




Offline digital payments:

Emerging solutions

February 2021



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Foreword

Dear readers,

It is my pleasure to bring to you the latest edition of our payments newsletter. In this edition, we take a look at opportunities in offline digital payments and emerging use cases that will disrupt the payment space. We highlight the value these use cases can offer to stakeholders and present our views on key considerations for their sustained growth.

In addition to our views, we have presented our recommendations on areas we feel should be looked into from a new perspective, to help achieve better synergies and boost the growth of the digital payment industry.

I hope you find this newsletter to be a good and insightful read.

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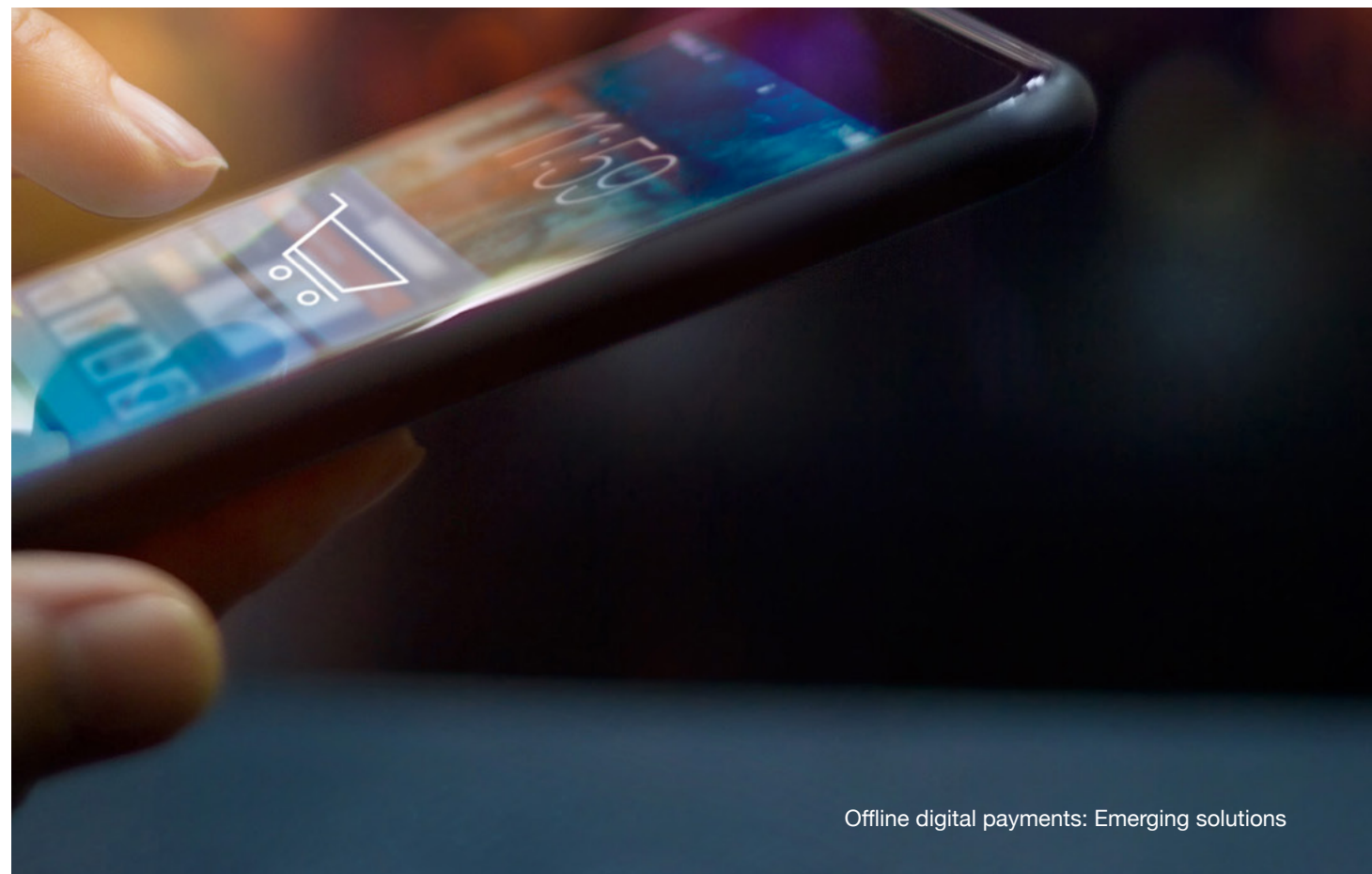
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**Payment
technology updates**



