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Decoding Instant Payments: The Emerging Markets' Story

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Preface

PwC is pleased to bring you the report: "Decoding Instant Payments: The Emerging Markets' Story." In this document, we conduct a comparative analysis of the Instant Payments ecosystem in four emerging economies: Mexico, Brazil, India, and Thailand. The publication identifies and builds upon the Instant Payments experiences of these four countries and puts forward recommendations for the effective adoption of Instant Payments.

Executive Summary

There is a growing trend in the developing markets towards faster payment systems (i.e., instant payments).

In the past six years, several emerging economies have introduced instant payments with varying degrees of success. In India, paying through UPI has become a way of life. Meanwhile, PromptPay and PIX transactions have been growing phenomenally in Thailand and Brazil, respectively. However, CoDi in Mexico still needs to gain traction after almost four years since its launch. Likewise, other countries are developing their own Instant Payments ecosystem.

Given that each country is following its own unique path, it is becoming essential to understand better the factors that can lead to the adoption of instant payments and confirm that lessons learned are not lost.

This report aims to perform a comparative analysis of the Instant Payments ecosystem across four developing countries. Through this analysis, we identify the emerging trends, benefits, and factors that can lead to adoption in Mexico, Brazil, India, and Thailand. Finally, the report is intended to provide recommendations for retailers, banks, and fintechs currently using or planning to use instant payments.

The key findings of the report are:

The factor that contributes most to the rate of adoption of instant payments seems to be its user experience; specifically in three key aspects which we collectively call: Adoption Boosters.

1. **Addressing:** The easier it is designed for a user to route a payment (i.e., specify who the recipient is without having to remember complex and sensitive details, such as bank accounts and routing numbers), the quicker the adoption is expected to be.
2. **Openness:** The more options a user has to initiate or receive a payment (i.e., which app can be used to make an instant payment, be it the app of their bank, non-bank, or fintech), the quicker the adoption is expected to be.
3. **Payment functionality:** The more use cases a user has (i.e., receiving payments, issuing a payment request, paying bills, etc.), the quicker the adoption is expected to be.

However, the effectiveness of each Adoption Booster may depend on the alignment between the strategy employed, the mobile penetration, and financial inclusion within the country. Countries with high mobile penetration and financial inclusion are likely to expect higher instant payments adoption rates. Some examples of how strategies need to vary depending on the environment are:

1. **Addressing:** The Instant Payments system in a country with low mobile penetration may not employ phone-based aliases for routing/addressing purposes but instead opt for aliases based on national IDs or domain-based aliases (i.e., user@bank).
2. **Openness:** The Instant Payments system in a country with low bank account penetration may allow third parties, such as non-banks and fintechs, to participate.
3. **Payment functionality:** In a country with an extensive welfare system, the Instant Payments system may allow and incentivize the reception of government aid by instant payments.

Despite the benefits that instant payments bring to the ecosystem, we also identified a few challenges that most Instant Payments solutions are facing in various countries. These challenges are:

1. **Finding the right fee structure to confirm sustainability:** Some specialists argue that free-for-the-user instant payments won't be able to maintain themselves over the long term without levying merchant discount rates to pay for its infrastructure.
2. **Overcoming the lack of awareness regarding Instant Payments' security:** Security concerns loom large in the minds of small merchants and users. If these concerns are not resolved, a bifurcation might occur where users may use instant payments only for transactions with high trust and lower expected chances of needing dispute resolution or fraud protection.
3. **Reaching places with poor internet connectivity and low digital literacy:** It may still be challenging to conduct Instant Payments transactions because a significant percentage of the population has no access to the internet or smartphones, or lacks digital literacy.

Section 1
Understanding instant payments

Setting the scene

There is a growing trend in the developing world towards faster payment systems. Let's talk about Anil in India and Gabriela in Brazil to show how and why the world seems to be moving towards instant payments.

Anil's bakery shop in a Tier 1 city in India

Anil runs a small mom-and-pop store that sells local bakery items and birthday cakes. When he started his business, he relied purely on cash to receive payments from his clients. Later, as customers began having bank accounts and holding debit and credit cards, he bought a Point of Sale machine, and a significant proportion of his payments moved to digital payments. While the process was generally reliable, it was very expensive and time consuming.

As his business grew, Anil started to receive more requests for rush orders, which required immediate payment. He was referred to try out UPI acceptance. He got a UPI QR Sound Box from a non-bank that charged him a fraction of the cost he paid for the POS provider, and he found the verbally narrated out acknowledgement of payment very convenient as it made the payment process very quick (no dipping the card or checking if payment was approved or not).

Gabriela's visit to a beach town in Brazil

Gabriela is from São Paulo, Brazil, and was recently in a beach town in Northern Brazil. When she found herself in need of cash, she went to an ATM but was surprised to find that it wouldn't accept her debit card. After calling her bank, Gabriela learned that her account had been frozen due to suspicious activity. Despite her protests that she was traveling, the bank told her it could take several days to resolve the issue.

Frustrated and in a different town where she knew no one and with limited resources, Gabriela turned to a new service called PIX. She had heard about it from a friend but had never used it before. She downloaded a digital wallet app. To her surprise, her parents were able to quickly transfer funds from their account to her new digital wallet using PIX instantaneously and then she withdrew the cash.

These anecdotes highlight the benefits of instant payments, which are becoming increasingly common in today's digital economy. Services like PIX in Brazil, PromptPay in Thailand, UPI in India, and CoDI in Mexico allow users to transfer funds instantly, often without fees or other complications.

In Anil's case, he turned to instant payments as it offered the convenience of real-time payments and the ability to manage cash flow. In Gabriela's case, it was easier to make payments, whether to pay a bill at a restaurant, at her hotel, or for activities at the beach. Given its convenience, the popularity of instant payments is only likely to grow in the coming years as more people become accustomed to the convenience and speed of these services. With technological advances and a growing emphasis on digital transactions, it is fair to say that instant payments are here to stay.

For this reason, it is critical to identify the emerging trends, benefits, and factors that can lead to the adoption of Instant Payments.

What are instant payments?

The term instant payment describes account-to-account fund transfers initiated, cleared and settled within seconds, at any time of the day or week, holidays and weekends included.

Many people use the terms "fast," "faster," "real-time", and "instant" payments interchangeably. And to consumers, faster and instant payments may seem similar, but they aren't.

Faster payment is designed to be a method that posts and settles payments faster than traditional payment rails, but they don't necessarily settle in real time. In contrast, Instant Payments solutions do settle in real time and payments are initiated and settled almost instantaneously. In this report, we focus on instant payments.

How do instant payments work?

The process of instant payments can vary, but generally, the following steps take place:

1. **Initiation:** The payer initiates the transaction through their bank or a third-party payment service provider (PSP) by providing the recipient's account details and the amount to be transferred.
2. **Authorization:** The payer's bank or PSP verifies and authorizes the transaction, ensuring that the payer has sufficient funds to complete the transfer.
3. **Clearing and settlement:** The payment is designed to be cleared in real time and settled to customers instantly, meaning that funds are debited from the payer's bank account and credited to the recipient's bank account immediately.
4. **Confirmation:** The payer and the recipient receive a confirmation that the payment has been successfully completed.

These terms and processes may seem a little complex. Let's use a metaphor to understand better and visualize how non-cash payment works.

The payments metaphor

Imagine a bustling city with a complex network of roads and intersections, representing the **payment system**. Each individual or institution has their own location within this city, like buildings or houses, which house their accounts.

When **a payment** is initiated, it's like a person or a courier carrying an envelope containing information. You can think of this information as the necessary details to make the payment, such as the recipient's account information, payment amount, and additional instructions. This metaphorical courier service involves authentication and verification processes to confirm the accuracy and integrity of the information contained within the envelope (i.e., the payment instructions).

This information is designed to typically be communicated through digital channels, such as mobile apps, online platforms, or point-of-sale systems. In our metaphor, these communication vessels can be thought of as the vehicles that are used to deliver the envelope.

The sender's location is where the envelope is picked up, representing the **Issuing Bank**.

If the recipient's account is held within the same institution, it's like walking to a neighboring room within the same building and submitting the payment instructions to the system to be executed.

However, if the recipient's account is held at a different institution, it's like delivering the envelope to a building located in another part of the city. The recipient's location represents the **Acquiring Bank**.

To reach the recipient's location, the person or courier must navigate the city streets and intersections securely, which in our metaphor, represents the **payment rails**.

Throughout this journey, the movement of the envelope (payment instructions) is facilitated by the coordination of traffic signals, the efficient navigation of roads, and compliance with established rules and regulations. These elements confirm that the envelope reaches its intended destination securely and represent **payment gateways, payment switches**, payment processors, among others.

Payments as instructions

But why does the envelope contain instructions and not funds? Because a **payment** is just an instruction to execute a series of debits and credits across a set of static accounts held in different institutions. The only thing that "travels" through the complex network of roads and intersections are messages with the information required to authenticate and authorize these series of debits and credits.

Let's picture two examples: (1) customer A paying customer B from the same bank, and (2) customer C paying customer D located at a different bank but connected through a clearing system.

In example 1, customer A's account is debited, and customer B's account is credited at the same time by simply "relabeling" the ownership of some of the Bank's funds (i.e., deposits).

In example 2, there are four general steps:

(i) Customer C's account is debited.

(ii) Bank C credits its own internal clearing account in a similar manner as if customer C was paying another customer named "internal clearing account of Bank C".

(iii) Bank D debits its internal clearing account and credits customer D's account similarly as if customer D was receiving a payment from a customer named "internal clearing account of Bank D".

(iv) Bank C debits its settlement account at the central bank (or a similar financial institution), and Bank D credits its settlement account at that same institution, in a similar manner as in example 1.

Of course, this is a general and simplified example. The order and timing of these actions, the number of transactions and settlements, as well as the number of accounts used will depend on the clearing system (i.e., real-time, batch, hybrid, same day, cheque, correspondent, card, etc.), its scheme (i.e., rules), and the participating institutions. But the key insight is that funds don't really travel anywhere. These series of coordinated debits and credits are like a movie where static images are shown in sequence – nothing moves, but it gives the illusion of a moving picture.

The previously described process depends on the underlying infrastructure and payment mechanism used. Depending on the specific payment method or service employed, it may involve interbank transfers, clearing and settlement systems, or payment networks. This underlying infrastructure is what enables instant payments to be possible.

The payment infrastructure in more detail

Payment rails could be thought of as the roads, highways, and transportation infrastructure that connects places and facilitates the movement of goods. They represent the pathways and systems through which payments are processed. (One important thing to remember is that what flows through the rails are messages, not funds).

Payment rails come in different forms, just like various modes of transportation in a city. Some common examples include credit card networks, electronic fund transfer systems, Automated Clearing House (ACH), wire transfers, and digital payment platforms. Each payment rail has its own set of rules, protocols, and processes that dictate how transactions are initiated, authorized, and settled. One essential rule is which vehicle can access and use the rail. Just like trains are the only vehicles allowed to use railroads but several types of vehicles can use highways, in the payments landscape, some rails are reserved for a certain type of vehicle, like credit and debit cards are the only vehicles allowed to use the card rails.

Just as you would choose a specific mode of transportation based on factors like speed, cost, and reliability, businesses and individuals choose payment rails that align with their needs. For instance, a person may use a credit card for online purchases, while a business may prefer ACH transfers for recurring payments.

Payment gateways can be likened to automated toll booths, security checkpoints at airports, information booths at a subway station hub, among others. Like the examples mentioned before, some work for specific rails and not others.

