payment rails over traditional systems are summarized below:

Advantages of alternate payment rails over traditional transfer mechanisms

Secured by cryptographic protocols

Irreversibility of transactions preventing fraud

Greater traceability for dispute resolution

Fast settlement of transactions

Low cost (executed without an intermediary)

Alternate payment rails are expected to radically transform the payments processes for following:

- Domestic and international direct remittance
- Internal payments settlements
- Clearing and settlement of securities
- Exchange of low liquidity assets

The differentiated user experience (for corporates and end users) achieved by deploying alternative payment rail technologies are:

- **Availability of high quality data**, which is timely, accurate, transparent, consistent and immutable
- **Faster transactions and lower costs** due to the elimination of an intermediary
- **Greater data security** from malicious attacks, since data is stored in the form of records



- **Banco Santander²²** is experimenting with blockchain and digital currencies; has identified 20-25 use-cases
- It is reportedly talking to several banks to explore a collaboration on building blockchain enabled payment infrastructure for international payments



- **Australian Stock Exchange (ASX)²³** is implementing blockchain technology for post trade settlement process
- ASX is expecting significant benefits such as reduction in administration and compliance costs, real time settlements and elimination of post trade settlement barriers

Implications for the financial services players

Digital technologies are going to evolve over time and will continue to disrupt the traditional ways of financial services business viz. service delivery, payments, infrastructure etc. Emergence of digital wallets, alternate payment rails, and contactless payments through NFS etc. is only the beginning of this. Every innovation

will redefine rules for the winner in the marketplace. To remain competitive, financial services players' especially incumbent ones must carefully look at their existing business and operating model and ensure that they are well positioned to identify and execute winning strategies. The pillars of the successful business and operating model to win in the 'digital' world are:

1

Customer centric product design

Keep the customer at the center and innovate based on customer needs rather than based on technology or processes capabilities. Ensure that sufficient time is given for surveys or market research to identify key customer requirements. Engage customers periodically to identify improvements that a product requires. Focus not only what customers explicitly want but also on 'untold' needs of the customers.

2

Organization re-design to develop and align teams to focus on a 'digital' agenda

Organizations promoting innovation or digital agenda need to ensure that organization culture and design supports the agenda. They should encourage collaboration across teams (e.g. product, technology, business) to drive digital agenda. Cross functional crack teams to conceptualize and execute digital projects can be formed. Further, performance of such teams can be evaluated based on success/failure of the project to bring in ownership and accountability. Employees need to be encouraged to experiment and should be helped to learn from failures. This will help organizations to develop a culture of continues innovation which is critical to success of the innovation or digital agenda.

3

Agile and faster technology development

Legacy and disparate systems create the biggest roadblocks in efforts to provide innovative and digital solutions. Financial services players should focus on creating service oriented architecture to support multichannel service delivery. Technology innovation projects should be treated as 'critical' with clear measurement of turn-around times from conceptualization to delivery. Incumbent financial services organizations need to 'think and execute like start-ups' when it comes to innovation projects which brings in agile and faster approach to technology development. In addition, incumbent players can consider partnering with or investing in technology companies to 'buy' the capabilities.

Rapid payment technology advances will even out in the long run across economies, resulting in regulatory alignment and easier international commerce. Financial service providers wishing to remain sustainably profitable will have to re-think business and operating models, delivery channels, partnership alliances and technology components to remain relevant in the evolving digital financial services eco-space. In the absence of this, market disruptors of today will eventually be market leaders in the times to come.

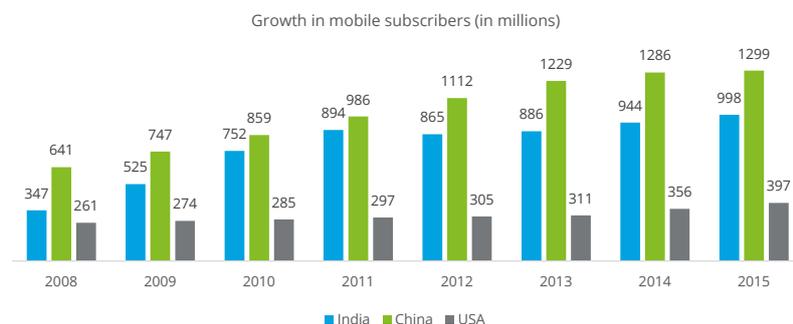
Building customer trust in mobile payments through improved authentication and verification process

India Mobile Penetration

India has more than a billion mobile subscribers²⁴, world's second largest after China, and currently has 225 million smart phone users, ranking third after China and the United States. Internet penetration is set to reach 50% by 2018, up from 26% in 2015. The Indian internet economy is expected to reach USD 200 billion by 2020²⁵. This offers a huge opportunity for growth in mobile based financial services, broadly termed as m-wallets, m-banking and m-payments.

