The emerging potential of offline payments in India

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PAYMENTS COUNCIL OF INDIA

VISA

Message from IAMAI

Dr Subho Ray
President, Internet and Mobile
Association of India (IAMAI)

Internet penetration in India has substantially increased over the past few years. The country's internet user base reached 830 million in 2021, registering a growth of 530 million from 2015.1[1]. Despite the growth, there is a considerable divide in usage of online payments in rural and urban areas as internet penetration is 33% in rural India compared to 99% in urban India.[2]

Online payments solutions have grown substantially in the last five years. To further consolidate growth and achieve the next milestone in digital payments, it is important to ensure that future developments are inclusive across all user segments and geographical areas. This has led to an immediate industry need to explore and develop offline payments solutions and complement existing online payments.

Offline payments solutions aim to further augment the coverage of digital payments across the hinterland and border areas of the country as well as support online payment modes to provide 24x7 availability.

In this report, we have highlighted the key developments and initiatives in the offline payments space and potential use cases, and advocated the means through which regulatory, fiscal and technological interventions can boost further growth. We have assessed the initiatives undertaken by other countries in the subcontinent such as Sri Lanka, Bangladesh and Nepal to understand the various measures taken by their regulators to promote digital payments, with a specific focus on offline payments.

We have also outlined key areas where all stakeholders could collaborate to develop offline payments solutions and help realise India's vision of becoming a 'less-cash' economy.

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1   https://inc42.com/buzz/indias-internet-data-usage-shoots-up-to-14-1-gb-per-month/

2   https://www.entrepreneur.com/article/375555

Message from Visa

Sandeep Ghosh
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Financial inclusion has been one of the main objectives of the Reserve Bank of India's (RBI) policy framework. This framework recognises the lack of consistent internet connectivity and digital infrastructure as key challenges in achieving widespread financial inclusion in India, thus necessitating the development of innovative offline digital payments solutions.

Cards and mobile-enabled payments are the most familiar digital payment modes in India today. As merchants shift from cash to digital and with the pandemic becoming a catalyst for growth, offline payments will enable deeper penetration of digital payments into the country's remote parts. Offline payments and its various use cases are not only alternatives to online payments but can also be integrated with newer use cases like Central Bank Digital Currency (CBDC) to ensure innovative and large-scale usage and adoption of digital payments.

While the introduction of a comprehensive framework for offline payments has launched efforts across the industry, the success of pilot programmes must be transformed into scalable and wide-reaching solutions on par with other digital payments alternatives to truly drive financial inclusion.

With offline payments are still at a nascent stage, it is imperative that key stakeholders in the ecosystem – the Government, regulator, innovators and financial institutions – contribute to their development and advancement. Enabling regulations that foster innovation, along with support from financial institutions to reach the target consumer base, will be key to achieving the offline payments objective.

As a pioneer of offline card payments in the country, Visa is delighted to partner with IAMAI in an attempt to understand the evolving landscape of offline payments in India as well as Nepal, Sri Lanka and Bangladesh, and propose the key steps India should take to ensure the growth and reach of offline payments.

We hope this report contributes to a better understanding of the offline payments ecosystem across the region and the challenges and opportunities for all market participants in future.

Message from PwC

Mihir Gandhi
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PwC India

Over the past ten years, digital payments have seen growing adoption in the Indian subcontinent. Until now, regulators, issuers, acquirers, and other ecosystem players have focused on solutions that require internet connectivity. Being the biggest economy in the subcontinent with the largest population, India's varied topography, demographic profile, and the emergence of new use cases across the board have led access to financial services becoming a key priority for the Indian payments ecosystem. An improved digital payments landscape is essential for India to achieve the target of becoming a USD 5 trillion economy. The digitisation of the Indian economy has been accelerated by the pandemic, resulting in the need for an end-to-end digital value chain. However, due to limitations in the existing digital infrastructure, it has become important to explore alternative technologies to extend the digital-payment value proposition to the remotest parts of the country.

Regulators and policymakers have recognised digital payments as one of the key enablers for citizens to access the formal financial system. In this context, offline payments can help in ensuring that digital payment options are available to everyone, despite connectivity issues.

The RBI has taken a more formalised approach to defining the framework for offline payments. Supported by innovation centres, this framework will enable industry participants to innovate and develop commercially viable solutions in the offline payments space.

This report explores the current state of the Indian offline payments space, with a focus on regulatory interventions, innovations and future directions. In addition, it offers a broader perspective by analysing the various offline payments frameworks across the Indian subcontinent.

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Executive summary

The Indian digital payments space has witnessed extraordinary growth in the last few years with the volume of transactions increasing at an average compound annual growth rate (CAGR) of 23%.[3] The digital payments industry has focused on developing services built on the Unified Payments Interface (UPI) infrastructure to target the maximum number of use cases. However, there has been a significant gap in the usage of digital payments modes in developed areas with well-established network infrastructure and remote areas which lack sustainable infrastructure that can seamlessly support digital payments.

Inclusive growth in digital payments has been one of the key priorities of the regulator in the last couple of years. Offline payments are now being seen as a complement to the existing digital payments rails and could ensure that there is an inclusive and sustainable growth in digital payments across India. With new technologies and use cases emerging in the offline payments space, we expect significant uptake of offline payments solutions initially in rural areas and subsequently in urban areas.

Based on the current developments in the offline payments space, it is expected that technology-centric solutions are going to be key. Offline payments solutions have been developed before but could not garner much attention due to a multitude of issues like high transaction rates and non-interactive user experience. To make offline payments mainstream, it is important to ensure that business models promote innovation among industry participants and that there is significant attraction for new entrants. The results of the first offline payments pilot are encouraging when it comes to end-user receptiveness to a proposed solution and the commercial and technical feasibilities for payment service providers. The results have been incorporated into a detailed framework developed by the regulator which is essentially the first step in commercialising and scaling offline payments use cases. Additionally, providing institutional support to the offline payments industry through bodies like the Reserve Bank of India Innovation Hub (RBIIH) will enable the industry to draw upon the experiences from various frameworks. Regulatory sandboxes can also ensure that these solutions are sufficiently tested before they are launched for large-scale usage.

Although offline payments are still at a nascent stage, we envision significant steps to be taken by the regulator to make the space financially attractive for payments companies as they would be key in the last-mile delivery of customer-centric solutions. Given below are some of the parameters that would be essential for a financially viable framework for offline payments players:

- Regulation: Provides a sustainable framework for industry players to work on and create-customer centric solutions.
- Collaboration: Knowledge sharing between various stakeholders would be key to not only innovation but also regular enhancements to the ecosystem.
- Customer awareness: The success of offline payments is going to be measured in terms of user adoption.
- Ecosystem: Active participation of key stakeholders like merchants, issuers, acquirers, and solution providers would be necessary to ensure the success of offline payments.

Offline payments modes are operational in various countries around the world. These frameworks have emerged either to meet financial inclusion goals of regulators or even as viable use cases that can enhance end-user experience in developed countries with sufficient network connectivity by ensuring there are no breaks in the payment flow even if there is temporary outage in internet connectivity. Offline payments would see significant traction in developing or underdeveloped countries with a clear focus on expanding the coverage of digital payments. As per a World Bank report, it is estimated that approximately 50% of the population in low- and middle-income countries have access to the internet.[4] Offline payments become very important for such economies to increase financial resiliency, facilitate higher savings and reduce poverty rates.

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3   https://www.pwc.in/assets/pdfs/consulting/financial-services/fintech/payments-transformation/the-indian-payments-handbook-2020-2025.pdf

4   https://www.forbes.com/sites/forbestechcouncil/2022/01/05/the-case-for-using-offline-authentication-to-accelerate-financial-inclusion/?sh=5c21a7476571

Introduction

Digital payments have witnessed tremendous growth in India over the last decade. They grew at a CAGR of 23% between 2016–20.[5] Launch of new payments modes, availability of cheaper smartphones and regulatory initiatives have driven the growth for digital payments in terms of reach and innovation. The pandemic has further accelerated the growth as there has been a shift in how customers use digital payments modes, thereby further increasing the value and volume of transactions.

To achieve the next milestone in digital payments, it is imperative to complement online payments and develop a genuine 'anywhere and anytime payment' model. This requirement gains added importance in developing countries where internet connectivity infrastructure is relatively underdeveloped. Offline payments are digital transactions that are processed without internet connectivity by the user or where the transaction is recorded offline and processed later. They become an important tool to service areas with little or no internet connectivity. This not only has the potential to increase the reach of digital payments services but also streamlines payment workflows by eliminating issues like transaction time-outs and patchy networks.

Offline payments are not only a stimulant for retail payments but also an enabler for small physical merchants like kirana stores. For a fully integrated value chain, it becomes important for the digital payments framework to include multiple avenues for achieving a wider access to digital payments. As per a report by an Indian digital payments company, 182 crore digital transactions were recorded at physical merchants post the second wave of the COVID-19 pandemic in Q3 2021 at a QoQ growth rate of approximately 60%.[6] The strong volume of growth along with definite strategic regulatory initiatives make offline payments a compelling business case for payments companies to not only innovate but also penetrate unexplored consumer segments.

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5   https://www.pwc.in/assets/pdfs/consulting/financial-services/fintech/payments-transformation/the-indian-payments-handbook-2020-2025.pdf

6   https://www.financialexpress.com/industry/banking-finance/improved-spends-driven-by-storefront-qr-codes-offline-merchant-transactions-grow/2353695/

Need for offline payments

Significant investments in the enhancement of telecom infrastructure, affordable connectivity and handsets have increased the telecom subscriber base. This has also improved India's tele-density. Investments in rural areas have also spurred growth in the subscriber base.

	Overall teledensity		Rural teledensity		Internet teledensity
	86.22%		**58.96%**		**57.28%**
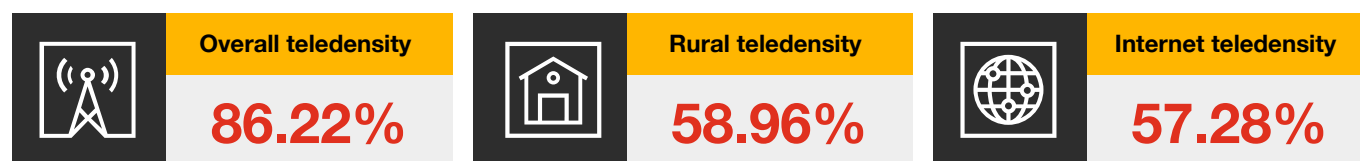
Source: Telecom Regulatory Authority of India

Even though there has been a substantial improvement in the telecom infrastructure and subscriber base, low internet tele-density points towards the need for increasing the coverage along with strengthening the supporting infrastructure which would boost digital transactions.

For a transaction to be completed, seamless connectivity across all the steps, i.e. merchant terminal/payment gateway, acquirer, payment scheme and issuer is necessary. A drop in connectivity at any point may lead to the transaction getting timed out, causing customer dissatisfaction and loss of revenues for the stakeholders involved.

Additionally, internet connectivity is poor in many parts of the country due to topography. Areas near borders or secure facilities have disrupted or limited/no internet connectivity due to network jammers. These challenges are bound to impact online payments. To address the issue of digital transactions in such circumstances, offline payments present a unique value proposition to the regulators and industry participants.

Some of the disruptions/impediments to a BAU payment experience which can be solved with the help of offline payments are:
- customer is outside the network coverage
- transaction-acquiring terminal is facing network disruption for a temporary period
- customer is facing disruption in network connectivity.

> " Lack of internet connectivity or low speed of internet, especially in remote areas, is a major impediment in adoption of digital payments. Against this backdrop, providing an option of offline payments through cards, wallets and mobile devices is expected to further the adoption of digital payments. "

Source: RBI

Lack of internet connectivity is one of the reasons behind the below average growth rate of digital transactions in rural areas. Traditional card-based transactions and new-age solutions like UPI that rely on network connectivity are unable to generate enough traction in these geographies due to majority of the population in these areas still using feature phones, digital illiteracy and underdeveloped infrastructure.