For example, when you enter the highway, you need to pass through a toll booth to ensure you have the proper authorization to use the road. Similarly, payment gateways verify and authenticate your payment information before allowing it to proceed along the payment rail. They act as intermediaries between the payer, the payee, and the financial institutions involved, ensuring secure transmission of payment data. On the other hand, in the subway hub example, you can use the information booth as a guide to help you reach your destination securely even if you are not familiar with the transportation system.

Since we should not forget that payments are a set of instructions that might be transmitted using different messaging protocols, these types of payment gateways can also be thought of as translators or interpreters that help you understand where you need to go. They act as intermediaries between buyers, sellers, and financial institutions, securely translating and transmitting payment information across different systems and networks.

Additionally, payment gateways often provide additional features and services, such as fraud detection and prevention mechanisms, currency conversion, and integration with other systems or platforms. These value-added services can be compared to extra security measures or services offered at toll booths or security checkpoints, such as identity verification or baggage screening.

Now, for the operator in the information booth at the subway station to give you a proper route and information, they need to access their system to know the trains' schedule, delays, and destinations. That system can be considered the **payment switches in** the payment ecosystem.

They manage the routing and switching of payment transactions between different financial institutions, much like traffic control centers manage the traffic flow between different highways or junctions. Payment switches direct the transaction to the appropriate payment network or financial institution (routing), ensuring the smooth and secure movement of payment instructions.

Payment switches often handle high volumes of transactions and are equipped with security measures to protect the integrity and confidentiality of the payment information they process.

Clearing and settlements are the backend processes that truly enable the payment to occur. They are the crucial infrastructure that needs to be in place and designed accordingly for instant payments to work.

In our metaphor, clearing means doing the paperwork required to accurately send the "envelope" with the payment instructions along the proper highway to the right destination. It involves checking the destination address (routing number, bank account, etc.), checking that the person who wants to send the envelope has the required authorization and sufficient funds in their account, and sending the "envelope" with the payment instructions.

These actions are expected to trigger obligations among the financial institutions involved (including the acquiring and issuing banks) and between them and their customers (the senders) - as explained in the Payments as instructions section.

For example, once the message arrives at the recipient's bank, they'll validate the instructions and act on the received payment messages, including rejecting invalid ones. Then, the acquiring bank will deposit the payment into the recipient's account. The clearing process is completed when the issuing bank withdraws the corresponding amount from the sender's account. However, the financial institutions involved in the transaction will still need to do the same thing but for their own accounts - this is the settlement process.

Imagine clearing as operators changing the labeling of packages that are switching ownership inside a warehouse. Sometimes it is just as easy as changing an ownership label from customer A to customer B and from customer C to customer D. Still, sometimes, it involves changing labels from customer A to customer B, then from B to C, and then from C to D. Wouldn't it be easier for that operator to just change the label from A to D? Indeed it is, and that is why some of these "clearing operators" prefer to batch transactions and only process them after some interval, netting them and, in our example, only doing one label change instead of three.

Instant payment schemes force clearing between payer and payee to be instantaneous and flow on a transaction-by-transaction basis. Meaning that interbank payments will flow from customers' accounts into a "clearing account" and vice versa - also as explained in the Payments as instructions section. However, banks can choose to begin the settlement process between them immediately, after clearing (real-time settlements), or later (batched and netted).

In our metaphor, real-time would be used to send within the payment "envelope" the instructions for clearing the payment but also settling the "clearing account" of the banks involved in the transaction. On the other hand, a deferred settlement would be like waiting until the end of the day to send just one payment "envelope" with the result of the netting and offsetting all the obligations among the participating financial institutions.In conclusion, what enables faster payments are:

1. A clearing process on a transaction-by-transaction basis that enables payments to be credited to the payees' accounts in real time.
2. The speed at which the payment message can travel through the rails, reach the destination, get processed, and the instructions within it get executed.

It's important to note that the availability and implementation of instant clearing and settlements can vary across different payment systems, countries, and financial institutions. Some support deferred settlement schemes using the legacy rails, while others design instant settlement systems and new payment rails. The systems and rules are different, but they both enable Instant Payments transactions.

Benefits and use cases - instant payments

The immediate, around-the-clock nature of instant payments can benefit all the parties involved.

Banks that offer Instant Payments services can remain competitive, create new solutions, and meet customers' needs. Instant payments can help businesses better manage cash flow, improve the efficiency of corporate payments, better liquidity management, and streamline reconciliation processes. For individuals, instant payments offer faster access to funds, timely payment notifications and facilitates easier cash flow management.

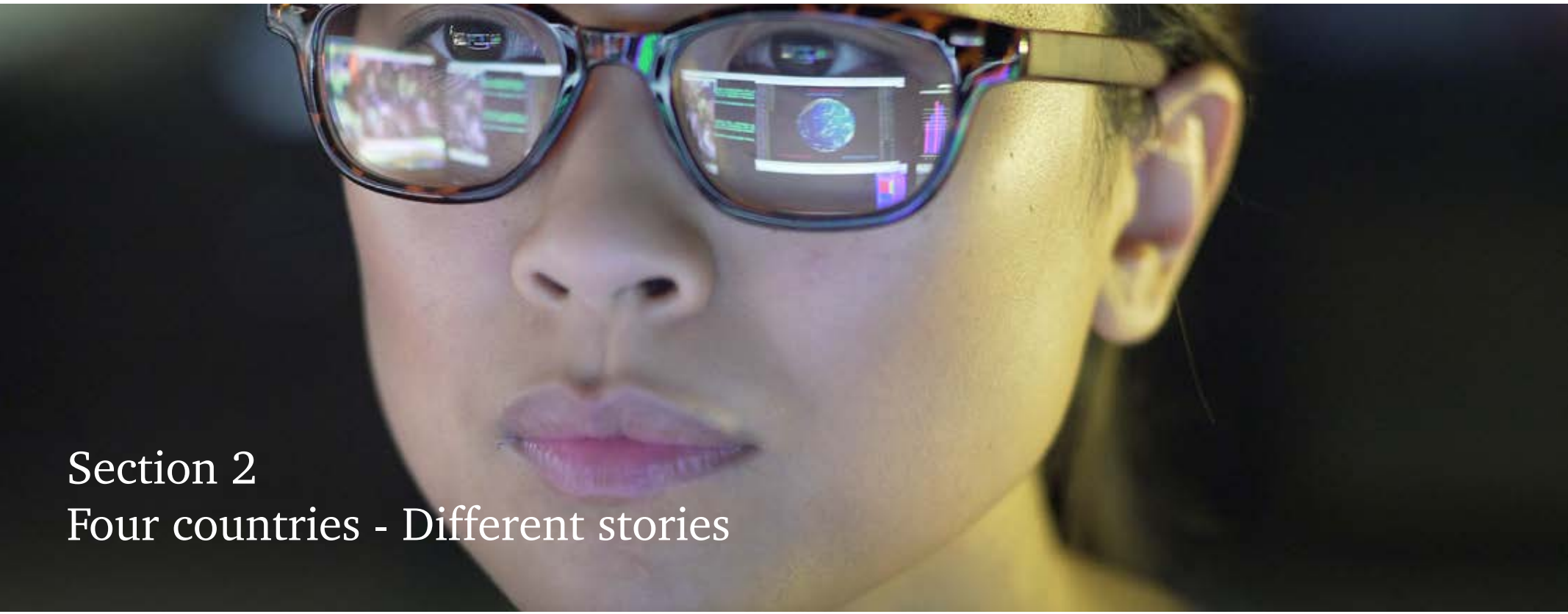
Instant payments - Use cases (not exhaustive)

Type	Use case
Consumer to consumer	1. Pay rent or a mortage on its due date. 2. Instantly reimburse the person who paid the tab for their portion of the bill. 3. Quickly move funds stored in a digital wallet to an account at a financial institution and vice versa.
Consumer to business	1. Buy without swiping a card or touching a pay pad. 2. Emergency bill payments.
Consumer to government	1. Pay taxes. 2. Make loan repayments. 3. Make donations.
Business to business	1. Just-in-time supplier payments. 2. Obtain needed materials by instantly paying suppliers that require payment before shipment. 3. Payment for services provided by external businesses. 4. Instant bill payments.
Business to consumer	1. Payroll, whether it be daily, weekly or monthly basis. 2. Bill payments (using Request to Pay). 3. Refunds & vouchers. 4. Legal settlements. 5. Insurance claims. 6. Employee reimbursements.
Business to government	1. Taxes. 2. Campaign donations.
Government to consumer	1. Payment of tax refund. 2. Donations to disaster relief. 3. Emergency relief disbursement. 4. Insurance payment claims for flood or fire. 5. Subsidies. 6. Government wages. 7. Pensions.

Instant Payments ecosystem evaluation framework

We analyzed the drivers below for each of the four chosen countries to identify possible recommendations to enable the adoption of instant payments.

Driver	Definition	Example
Adoption boosters (Addressing)	Addressing refers to a simplified address for an account and is used to send and receive money through instant payments instead of using the full bank account details.	With UPI ID, users generate their unique ID, usually with the following format: name/phone number@bank. This ID allows the user to access UPI services seamlessly.
Adoption boosters (Openness)	Capability of instant payments to connect with other bank accounts, wallets, and other financial institutions regardless of where the user is an account holder.	Thailand's PromptPay partnered with PayNow (Singapore) to allow users to make cross-border payments and transfers.
Adoption boosters (Payment functionality)	Request to Pay allows a potential recipient of an instant payment to request an instant payment from another person or organization.	Pix offers request-to-pay services via QR codes.
Government involvement	Regulations and/or restrictions implemented by the government regarding instant payments.	Mexico's Central Bank (Banco de México) made it mandatory for all financial institutions with over 3,000 accounts to offer CoDi.
Infrastructure	Refers to the infrastructure the Instant Payments solution utilizes to function properly, for example, a security or settlement model.	PromptPay utilizes ISO 20022, which is gradually becoming the standard across the globe.
Fees & incentives	Fees and incentives involved with the usage of the Instant Payments solution.	CoDi doesn't charge fees to users.
Supported payment types & complimentary services	Value-added services that instant payments solutions offer.	UPI allows its users to invest in the stock market using trading applications and platforms provided by brokerage firms that support UPI.