India Mobile Payments

In developed economies across the world, cash transactions have been on the decline for several years. Globally, volume of non-cash transactions was nearly 335 billion in 2012. In the same year, India had just 6 non-cash transactions per citizen²⁶. The global number is largely driven by developed economies – Finland, for instance, recorded 451 non-cash transactions per citizen in 2013²⁷. However, even poor / emerging economies like Somaliland and Kenya have adopted non-cash payment mechanisms rapidly.²⁸



Source: World Bank Data, Deloitte analysis

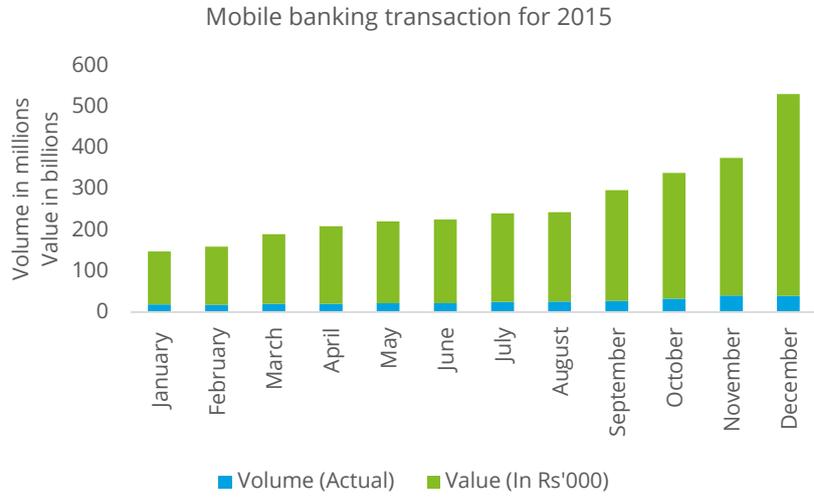
The Indian mobile payment market is expected to grow to USD 1.15 billion worth of mobile payments in 2016²⁹ with more than 200 million registered mobile wallets. In spite of these numbers, cash still remains the predominant payment mode in India. At 12.4% of GDP, the value of banknotes and coins in circulation is high when compared to other emerging markets, like Brazil (4.1%) and Mexico (5.7%)³⁰. Mobile technology has boomed in India the last decade, and there are nearly 80 mobile connections per 100 citizens. The question, therefore, is - can mobile based financial services

succeed in India the way they have in other emerging markets, like Kenya, where nearly 50% of the population has signed up for Vodafone's M-pesa payment platform; or Pakistan, where Telenor and Tameer Bank's Easypaisa platform, which began in 2008, has 13 million users, as compared to banks, which reach out to just over 28 million customers³¹?

Mobile Payments - Convenience and Security

Banking services available on mobile devices are fairly limited – looking at the numbers, there is tremendous potential for growth. India recorded over 49 crore mobile banking transactions in December 2015, a month on month increase of nearly 46%³². To achieve this, it is not only important to provide innovative products on mobile platforms but also offer convenience and security to the end consumer. The most common reason, for not using phone to make a payment is inadequate security. An appropriate level of security needs to be provided in repeated and regular usage with a zero-fail rate, a necessary customer confidence build measure.