Given the context, it is important for the payments industry to explore offline payments solutions. However, it is equally necessary for the solutions to be technology driven with minimal manual intervention.

The operational structure as mentioned above will not only stimulate the reach of financial services to the unbanked segment but also enable the creation of a viable business case for existing and prospective PSPs in the offline payments space.
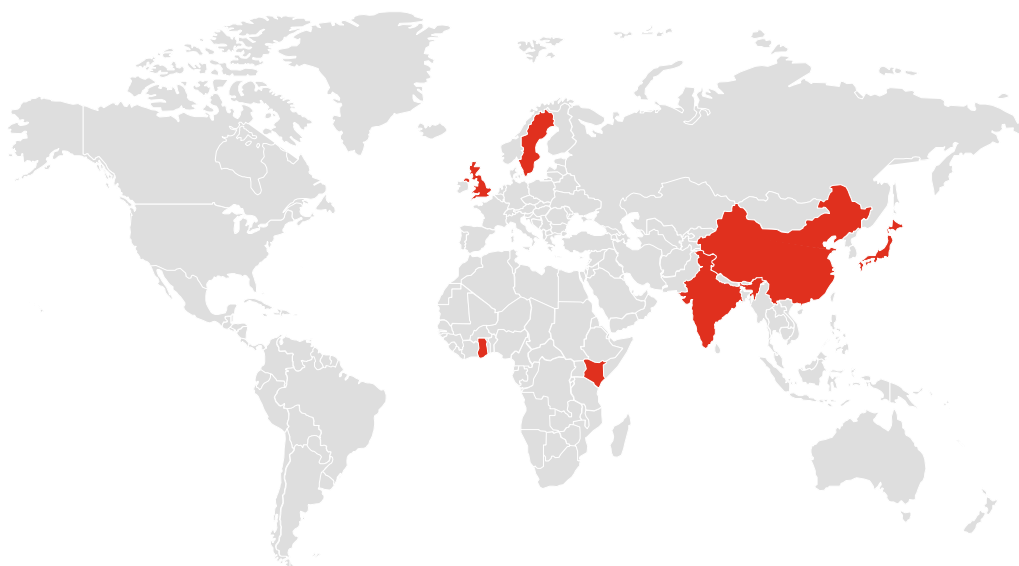
Offline payments: The global landscape

Offline payments solutions are relatively new. Some of the popular offline solutions used globally are SIM overlays, offline e-wallets, NFC-based payments and prepaid cards. Countries like China, Japan, and the UK mainly use NFC-based technology solutions which are not fully offline solutions and are applicable for a limited number of use cases such as public transport.[7]

As offline and online commerce seamlessly integrate into a common marketplace, it is necessary for the payments industry globally to continuously innovate for driving the upward trajectory in terms of volume and revenue of digital payments. As per a World Bank report, of the USD 38 trillion worth of MSME payments made globally, USD 19 trillion is still made in cash, with emerging economies accounting for a major share.[8] In this regard, offline payments is a key enabler to garner a major share of the transactions in the digital payments value chain by removing the current impediments to digital transactions.

The map below shows the countries that have started using offline payments in some ways.

Source: PwC analysis

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7   https://www.mobiletransaction.org/different-types-of-mobile-payments/

8   https://www.cgap.org/topics/collections/digitizing-merchant-payments/opportunity

Offline payments solutions have been adopted in other countries like Ghana, Kenya, Sweden, and South Korea.

Sweden

A private technology company has developed an offline wallet. People can pay offline using the e-wallet and the transaction would be completed once an internet connection is established.[9]

Ghana

A government-owned payment switch and smart card system is used in Ghana where people can make either online or offline payments through biometric authentication. This is primarily used for government-to-person payments and in the places where merchants accept this offline payment solution.[10]

Kenya

A Kenyan mobile network operator launched a mobile-based money transfer service. The mobile transfer service, along with a team of small retail agents, has acquired merchants in the rural areas and allows them to deposit or withdraw cash from a simple STK which does not require an internet connection.[11]

South Korea

Based on the operator, up to ten offline transactions can be done using a mobile-based payment application which contains tokenised digital cards that can store the transaction details for reconciliation whenever internet access is available.[12]

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9   https://www.crunchfish.com/

10   https://www.bog.gov.gh/wp-content/uploads/2021/08/CBDC-Joint-Press-Release-BoG-GD-1.pdf

11   https://www.safaricom.co.ke/personal/

12   http://www.businesskorea.co.kr/news/articleView.html?idxno=31849

Evolving landscape of offline payments in India

Before the RBI's recent push in the offline payments space, offline solutions have been present in the Indian landscape in one form or the other. One of the most popular and old offline payment methods is the use of business correspondents, who, in addition to payments, offer a multitude of banking services like KYC and account opening services. However, the model is fraught with its own challenges due to the high level of manual intervention and the low penetration that can be achieved through a correspondent banking framework.

The *99#, a USSD-based model of mobile banking service was launched in November 2012. End users can access their UPI accounts by dialling *99# on their feature phones via a GSM protocol. However, challenges around user experience and LTE technology not being compliant with various mobile network service providers were initially the key roadblocks for the wide adoption of this service. The service had limited reach initially and only two service providers offered this service. However, in the subsequent years, the service has been enhanced significantly, including 11 TSPs coming on board and the provisions being made available of various additional features that can be availed by the user. Despite certain enhancements, issues with a non-interactive user interface, high transaction charges and multiple transaction drops have adversely affected end-user adoption.

USSD payments volume in India has declined from INR 0.22 crore in 2017–2018 to 0.06 crore in 2021–2022, an approximately 70% reduction for the period.[13]

As mentioned earlier, the renewed vigour that the RBI has shown towards offline payments revolves around the strategy to drive innovation in the space and address the earlier challenges with the help of technology-led solutions.[14] A common theme across present-day solutions is the simultaneous exchange of funds with settlement taking place asynchronously in batches once server connection is established.

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13   https://bi.etaal.nic.in/Reports/powerbi/ModeWiseAnalysis(WL)?rs:Embed=true

14   https://www.rbi.org.in/scripts/FS_Notification.aspx?Id=12215&fn=9&Mode=0

RBI's initiatives

With the issuance of guidelines on offline payments, the RBI took the first step towards developing the required ecosystem. By allowing banks and non-banks to participate in the pilot for offline payments, the central bank has ensured collaboration between solution developers and the larger industry players with access to customers.

Key highlights of the RBI's guidelines on offline payments

- Offline payments can be offered through cards, e-wallets, and mobile devices.
- Offline payments can be remote or proximity based, and can use additional factor of authentication.
- The limit for offline transactions is INR 200 and the instrument limit is INR 2,000.
- The payment system operator should inform the RBI before launching the offline payment solution.

Source: RBI

These guidelines provide direction on the RBI's role, development of solutions, participation of entities, modes of payments allowed, customer protection, security, etc.

Most of the companies developing offline payments solutions are start-ups. Some of the existing players have attained maturity and experience in the payments space. The RBI guidelines provide a platform for collaboration among such entities in the offline payments space.

The decision to set up the **RBIH** to foster innovation in the financial sector is a step forward and can play an important role in the development of offline payments solutions in the country.

The RBIH laid the foundation for different financial sector institutions, technology companies and even academic institutions to work with the hub on innovative ideas and develop working prototypes for offline payments solutions. The hub would develop internal infrastructure to promote innovation and work with innovators, start-ups and tech firms.[15]

In 2019, the RBI announced the first cohort under the regulatory sandbox covering offline payments. The **regulatory sandbox** will help the participating entities by providing a controlled environment for testing their products. This environment will enable the regulator, payment system operators and the solution developers to analyse the data vis-à-vis the market condition and tweak the product construction and solution. The central bank has provided ample support to cohort participants in terms of onboarding, reviews, test designs, etc. In addition to this, deviations were allowed by the central bank to the cohort participants which helped in a practical testing approach for offline payments solutions.

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15 https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=50666

The RBI's regulatory sandbox

The central bank had received 32 entries for regulatory sandbox testing, out of which six were given the go ahead. Out of these six, two companies began their testing in November 2020 and the remaining four were to begin testing in December 2020, which was hindered by the ongoing pandemic. Chosen solutions include NFC-based prepaid cards with NFC-enabled PoS, sound-based IVR channel for UPI-based payments, voice-based UPI payments solutions and STK-based UPI solutions for both P2P and P2M modes of payments.

The latest regulatory measure taken in January 2022 for the offline payments space was to introduce a detailed framework for offline payments.[16] This was influenced by the encouraging results of the preceding pilot tests wherein pilots were successfully conducted under the offline payments scheme from September 2020–June 2021, covering a volume of two lakh transactions amounting to a cumulative value of INR 1.16 crore.
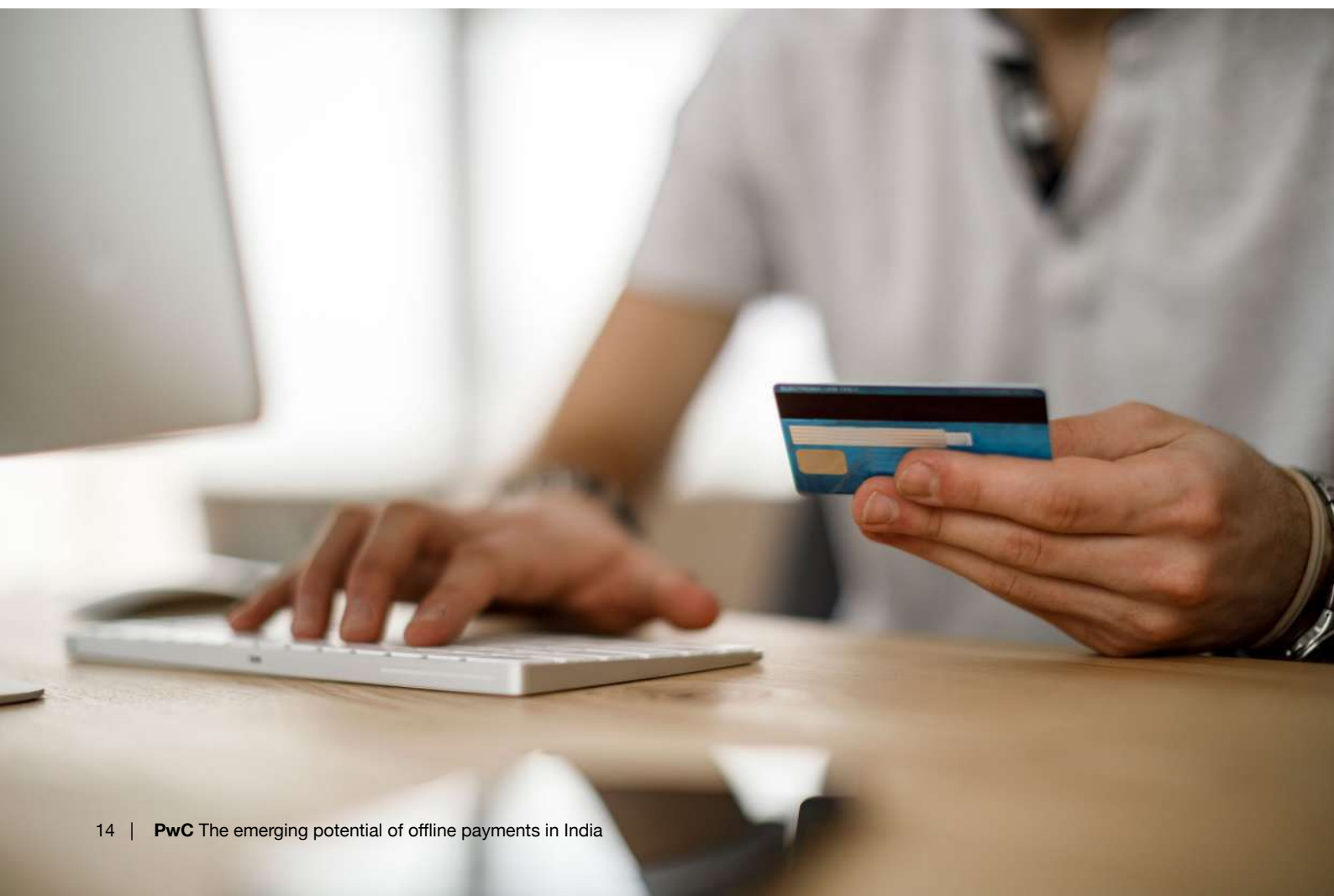
The detailed framework on offline payments introduced by the RBI has the following salient features which makes the offline payments experience standardised and unambiguous:

- offline payments to have an omnichannel experience, i.e. payments in offline modes are not restricted by any channels or instruments
- offline payments can be offered without AFA for an uninterrupted experience
- upper limit of transactions shall be INR 200 with the total limit not exceeding INR 2,000 at any point of time
- replenishment of used limit can be done only via online modes.