01

Introduction to offline payments



Introduction to offline payments

Over the past two decades, India has made tremendous progress in terms of internet and cellular connectivity, leading to a rise in digital transactions across the country. In order to perform any digital transaction, seamless connectivity between terminals or web pages, banks, payment networks, payment processors, etc., is a necessity. Although these systems are designed to have high availability, a drop in connectivity at any single point may lead to a transaction being declined.

So, how do we solve the challenge of connectivity and provide a seamless digital payment experience? Some situations are mentioned below:

- End user faces disruptions in internet connectivity.
- Connectivity is not available at acquiring terminals for a temporary period.
- The user device is not within internet range.

Offline digital payment provides a solution in the above scenarios which are common not only in India but also in some other parts of the world. It can provide a seamless experience to end users and reduce failures due to connectivity issues.

These digital payment transactions are performed without an internet connection, using alternative modes such as SMS, IVR and GSM technology. Alternatively, transactions can be recorded on the payment device and sent to the sponsor banks at a later point in time, once connectivity is restored.

There are various methods through which a user initiates a transaction without internet connectivity and the same is notified to the merchant once successful.

The table below presents a comparison between online and offline payments:

Comparison between online and offline payments

Parameters	Online payments	Offline payments
Network connection	Required	Not required
Transaction processing time	High	Low
Transaction value limits	High	Low
PIN required	Yes (not required for contactless transactions worth up to INR 5,000)	No (required in case of UPI-based transactions)
Risk to participants	Low	High
Acceptance	Widely accepted	Closed loop/limited acceptance

Source: PwC analysis

Initiatives which are currently driving offline payments in India

India has a vast opportunity to tap and grow in the offline payment space, and multiple initiatives are being taken by ecosystem players. Regulators have been keen to drive offline payments and have rolled out various guidelines for contactless and contact-based transactions. Moreover, FinTech companies have been provided a platform to showcase their offerings and perform pilot testing.¹ The Government has launched the National Common Mobility Card (NCMC) – an offline payment mechanism in the transit segment. FinTech companies and start-ups are exploring various ways in which offline digital payments can be performed through various form factors and underlining the prevalent payment technologies.

Key drivers of offline payments



Government initiatives in the transit segment



RBI guidelines for offline payments



Innovations by FinTechs



Collaborative efforts by ecosystem participants

Source: PwC analysis

¹ <https://economictimes.indiatimes.com/tech/technology/google-pay-was-the-most-used-upi-app-in-november/articleshow/79627869.cms?from=mdr>

² <https://www.timesnownews.com/business-economy/personal-finance/article/state-bank-freedom-over-nuup-transfer-funds-from-your-mobile-phone-without-internet-connection/518461>

³ <https://www.npci.org.in/what-we-do/99/product-statistics>

Existing solutions

In recent years, digitisation of payments in rural areas has seen significant progress due to FinTechs, start-ups and banks that are offering innovative models. However, there still exist opportunities to cater to areas with limited/no internet connectivity. In the last few years, the focus on offline payment solutions was limited to certain use cases for merchant payments (which are more urban centric) and use cases that will drive financial inclusion. A few of the existing solutions are discussed below:

Offline PIN authentication

Currently, this method of offline card payment is limited to a few use cases wherein the PIN entered on a PoS terminal by cardholders is verified by the card chip itself and the transaction is stored on the PoS terminal and settled with the bank at a later point in time. This requires separate certification for acquiring devices and also depends upon whether the card issuer and payment scheme are willing to provide these facilities.