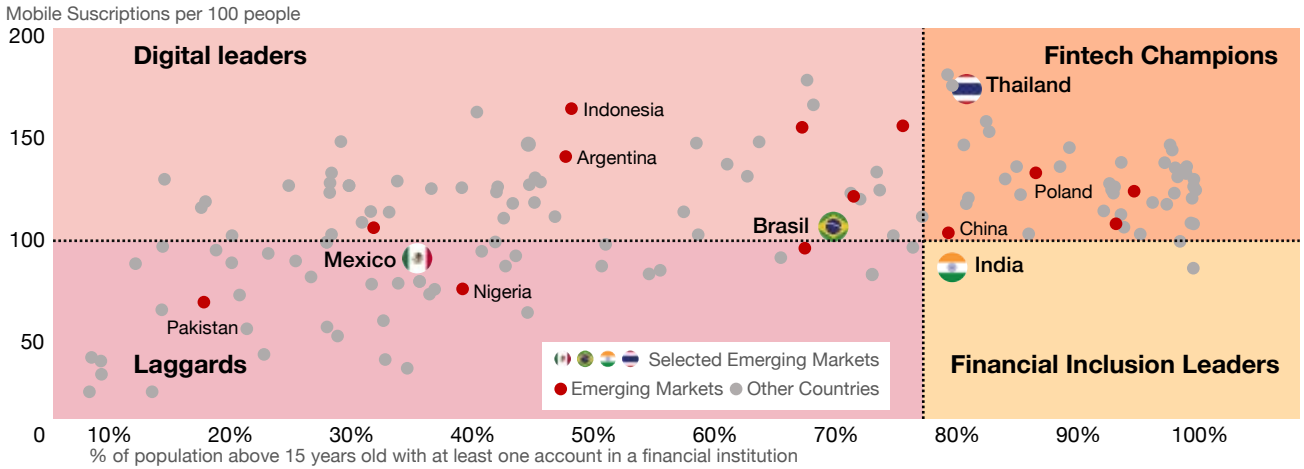


Section 2
Four countries - Different stories

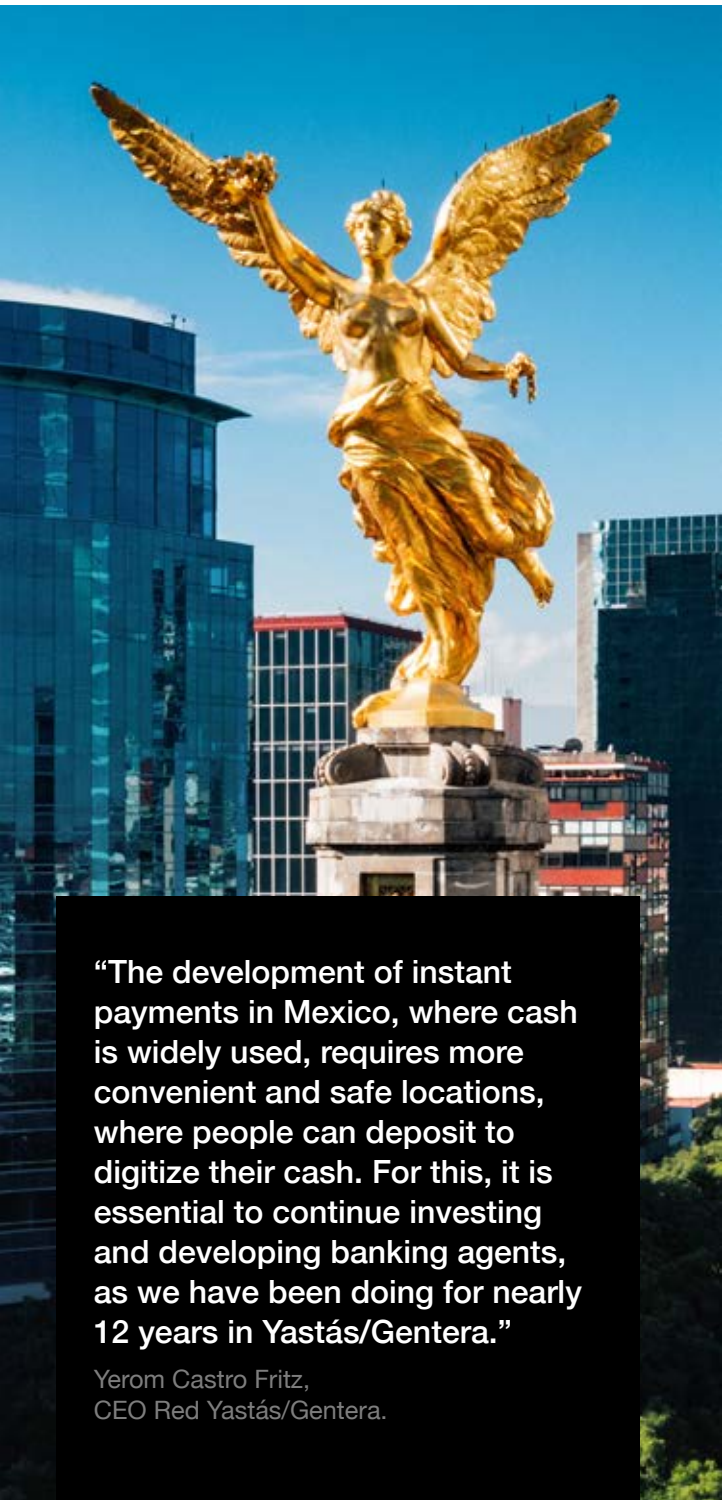
We selected four emerging countries for the analysis - Brazil, India, Mexico, and Thailand. These countries started their journey in instant payments in different periods, their instant payments ecosystem maturity is varied, and their instant payments growth is very different. This gives us a holistic perspective on what has worked and what hasn't in the instant payments ecosystem to analyze different stages of instant payments adoption.

This graph shows that each of the four selected countries are in a different quadrant. India has high financial inclusion and low digital maturity; Brazil has low financial inclusion and high digital maturity; Thailand has high financial inclusion and digital maturity; and Mexico has low financial inclusion and digital maturity.

Instant Payments Ecosystem Maturity



Source: The World Bank, The Global Findex Database, 2021.



"The development of instant payments in Mexico, where cash is widely used, requires more convenient and safe locations, where people can deposit to digitize their cash. For this, it is essential to continue investing and developing banking agents, as we have been doing for nearly 12 years in Yastás/Gentera."

Yerom Castro Fritz,
CEO Red Yastás/Gentera.

Mexico

Introduction

The Interbank Electronic Payment System (SPEI) was introduced in the mid-2000s as Banco de México's (BANXICO) new real-time gross settlement system. The objective was to process real-time payments, minimizing credit and liquidity risks. The system was designed to offer a high level of services to users and participants, including provisions for business continuity plans, adequate risk management, and legal certainty. Some years ago, it was upgraded to offer instant payments 24/7.

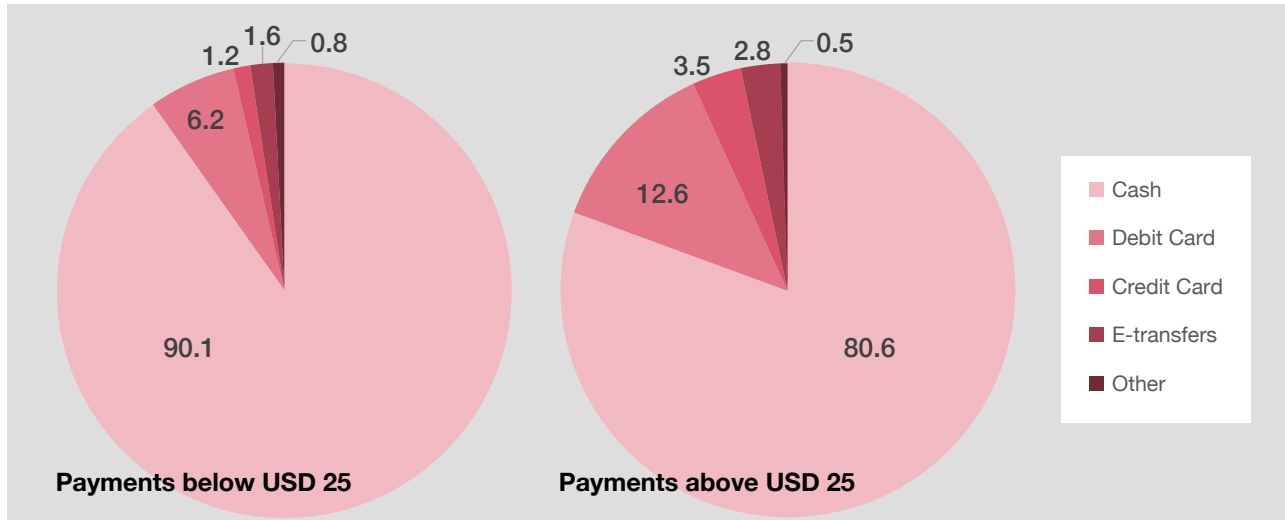
To try to complement the services offered by SPEI, BANXICO introduced another Instant Payments system in 2019 called CoDi. However, this system has failed to reach its initial adoption objectives and is still barely used in Mexico.

In addition to CoDi, BANXICO also launched DiMo in 2023, an Instant Payments system that seeks to facilitate the transfer of payments without needing a bank account.

Instant Payments transactions in Mexico remain low compared to the use of cash. Despite Mexico's government policies to promote a digital economy, only 49.1% of the population that is between 18 and 70 years old has an account with a financial institution, making this transformation a complicated task. For payments below USD 25, 90.1% of transactions are done in cash, while for payments above USD 25, 78.7% of payments are done in cash.

The following graphs clearly show that cash is still the preferred payment method in Mexico.

Payments methods in Mexico



Source Comisión Nacional Bancaria y de Valores, Encuesta Nacional de Inclusión Financiera, 2021.

Analysis of Instant Payments ecosystem

We analyzed the CoDi, SPEI and DiMo ecosystems using the evaluation framework.

Adoption boosters

Addressing
Mexico's new Instant Payments system, DiMo, is expected to leverage the benefits of addressing by allowing people to transfer funds using only cellular phone numbers as an ID for bank accounts. This new method comes after the adoption troubles of CoDi.

Openness
All banks and non-bank financial entities regulated and supervised by BANXICO or other Mexican financial authorities are eligible to participate in SPEI. BANXICO requires institutions that intend to join SPEI to satisfy its established operational risk-management and information-security requirements. It also has a review procedure to understand whether applicants meet the legal requirements for participation established in the SPEI regulation. SPEI participants can also partake in the overlay service CoDi if they fulfill a functionality certification and satisfy technological requirements specific to CoDi. Limited APIs are provided by BANXICO. SPEI allows using limited-purpose APIs for value-added services such as checking transaction status and retrieving transaction details. CoDi also runs on an array of APIs open to all SPEI participants. Furthermore, BANXICO may be considering allowing access to third-party open APIs.

Payment functionality
CoDi offers request-to-pay functionalities that support the use of QR codes, near-field communication (NFC), and messages through the Internet for payments. Users can generate a QR code with the payment information and send this code via a messaging platform or CoDi's app.

Government involvement

Mexico's government is constantly trying to decrease the levels of informal economy that prevail in the country. As mentioned, Mexicans rely heavily on cash for their transactions. To counter this, BANXICO has been deeply involved with the introduction of instant payment systems in the country as alternatives to cash. BANXICO was in charge of designing and developing SPEI and currently operates it. Additionally, BANXICO is in charge of the system's regulation, supervision, and surveillance. More recently, a similar path was followed with CoDi, as BANXICO also designed and developed the Instant Payments system and is in charge of its regulation.

Infrastructure

SPEI was developed in-house by BANXICO to handle high- and low-value transactions and provide the desired service levels for large volumes. Although SPEI was a new platform when launched in 2004, BANXICO wanted to enable a seamless transition for participants, so it reutilized the front-end components of the previous real-time gross settlement system (that is, SPEUA).

SPEI has adopted a hybrid instant settlement system for payments. It uses a multilateral offsetting algorithm running in quick successions (every three seconds or a configurable number of payments) to clear and settle transactions. The algorithm selects those transactions that can be settled based on available balances in the participants' settlement accounts and clears and settles in batch mode. At the start of operations, participants transfer funds from their accounts at BANXICO's Account Holders Service System (SIAC) to their SPEI account. At the end of the day, positive balances in SPEI are credited to banks' current accounts in SIAC or to a concentration account within the system for participants without a SIAC account.