The detailed guidelines on offline payments will provide the framework that will act as a catalyst to operationalise the ideas incubated and tested through the RBIH.

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16   https://www.rbi.org.in/Scripts/BS_PressReleaseDisplay.aspx?prid=53038

Offline payments solutions

Solution name	Description	Advantages	Disadvantages
Closed loop cards	Closed loop is a preloaded payments card issued by a single issuer/operator. The card can use NFC or RFID technology for communication with the system. For example, the smart cards issued by the Delhi Metro are closed loop cards.	• The card provider (like transit operator) owns and controls the smart card fare collection system • Prepaid funds provide float to the operator's account • Can be used by unbanked customers as well	• The card can only be used at a single merchant outlet • High cost of ticketing infrastructure and cash handling • User's funds are locked in
Open loop with stored value cards	This is a contactless card-based solution where a certain amount is stored in the card itself. EMV chips have the ability to set limits and process offline payments. Once the merchants start accepting offline card payments, the transaction can take place in proximity (using NFC) without any internet connection or real-time authorisation. For example, the NCMC to be launched for the Chennai Metro can also be used for other purposes.	• Widely accepted by multiple merchants like transit, retail purchases, and parking • Eliminates smart card issuance, infrastructure and lifecycle costs • Serves unbanked customers as well	• Transit operators must pay merchant service fees to the banks • Flexible fare model configuration is not possible

Solution name	Description	Advantages	Disadvantages
Account-based cards	An account-based card operates on a system where the proof of entitlement to travel and all records of travel are stored in a back office and not on the physical card. The fare and bill are calculated once the journey or usage are completed.	• Account-based cards can work both online and offline • These can be open-loop cards and used at multiple merchant locations • Flexible fare models can be configured in the back office, hence providing users with benefits of additional features like loyalty and discounts • Fare logic moves from front end to the back end • Multiple fare media such as mobile wallet, QR code, closed loop cards and open loop cards can be used	• First tap/ride risk is when customers are presenting their unregistered card to the operator, so there is a possibility that they may not have enough funds to pay when the transaction is billed to the account • Holistic system to build can be expensive for the ecosystem • A customer may not have up-to-date balance for minutes, hours or a day
Sound- and IVR-based solution	This technique uses sound as a form factor where the credentials are encrypted. The different types of sound-based payments systems are described below: **1) IVR and audio signal based:** A feature phone user will dial an IVR invitation code and the encrypted audio signal from the call will initiate the transaction. The customer will enter the amount and payment will be received. A prepaid wallet or UPI could be the underlying payment method. **2) Use of voice as password:** It is a sound wave technology product where voice authentication is used for payment processing. As part of the initial registration process, the customer is required to record his/her voice with the solution provider which is then matched while making a transaction. Hence, the customer's voice acts as the mode of authentication for payment processing. UPI is the underlying payment method. **3) IVR-based prepaid card transactions:** Customers can initiate a transaction from their phone which gets authenticated using an OTP and a telephone pin using IVRS technology. The transaction is then processed using underlying prepaid card technology. This technology is currently being tested as a pilot.	• It allows transactions using multiple platforms such as smartphones, feature phones, card swipe machines and PoS devices • Low cost for merchants to adopt this technology • The solution also offers the convenience of selecting one's preferred Indian language through IVR, thereby enhancing customer usability	

Solution name	Description	Advantages	Disadvantages
SMS payments	Customers need to send a text message with the relevant information to the correct mobile number. The amount gets added to the customer's phone bill. 1. **Person-to-merchant payments:** This payments system is usually availed by people in rural areas with erratic or no internet connection. It requires the customer to have a basic phone that can send a text message. Customers can pay merchants for goods bought using this method. For example, credit card bills can be paid using SMS payments. 2. **Direct carrier billing:** This use case caters more towards the urban population. A payment can be made through the mobile carrier instead of using any other payment method. The phone number needs to be entered on the purchase page or the app, and after a few steps of authentication, the money (transaction amount) is added to the user's phone bill or deducted from a prepaid balance account.	• This is the easiest form of payment for customers as they are only required to send a text message in a specific format • This mode of payment is independent of the SIM card or phone type	• This is not a purely offline solution, hence aimed towards the urban population
*99#	The *99# service works on USSD communication protocol. It is a communication technology that is used to send texts between a mobile phone and an application programme in the network, and works only on GSM phones. The user needs to dial *99# and a service option will appear on screen.	• It allows UPI transactions on features phone with no internet connectivity • It supports both financial and non-financial transactions	• Multiple stages lead to connection failure and hence affect customer experience • Does not support to CDMA/LTE service providers
STK solution	This solution uses an overlay smart card placed on the SIM of a phone to drive the STK menu-based user interface. Customers can use this user interface on their feature phones to initiate fund transfers and make bill and merchant payments using the underlying UPI technology. One technology company received permission from the RBI to initiate the test solution as a part of its regulatory sandbox.	• This solution addresses the challenges of *99# like sessions break and user experience • It allows transactions on feature phones with no internet connectivity	• Users may be initially reluctant in using the technology and might require some handholding
Offline digital cash product	This solution is an offline digital cash product which helps in digitising payments in rural areas for the SHG ecosystem. A leading technology provider is testing this technology by offering a smart card to the user and a device to the merchant. The device is used to accept the payment and store e-cash offline.	• Offers digital payments options for person-to-person and person-to-merchant payments, loan payments/disbursement solutions without smartphones and internet connectivity • End-to-end encryption during offline and online transactions	• There are withdrawal limits as per prepaid guidelines

Use cases for offline solutions

Technology service providers are working to develop solutions that can cater to multiple use cases:

- **In-store merchant payments:** This would be beneficial for people staying in the rural parts of India or areas with poor or no network. Customers can pay by just tapping their EMV contactless cards using NFC at PoS terminals. Solutions supporting UPI payments rails in offline mode can also be used for account-based transactions in these rural locations. There are over 12 million kirana retailers in the country.[17] However, an increasing number of retailers are now participating in the digital transformation process. In India, 95% of the transactions in kirana stores are worth less than INR 200 and more than 80% of such stores continue to be cash intensive and operate in an unorganised manner.[18]

- **Transit:** The value of transit payments is small, coupled with a shorter exit window. Offline payments solutions are being widely implemented for contactless transactions at automatic fare collection gates and ticket terminals of public transport operators like metro, rail and bus to reduce the checkout times for commuters. In 2019–20, an average of six million people used the Delhi Metro smart card (closed loop) and token daily. Metro authorities in other cities are working on implementing the NCMC, which is an open loop stored value card which can be used offline.[19]

- **In-flight payments:** In-flight purchase of food and beverage and merchandise by Indian flyers is gradually increasing.[20] Cash is the primary mode of payment for purchase during travel. As more customers become aware of offline solutions, their usage will increase for in-flight payments.

- **Money transfers:** Offline payments solutions based on real-time payment rails can be leveraged to make P2P transfers. This can emerge as one of the major use cases in the domestic remittance market where remitters and beneficiaries have to rely on business correspondent network for availing this facility.

- **Microfinance:** Offline payments solutions like SIM overlays or digital cash products can be leveraged for loan repayment, collection and EMI payments. MFIs and SHGs can leverage such technologies for loan disbursement and collection process. Traditionally, repayments in the microfinance segment were made through group meetings and the collection process was largely cash based. Now, many institutions are keen to adopt the digital collection process due to the collection challenges faced during and after the pandemic.[21] A few key technology providers are working on developing solutions targeting SHGs/MFIs in rural areas.

17 https://www.orfonline.org/research/digitising-indian-retail-analysing-challenges-and-exploring-growth-models/

18 https://www.investindia.gov.in/team-india-blogs/modernization-kirana-stores-india

19 http://www.delhimetrorail.com/OtherDocuments/DMRC-English-Annual-Report-2019-20.pdf

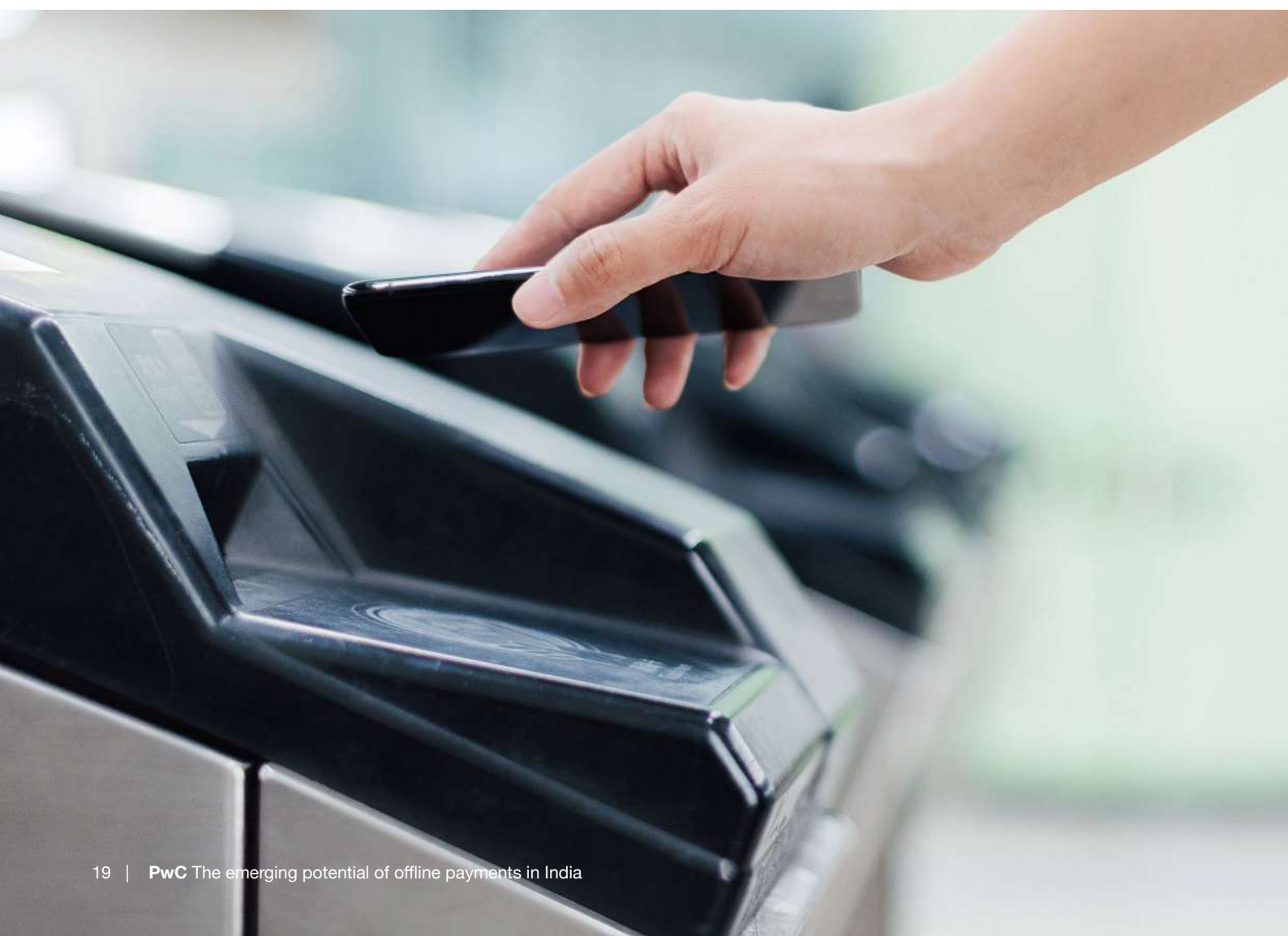20 https://www.factmr.com/report/945/in-flight-catering-market.