A few leading airlines in India and globally have started using in-flight PoS devices to allow customers on the aircraft to make payments using their cards. These transactions are authenticated using the PIN stored on the card and then stored on the in-flight PoS device. They are processed only once the PoS device has internet connectivity.

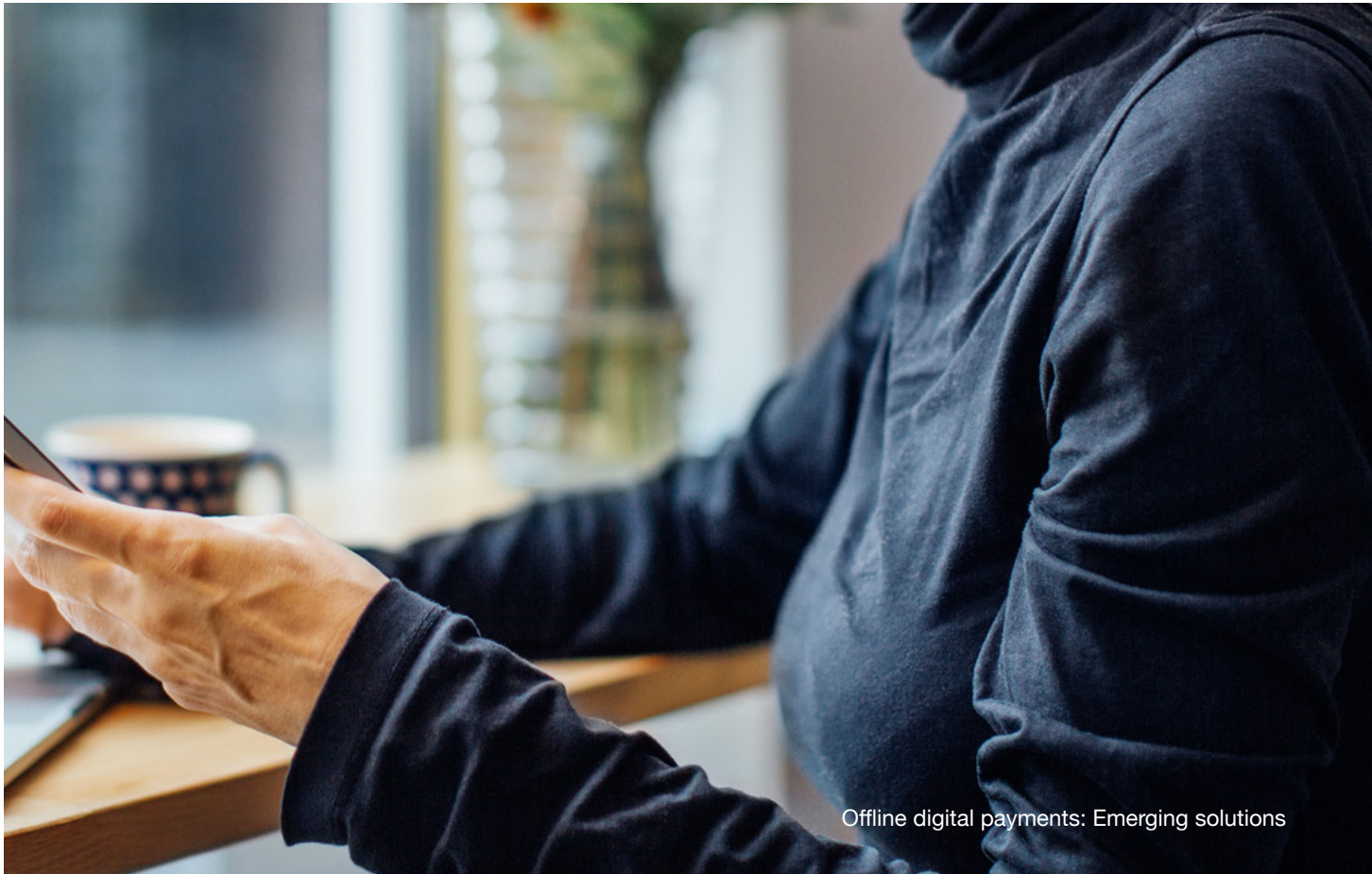
NUUP - *99#

The National Unified USSD Platform (NUUP) is a USSD-based solution which works across all GSM-based phones. This mechanism was developed to provide UPI on feature phones in remote areas. It has a predefined menu with multi-language support and is a key catalyst in the financial inclusion drive.²