"The Mexican payments ecosystem is undergoing a radical transformation, pushing towards a cashless society where solutions such as VPA are becoming very relevant. Multi-rail strategies have increased the adoption of new technologies that offer consumers speed, convenience and security to pay anytime, anywhere."

Mauricio Schwartzmann,
Country Manager Mastercard México.

"Mexico has the table set for an exponential change in electronic and instant payments that would also translate into a substantial increase in financial inclusion. Governments, regulators, and participants in the payments ecosystem in Mexico have to come to agreements that ensure a viable business model that incentivizes the different participants with an adequate balance."

Jean Marc Mercier,
Invex Bank CEO and President of COMEPA
(Comisión de Medios de Pago, Asociación
de Bancos de México).

Fees and incentives

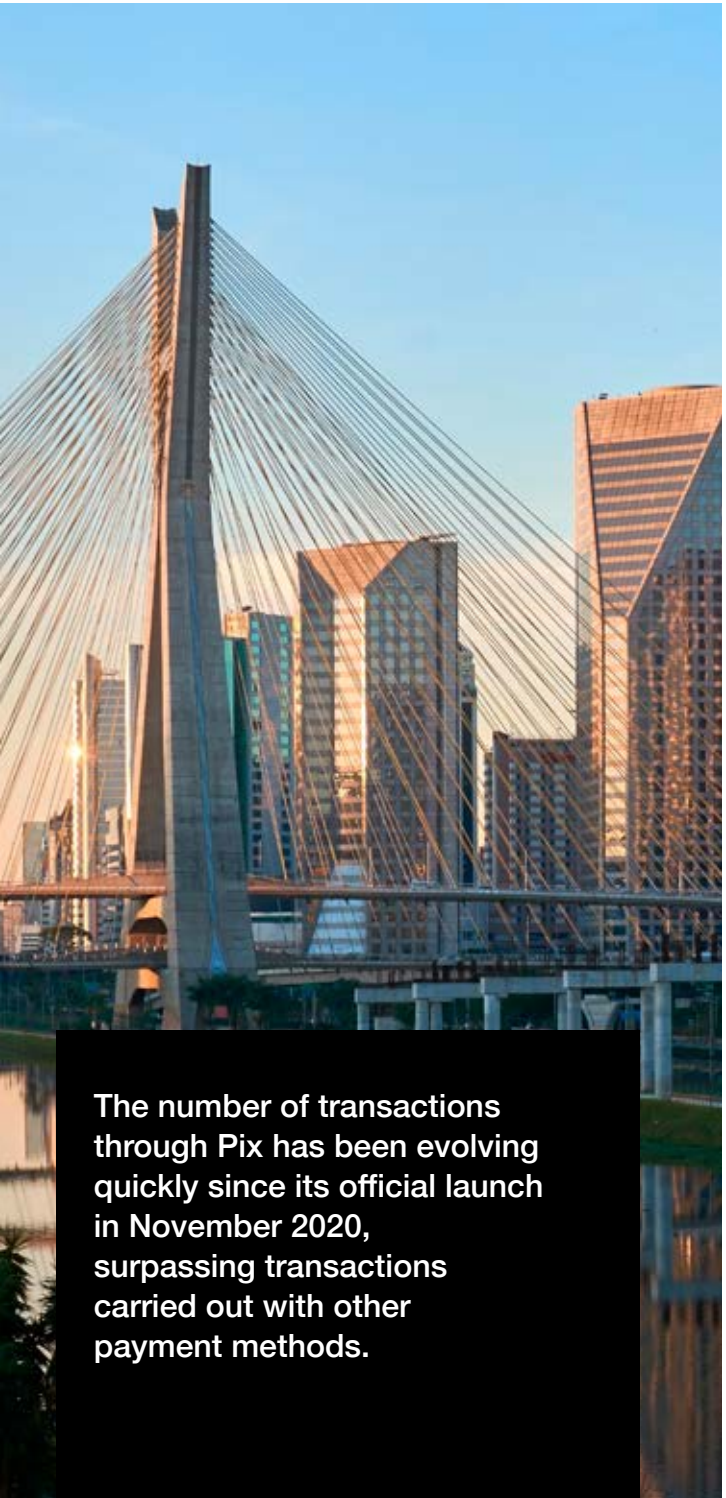
BANXICO has adopted a pricing scheme that aims to cover the full costs of developing, maintaining, and operating SPEI without affecting its adoption adversely. Fees charged to participants reflect marginal zero processing costs to incentivize among participants an efficient use of SPEI and reduce entry barriers. More specifically, BANXICO has established a scheme in which participants pay a fixed fee that allows them to send and receive unlimited payments.

The annual fixed fee varies for different participants. It is calculated by distributing total costs based on the share of each participant in the total number of payments made through the system during a specific period (the last five years). In addition, participants are required to pay an "operations fee" that is calculated on the basis of multiple factors, such as the number of returns for which a participant is liable; fund transfer orders done through CLS Bank, and the number of bytes retransmitted by SPEI at a participant's request.

Regarding charges to end users, BANXICO forbids charges for receiving payments, but it allows participants to decide user charges for sending payments. All participants are required to register their customer fees with BANXICO. For payments made through the overlay CoDi, BANXICO has waived off end-user charges, including the merchant discount rate. Participants charge no fees to the payer or payee.

Supported payment types & complimentary services

BANXICO introduced a standardized request-to-pay functionality through the overlay service CoDi. It was designed to simplify and homogenize the experience of requesting a payment or answering a request to pay by payers. Complimentary services, such as bill and merchant payments, were also added.



The number of transactions through Pix has been evolving quickly since its official launch in November 2020, surpassing transactions carried out with other payment methods.

Brazil

Introduction

Pix is an Instant Payments system introduced by the Brazilian Central Bank in November 2020. It is designed to facilitate quick and convenient electronic transactions between individuals, businesses, and government entities in Brazil. The name "Pix" is derived from the Portuguese word "pixel," representing the idea of instant transactions.

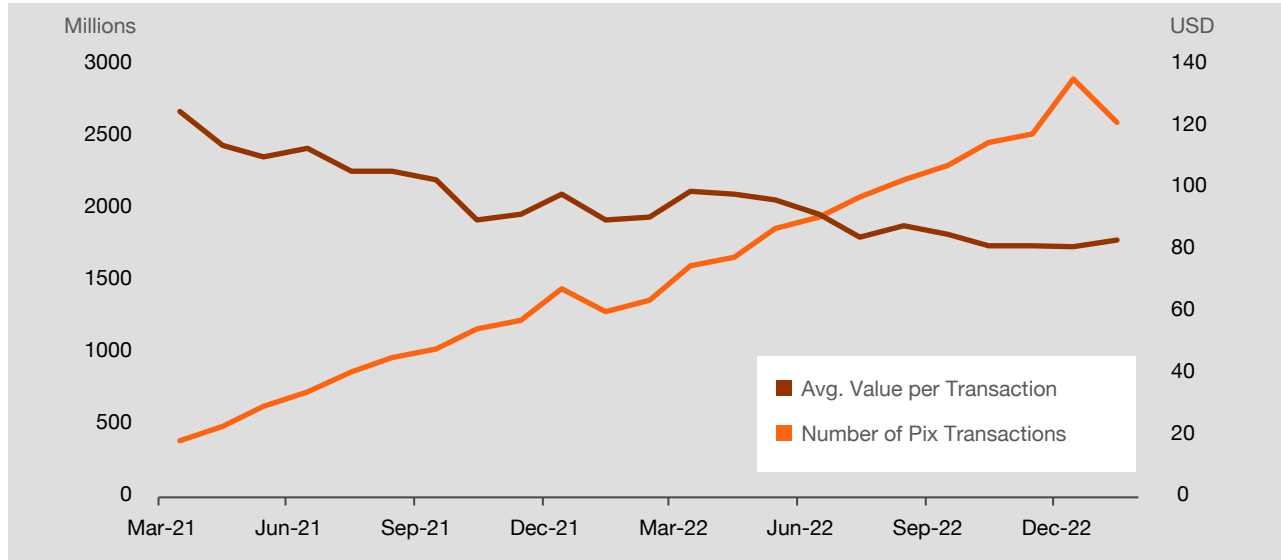
Pix enables users to make real-time payments 24/7, including weekends and holidays, without the need for traditional payment methods such as cash, checks, or credit cards. It operates through a digital platform that allows users to transfer funds directly from their bank accounts to the recipient's account in seconds. Users can initiate Pix transactions using various identifiers such as phone numbers, email addresses, taxpayer identification numbers, or QR codes, making it simple and user-friendly. Pix can be integrated with various other services, such as e-commerce platforms, mobile wallets, and financial applications, offering a seamless payment experience.

As of January 2023, 90% of Pix transactions were initiated by private individuals - 64% were P2P and 26% P2B - while only 10% were initiated by businesses.

The number of transactions through Pix has been evolving quickly since its official launch in November 2020, surpassing transactions carried out with other payment methods. Since the Pix launch, TED transactions have decreased by 55%, while Pix transactions continue to grow at an exponential rate. Credit card transactions are still growing since they offer other features, such as installment purchases, which Pix does not yet allow. Pix is currently the most used payment method in Brazil.

The following graph shows the exponential growth of Pix transactions, an excellent sign of adoption, and even better when this growth is combined with a decrease in the average value per transaction, an indicator of Pix becoming a day-to-day payment method.

Exponential Growth of Pix Transactions



Source: Banco Central do Brasil, Pix Statistics, 2023.

Analysis of Instant Payments ecosystem

Using the evaluation framework, we analyzed the Pix ecosystem.

Adoption boosters

Addressing
Users can initiate Pix transactions using various identifiers such as phone numbers, email addresses, taxpayer identification numbers, or QR codes, making it simple and user-friendly. This means that users can choose the most convenient identifier for them and their recipients.

Openness
Pix is designed to be accessible to anyone with a bank account, including individuals, businesses, and government organizations. Both individuals and organizations can use Pix to send and receive payments, promoting widespread adoption across different sectors. Pix can be accessed through various channels, providing flexibility and convenience to users. These channels include mobile banking apps, internet banking platforms, ATMs, and even in-person transactions at physical bank branches.

Pix can be integrated with various platforms, applications, and services. It allows businesses to incorporate Pix as a payment option in their e-commerce websites, mobile apps, and digital wallets. It also enables seamless transfers between different platforms and facilitates interoperability among financial institutions.

Payment functionality
Request to Pay, also known as Pix Cobrança in Brazil, is a Pix Instant Payments system feature that allows individuals and businesses to request payment from others. Request to Pay in Pix provides a convenient way for individuals and businesses to streamline payment collection processes. It eliminates the need for manual invoicing, check deposits, or waiting for funds to clear, making transactions faster, more efficient, and less reliant on traditional payment methods.

Government involvement

Here are some examples of the Brazilian government's efforts to promote the adoption and usage of Pix:

Regulatory framework: The Brazilian Central Bank (BCB), the country's monetary authority, played a key role in the development and implementation of Pix. They established the regulatory framework and guidelines for the operation of Pix, ensuring compliance, security, and interoperability among financial institutions.

Government payments: The government has actively promoted the use of Pix for public payments. Various government entities, including federal, state, and municipal agencies, have adopted Pix as a preferred payment method for collecting taxes, fees, fines, and public services. This showcases the government's support for Pix and encourages its use among the population.

Awareness campaigns: The government has conducted extensive awareness campaigns to educate the public about the benefits and usage of Pix. These campaigns aim to familiarize individuals, businesses, and government entities with Pix's features, convenience, and security. They have utilized various communication channels, including television, radio, online platforms, and print media, to reach a wide audience.