21 https://www.financialexpress.com/industry/banking-finance/microfinance-institutions-look-at-new-ways-to-boost-collections/2314099/

- **Microinsurance:** Microinsurance guidelines were issued by the IRDAI to increase insurance penetration and reach low-income groups through microinsurance agents like NGOs, SHGs, MFIs and BCs. Premium collection is a challenge in the microinsurance industry as customers in the target market have low incomes and irregular and unpredictable cash flows. In rural or remote areas, where internet connectivity is a problem, customers have poor access to traditional financial service payment mechanisms. So, there is a customer need as well as an opportunity for technology players to develop offline payments products which can be used in such areas. Both the IRDAI and the RBI should together develop a framework for offline payments in microinsurance so that the premium ticket size can be catered to through the offline payments space.

- **Bill payment:** The fragmented method of bill payments became organised with the launch of the BBPS by the NPCI. This has helped users to pay all types of bills through the platform using a variety of online payment methods. In October 2021, BBPS recorded 60.6 million online transactions in which electricity bill payment was leading with 31 million transactions (51% share by volume), followed by online recharge of FASTag at 10 million transactions.[22] One of the key technology enablers has plans to develop a framework for offline bill payments which will be beneficial for people with poor internet connectivity.

- **Toll transaction:** FASTag is currently a closed loop payment method that uses RFID-based technology. It is mandated by the Government for vehicles to use FASTag for paying toll taxes at toll plazas. When a vehicle drives through a toll gate, its FASTag status is recorded, allowing it to cross the toll gate without being stopped for a cash payment. The acquirer bank/toll plaza dispatches the transaction file in batches to deduct the balance from the customer's FASTag account in minutes/an hourly basis. In this case, the customer does not require any internet connection for toll transaction. However, the acquirer bank needs connectivity to process the transaction in batches at a later stage. Customers also require connectivity to add funds and recharge their tags. By October 2021, India had recorded 214.23 million toll transactions through FASTag and issued 40,905,674 tags.[23]

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22 https://www.bharatbillpay.com/statistics
23 https://www.npci.org.in/what-we-do/netc-fastag/product-statistics

Interplay between CBDC and offline payments

CBDC has emerged as a prominent area of interest for central banks worldwide. Around 86% of the global central banks are at various stages of research and trials related to CBDC.

There are multiple use cases that are being explored for CBDC. Retail payments, cross-border remittances and programmable money for subsidy payments are the possible use cases that have been identified till now. While CBDC will be able to run on online payment rails, researchers are still debating on how it can be used to support offline payments.

Offline payments use cases would be determined by the business and technical rules implemented by participants like banks, PSPs, big techs and FinTechs based on access points allowed as per the CBDC core rule book.

From an offline payments perspective, there are broadly two design considerations that can be explored:

- Account-based CBDC: In this model the payer and payee balances are updated and the user needs to have a bank account.
- Token-based CBDC: The closest design type that can support offline payments where the token represents a bearer instrument, and the security of the tokens is maintained through encryption mechanisms.

One of the key technology enablers for offline payments through CBDC follows a system protocol that enables payments through a point-to-point channel. It is consistent with an asynchronous processing model and accounting, and core payment processing can take place when connectivity is achieved. The key advantage of having an offline model for CBDC is that it not only helps in achieving financial inclusion objectives but also reduces the risk of counterfeiting online CBDCs and compromising the entire system through cyberattacks. From a security perspective, one of the key principles to secure offline payments in a CBDC environment is to build trust among users and CBDC participants. One of the most popular methods to encrypt transactions is through a public-key cryptography method wherein the key can be stored on a mobile device and funds can be transferred using hardware protected credentials. If the CBDC model for offline payments is to succeed, it is imperative for the underlying structure to develop on multiple parameters like initiation devices and acceptance points.

A central bank in East Asia recently concluded a study on the use of CBDC for offline payments. The bank considered storing monetary value, communication between users, verification of transactions, ability to initiate transactions and whether data can be stored without connectivity as evaluation parameters. As per the research, it was concluded that the use of chips on SIM cards on feature phones was not feasible from both a technology and user-experience perspective. The closest device that was found feasible to enable offline payments through CBDCs was the use of advanced debit cards. However, there are technical challenges such as storing a private key on such cards.

China has been testing and developing DCEP, its own digital currency, over the last decade. The Chinese central bank envisions DCEP to become a legal tender in the country. Operationally, it is expected that DCEP will be issued by the central bank to banks, non-bank payment platforms and other intermediaries. These intermediaries will in turn make DCEP available to end users. The dual offline payments feature of DCEP will enable payments to be made even if both the parties engaged in the transaction are offline. DCEP is expected to be stored in RMB wallets as tokens which in turn can be exchanged offline with the help of the underlying technology. It is important to note that the tokens stored in the RMB wallets would be a direct liability on the central bank wherein the wallet interface would be provided by the intermediaries.

Union Finance Minister Nirmala Sitharaman in her FY22 budget speech announced the creation of an Indian CBDC. From an offline payments use case perspective, the industry would be waiting to see how CBDC can be incorporated in the offline payments framework and provide further use cases and solutions in the offline payments space. Some of the use cases that can be included within the intersection of offline payments and CBDC are:

- programmable money for subsidy payments
- peer-to-peer payments
- P2M
- B2B payments.
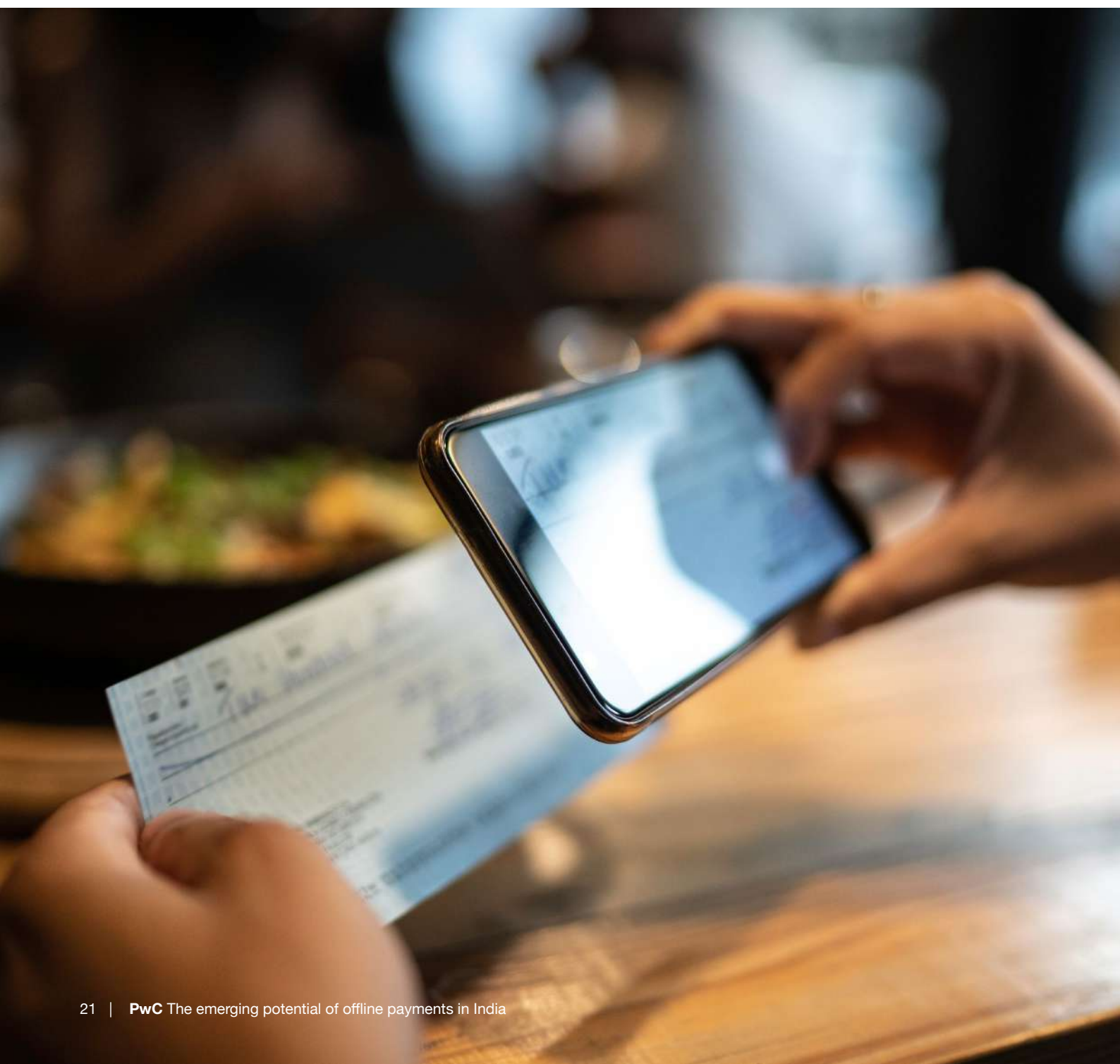
Enablers for offline payments

For successful implementation and offtake of offline payments solutions in the country, it is necessary that the right enablers are identified by the stakeholders. All the enablers need to work together in close coordination.

01 Regulation

02 Collaboration

03 Ecosystem

04 Customer awareness

Source: PwC analysis

Regulations play an important role in the development of any ecosystem. It lays down the guidelines that allow stakeholders to identify the relevant focus areas and make definitive contribution towards further development. Regulations with a wide coverage of areas like product and solution features, security, customer protection, grievance redressal, and roles and responsibilities of participants are laid down in the interest of all the players involved.

Collaboration between multiple stakeholders helps in identifying the right areas where solution-based intervention is required. Experienced collaborators not only mentor new start-ups in developing new solutions but also provide access to an appropriate target segment that will be serviced by the solution. OEMs spread across PoS terminals, handsets manufacturers, card suppliers along with payments schemes and issuers need to work together to co-create appropriate solutions.

For any solution to be successful in terms of adoption, creation of the right **ecosystem** is key. Participation of issuers, acquirers and merchants supported by payments schemes will help in developing and nurturing an ecosystem. Guided by the payments schemes and solution providers, issuers and acquires will need to upgrade their systems to support offline payments. Merchants will need to be sensitised about the solutions being implemented with respect to their features and functionalities, usages, etc.