Around 83 banks are currently live on this solution, with a peak volume of approximately 0.09 million transactions per month.³ However, owing to multiple layers involved while performing a transaction and because this solution is only supported on the GSM network, there have been challenges in adoption. In addition, the transaction cost per USSD session is comparatively higher than that of other mediums.

02

Emerging solutions with use cases



Emerging solutions with use cases

It is important to create solutions that encourage quicker migration from cash to digital. Offline payment solutions will be targeted at increasing financial inclusion and at making payments convenient and secure for people in areas where internet connectivity is limited or unavailable. These solutions can have various form factors for making payments (e.g. cards, mobile devices, digital wallets, IVR-based solutions, tokens) which are inexpensive for the common man and widely available for faster adoption. Also, these payment mechanisms will be in line with other modes, thus enabling interoperability and allowing maximum participation.

In India, FinTechs are the frontrunners in this segment and have been performing pilots with the RBI and a small section of society. Below are a few use cases which are being developed using different technologies.

1. Stored value card based solutions

Low-risk and low-value transactions can be performed using offline payment modes. For these transactions, ceiling limits can be defined in the EMV chip, and if offline card payment enabled at the merchant terminal, transaction authorisation can take place locally without online or real-time authorisation. There is a provision of a small vault within the EMV chip for processing offline payments. These cards can be topped up by the customer via online web portals, or at designated counters through UPI or mobile wallet payment.

To use the card, the customer can tap it at an offline terminal (such as one at a metro station) to make a payment. The balance available in the vault is verified by the terminal and gets debited in real time.

The updated balance is then stored in the vault for future transactions. Some of the solutions in development are described below.

Offline merchant payments

A banking technology player is developing a solution which will work with prepaid cards and can be used at PoS terminals. A customer can use this card to make offline payments to a merchant using NFC technology. The solution works using prepaid card technology, with the authentication taking place offline. This will benefit customers who face difficulties in making payments in rural parts of India.

Another FinTech is developing a solution with an emphasis on testing offline payments in rural areas and among self-help groups. The solution makes use of a smart card and a payment device to facilitate transactions in the offline mode using NFC technology. Customers can top up the wallet account built into the smart card from their bank account. When swiped on the payment device, the card will accept payments offline. This offline solution is aimed at facilitating loan disbursement and collection by financial institutions in remote areas where access to smartphones and the internet is very limited.

Offline transit payments

A prepaid card-based solution provider is testing a new product that works on NFC technology with a FinTech player. A customer can pay for transit services like buses, metros, etc., in cities by swiping the card over NFC-enabled PoS devices. The solution can also be used by the customer as a wallet to make payments to merchants at select shops.



2. Sound- and IVR-based solutions

This technique uses sound as a form factor where the credentials are encrypted. The types of sound-based payments being developed are described below.

Use of voice as password

A FinTech organisation which has a strong background in voice recognition techniques is developing 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 her/his 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 and the underlying payment method is UPI technology. This solution can be used for person-to-person and person-to-merchant transactions. The solution also offers the convenience of selecting one's preferred Indian language through IVR, thereby enhancing customer usability.

IVR-based prepaid card transactions

A large card scheme, in collaboration with a next generation bank and a wallet venture, is testing a technology to improve financial inclusion at the village level. The pilot mission is being conducted to test the patent-pending feature phone based offline payment technology. A customer can initiate a transaction from her/his phone which gets authenticated using an OTP and a telephone pin-based authentication using interactive voice response system (IVRS) technology. The transaction is then processed using underlying prepaid card technology.