The electronic payments domain is marked by significant risk of fraud with sensitive financial data being ferried across the world multiple times a day. India has also seen a rapidly growing trend of cyber fraud in the recent past³³. Some notable methods of fraud are (1) site replication, in which a fraudulent website is used to obtain critical information from a user which is then used to the scammer's advantage; (2) credit card charge back, in which a customer makes an online purchase with their credit card and the requests a chargeback from the credit card company, thereby canceling the transaction, is often used by scammers to purchase goods and have the transaction reversed; (3) phishing, which is similar to a fake website in that it tricks users into giving away critical information, which can be later misused; (4) malware insertion, in which a user is tricked into installing an app which can read information like credit card details, during transactions being conducted via a mobile phone; and (5) account take over, in which a scammer gains access to a victim's bank or credit card account and then misuses it. Lack of strong authentication and verification process is one of the reasons for increase in risk of fraud. Authenticating a consumer's mobile identity



Source: RBI, Deloitte analysis



Source: The economic times, Deloitte analysis

is increasingly getting difficult in an age of rapid and constant change. Hundreds of mobile change events like device upgrades, new passwords, and stolen phones can obfuscate consumer identity, requiring additional authentication measures. Additionally, since some platforms, like Android, allow the user to run third party applications from external sources, like the Google Play store, it becomes difficult to control the spread of malicious applications. Malware on mobile phones is, therefore, particularly dangerous.

Existing scenario in India

According to RBI regulations, two-factor authentication is mandatory for all mobile payments excluding payments below INR 2,000 for contact less cards. This is the reason why one-time passwords sent via SMS or verified by Visa/MasterCard secure code passwords are required to authorize payments. However this method of two factor transaction isn't fool proof. Along with serious security concerns it is very inconvenient for small transactions.

The Prognosis

Most common ways in which mobile payment fraud attacks have been reported are:

- Theft of user credentials used to access mobile applications and then criminal use of those credentials to hijack customer accounts.
- Hijacking and diverting of SMS messages sent to user mobile devices for user authentication or verification of transactions initiated on PCs.

Constant innovations by hackers have also forced mobile payment providers to innovate. These innovations can be grouped into three broad categories:

- Mobile app security: Methods to secure the apps against exploitation.
- Mobile environment security: Defences that address weaknesses in mobile platforms
- Mobile-friendly user authentication: Improvements in human interactions on mobile devices so that users can be strongly authenticated

It is important for an enterprise to prioritize at least one the above mentioned ways in order to gain consumer trust.

Options for strong user authentication

There are three ways in which a transaction can be authenticated, by verifying:

- Something that you are (e.g. fingerprint)
- Something that you know (e.g. password)
- Something that you have (e.g. SIM Card)

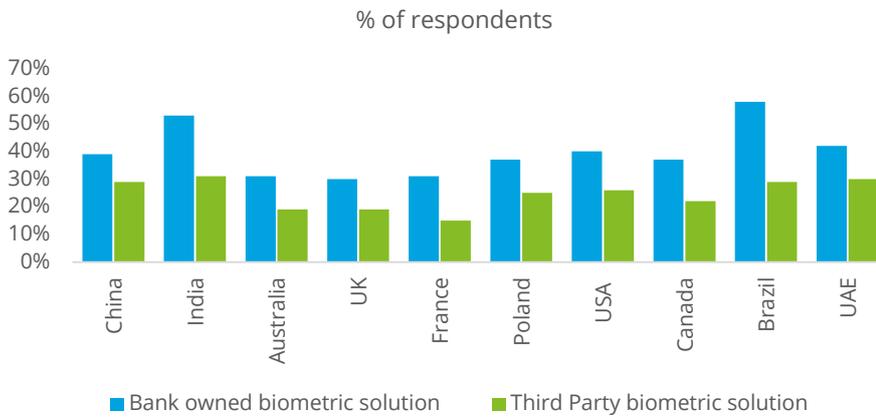
For strong authentication, an innovative mix of the above three ways should be used. Several PC-based methods that are commonly used in B2C applications, like secret questions, long passwords are somewhat unsecure when used on mobile devices. Mobile devices have advantage of improved human interfaces which can be used by enterprises so that users can be strongly authenticated.

1. Biometric authentication

Mobile devices provide rich opportunities to engage in biometric authentication because they have built-in features that enable biometric capture- microphone for voice, camera for retina or fingerprint capture. This kind of authentication has an advantage over traditional passwords or secret questions which are insufficient for personal identity simply because they provide evidence of ownership of knowledge whereas biometrics provide information regarding who the user is rather than what he knows. In contrast with passwords and PINs, a biometric identifier cannot be lost, forgotten or shared. Another type of biometric authentication is behavioural authentication: it is invisible to the user and measures and records the user's keystroke and typing rhythms, screen interface movements, e.g. how a user enlarges images on a smartphone, and effectively creates a bio print for that user. This bio print can be used to authenticate the user during repeated log-ins to a service.