Participants directly in contact with end users need to create **customer awareness**. Promotion of the product/solution along with sensitisation about the functionalities, requirements for usage and benefits will help in further adoption. Focusing on areas like customer experience and grievance redressal will be important to ensure that customers adopt the product and continue using it.
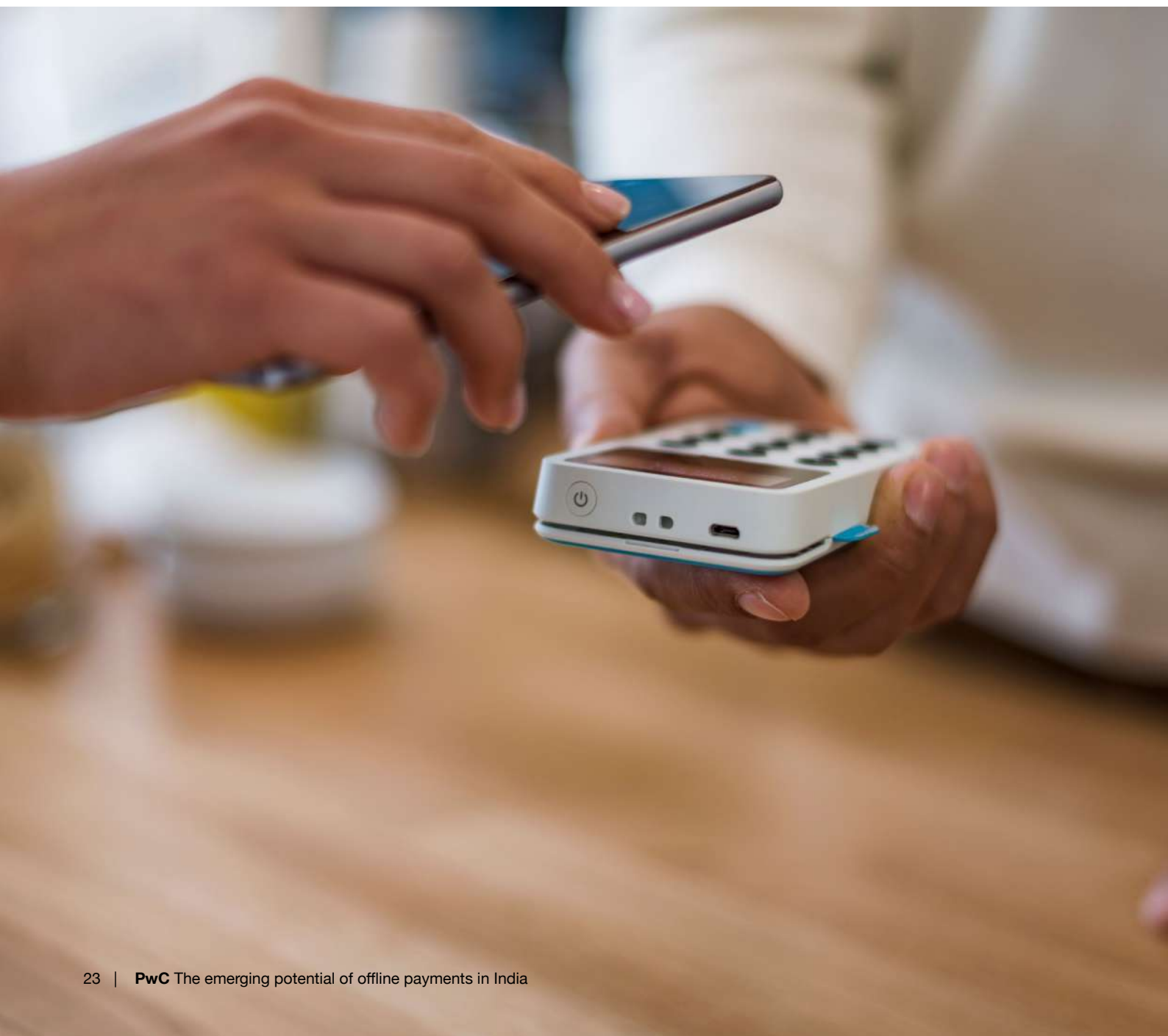
Role of the RBIH in expanding offline payments

The Innovation Hub introduced by the RBI focuses on the incubation of new ideas and sees them through from ideation to final roll-out. With a key focus on collaboration – given the central bank's mandate on the implementation of offline payments solutions – it is envisioned that the Innovation Hub will have active stakeholder participation from the industry, including payment service providers, banks, wallet players and non-banks. The RBIH initiative is similar to various global hubs established by multilateral organisations like the BIS and global central banks. Such centres keep technology as the focal point and present various viewpoints on a common platform, enabling knowledge sharing to foster innovation and bridge the gap between ideation and practically viable solutions.

Infrastructure

Develop internal infrastructure to promote FinTech research and facilitate engagement with innovators and start-ups

Key objectives

Extensive support

Guide entities to transform ideas into tangible solutions spanning regulatory remits and national boundaries

Reduce time to market

Reduce time to market for offline payment solutions with the help of accelerators which can enable faster transformation of ideas to solutions that can be tested extensively before a live roll out

Source: RBI

Multiple offline payments solutions are currently being tested extensively by using the RBI's Regulatory Sandbox. However, it is envisioned that the RBIH will be able to close the existing gaps, which can drive more real-life implementation of offline payments solutions. As with any tech-centric financial product, a concept that requires further ideation would be introduced first. The concept is then proved through intensive testing, before an active roll-out to the intended audience. With the help of the RBIH, the initial phases of product development will be more streamlined and enhanced with increased stakeholder engagement and cross-functional brainstorming. Moreover, as the RBIH matures, incumbent solution providers can draw inferences from past experiences to provide a sustainable model that can be used to foster new ideas in the offline payments space.

Way forward

Digital payments have grown exponentially in the past decade. However, for India to achieve an additional approximately 50 times volume/value growth in the next five years, digital payment service providers cannot rely only on online solutions. Thus, it is important to develop solutions in the offline payments space as well, given that a substantial portion of the Indian population has low or no internet connectivity. Moreover, certain urban areas also require offline payments modes for seamless transactions.

From a global perspective, a popular payments platform in China has been very successful in introducing offline payments modes by taking advantage of the country's vast merchant network. These offline payments modes have use cases in transit, convenience stores, vending machines, etc. Given that offline payments modes can seamlessly merge offline and online behaviour, offline payments are of strategic importance to payment service providers in identifying touchpoints for value addition to both customers and merchants.

As with online digital payments programmes, policy interventions are pivotal to provide the necessary push to payments initiatives. Extensive policy guidelines enable industry participants to not only build relevant solutions but also align their strategy to various policies governing the overall payments market. Given the above context, below are some action points for both the regulator and industry participants concerning the future of offline payments.

Focus areas for regulators

From an offline payments perspective, the current policy stance of the central bank has focused on providing the necessary infrastructure to drive offline payments solutions to the market. The creation of the Payments Infrastructure Development Fund (PIDF) to drive offline payments infrastructure creation in remote areas along with a standardised framework is one such initiative. However, targeted future policy interventions might revolve around the following themes based on regulatory trends and institutional frameworks set up by the central bank:

- create economic benefits for payment service providers to build sustainable use cases around offline payments
- provide financial, research and development and end-to-end product support for start-ups planning to enter the offline payments space
- drive specific incentivisation programs on pricing, relaxations, etc., to increase merchant adoption
- liaise with other industries to extend the offline payments value proposition beyond payments with the help of standardised regulatory and operational frameworks
- introduce specific data reporting regulations targeting offline payments which will help evaluate progress and highlight shortcomings

- cross-collaborate with other regulatory bodies for the inclusion of use cases beyond payments, like insurance
- provide a framework to include other payments modes like bill and loan payments into the offline payments fold
- create an interoperability framework for offline payments that can drive various payments options in the offline space and beyond
- enable NUE to be collaborators rather than competitors as many participants can benefit from a new way of working which can help to spur innovation.

In addition to targeted policy interventions, to increase the reach and attractiveness of offline payments among end users and payments service providers, it is imperative for the current framework to be scalable enough to encompass a wide variety of use cases within payments and beyond. One of the key hindrances in this regard is the low payment limit allowed for offline payments. Currently, the limit on offline payments modes is INR 200, with a cumulative limit of INR 2,000. When compared with other payments options, this limit is relatively low, making it less attractive from both the demand and supply perspectives. As per an NPCI report, the average ticket size for peer-to-peer (P2P) transactions was INR 2,700, while average spends in the cards space stood at INR 11,000 for July 2021.[24]

Given that offline payments modes are still in their nascent stage in terms of adoption, we envision the current INR 200 limit to be increased significantly with a focus on driving volumes and value through the offline payments space. However, the limit would be similar to – or even lower than – that of online payments mechanisms (e.g. UPI) going forward. The increase in the limit would enable offline payments to garner a wider reach and include use cases like microloan payments. From a global perspective, new payments schemes have seen significant traction with an increase in the limits – not only from an end user adoption perspective but also the inclusion of a wide variety of use cases. For example, in the UK, the increase in payments limits in the fast payments space helped in extending the value proposition to other areas and driving volumes through the payments scheme.

In addition to increasing limits of offline payments to include a wide array of use cases, it is important to ensure a framework around authentication and authorisation – including velocity checks – to guarantee a secure and seamless payments experience. Going forward, it is imperative to increase investments and introduce policies around these focus areas. In addition, the functionality of these payments modes via mobile applications and feature phones as well as their impact on the overall settlement processes carried out by banks will need to be examined.

Focus areas for industries

PSPs are the enablers of last-mile delivery, with the responsibility of providing technology-led solutions which impact how customers perceive and operate the solution and how easy it is for merchants to implement and integrate. Below are some of the features that are integral for PSPs to enable effective delivery of payments solutions and resolve the challenges faced in traditional USSD payments solutions such as multiple steps on user screen, transaction drop rates and transaction charges.

- Continue focusing on innovation and streamlining processes that are peripheral to the core payments service. For example, a few card manufacturers have launched biometric-enabled cards wherein customers' fingerprints are stored on the card itself. After encountering a payments terminal, the biometric pad on the card gets activated for authentication. This functionality can be leveraged for offline PIN authentication in the case of offline payments. After authenticating the customer, transactions within the defined threshold limit can reside on the terminal and can be synchronised later.

- Increase the number of mutually beneficial partnerships – organic and inorganic growth might take place as offline payments gain traction with a mix of start-ups and traditional organisations like banks already operating and expanding in the space.

- Enhance the overall customer experience with grievance redressal mechanisms and customer service points based on technology-centric solutions like workflow management, IVR solutions and chatbots.

- Increase focus on literacy programmes within rural areas, especially on the value chain, to achieve maximum coverage of the target consumer segment. Some novel approaches to increase literacy are community-building exercises (with the help of community leaders) and partnerships with existing players and banks to leverage an already established value chain.

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24 https://www.business-standard.com/article/finance/upi-forms-10-of-overall-retail-payments-in-fy21-says-macquarie-report-121081600963_1.html

Offline payments ecosystem in Bangladesh, Nepal, and Sri Lanka
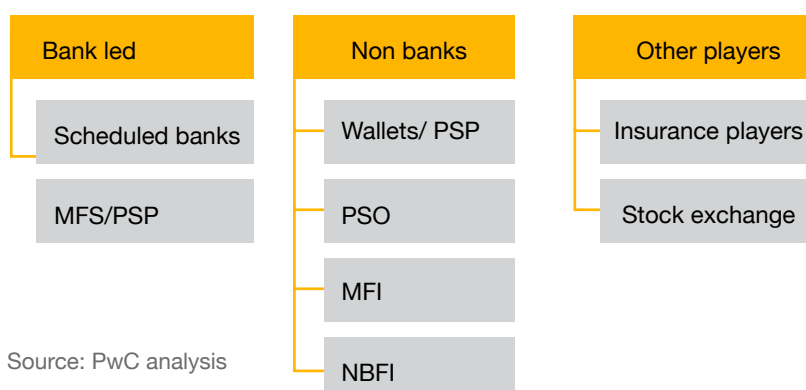
1. Bangladesh

Bangladesh is a buoyant economy, with much of its economic growth potential attributable to the agriculture sector, remittances and domestic industries like garments. As per World Bank, Bangladesh's GDP growth rate is expected to increase by 6.4% in FY 2021–22.[25] However, as of December 2020, only 28% of Bangladesh's population has access to mobile internet services. Mobile service companies have covered 95% of the population with 4G services, but only 28% of the internet users have access to 4G connections.[26] This suggests that despite the rapid expansion of mobile broadband coverage, a huge gap in utilisation remains. End users are facing barriers like affordability and lack of knowledge/skills in the adoption of digital payments services.

It is important to plan and implement digital initiatives to connect people to new opportunities and support the upward economic growth trajectory. To achieve this, it is imperative for the country and regulator to support a resilient and scalable payments framework. A few of the key enablers for Bangladesh's growing payments system include stable connectivity, mobile penetration and digitally native users.

Payments ecosystem

Bangladesh is increasingly adopting digital payments modes. As per Bangladesh's regulator, there has been an upward trend in mobile and internet penetration in the country.[27] Bangladesh is favourably poised to take the next step in its digital payments journey owing to its continuously improving infrastructure and a young population i.e. citizens between the ages of 15–40 that is relatively more receptive to newer payments alternatives.