IVR-based sound technology

A FinTech which is extensively involved in sound-based authentication is using IVR and UPI technology to process payments. Merchants can request for a payment from their device by clicking on the receive payment button. A sound wave containing a transaction request gets produced from the merchant device and is captured on the customer's device. The customer device produces a sound wave which carries the transaction response details. This establishes an encrypted data transfer between both devices and the transaction gets completed.

3. SIM overlay solution

This technique uses SIM overlay technology in conjunction with feature phones to enable offline payments.

SIM overlay toolkit based solution

A solution is being tested in which a smart sleeve is set to act as a SIM card overlay in conjunction with the SIM toolkit user interface on feature phones. A customer can use this user interface on their feature phone to initiate fund transfers and bill and merchant payments using the underlying UPI technology. This technology aims to address the drawbacks of USSD technology, which is restricted to GSM and not supported for LTE telecom providers. It is in use in China and Kenya, and being tested in Japan.^{4,5}



⁴ <https://indianstartupnews.com/news/rbi-adds-four-startups-to-its-retail-payments-regulatory-sandbox/>

⁵ <https://www.zeebiz.com/personal-finance/news-mobile-payment-without-internet-to-soon-become-reality-in-india-145325>

03

Potential challenges and way forward



Potential challenges and way forward

One of the key enablers of the success of a payment instrument is its cost-effective implementation and adoption on a mass scale. To extract the maximum benefits from implementation of offline payments across use cases, it is critical to identify the potential challenges and address them at an early stage.

Security challenges

For offline payments, security is a critical factor as these payments may be more prone to frauds and money laundering activities. There needs to be rigorous certification of devices which are being used and the channels for making such payments should be highly encrypted, thus ensuring customer data protection and reducing frauds. Threats such as SIM swap related frauds plague users, particularly in areas with low connectivity. Vigilant verification also needs to be ensured to overcome man-in-the-middle attacks and other social engineering tactics used to compromise customer credentials and tap into transactions.

Low transaction value limits

Transaction value has been a limiting factor for offline payments, which is likely to pose hurdles for person-to-merchant transactions. Currently in India, the upper limit of a payment transaction is capped at INR 200 per day, and the total limit for offline transactions on an instrument is capped at INR 2,000. This has been done in order to provide security to the end users and liability protection. Another reason is that these solutions are still in the pilot phase. Once there is a successful uptake in transaction volumes and increase in customer trust, the transaction value could be increased.

Customer service

Offline payment solutions need to have fail-proof process flows in place which would help provide better customer experience while making payments. Clear guidelines have to be laid down by the players for addressing any complaints/disputes and frauds as well as for value-added services and pricing.

Customers must be informed about the guidelines during on-boarding and on a regular basis through various modes. This will help develop customer confidence and pave the path for mass adoption.