In India, the feasibility of using Aadhaar as a biometric authentication tool for all payment transaction as a second factor authentication could be looked at. Indeed, biometric authentication devices can capture a customer's data at the point of sale and compare it with the data stored in the Central Identities Data Repository to verify the identity of the customer. This is a significantly simpler process for the poor, illiterate masses who would find it difficult to cope with multiple passwords and the complicated technology associated with credit cards. However, this would require image processing technology to be made available at the point of sale, to avoid transmitting images over low speed connections.

The figure below shows percentage of retail banking customers who consider the bank safe and secure when using biometrics. While significant percentages of customers see the potential benefits of biometric solutions, many remain skeptical or concerned.



Note: This represents the percentage of respondents with top two ratings (6 or 7 on a scale from 1 to 7, where 1 means not at all safe and secure; 7 means extremely safe and secure).³⁴

Some of the recently introduced biometric authentication techniques in the domain of mobile payments are:

• **Alipay’s “Smile To Pay”**

Alibaba is currently working on this new technology of biometric recognition that will allow users to make mobile payments by simply scanning their faces. Although currently in test-mode, the start-up behind the facial recognition technology that would power the service has already raised \$47 million.

• **MasterCard’s Facial Scanning**

This program which recently ran a successful pilot in the US lets users confirm an online payment by holding up a smartphone’s camera to their face and blinking to ensure the program isn’t being duped by a still photograph. The process would take place within MasterCard’s own Identity Check app. The results of the pilot run were:

- Participants found that biometric authentication was overwhelmingly easy to use on its own (88%) and a clear majority found it even easier than password-based authentication (86%).
- Speaking of its convenience and ease of use, more than 90% of participants said that biometric payment authentication is something they could see themselves using on a daily basis.

• **Samsung’s Iris Authentication**

Samsung recently launched Galaxy Tab Iris featuring iris-recognition technology that is ready for Aadhaar authentication through an integrated and highly secure biometric device. The Galaxy Tab Iris will provide cashless and paperless services in various applications such as banking, e-Governance services such as passport, taxation, healthcare and education. The capability of the Galaxy Tab Iris is to function as an authentication device enabling banks and financial institutions to easily authenticate an individual’s data for account integration with their Aadhaar numbers as well as provide an additional layer of security for banking services such as locker access, fixed deposits, where authentication is required

2. Tokenization

Tokenization replaces valuable information, such as credit card details or PAN details with a random string which may resemble the original information in structure, but otherwise bears no similarity. There’s no way for a scammer to “decrypt” this information to get the original details. The token can be matched to the original information only for the duration of the transaction, and only at the originator’s database, where details are encrypted and stored securely. Thus, these details always reside in a secure location, while the information that travels through the

transaction process is essentially useless to a scammer.

Tokenization has emerged as one of the most important solutions for enabling secure cloud based payments. In March 2016, ICICI bank became the first in India to launch Host Card Emulation (HCE) based mobile payments at any contactless enabled terminal using its pocket app. This service makes use of tokenization and could be adopted by other vendors for secured online payments. Apple Pay, Apple Inc.’s mobile payment system, uses tokenization as well.

Tokenization has some advantages such as no impact on physical retail NFC terminal, no requirement for merchants to invest in new hardware or software, and little impact on issuer’s existing back-end technology. In addition to this, tokenization complements the EMV (Europay, MasterCard and Visa) standard mandated by the RBI, further strengthening the security of all transactions. EMV standards ensure chip-based payment cards and terminals are compatible around the world rather than only magnetic strips cards. Tokenized payments complement EMV, which has been successful at reducing fraud at the point-of-sale. Tokenisation has the potential for reducing fraud from card not present transaction. Offering both EMV and tokenization enhances the overall payment data security.