Formal financial services sector in Bangladesh

Bank led	Non banks	Other players
Scheduled banks	Wallets/ PSP	Insurance players
MFS/PSP	PSO	Stock exchange
	MFI	
	NBFI	

Source: PwC analysis

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25   https://www.worldbank.org/en/country/bangladesh/overview#1

26   https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/03/Achieving-mobile-enabled-digital-inclusion-in-Bangladesh.pdf

27   https://www.bb.org.bd/en/index.php/financialactivity/mfsdata

A rapid increase in mobile phone users along with significant improvements in the IT infrastructure has led to an increase in mobile banking in Bangladesh. To this end, in 2018, the central regulator amended the rules for the Mobile Financial Services (MFS) Act, enacted originally in 2011. Below is an indicative list of the permitted use cases:

- Cash in: Exchange of cash for electronic value through agent locations, bank branches, ATMs, etc.
- Cash out: Exchange of cash for e-money value through agent locations, bank branches, ATMs, etc.
- P2P: Transfer from one MFS personal account to another with the same MFS provider or another MFS provider as well as payments from one MFS account to a bank account and vice versa, with the same or different parent bank
- P2B: Utility bill payments, mobile top-ups
- P2G: Tax payments, toll payments
- G2P: Pension payments, subsidies, direct benefit transfers.

In Bangladesh, the above-mentioned use cases are delivered through two prominent models from a mobile payments service perspective:

- Bank led: Bank-led MFS is a model wherein a bank may run the MFS as a product of the bank, or it may form a separate subsidiary with at least 51% of the share held by the bank along with control of the board.[28]
- PSP model: In this model, a PSP licence is obtained from the regulator under BPSSG, which facilitates and settles payments through a scheduled bank.

What are MFS?

MFS refers to e-money services provided against a mobile/cell phone number of a client (termed as mobile account), wherein the record of funds is stored in an electronic general ledger. However, unlike e-money products, cash in, cash out and other services, as permitted by the regulator at agent locations, are allowed for MFS accounts. In Bangladesh, MFS providers can only be led by scheduled commercial banks. A single bank, known as the parent bank, must have at least 51% of the equity of the MFS subsidiary. From an interoperability perspective, MFS service providers shall proactively foster linking of MFS accounts with existing and new user accounts. Moreover, these providers must also maintain interoperable designs within various MFS and bank accounts.

Need for offline payments

Despite favourable factors, Bangladesh still faces challenges in propagating a digitally inclusive payments model. Some of these challenges are highlighted below.

- Digital payments penetration is still low, with a large section of the population still dependent on cash due to legacy business models and processes.
- Only 41% of the total population has a smartphone, and only 28% uses mobile internet services. This shows that a major part of the country is still not fully onboard the digital payments framework.[29]
- There is a lack of literacy on digital financial products and their usage due to inadequate access to smartphones and the internet.
- GSMA, the organisation for mobile service operators in Bangladesh, has highlighted the poor condition of internet speeds in the country. The average interned speed of 10 Mbps is one of the lowest among neighbouring countries.

Given the above challenges, offline payments present a unique value proposition to the regulators, industry participants and end users. Supplementing the online payments model with offline can help create a digitally inclusive model that can support payments in all areas regardless of internet connectivity, topology and area categorisation (use of network jammers near border areas).

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28 https://www.bb.org.bd/en/index.php/financialactivity/paysystems

29 https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2021/03/Achieving-mobile-enabled-digital-inclusion-in-Bangladesh.pdf

Offline payment solutions in Bangladesh

The majority of Bangladesh's 165 million citizens live in rural areas, where mainstream banks don't have a sizable presence. As per a report by Bangladesh Bank, only 15% of the population has access to banking services.[30] MFS were aided by the regulator to fill this gap for people without a bank account. To facilitate bill payments and P2P transfers, PSPs integrated telecom services to enable payments on a USSD service. In addition to this, the use of a vast agent network enabled the penetration of last-mile payments services.

Partnerships with various GSM operators enabled payments services to operate via the telcos' USSD and SMS systems. However, the offline payments model is not a substitute for online payments but rather a complement. Thus, payments service operators are partnering with banks and other entities to develop solutions like e-wallets, as internet connectivity and smartphone penetration in the country improves. This is in line with the evolution of digital payments in other countries, such as China and India.

Agents are a pivotal cog in the offline payments machinery. As per the Bangladesh Bank,[31] cash-out transactions remain the second-most popular payments product after P2P, registering a growth of 10% in June–July 2021. Facilitating these transactions are agents who have steadily increased in number over the years, with the total number standing at around one million as of July 2021.[32]

Key policy initiatives to promote digital payments

Below are certain key initiatives taken by the government or regulatory body to promote cashless transactions across the economy:[33]

- **Interoperable digital payments platform:** Bangladesh Bank signed a memorandum of understanding with the Information and Communication Technology division to implement an interoperable system for digital payments. This will help in developing a common platform between all participants – customers, merchants, technology providers, banks, e-wallets and non-government companies.

- **Internet banking policies:** Bangladesh Bank has raised the limit for daily interbank transactions to encourage more users to use internet banking.

- **Micro merchant support:** There would not be any additional VAT or tax while opening retail accounts for micro merchants with banks or MFS. This step will allow financial inclusion at the grassroots level and incentivise merchants to offer digital payments.

- **Regulatory sandbox setup:** Bangladesh Bank has introduced regulatory sandbox under the payments systems department to test inventive business products and services which are not protected under the existing regulatory guidelines.

- **Two-factor relaxation for contactless credit cards:** Bangladesh Bank has relaxed the requirement of two-factor authentication for NFC transactions made through credit cards to encourage the adoption of digital payments methods.

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30   https://www.bb.org.bd/en/index.php/about/financial_inclusion

31   https://www.bb.org.bd/en/index.php

32   https://www.bb.org.bd/fnansys/paymentsys/mfsdata.php

33   https://www.lightcastlebd.com/insights/2020/12/digital-payments-in-bangladesh-a-road-to-growth-and-stability
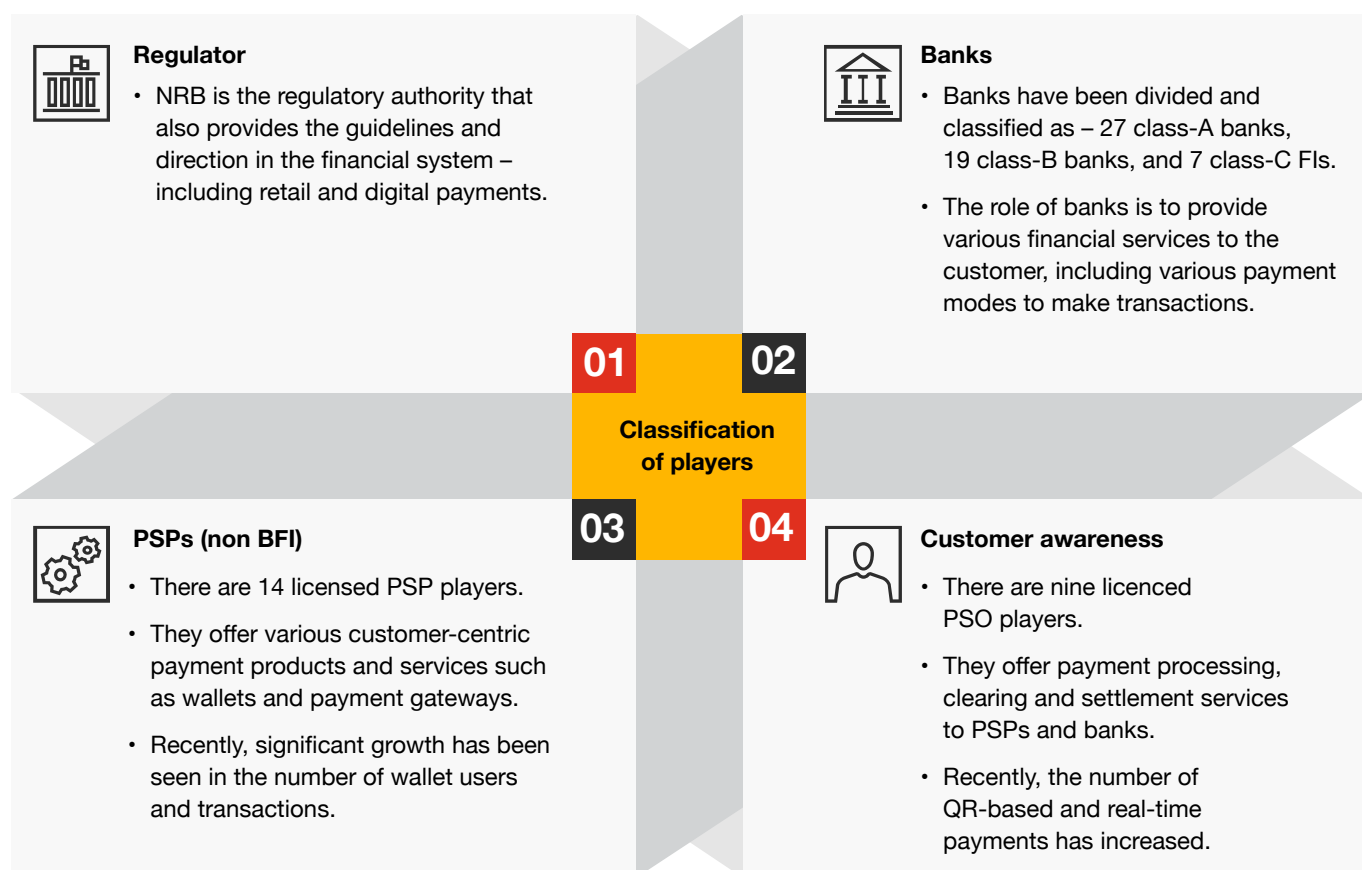
2. Nepal

Nepal is largely a cash-based economy with most financial services concentrated in urban areas as rural areas have limited IT infrastructure. However, Nepal is now witnessing a shift from cash to digital transactions and gradually becoming a cashless society with increasing number of digital transactions and users. In 2018, digital transactions worth NPR 712 billion were performed in Nepal, while in 2019, the amount increased to NPR 1,559 billion.[34]

Due to the pandemic, there has been a considerable increase in the number of digital payments. Various sectors such as insurance, remittance, hospital, school, and government payments have adopted digital payments.[35] In the remittance sector, non-residents can send money directly through digital payments platforms like mobile banking, internet banking, electronic cards and digital wallets.

Smartphone-based money services are gradually gaining momentum as part of the payments ecosystem. However, debit cards dominate the plastic card market, and the recent association with international payments networks for QR-based payments has paved the way for players to offer new solutions in this space.

Payments ecosystem

Key stakeholders in Nepal's payments landscape

Regulator
- NRB is the regulatory authority that also provides the guidelines and direction in the financial system – including retail and digital payments.

Banks
- Banks have been divided and classified as – 27 class-A banks, 19 class-B banks, and 7 class-C FIs.
- The role of banks is to provide various financial services to the customer, including various payment modes to make transactions.

01   02

Classification of players

03   04

PSPs (non BFI)
- There are 14 licensed PSP players.
- They offer various customer-centric payment products and services such as wallets and payment gateways.
- Recently, significant growth has been seen in the number of wallet users and transactions.

Customer awareness
- There are nine licenced PSO players.
- They offer payment processing, clearing and settlement services to PSPs and banks.
- Recently, the number of QR-based and real-time payments has increased.

Source: PwC analysis

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34   https://nepaleconomicforum.org/the-future-nepal-entering-a-cashless-economy/

35   https://nepaleconomicforum.org/neftake/the-future-nepal-entering-a-cashless-economy/

With new initiatives being proposed by the Nepal Rastra Bank (NRB), Nepal is gradually shifting towards a digital payments ecosystem which offers various modes of payments.