Financial inclusion efforts: The government recognizes Pix as a tool for promoting financial inclusion. They have encouraged financial institutions to offer simplified bank accounts with lower requirements, making it easier for unbanked or underbanked individuals to access financial services and participate in the Pix ecosystem.

Collaboration with financial institutions: The government has worked closely with financial institutions to enable Pix's successful implementation and widespread adoption. This collaboration includes working closely with banks and payment service providers to develop and integrate Pix into their platforms, provide technical support, and address operational challenges that may arise.

Pix enables users to make real-time payments 24/7, including weekends and holidays, without the need for traditional payment methods such as cash, checks, or credit cards.

Infrastructure

The Brazilian Central Bank manages the Directory of Transactional Accounts Identifier (DICT), which connects an individual's financial and personal information. The financial institutions are responsible for the interface with the users. DICT, ultimately, is a set of links between the Pix key and the user's account and name. The DICT is accessible via an API.

Additionally for instant payments, SPI (Instant Payment System) is a single centralized infrastructure used for liquidation between Brazil's different institutions. The interface between DICT and the SPI infrastructure must be performed by institutions registered and approved by the BCB. The instant payments are liquidated with entries in a specific account that the institutions, which directly participate with the SPI, maintain within the Central Bank of Brazil.

Pix can be integrated with various platforms, applications, and services. It allows businesses to incorporate Pix as a payment option in their e-commerce websites, mobile apps, and digital wallets.

The Brazilian instant payment system is designed to be safe since it uses the security infrastructure of the banks for processes, such as KYC and AML, that has been providing safety for the Brazilian financial system for decades. All transactions' information is encrypted and goes through RSFN (National Financial System Network), another BCB-managed system consisting of a communication network between the banks, which is topologically separated from the internet. Financial institutions are responsible for enforcing safety standards, such as reporting suspicious activity. In this network link, each financial entity has specific responsibilities and obligations, whether it's a large or small commercial bank or a PISP.

Fees and incentives

To promote the adoption and use of Pix in Brazil, various fees and incentives have been implemented. It is worth noting that BCB regulations require Pix to be free of charge for non-commercial users.

Regarding fees:

Transaction fees: The Brazilian Central Bank has set limits on transaction fees for Pix. There are no fees for individuals or small businesses for making Pix transactions. This fee exemption aims to encourage individuals and small businesses to use Pix as a cost-effective payment method. However, fees may apply for certain types of transactions, such as large businesses or specific use cases set by the financial institutions.

Cash withdrawal fees: While Pix does not impose fees for cash withdrawals, financial institutions may charge fees for cash withdrawals made at their ATMs or banking channels. These fees are typically determined by the individual financial institutions and may vary.

Regarding incentives:

Incentives for businesses: The government has introduced incentives to encourage businesses to accept Pix as a payment method. For instance, they have set limits on the fees that can be charged for Pix transactions, making it cost-effective for businesses to accept payments through Pix. This incentivizes businesses to offer Pix as a payment option to their customers.

Supported payment types & complimentary services

In addition to the traditional use cases like Person to Person, Person to Business, Business to Person, and Government Payments, Pix has developed other payment types and complimentary services. For example:

E-commerce payments: Pix can be used for online purchases. E-commerce platforms and merchants integrate Pix as a payment option, allowing customers to pay instantly. Users can scan QR codes or enter payment information to finalize the transaction seamlessly.

Moreover, Pix offers additional features and complimentary services to enhance the payment experience:

Request to Pay (Pix Cobrança): This feature allows individuals and businesses to generate QR codes or requests to receive payments from others. It simplifies the process of invoicing, bill payments, or requesting funds from customers or clients.

Scheduled and recurring payments: Pix supports scheduled and recurring payments, allowing users to set up future payments or automate recurring transactions. This feature is useful for paying bills, subscriptions, or regular expenses.

Limits and controls: Pix allows users to set transaction limits and control their payment preferences. Users can define daily limits for transaction amounts or set up payment preferences based on specific criteria.

Account integration: Pix integrates with banking and financial management platforms, enabling users to view their transaction history, manage accounts, and reconcile payments more efficiently.

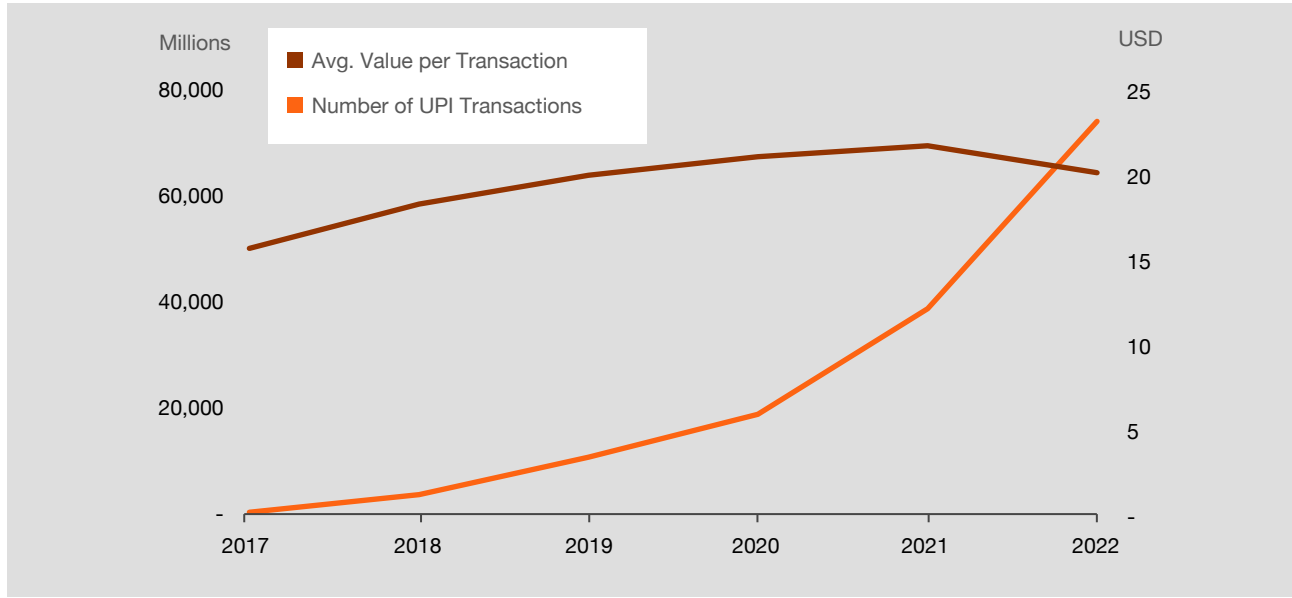
Credit offers: The expansion of supported services, such as credit offers, are already planned in the Pix future development pipeline, and its future growth is tied to Open Finance and Real Digital, Brazil's CBDC initiatives.

India

Introduction

In India, the Instant Payment in place is called UPI (Unified Payments Interface). It is a real-time payment system developed by the National Payments Corporation of India (NPCI), an umbrella organization for operating retail payment systems in India. NPCI conducted a pilot launch with 21 member banks on April 11, 2016. Today, more than 380 banks are offering the UPI solution in India. UPI's growth has resulted in close to 300 million unique users and, as seen in the graph below, billions of transactions per month. UPI's average value per transaction has seen a slight increase over the last years, however standing at around USD 21 (as of December 2022), this figure is still far less than the average of other Instant Payments systems such as Pix and Promptpay, which is close to USD 85. This can be attributed to the fact that since its creation, UPI was intended to be a replacement of cash payments in India.

Exponential Growth of UPI Transactions



Source: National Payments Corporation of India, 2023

Analysis of Instant Payments ecosystem

Using the evaluation framework, we analyzed the UPI ecosystem.

Adoption boosters

Addressing

As mentioned in Section 1, with UPI ID, users generate their unique ID, usually composed as follows: name/phone@bank. This ID allows users to access UPI services seamlessly. Additionally, the accessibility of UPI in India aims to ensure that users from various backgrounds and technological capabilities can conveniently and securely access the benefits of digital payments. The key details of accessibility for UPI are:

Supported devices: UPI can be accessed through smartphones, tablets, and feature phones. It is available on both Android and iOS platforms, allowing users with different types of devices to access UPI-enabled apps.

Multiple language support: Some UPI apps are designed to support multiple languages, including English and many regional languages of India. This enables users across different regions of India to access and use UPI in their preferred language, enhancing usability and accessibility.

Virtual Payment Address (VPA): UPI uses VPA as a unique identifier for users. They are similar to personalized email addresses associated with bank accounts, making it easy for users to share their payment details without revealing sensitive information like bank account numbers. With VPAs being the only information required for transactions within the UPI ecosystem, the payment process has become much more convenient and streamlined for users.

USSD (*99#) banking: In addition to mobile apps, UPI can also be accessed through USSD banking. Users can dial *99# from their mobile phones and follow the instructions to access UPI services, even on feature phones with no internet connection. USSD banking allows users to perform basic UPI transactions using simple text-based menus.

Accessibility for non-smartphone users: To cater to users who do not have smartphones or internet access, UPI has introduced UPI 123Pay function for users who would like to make a UPI-based payments, without internet connectivity.

Openness

UPI in India is accessible to a wide range of users, ensuring convenience and inclusivity in the payment system. UPI enables a real-time payments platform that allows easy and instant money transfers from any bank account in India. Not only traditional banks can offer UPI. Non-banks, including fintechs and big techs, can also offer UPI payment initiation services to their customers. UPI also provides several authentication options, including a unique Mobile Personal Identification Number (MPIN) required to authenticate a transaction. Additionally, biometric identification, PIN number, and device recognition are used to access the UPI app. These options reduce the authentication process's complexity and time.

Payment Functionality

Request to Pay (RTP) is a feature in UPI that allows users to generate payment requests and receive funds from others. RTP follows the traditional steps where the beneficiary initiates a payment request, selects the payee, generates and sends the payment request, receives the payee's response and authorization, and finally receives the notification and acknowledgment.

RTP in UPI simplifies the process of invoicing, bill splitting, or requesting funds from individuals or businesses. It provides a convenient way to send and receive payment requests, streamlining transactions, and promoting digital payments in India.

"India's UPI allows both domestic and global players to develop mobile payment applications. As such, it lowers the barriers to entry, especially for smaller firms, thus leveling the playing field."

Sundar Pichai, Google CEO.

Government involvement

The government's support for UPI has been instrumental in driving its widespread adoption and success in India. Through various initiatives, campaigns, and integration with government schemes, UPI has gained popularity as a convenient and secure digital payment method, contributing to the growth of a digital economy in the country. Some of the notable government initiatives are:

Regulatory support: The Reserve Bank of India (RBI) has played a crucial role in formulating regulations and guidelines for UPI to enable its security, interoperability, and smooth functioning. The government has provided regulatory support to UPI, promoting a transparent and secure digital payment ecosystem.

Digital India campaign: The Digital India campaign, launched by the Government of India, aims to transform India into a digitally empowered society. UPI is a key component of this initiative, focusing on promoting digital payments, financial inclusion, and a cashless economy.

National Payments Corporation of India (NPCI): The NPCI, an initiative by the RBI and Indian banks, operates UPI and is supported by the government. NPCI plays a crucial role in developing, managing, and expanding the UPI ecosystem, ensuring interoperability and security.