3. Mobile device combined with user attributes for stronger authentication

In this category, mobile device information is combined with user attributes to enable stronger user authentication. It is a form of multi-form authentication. The information that can be combined includes, but is not limited to the following:

Mobile device information:

- The mobile device itself, as known from its hardware-resident or subscriber identifiers (for example, International Mobile Station Equipment Identity, MAC address, International Mobile Subscriber Identity and SIM card)

- The mobile phone number and its status
- The carrier network
- The mobile device's location

User attributes

- A biometric factor belonging to the user, such as voice, iris scan or fingerprint captured through the mobile device microphone or camera
- A password entered by the user
- Financial transaction information associated with the device and its owner, as recorded from past interactions

Authentication and the transaction process flow

While a cash transaction involves immediate exchange of money between the customer and the merchant, mobile payments are more complicated, since the actual exchange of money happens between the customer's bank and the merchant's bank. Thus, banks need to validate the transaction before processing them, which is where authentication comes in.

A typical non-cash payment process is shown below:

In the process shown below, the authentication details are how a bank identifies the customer and ultimately processes the payment. If a customer is unable to provide the correct authentication details, the bank declines the payment and the transaction fails. The entire process is automated and depends on authentication. Thus, stolen

authentication details can easily be used to carry out spurious transactions without any detection – unless the victim herself finds out and notifies her bank.

As detailed earlier, there are many types of security breaches, most of which involve a scammer impersonating another user by stealing critical information through various means: site replication, phishing, malware insertion, etc. Even data theft occurs because a scammer hacks into a secure database – which means that for the database the scammer is a legitimate user.

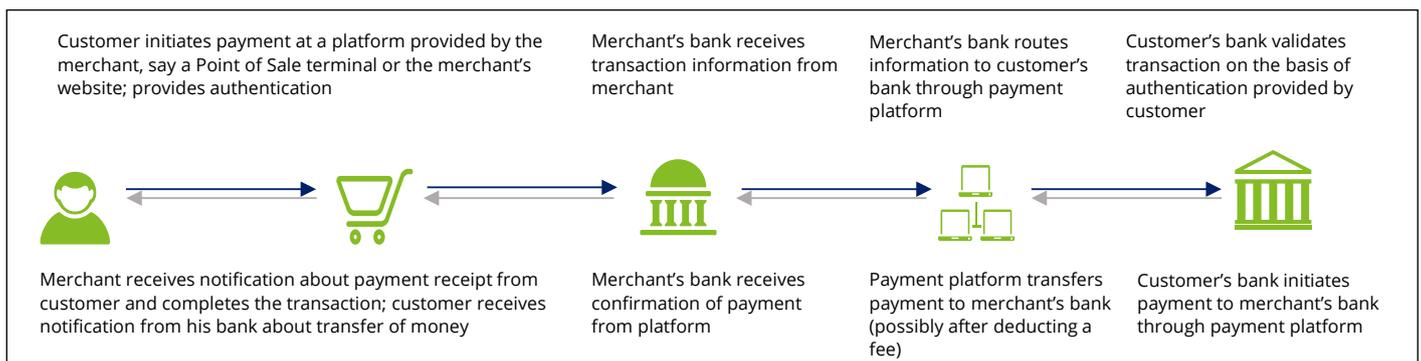
While no mode of authentication can completely address such security breaches, the methods outlined earlier can definitely reduce the probability of a breach. Biometric authentication uses information which is unique to an individual, such as fingerprints or iris patterns. This information can be replicated with great difficulty. A stolen credit card may be used to make payments at a store. However, if the store requires a customer to scan her fingerprint, following which it directs the information to the bank which authenticates it against the customer's Aadhar information, the chances of a security breach reduce to almost zero, since a criminal can't replicate someone else's fingerprints – if he can, there's a much bigger crime to solve. Similarly, tokenization simply creates a random data array to replace a vital piece of information. This information can only be matched to the original piece of information by a payment processor, which is at a highly secure location. This also

reduces chances of a security breach since these tokens can't be traced back to the original information by scammers.

Conclusion

India is witnessing exponential growth in digital payments. The macro-economic factors prevailing in the country hold huge potential of accelerating this growth further; these include pre-dominance of working age population adaptable to newer technology, and unprecedented growth in smartphone and internet penetration. Furthermore, flagship government initiatives like 'Digital India' are expected to act as key catalysts and enablers in this transformation. However, security related issues have the potential to severely undermine public confidence in the use of electronic payments, which will in turn adversely impact their usage. Therefore, it is imperative that payment products are not only customer-friendly but also assure a high level of security to prevent any fraud. New and innovative ways of authentication should be developed and adopted equally amongst all m-payment providers. Addressing security concerns around payment system isn't a work of a single stakeholder; broad-based collaboration will be essential between banks and third party mobile payment providers to avoid the reoccurrence of episodes.