Payments systems and modes in Nepal
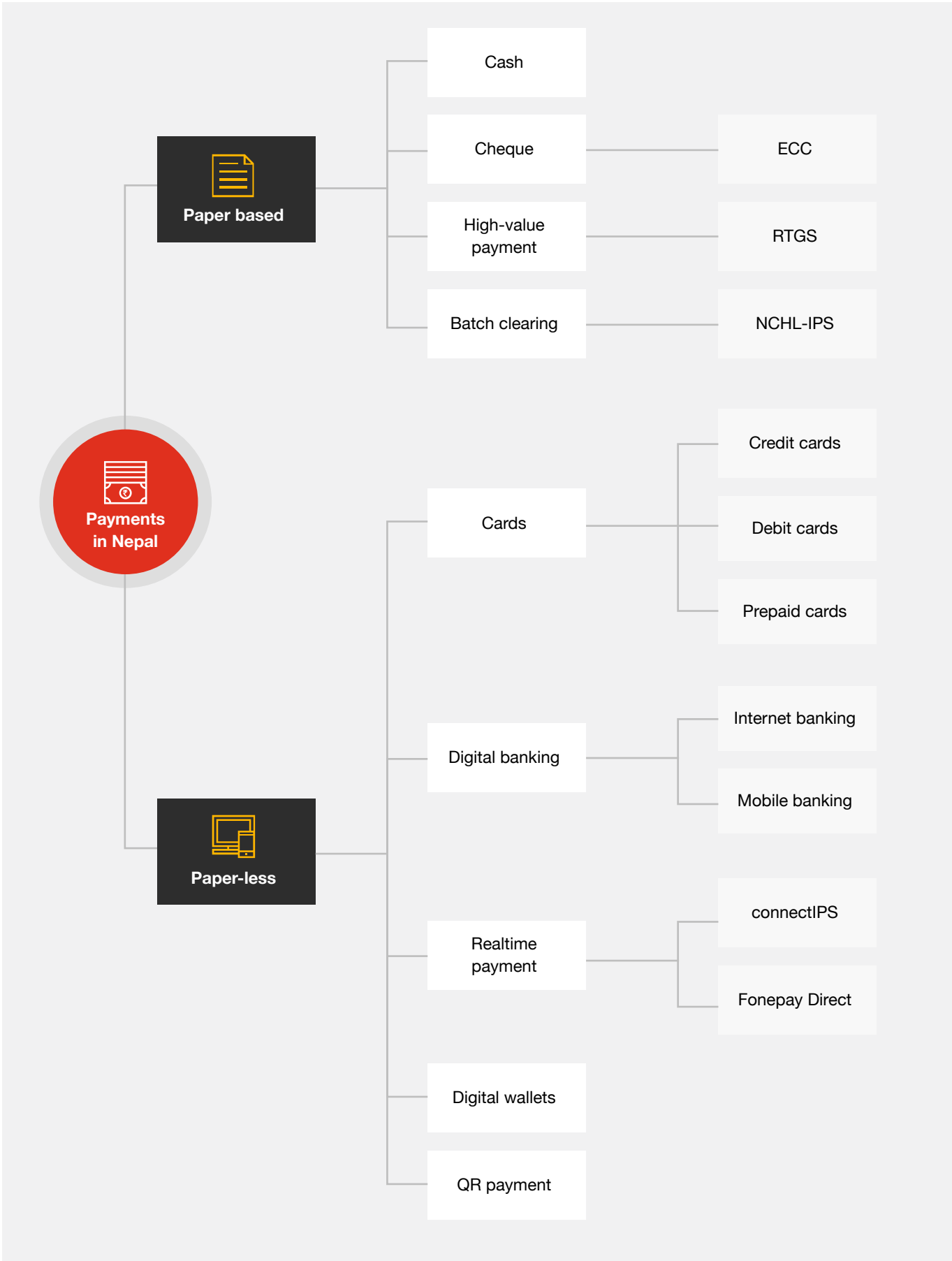
The key paperless payments offerings/systems available in Nepal are discussed below:

- **High value payments:** The NRB has introduced real-time gross settlement (RTGS) mode for high-value payments, operated by NRB itself.

- **Batch payments:** Nepal Clearing House Ltd (NCHL) operates the batch processing of direct debit and credit transactions, called NCHL-IPS. Currently, 87 financial institutions are participating in this payments mode.

- **Card payments:** Three types of cards are available in Nepal – debit, credit and prepaid – which can be used to transact at point of sale (PoS) terminals and online portals as well as for QR payments.

- **Immediate payments:** Currently, there are two products for immediate payments:
  - connectIPS: This is a popular immediate-payments mode, especially for mid-range value payments. It is used to transfer funds from one bank account to another.
  - Fonepay Direct: This is an immediate-payments mode offered under mobile banking applications of most banks. It is used to transfer funds from one bank account to another.

- **Digital wallet payments:** Digital wallets have shown tremendous growth lately. Wallet payments are deducted from the digital wallet of the user. In November 2020, there were 6.6 million users of digital wallets – a staggering 22% of Nepal's population.[36]

Need for offline payments solutions

In the context of the challenges discussed below, offline payments present a unique value proposition to the regulators and industry participants.

- Geographically, Nepal has a hilly terrain which makes it difficult for people to access financial institutions for transactions or obtaining cash.
- In addition, there is a lack of internet and technology access in such areas. In Nepal, 131% of the population has a mobile connection (one person tends to own more than one SIM card); however, internet users account for only 36% of the population.[37]
- There is a significant difference in internet services across urban and rural areas.[38] In urban areas, there are many options for broadband and mobile network connectivity, whereas most rural areas are still awaiting high-speed 3G, 4G, and other broadband services.

Hence, in Nepal, supplementing the online payments model with offline can help create a digitally inclusive model that can support payments in all areas regardless of internet connectivity, topology, and area categorisation.

Offline payments solution in Nepal

USSD service: Namaste Pay was launched in September 2021 by Nepal Digital Payments Company (NDPC), a joint venture of Nepal Telecom and Rastriya Banijya Bank. Namaste Pay is the first offline mobile wallet, i.e. users do not need internet access to perform transactions. Users can transfer or request funds and pay electricity and water bills, etc., using this service.[39]

Key policy initiatives to promote digital payments

Below are certain key policy initiatives taken by the regulator to promote digital payments:[40]

- **Regulatory framework for telecom companies:** Earlier, mobile payments were specifically managed by banks. However, in 2016, the NRB opened the doors to telecom companies to operate mobile payments services by obtaining a payments service operator licence.

- **Digital Nepal Framework:** This framework was designed in 2019 to achieve the country's growth potential by using innovative technologies.

- **Review of transaction limits:** In the monetary policy of FY 2021–22, the NRB announced that transaction limits would be reviewed, and the tariff imposed on digital transactions would be reduced.

36   https://www.nrb.org.np/contents/uploads/2020/11/Payment-systems-Indicator-2077-Ashwin_Final_Print.pdf

37   https://datareportal.com/reports/digital-2021-nepal | https://www.statista.com/statistics/765517/internet-penetration-rate-nepal/#statisticContainer

38   https://techsathi.com/state-of-the-internet-in-nepal

39   https://ndpc.com.np/our-product/ | https://ictframe.com/offline-digital-payment-system-in-nepal/

40   https://nepaleconomicforum.org/neftake/key-highlights-of-monetary-policy-fy-2021-22/

3. Sri Lanka

Sri Lanka is facing significant macroeconomic challenges, including high public debt, high food inflation and external financing requirements. The crisis impacted the livelihood of several citizens as poverty rate increased from 9.2% in 2019 to 11.7% in 2020. In addition, the pandemic affected the travel and tourism industry of country, which is its third major revenue-generating sector. The fiscal deficit is projected to stay high in the next few years, with low revenue collection and high expenditures. Public debt was expected to reach 116.5% of the GDP in 2021 and is expected to further rise in 2022–23. Sri Lanka's GDP growth contracted by 3.6% in 2020 due to the pandemic.[41] It is expected that growth in the near term will come from increased private consumption. In order to support this, it is imperative for the country and regulator to support a resilient and scalable payments framework. Recently, we have seen foundations and infrastructure for the technology-driven banking facilities being developed in Sri Lanka. These include internet and mobile banking, automated clearing system for cheques and common ATM switch.

Sri Lanka is essentially a cash-based economy. Due to this, digital adoption has been slow owing to less innovation and perceived risks associated with mobile and internet use.

Payments ecosystem

Non-cash payments are facilitated through large value and retail payments systems in Sri Lanka.

Payments methods in Sri Lanka

Large-value payments system	Retail payments systems and instruments
• RTGS system	• Cheques
	• SLIP system
	• Payment cards
	• Mobile phone based payment mechanisms
	• Internet-based payment mechanisms
	• Telebanking
	• Postal instruments
	• LANKAQR

The CBSL has reported nearly 66% QoQ growth of total payments (comprising both large-value and retail payments) in Q1 2021. Retail payments have had a growth of 12.5% QoQ in this period.[42]

The CBSL introduced LankaClear in 2002 to Sri Lanka's national payment infrastructure. Since then, LankaClear has revolutionised the country's banking and financial services sector by innovation and advanced technology. It aims to break the dependency on physical cash by empowering every Sri Lankan with fast, secure and affordable payments solutions.

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41   https://www.worldbank.org/en/country/srilanka/overview#1

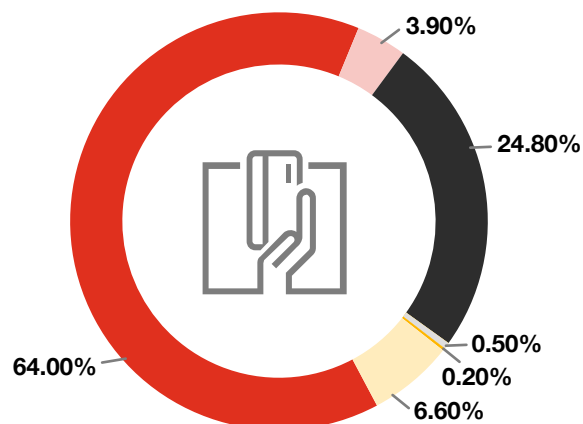42   https://www.cbsl.gov.lk/sites/default/files/Payments_Bulletin_1Q2021_e.pdf

The mobile phone based payments mechanism consists of the following services:

- Customer account based mobile payments system: This is a mobile phone banking facility for customers. In 2021, this system registered a QoQ growth of 67% and 38% in terms of volume and value, respectively, compared to 2020.[43]

- Mobile phone-based e-money systems: These systems issue monetary value upon receipt of funds and store them electronically.[44]
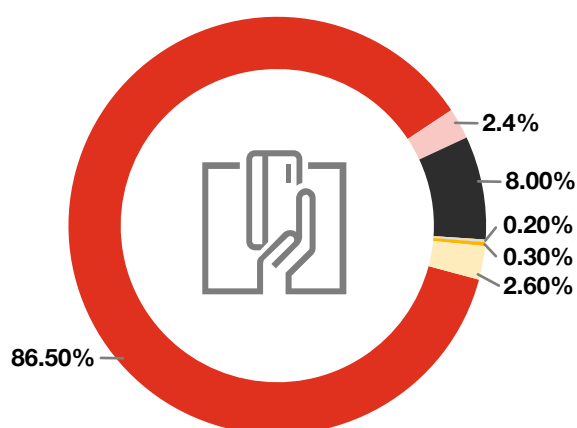
2.4%
8.00%
0.20%
0.30%
2.60%
86.50%

3.90%
24.80%
0.50%
0.20%
6.60%
64.00%

- Utility bill payments
- Institutional payments
- Internet transactions
- Money transfers
- Purchase product/over the counter
- Other

- Utility bill payments
- Institutional payments
- Internet transactions
- Money transfers
- Purchase product/over the counter
- Other

Composition of mobile phone-based e-money transactions in Q1 2021 (in terms of volume)

Composition of mobile phone-based e-money transactions in Q1 2021 (in terms of value)

Source: CBSL

- JustPay: LankaPay has launched JustPay, a payments product that allows customers to make retail payments using smartphone devices by transferring funds from their bank accounts to the merchant's account directly.[45] Sri Lanka has accepted this product as the transaction volumes doubled and the monthly transaction value grew by 60% during the lockdown period. JustPay reached a landmark of INR 1 billion in monthly transaction value in May 2020, with an average ticket size of nearly INR 2,500.[46]

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43   https://www.cbsl.gov.lk/sites/default/files/Payments_Bulletin_1Q2021_e.pdf

44   https://www.cbsl.gov.lk/sites/default/files/Payments_Bulletin_1Q2021_e.pdf

45   https://www.aba.org.tw/wp-content/uploads/2017/08/11-2021-0826-Kumaratunge-CBSL-Current-Banking-Trends-and-Implications.pdf

46   https://economynext.com/brand_voice/lankaclear-enabling-a-digital-economy/#modal-one

Need for offline payments solutions

Sri Lanka has the opportunity to build the required infrastructure and offer a product that is easy to use, anywhere and at any time. Below are the some of the factors which highlight the need for an offline payments solution.