BHIM (Bharat Interface for Money) App: The BHIM app was developed by the NPCI with government's support to promote UPI usage. The app provides a simple and user-friendly interface for UPI transactions and has been actively promoted by the government to drive digital payments.

BHIM also serves as the first app to show the industry how a new feature or capability will work and can be incorporated into participant apps, helping, thereby, to accelerate the adoption of new features.

Pradhan Mantri Jan Dhan Yojana (PMJDY): PMJDY is a financial inclusion program launched by the Government of India. Under this initiative, bank accounts are opened for unbanked individuals to provide them access to formal banking services. UPI has been integrated with PMJDY accounts, enabling UPI transactions for these account holders.

Direct Benefit Transfer (DBT) Scheme: The DBT scheme is an initiative aimed at transferring government subsidies and benefits directly to beneficiaries' bank accounts, eliminating intermediaries and reducing leakages. The DBT funds the accounts via AEPS and UPI enables digital spending rather than postbox cash out type accounts.

Financial literacy programs: The government has launched financial literacy programs to educate and create awareness among individuals about digital payments, including UPI. These programs aim to empower citizens with the knowledge and skills required to use UPI effectively.

Incentivizing acquiring banks: The government has announced a scheme worth INR 2,600 crore to incentivize the acquiring banks by way of paying a percentage of the value of RuPay debit card transactions and low-value BHIM-UPI transactions up to INR 2,000 (Person-to-Merchant or P2M) for the financial year 2022-23, with effect from April 1, 2022, to boost digital transactions in the country.

Moreover, from an adoption standpoint, NPCI International Payments Limited (NIPL) - the international arm of the NPCI - is in advanced discussions with various international institutions to integrate and implement the UPI system for cross-border instant payments.

Infrastructure

UPI in India utilizes a combination of technology and data infrastructure to facilitate seamless and secure transactions. UPI has been able to build a novel digital public infrastructure that provides better and low-cost alternatives relative to closed private payment systems, which have been traditionally costlier, opaque, and non-interoperable.

Here are the key components of the technology and data infrastructure used by UPI:

UPI platform: The UPI platform acts as a central system that facilitates the funds transfer between banks. It provides the necessary infrastructure for routing and processing UPI transactions securely in real time. NPCI operates and manages the UPI platform. UPI adheres to the regulations and guidelines of the RBI and the NPCI. These regulatory bodies oversee the UPI's security, interoperability, and compliance aspects.

Virtual Payment Address (VPA): UPI uses Virtual Payment Address (VPA) as a unique user identifier. VPAs are like personalized email addresses associated with bank accounts, allowing users to receive payments without sharing their bank account details. VPAs are used for initiating and receiving payments in UPI transactions.

"UPI was thoughtfully planned, and critical aspects of its design led to its success. It is an open system on which technology companies can build apps that help users to directly manage transfers into and out of their bank accounts."

Sundar Pichai, Google CEO.

Payment Service Provider (PSP) systems: PSP systems are the intermediaries between users and the UPI platform. They develop and maintain UPI-enabled mobile apps, provide a secure payment environment, and enable interoperability between different banks' UPI systems.

National Financial Switch (NFS): The National Financial Switch is an infrastructure that allows interoperability between different payment systems in India, including UPI. It enables seamless connectivity between banks, payment service providers, and other financial institutions participating in UPI transactions.

Two-Factor Authentication (2FA): UPI incorporates two-factor authentication for enhanced security. Users typically need to authenticate themselves using a combination of factors, such as their device credentials (PIN, pattern, fingerprint) and UPI PIN, to authorize UPI transactions.

Fees and incentives

Various fees and incentives are offered to encourage individuals and businesses to adopt and utilize the UPI platform in India. Here are some common types of fees and incentives associated with UPI:

Transaction fees: UPI transactions are free for end users. This encourages users to make digital payments without incurring additional costs. However, it's worth noting that certain types of transactions, such as merchant payments or bill payments, may attract a small fee depending on the service provider or the payment platform used.

Cashback offers: Many banks, payment service providers, and e-commerce platforms offer cashback incentives to users who choose UPI as their payment method. Users can earn a percentage of their transaction amount back as cashback, encouraging them to use UPI for payments. Cashback offers can be time-limited or available on specific platforms and help drive adoption and usage.

Discounts and offers: UPI is often integrated with various e-commerce platforms and service providers, offering discounts and special offers to users who choose UPI as their payment method. These discounts may include price reductions, exclusive deals, or additional benefits for using UPI while making purchases.

Referral programs: Referral programs incentivize users to refer UPI to friends, family, or acquaintances. Users who refer others to use UPI may receive incentives such as cash rewards, vouchers, or additional benefits when the referred user performs qualifying transactions. This helps in expanding the user base and spreading awareness about UPI.

Merchant discounts: UPI provides benefits to merchants as well. Merchants who accept UPI payments may receive discounts on transaction fees or lower fees than other payment methods. These incentives encourage merchants to adopt UPI as a payment option and promote digital payments.

Supported payment types & complimentary services

UPI in India supports various payment types and offers complementary services to enhance the overall user experience.

It provides a diverse range of additional services such as UPI AUTOPAY, UPI Lite, UPI 123Pay, UPI Intent-based payments, UPI for IPO suscription payments, static and dynamic QR codes for UPI transactions, cash withdrawal at ATMs using UPI, credit on UPI using RuPay credit cards, one time or recurring payment mandates and interoperable QR codes for UPI payments. In addition to the traditional use cases like Person to Person, Person to Business, Business to Person, and Government Payments, UPI has developed other payment types and complimentary services. For example:

Bill payments: UPI supports the payment of utility bills, mobile recharges, DTH (Direct-to-Home) services, and other bills through the UPI-enabled apps. Users can easily initiate payments for various services by selecting the biller and entering the required details.

In-app payments: UPI can be integrated into various third-party apps, such as e-commerce platforms, food delivery apps, ticketing services, and more. This integration allows users to make seamless UPI payments within these apps without needing additional authentication or entering payment details.

Cash withdrawal at merchants: UPI offers the facility of cash withdrawal at select merchants. Users can visit participating merchants, provide their UPI ID, and withdraw cash from their bank accounts without visiting an ATM.

Additionally, it offers the below complementary services:

Transaction history and statements: UPI apps provide users with access to their transaction history, allowing them to view details of past transactions, including payment amounts, recipient information, and timestamps. Users can also generate statements for their UPI transactions, providing a record of their payment activities.

Balance Inquiry and Account Management: UPI apps allows users to check their account balance, view linked bank accounts, and manage their UPI settings. Users can also link multiple bank accounts to their UPI ID and switch between them for transactions.

Bharat Bill Payment System (BBPS) integration: UPI integrates with the BBPS, allowing users to pay for a wide range of bills, including electricity, water, gas, and more. Users can conveniently pay their bills through the UPI app, eliminating the need to visit multiple billers' websites or payment platforms.

UDIR (Unified Dispute and Issue Resolution) System, which is an automated, single-channel redressal system designed to seamlessly address customer issues and complaints.

Thailand

Introduction

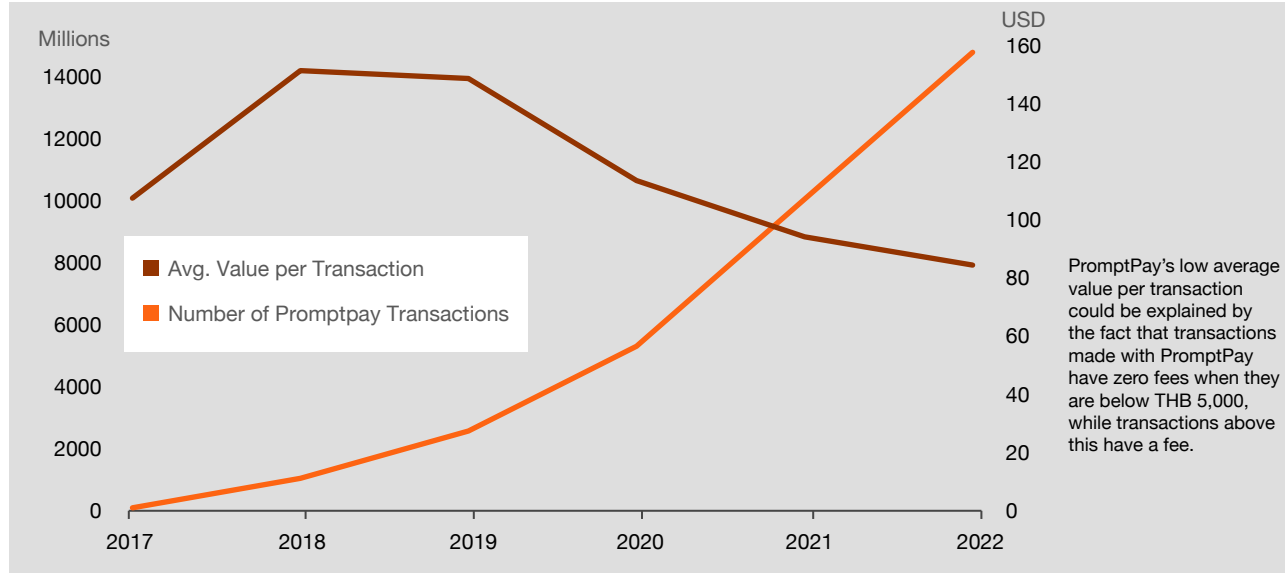
In Thailand, the Instant Payments solution is named PromptPay. It is developed and managed by ITMX (local operator) and the technology stack was developed in partnership with a third party. PromptPay was launched in January 2017. PromptPay was initially developed to support the Bank of Thailand's e-Payments roadmap for more digital payments in the country. Its first use case was to digitize the Thai government's social grants and enable more seamless digital payments for individuals and businesses.

As of September 2020, PromptPay reported 55.1 million registrants (out of a population of 69 million), with 20 million daily transactions. According to the Rapyd Asia Pacific eCommerce and Payments Report 2020, it was used by 37% of respondents at least once in the past month.

PromptPay does not compete with other services regarding real-time credit transfers because it is the only rail in the country. Its closest competitors are from other types of payments, primarily credit cards, which are often for higher payment values. PromptPay has enjoyed a proliferation of use due to the convenience and acceptance of many small merchants in the country. The fact that Thais are also incentivized to sign-up for PromptPay to be eligible for additional social grants (and prioritized for receiving grants as well as tax returns ahead of analog modes) is also helping with user stickiness. Furthermore, Thailand has sunsetted other clearing rails, such as ORFT (Online Retail Funds Transfer) and legacy bulk transfer payments, to consolidate them onto the modern PromptPay rails. In turn, this simplifies the payments operating model for the banks - one of the key drivers of the industry case for change.

The roll-out of PrompatPay in Thailand has been rapidly accepted because of the ease that this payment option represents. Since 2017, the number of Instant Payments transactions has grown at a rapid pace, as seen in the graph below. Also, similarly to what is happening with Pix in Brazil, a decrease in the average value per transaction is seen in Promptpay.

Exponential Growth of PromptPay Transactions



Source: Bank of Thailand, 2023

Analysis of Instant Payments ecosystem

Adoption boosters

Addressing

PromptPay has been designed with accessibility in mind and is widely available throughout Thailand. PromptPay service leverages the use of 'proxies' where PromptPay users sign up for a PromptPay ID which could be their National ID number, mobile number, passport number or business registration number (for business users). The proxies are housed centrally by ITMX, which operates the PromptPay service. The underlying store of value is a bank account or virtual bank account for mobile wallets that are ultimately housed in a bank/licensed financial institution. Users are expected to sign-up with their banks for a PromptPay ID, or they can do so centrally by downloading a universal PromptPay app (which may still prompt the user to identify which bank/SOV they will be using to house the funds).