Transaction failure/sync up challenges

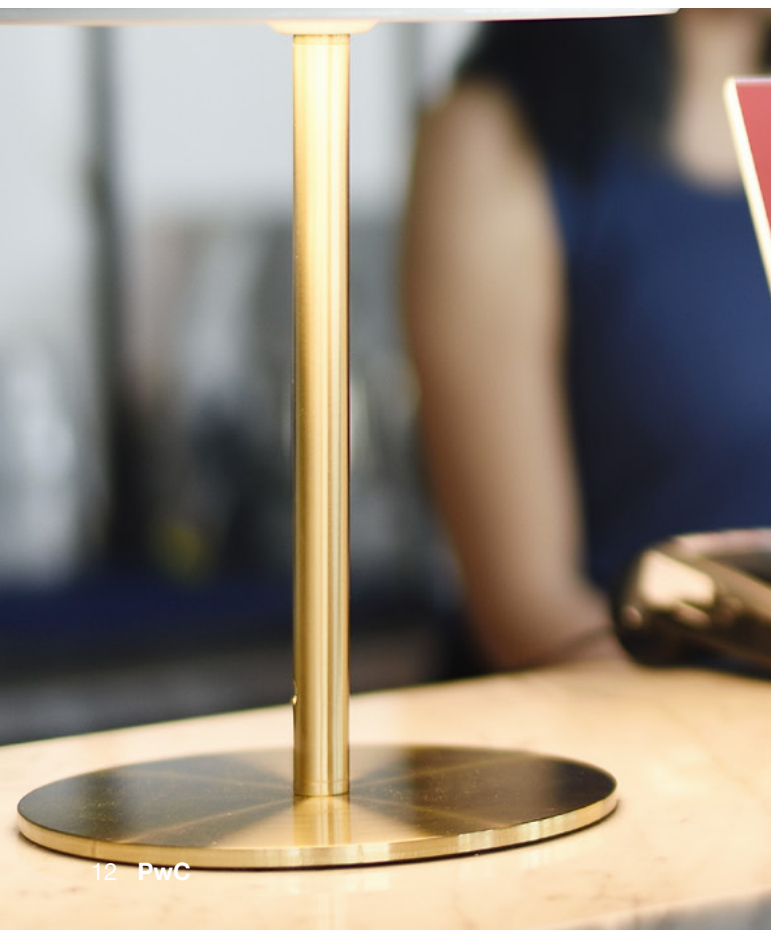
The transactions conducted are prone to failure due to limited cellular connectivity, lack of support for messaging formats or sync issues. The new form factors/devices/software for offline payments must be tested well in adverse conditions as the main usage would be in rural/hilly locations. The technology and back end infrastructure should be robust to process the transactions in minimal time without any failures. To achieve smooth transactions for offline payments, necessary guidelines and uniform standards should be defined.

Offline payments are in an evolutionary phase in India and across the globe. Given the changing environment due to digital disruption as well as regulatory changes, more innovations will take place, improving the overall customer experience in regions with less/no connectivity.

In future, we are likely to see non-banks/technology service providers becoming key payment interface providers for offline payments, with banks continuing to handle the underlying payments infrastructure. Based on the outcomes of various pilots, regulators may issue detailed guidelines and standards. Further, we are likely to see more partnerships between non-banks/third-party service providers and banks, as both parties are likely to leverage their strengths to drive offline payment transactions and co-create solutions for addressing customers' needs.

04

Payment technology updates



Payment technology updates

RBI proposes to strengthen digital payment user grievances

Economic Times

Measures are proposed by the RBI to strengthen grievance redressal and security features for consumers of digital payments in India, including setting up of an integrated Ombudsman platform and a 24*7 customer helpline.

[Read more.](#)

INR 1,500 crore budget boost for digital payments by MoF

Economic Times

The Ministry of Finance has earmarked a budget of INR 1,500 crore for the growth of the digital payment industry.

[Read more.](#)

UPI volumes increase 77% year-on-year in Jan '21

Business Standard

UPI transaction volumes have increased to 2.3 billion (about 77%) compared to last year, and the value has doubled to INR 4.3 crore.

[Read more.](#)

NFC-enabled smartphones can now be used as payment acceptance devices

Business Standard

Pine Labs has deployed an App 'AllTap' which turns NFC-enabled smartphones into payment acceptance devices which can be used by merchants.

[Read more.](#)

Third factor of authentication makes payment bank safest pay option

Business Standard

To curb online payment frauds, Airtel Payments Bank has introduced a third factor of authentication where the remitter has to confirm details of the beneficiary before a payment gets processed.

[Read more.](#)

FASTag made mandatory from 16 Feb 2021

Livemint

FASTag has been mandatory for all vehicles from midnight on 16 Feb 2021. The reloadable tag has a one-time fee of INR 200, a reissuance fee of INR 100, and a refundable deposit starting from INR 200, which varies based on vehicle type.

[Read more.](#)

PayPal to shift focus to enabling international sales for Indian businesses

India Today

PayPal has shut its Domestic operations and focusing more on international business from 1 April 2021.

[Read more.](#)

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