- As per World Bank data for 2020, only 19% of the country's population lives in urban areas and it has a mobile phone penetration rate of around 149%. However, only half of the population uses smartphones and just 35% of the population has internet access.[47]

- Most people still prefer transacting in physical cash despite the digital options available. Sri Lanka's lower internet and smartphone usage compared to the neighbouring countries can be a possible reason for the low uptake of digital payments. For instance, mobile phone penetration is 134% of the population in Thailand, but it's 149% in Sri Lanka. Internet usage is higher in Thailand at 75%, whereas it is still 45% in Sri Lanka.[48]

- To increase digital adoption across the country, it is important to introduce cutting-edge technology and an easy to use solution.

- Despite good penetration of bank accounts (83% of adults), 31% of the population has not made any transactions (deposit and withdrawal) in 2020.[49]

Offline payments solution in Sri Lanka

USSD-based mobile banking: Sri Lanka is facing an economic crisis at the moment. With an increasing poverty rate, a majority of the population is living in rural areas where mainstream banks don't have a considerable presence. The regulatory body is developing MFS infrastructure for people who do not have bank accounts or smartphones. To facilitate sending money to peers, making bill payments, paying merchants and checking balance, the regulator has allowed PSPs to enable payments on a USSD service.

Key policy initiatives to promote digital payments

The CBSL has introduced certain policy initiatives to foster digital payments and financial inclusion in the country. A few such initiatives have been outlined below:

- The CBSL revised its mobile money regulations in 2011 and released 'Mobile Payments Guidelines No. 1 of 2011 for bank-led mobile payments services' and 'Mobile Payments Guidelines No. 2 of 2011 for custodian account-based mobile payments services'.[50] The revised regulations now allow customers to register for mobile money accounts without having a bank account.

- In October 2018, the CBSL released national QR code standards to be followed by banks, finance companies and operators of mobile phone based e-money systems while offering QR code payments.

- In the roadmap of 2019, the CBSL mentioned the facilitation of the National Transit Card, with the required infrastructure for a ticket and automatic fare collection system. The CBSL has coordinated with the Sri Lanka Transport Board and a bank for the launch of this card. This will reduce the use of cash at various transit locations.[51]

- The CBSL and International Finance Corporation (IFC) have launched the National Financial Inclusion Strategy to help the underbanked and underinsured and provide SMEs with access to financial services.

47   https://data.worldbank.org/indicator/IT.NET.USER.ZS?locations=LK

48   https://economynext.com/brand_voice/lankaclear-enabling-a-digital-economy/#modal-one

49   https://economynext.com/ifc-helps-sri-lanka-reach-under-banked-under-insured-9801/

50   https://www.pwc.in/assets/pdfs/consulting/financial-services/fintech/point-of-view/pov-downloads/digital-payment-opportunities-in-emerging-markets.pdf

51   http://www.sundayobserver.lk/2021/05/02/business/sri-lanka-transit-card-launched

Regulatory challenges and way forward for Bangladesh, Nepal and Sri Lanka

All three countries have made some successful policy interventions – for example, a framework for telecom companies – to promote payments services and financial inclusion strategies. Going forward, the regulators can look at formalised frameworks to introduce innovations in the offline payments space. This will also enable PSPs to build a sustainable business case to run offline payments at the scale needed for each country's payments market. In addition, encouraging new start-ups to enter the offline payments space should be a key consideration for the regulators.

- **Lack of interoperability:** The lack of a robust interoperability policy and framework in the payments ecosystem leads to duplication of effort for different players as well as citizens.

- **Limited participation of start-ups:** The limited participation of SMEs and start-ups in the payments ecosystem limits innovation in digital payments. Moreover, lack of customer data discourages participation.

- **Lack of adoption:** The uptake of digital payments is slow, specifically in Sri Lanka. In addition, low investment in infrastructure by financial service providers has contributed to low awareness of payments products.

- **Regulator-backed innovation hubs:** The central banks need to support multiple entities to help develop world-class innovative offline payments solutions. These solutions are not limited to only financial aspects but include the creation of a more collaborative framework to enable PSPs to systematically turn ideas into commercially viable solutions.

- **Mandatory bank partnerships:** Start-ups need to partner with banks to offer financial products. However, it is difficult for all start-ups with a good product/service to find a bank partner.

- **Discouraging extensive use of cash:** The regulator should work with the government to promote mobile financial transactions that will allow users to instantly send money, pay bills and make transit payments in offline modes when the customers do not have a smartphone or internet connectivity.

- **Incentives for merchants:** The low digital adoption rate is also due to merchant reluctance to accept digital payments systems. There should be enough incentives for merchants so that adoption of online and offline payments increases.

In emerging countries like Nepal, Bangladesh and Sri Lanka, digital payments are still at a nascent stage. However, a large number of opportunities are available, and these can be seized by addressing the challenges and next steps discussed.

Conclusion

As the offline payments framework matures in India, it is important for offline payments to co-exist with UPI. Offline payments can be the perfect supplement for solving network impediments in the UPI infrastructure. As seen during the COVID-19 pandemic, due to the high surge in digital transactions, UPI witnessed an above-average increase in payments failures. In such a scenario, seamlessly switching to an offline payments mechanism can ensure that the end-user experience is not disrupted, and payments success rate can improve substantially.

The offline payment framework issued by RBI is a novel step for standardising the rules and user experience from an offline payments perspective. However, as the infrastructure and use cases around offline payments mature, there can be further enhancements and modifications to the current framework.

In future, the offline payments value proposition can be extended to other areas such as insurance and microcredit. However, this would require collaboration across various regulators to develop an extended framework that caters to multiple domains in the financial services space. For offline payments, security is also a critical factor as such payments may be more prone to frauds. Thus, the devices that are being used need to be certified and the channels must be highly encrypted.

Glossary

ATM	Automated teller machine (banking outlet that allows people to complete transactions)		**GDP**	Gross domestic product (monetary measure of market value of goods and services produced in a country)
BC model	Business correspondent model (agents to provide services)		**GSM**	Global System for Mobile communication (standard for communication globally)
BIS	Bank for International Settlements (international financial institution owned by central banks)		**GSMA**	Global System for Mobile Communications Association
BBPS	Bharat Bill Payment System (integrated bill payment system)		**IFC**	International Finance Corporation (sister organisation of the World Bank that offers investment and advisory services)
BPSSG	Bangladesh Payments and Settlements Guidelines		**IFSC**	Indian Financial System Code (11-character alphanumeric code for bank branches)
CAGR	Compounded annual growth (mean of annual growth rate)		**IRDAI**	Insurance Regulatory and Development Authority of India (a regulatory body under the jurisdiction of Ministry of Finance, Government of India)
CBSL	Central Bank of Sri Lanka			
CBDC	Central Bank Digital Currency (India's digital currency)		**IVR/ IVRS**	Interactive voice response system (automated business phone system feature that interacts with callers and gathers information by giving them choices via a menu)
CDMA	Code-Division Multiple Access (a protocol used for 2G and 3G communications)			
DCEP	Digital Currency Electronic Payment (China's digital currency)		**KYC**	Know your customer (guidelines in financial services require that professionals make an effort to verify their identity)
EMV	Europay, Mastercard and Visa (payment standard for terminals and ATMs)			

LTE	Long-Term Evolution telecommunication (standard for wireless broadband communication for mobile devices and data terminals)		**PoS**	Point of sale (place where a customer executes the payment for goods or services)
MFI	Microfinance institutions (financial companies that provide small loans to people who do not have any access to banking facilities)		**PSPs**	Payment service providers
			QoQ	Quarter on quarter period
MFS Act	Mobile Financial Services Act (in Bangladesh)		**RBI**	Reserve Bank of India (India's central bank and regulatory body under the jurisdiction of Ministry of Finance, Government of India)
MMID	Mobile Money Identifier (7-digit number allotted by your bank for receiving funds)		**RBIH**	Reserve Bank Innovation Hub
NCMC	National Common Mobility Card (open-loop stored value card used in automatic fare collection system)		**RFID**	Radio Frequency Identification (wireless system comprising two components – tags and readers)
NFC	Near-field communication (transfers data between devices that are a few centimetres apart, typically back-to-back)		**RMB**	Renminbi (the official currency of the People's Republic of China)
NGO	Non-governmental organisation (voluntary group or institution with a social mission, which operates independently from the government)		**RTGS**	Real-time gross settlement (funds transfer system based on a gross settlement concept where money is moved from one bank to another in real time)
NDPC	Nepal Digital Payments Company		**SLIPS**	Sri Lanka Inter-bank Payment System
NPCI	National Payments Corporation of India (an umbrella organisation for operating retail payments and settlement systems in India; initiative of Reserve Bank of India (RBI) and Indian Banks' Association)		**SMS**	Short message service
			SHG	Self-help group (small groups of poor people)
			SMEs	Small and medium-sized enterprises (non-subsidiary, independent firms which employ fewer than a given number of employees)
NRB	Nepal Rastra Bank (central bank of Nepal)		**STK**	SIM application toolkit
NUE	New umbrella entity		**TSP**	Telecommunications service provider
NUUP	National Unified USSD Platform (also known as the *99# service; provides access to the Unified Payment Interface service over the USSD protocol)		**UPI**	Unified Payment Interface (instant, real-time payment system developed by the National Payments Corporation of India)
PSO	Payment service operator		**USD**	United States dollar
P2P	Peer-to-peer (e-money transfers made from one person to another)		**USSD**	Unstructured Supplementary Services Data (session-based service unlike SMS, which is a store and forward service)
P2M	Person-to-merchant		**VAT**	Value-added tax (consumption tax levied on a product)

About VISA

Visa is a global payments technology company that connects consumers, businesses, financial institutions, and governments in more than 200 countries and territories to fast, secure and reliable digital currency. Underpinning digital currency is one of the world's most advanced processing networks—VisaNet—that is capable of handling more than 20,000 transaction messages a second, with fraud protection for consumers and guaranteed payment for merchants. Visa is not a bank, and does not issue cards, extend credit, or set rates and fees for consumers. Visa's innovations, however, enable its financial institution customers to offer consumers more choices: Pay now with debit, ahead of time with prepaid or later with credit products. For more information, visit www.corporate.visa.com

About Payments Council of India (PCI)

The Payments Council of India was formed under the aegis of IAMAI in the year 2013 catering to the needs of the digital payment industry. The Council was formed inter-alia for the purposes of representing the various regulated non-banking payment industry players, to address and help resolve various industry level issues and barriers which require discussion and action. The council works with all its members to promote payments industry growth and to support our national goal of 'Cash to Less Cash Society' and 'Growth of Financial Inclusion' which is also the Vision Shared by the RBI and Government of India. PCI works closely with the regulators i.e., Reserve Bank of India (RBI), Finance Ministry and any similar government, departments, bodies, or Institutions to make 'India a less cash society'.

About Internet and Mobile Association of India (IAMAI)

The Internet and Mobile Association of India [IAMAI] is a young and vibrant association with ambitions of representing the entire gamut of digital businesses in India. It was established in 2004 by leading online publishers, and since the past 18 years has come to effectively address the challenges facing the digital and online industry including - online publishing, mobile advertising, online advertising, ecommerce, mobile content and services, mobile & digital payments, and emerging sectors such as FinTech, EdTech and HealthTech, among others. Since its establishment, the association is still the only professional industry body representing the digital and mobile content industry in India.

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