Here are some other key details regarding its accessibility:

Participation of banks: PromptPay is supported by all commercial banks in Thailand as well as multiple financial institutions. This wide participation ensures that a large number of customers have access to PromptPay services.

Mobile apps: PromptPay is accessible through dedicated mobile apps provided by participating banks. Users can download and install these apps on their smartphones, which allows them to access and utilize the PromptPay system. The apps typically provide a user-friendly interface for performing transactions, managing accounts, and initiating payment requests.

National Identification Number Integration: In addition to mobile phone numbers, PromptPay also supports the use of National Identification Numbers as a means of identification. This inclusion of National Identification Numbers expands accessibility, as individuals who may not have a mobile phone or have limited access to mobile services can still participate in the PromptPay system.

Merchant acceptance: PromptPay is widely accepted by merchants across Thailand. Many physical stores, online retailers, and service providers have integrated PromptPay into their payment systems, allowing customers to make purchases using their PromptPay accounts. This broad acceptance increases the accessibility and usability of PromptPay for various transactions.

Language support: PromptPay mobile apps and interfaces are available in Thai, the primary language of Thailand. This ensures that users can navigate and use the system comfortably in their native language, enhancing accessibility for Thai-speaking individuals.

PromptPay's accessibility initiatives, such as the broad participation of banks, mobile app availability, support for National Identification Numbers, merchant acceptance, government integration, and language support, collectively contribute to its widespread accessibility and usability across Thailand.

Openness

PromptPay is an open system in Thailand designed to promote interoperability and collaboration among participating banks and financial institutions. The open nature of PromptPay allows users to transfer funds and make payments across different banks and financial service providers seamlessly.

The high rating of PromptPay is due to its availability through all banks in Thailand and its accessibility to users who can sign up with the participating banks they prefer. Fintech companies can also access the service indirectly through their partner banks using standard APIs. However, only banks and licensed financial institutions have access to clearing and settlement, ensuring the payment system's security and stability. PromptPay focuses on interoperability, allowing users to transfer funds and make payments across participating banks and financial institutions.

PromptPay is integrated into various government services in Thailand. This integration allows users to pay for government fees, taxes, and other public services using PromptPay, regardless of the bank they are associated with. PromptPay utilizes QR codes for payments, making it compatible with a wide range of devices and platforms.

Overall, the open nature of PromptPay enables collaboration between banks, facilitates interoperability, and promotes the adoption of digital payments across different financial institutions. It provides a convenient and inclusive platform for users to transfer funds, make payments, and engage in financial transactions seamlessly.

Payment functionality

Request to Pay is a feature within the PromptPay system that allows users to send a payment request to another person or business. It provides a convenient way to request payment for goods or services without sharing bank account details or other sensitive information. Request to Pay in PromptPay streamlines the payment process by allowing individuals and businesses to initiate payment requests and receive funds securely. It simplifies transactions by eliminating the need for physical cash or sharing bank account details, enhancing convenience and security for both parties involved.

It works on all bank mobile applications as well as the universal PromptPay application. Depending on the application, QR codes can be presented so a request can be sent to the user by the requestor, or the requestor can present a QR code so the user can pay the requestor. The latter is the most prevalent use case in Thailand.

As of September 2020, PromptPay reported 55.1 million registrants (out of a population of 69 million), with 20 million daily transactions.

Government involvement

There was no specific mandate in Thailand for the obligatory use of PromptPay. PromptPay was devised as a response to the Bank of Thailand's e-Payments Masterplan. The Bank of Thailand did drive the implementation of PromptPay through incentives, but the explicit use/adoption of PromptPay was driven primarily by market forces.

Nevertheless, PromptPay has received significant government support in Thailand to promote its adoption and integration into various sectors. The Thai government has played an active role in driving the development and implementation of PromptPay through the following initiatives:

National e-Payment Master Plan: PromptPay is expected to be a key component of Thailand's National e-Payment Master Plan, which was launched by the government in 2016. The master plan aims to assist efficient and secure digital payment infrastructure to support the country's economic development and financial inclusion. PromptPay was introduced as a central initiative to enable the widespread adoption of digital payments.

Collaboration with financial institutions: The government has worked closely with financial institutions, including commercial banks, to enable the successful implementation of PromptPay. This collaboration has involved providing regulatory support, encouraging participation, and facilitating the integration of PromptPay into the banking system.

Funding and investment: The government has allocated substantial funding to support the development and implementation of PromptPay. Financial resources have been dedicated to infrastructure enhancement, technological development, and promoting awareness and education about PromptPay among the general public.

Government service integration: One of the government's most effective incentives was the receipt of government grants/social grants/tax returns. Citizens that chose PromptPay are prioritized over other payment methods (e.g., cheques/mail), which drove many people to sign-up for PromptPay. The Thai government has actively integrated PromptPay into various government services. This includes enabling PromptPay as a payment method for fees and charges related to government services such as vehicle registration, passport applications, healthcare services, and tax payments. By incorporating PromptPay into government transactions, the government has promoted its use and facilitated convenience for citizens.

Regulatory framework: The government has established a regulatory framework to govern the operations and security of PromptPay. This framework ensures that compliance, consumer protection, data privacy, and security standards are met by all participating financial institutions and service providers. It helps build trust and confidence in the system among users.

Public awareness campaigns: The government has conducted public awareness campaigns to educate the general population about PromptPay, its benefits, and how to use it. These campaigns have included mass media advertisements, informational materials, and community outreach programs to promote understanding and adoption of the system.

The government's support for PromptPay has been instrumental in driving its widespread adoption, fostering financial inclusion, and transforming Thailand into a more cashless society. The collaborative efforts between the government, financial institutions, and other stakeholders have played a vital role in establishing and expanding the usage of PromptPay throughout the country.

Infrastructure

The clearing is operated by ITMX (national payments operator). Settlement is managed and operated by the Bank of Thailand settlement system (RTGS). Settlement for PromptPay is done on a deferred net settlement basis across agreed windows throughout the day.

PromptPay is run as a scheme where the Thai Bankers Association (TBA) ultimately owns the scheme (divided across the participating banks and the Bank of Thailand). The TBA acts as the coordinator between banks and Payment Service Provider (PSPs) overall. During the program, a special committee of banks and industry participants were also set up to discuss/agree on matters for the implementation of PromptPay.

With the advent of PromptPay, came the country's first instant payments service, which replaced previous electronic funds transfers (which were running on older standards and required time to clear). KYC and AML processes are done by the respective banks holding customer relationships. As a scheme, technical errors or disputes between participants are handled by the scheme manager, ITMX. Authentication is done by respective banks and the number of factors are defined by the individual bank standards.

PromptPay is built as a native ISO 20022 platform but also houses ISO 8583 translators to maintain interoperability at the clearing level for banks that have not transitioned fully to ISO 20022.

ITMX operates the service centrally.

Fees and incentives

User fees are set by the market (currently zero for transactions below THB 5000 and vary above that threshold). ITMX charges switching fees per transaction (not disclosed), and there are no interchanges for PromptPay.

However, to encourage the adoption and usage of PromptPay, various fees, and incentives have been implemented in Thailand. These include:

Fee waivers: Many participating banks in Thailand offer fee waivers for transactions made through PromptPay. This means that users may not incur additional fees when sending or receiving money using PromptPay, making it a cost-effective payment option.

Government subsidies: The Thai government has implemented subsidy programs to incentivize digital payments, including PromptPay. These subsidies may involve cash rewards or incentives provided to individuals and businesses for conducting transactions through PromptPay. Such measures aim to promote the shift towards a cashless society and accelerate the adoption of digital payment methods.

Merchant discounts and promotions: Merchants may offer discounts or special promotions to customers who make payments using PromptPay. These incentives can encourage users to choose PromptPay for their transactions and provide an added cost savings or rewards benefit.

Cross-Border Transfer Incentives: Certain banks and financial institutions may offer incentives for international transfers made through PromptPay to facilitate cross-border transactions. These incentives could include discounted exchange rates, reduced fees, or special promotions for cross-border transactions using PromptPay.

Government service fee reductions: The Thai government has implemented measures to reduce or eliminate transaction fees for various government services when payments are made through PromptPay. This reduction in fees makes it more affordable for individuals to pay for government-related transactions, such as vehicle registration or tax payments, using PromptPay.

Cashless campaigns and lucky draws: Periodic cashless campaigns and lucky draws are conducted to further encourage the use of PromptPay. These campaigns may involve cash prizes, giveaways, or other rewards for individuals who actively use PromptPay for their transactions during the campaign period.

The availability of these fees and incentives aims to promote the adoption of PromptPay, drive the transition to digital payments, and create a favorable environment for individuals and businesses to embrace cashless transactions.

Supported payment types & complimentary services

PromptPay is now regionally interoperable with similar domestic payment schemes in Malaysia (DuitNow) and Singapore (PayNow) so that PromptPay users are able to make payments when traveling in Malaysia and Singapore (and vice versa for the other countries).

PromptPay also supports instant bulk payments, which makes PromptPay the universal real-time payments platform for Thailand (as all types of credit transfers have now migrated over onto the PromptPay platform). The other types of payments (e.g., buy now pay later, or scheduled payments) are handled at the edges by the Banks/PSPs and later cleared on PromptPay.

Thailand supports all payment flows as a clearing rail. The key distinction is when it comes to B2B payments and its unique nuances, which traditional payment rails provide limited coverage of. The proposed overlay of PromptBiz (to go live in q3 '23) is expected to streamline B2B with end-to-end coverage of "invoice to cash", enabling straight-through reconciliation for the AR counterparts. This includes supporting the four corner eInvoice pattern. This is likely to be a global first in B2B payments.

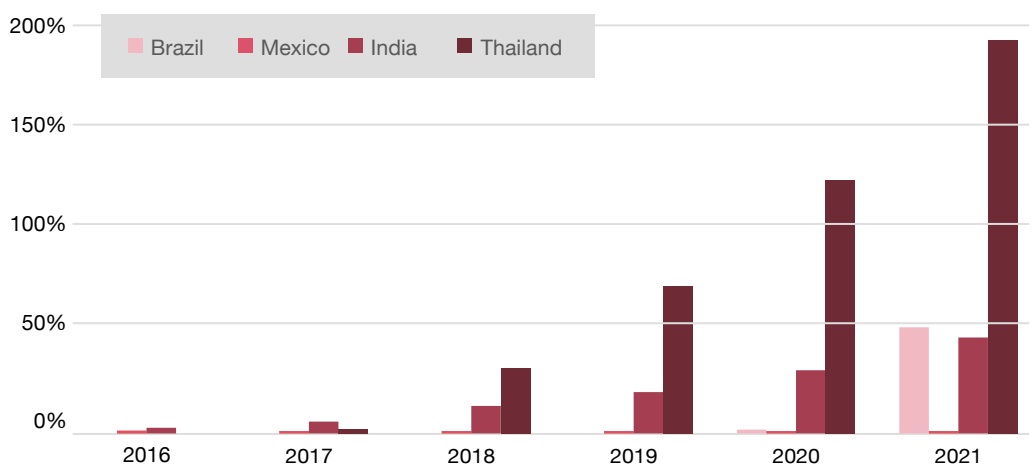
Section 3
Comparison of chosen countries

To compare the rate of instant payments adoption across countries while trying to control for different population and economy sizes, we used the value of all Instant Payments transactions as a percentage of GDP.