How the customer authentication takes place



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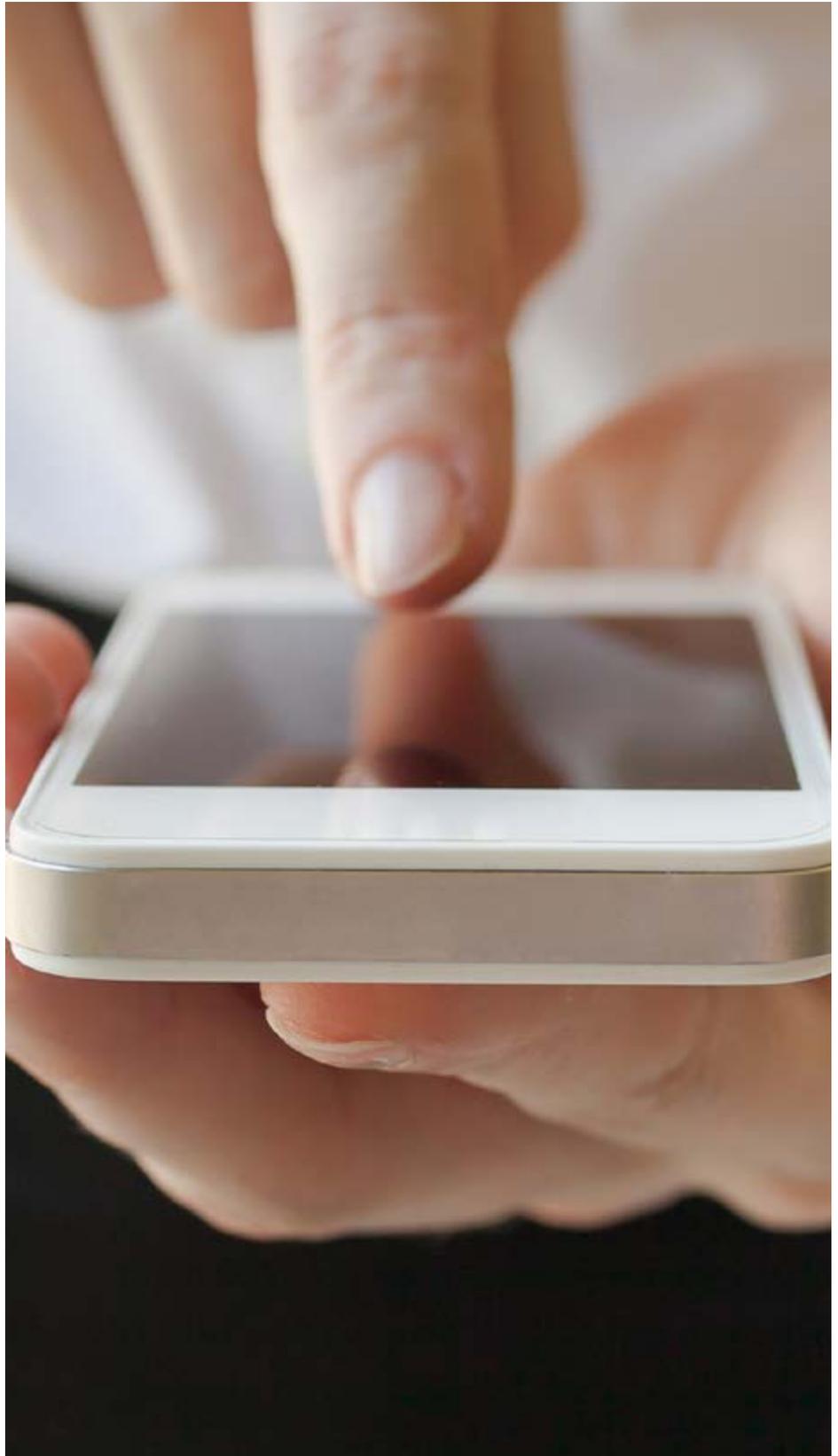
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