As a percentage of GDP, Instant Payments systems have had different trajectories for our selected countries. Thailand has the highest proportion of instant payments as a percentage of GDP, while India and Brazil have grown up to a similar proportion. However, Brazil has grown significantly faster than India, almost as fast as Thailand. On the other hand, Mexico still lags significantly with only 1% of instant payments as a proportion of GDP.

High levels of central banking involvement and participation of banks and other financial institutions could be important determinants of adoption. Moreover, mobile phone penetration might ease instant payments adoption. Still, through our analysis, we can surmise that the key determinants of a country's performance are the three adoption boosters: addressing, openness, and payment functionality.

Value of all Instant Payments transactions as a percentage of GDP



Sources: Bank of Thailand, Banco Central do Brasil, Banco de México, National Payments Corporation of India, World Bank, 2023.

Easy and convenient addressing enables users to send and receive money without remembering or asking for the full bank account details. In other words, you're outsourcing the labor of having to route the payment instructions to a system that is better equipped to handle it because it was specifically designed for that task.

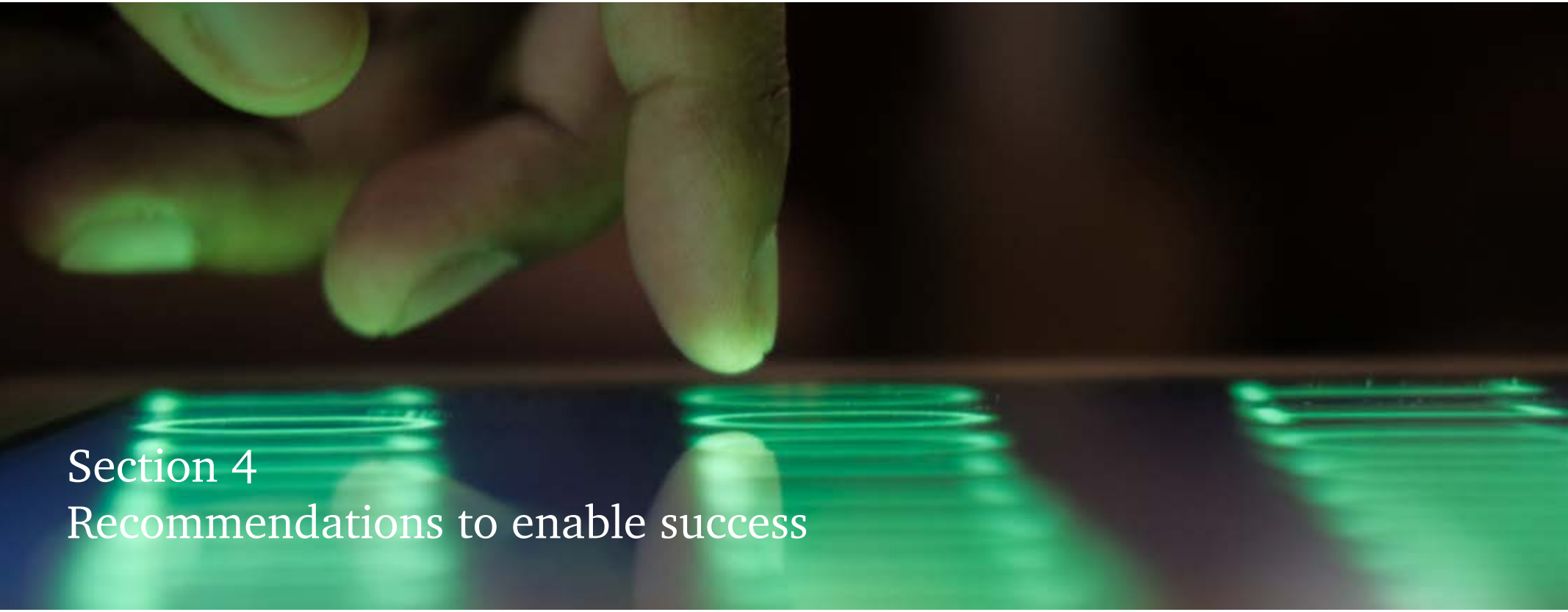
Openness leads to fintechs and other non-banks being invited to use the instant payments rails directly (or indirectly through a sponsor bank). Limiting the participants in the network may mean that a consumer could make a payment with the new instant payments system and have it declined because they are outside the network. This makes the payment method less attractive to merchants and users.

Payment functionality enables the quality of the overlay services built on the instant payments system to move the needle for merchants and users toward adoption. Additionally, this booster, combined with Openness, allows for further development of these added services and functionality to be built by network members, be it the central bank, commercial bank, non-bank financial institutions, or fintech alike. Request to pay is one functionality that deserves highlighting, being a key driving factor in countries like Brazil, India, and Thailand.

The following table summarizes the contribution of adoption boosters to the historical adoption of instant payments in the selected countries. Therefore, it focuses on the very first years after the introduction of the Instant Payments and does not represent the current level of sophistication/effectiveness of adoption boosters.

Contribution of Adoption Boosters to the historical adoption of Instant Payments

Categories	Brazil	India	Mexico	Thailand
Adoption boosters (Addressing)	High	High	Low	High
Adoption boosters (Openness)	High	High	Medium	High
Adoption boosters (Payment functionality)	High	Medium-High	Low	High
Government involvement	Highly favorable	Highly Favorable	Slightly favorable	Highly favorable
Infrastructure	Medium	High	Medium	High
Fees & incentives	Favorable for banks	Favorable for users	Favorable for users	Favorable for banks
Supported payment types & complimentary services	High	High	Low	High



Section 4
Recommendations to enable success

So, what recommendations could different countries and players in the Instant Payments ecosystem follow to enable the success of the Instant Payments ecosystem?

To answer this question, we analyze the three adoption boosters (addressing, openness and payment functionality) more in-depth by separating the recommendations into four quadrants since these adoption boosters have a significant impact on the adoption of Instant Payment solutions. Additionally, we surmise that the effectiveness and manner in which these adoption boosters ought to be used varies considerably depending on the current situation of the country where the Instant Payments solution is being developed.

For example:

Addressing: The Instant Payments system in a country with low mobile penetration may not employ phone-based aliases for routing/addressing purposes but instead opt for aliases based on national IDs or domain-based aliases (i.e., user@bank).

Openness: The Instant Payments system in a country with low bank account penetration may allow third parties, such as non-banks and fintechs, to participate.

Payment functionality: In a country with a large welfare system, the Instant Payments system may allow and promote the reception of government aid by instant payments.

Recommendations for adoption boosters quadrant

Quadrant I - Fintech champions

Adoption booster	What to do	How to do it
Addressing	Continually improve addressing solutions.	Being aware of new global trends and innovations in addressing solutions.
Openness	Increase interoperability between different payment systems.	Exploring partnerships with other countries could help increase the reach and appeal of the platform, especially now that demand for global solutions continues to increase.
Payment functionality	Introduce additional technologies, such as cloud computing, to provide new functionalities and improve current offerings.	Integrate with other financial services such as loans, insurance, and investment solutions.

Quadrant II - Digital leaders

Adoption booster	What to do	How to do it
Addressing	Increase the reach of addressing solutions.	Design addressing solution to be interoperable with other countries and systems.
Openness	Maintain and improve current digital and mobile infrastructure.	Be aware of new trends in tech and adapt their infrastructure and security accordingly.
Payment functionality	Increase the value-added services financial institutions currently offer.	Offer a seamless onboarding process, an excellent UX, 24/7 customer support, request to pay, addressing, multi-currency support, and cross-border capabilities.

Quadrant III - Laggards

Adoption booster	What to do	How to do it
Addressing	Increase the flexibility of the addressing solution.	Allow users to generate their unique ID with different sources. For example, their telephone number, social media, or email.
Openness	Improve access to Instant Payments solutions for underserved sectors of the population.	Address the cultural and technical challenges for the adoption of Instant Payment solutions.
Payment functionality	Decrease the use and dependency of cash transactions and incentivize the use of Instant Payments solutions.	Provide discounts or rewards for using Instant Payments solutions.

Quadrant IV - Financial inclusion leaders

Adoption booster	What to do	How to do it
Addressing	Increase the reach of the addressing solution.	Allow ID generation through multiple devices. For example, giving the option of using a computer or a cell phone.
Openness	Generate the confidence needed for consumers to use mobile tech for financial transactions.	Invest in security infrastructure and systems that make connectivity available to most citizens.
Payment functionality	Continuously add other financial services and instant payments offerings.	Integrate with other financial services such as loans, insurance, investment solutions, multi-currency support, and cross-border capabilities.

Recommendations to enable a higher adoption of instant payments

Based on the analysis, we provide the following recommendations to enable a higher adoption of instant payments.

Government involvement

1. **Digital ID infrastructure:** Governments can provide digital identification infrastructure to support instant payments. This can involve creating secure digital identities that can be used for authentication and verification in payment transactions. This increases the security and reliability of instant payments.
2. **Collaboration:** Governments can collaborate with payment service providers, industry associations, and other stakeholders to identify common challenges and opportunities and develop solutions that benefit all parties involved. This can include creating a forum for dialogue and information sharing, as well as providing support and funding for research and development in instant payments.
3. **Cybersecurity:** Governments can play a critical role in ensuring the security of instant payments by developing and implementing cybersecurity regulations and standards. This can involve creating guidelines for data protection, secure transmission, and storage of financial information.

Infrastructure

1. **Scalability:** As the volume of instant payments increases, payment systems need to be able to handle this growth without becoming overwhelmed. This requires a scalable payment infrastructure that can adapt to changing traffic volumes.
2. **Security:** Instant payments need to be secure to prevent fraud and confirm that users' funds are protected. Payment infrastructure must be designed with security in mind, incorporating features such as encryption, fraud detection and prevention, and multi-factor authentication.

Fees & incentives

1. **Lower fees:** High fees can deter consumers and businesses from using instant payments, especially for smaller transactions. Payment service providers can lower fees to make instant payments more accessible and affordable for the majority of users.
2. **Incentives for adoption:** Payment service providers can offer users incentives to encourage instant payments adoption. This can include discounts, cashback rewards, or other bonuses that incentivize users to switch from traditional payment methods to instant payments.
3. **Transparent Pricing:** Transparent pricing can help users make informed decisions about which payment service provider to use. Payment service providers can offer clear and simple pricing structures, with no hidden fees or charges.

Supported payment types & complimentary services

1. **Integration with complimentary services:** Integration with complimentary services, such as invoicing, accounting, and inventory management systems, to provide users with a seamless and integrated payment experience. This can help reduce friction and streamline payment processes for businesses and consumers.
2. **Multi-currency support:** Offering multi-currency support to cater to users who make cross-border payments. This can help reduce foreign exchange fees and simplify payment processes for users who conduct international transactions.

Section 5
Challenges and conclusion

General challenges of instant payments

Instant Payments solutions are growing rapidly, but there are still some challenges that most are facing or are expected to face, especially when compared to cash transactions.

Finding the right fee structure to enable sustainability: It may be argued that free-for-the-user instant payments (like UPI and CoDi) won't be able to maintain themselves over the long term without levying merchant discount rates to pay for their infrastructure.

Overcoming the lack of awareness regarding instant payments' security: Security concerns loom large in the minds of small merchants and users. If these concerns are not resolved, it may lead to a situation where users may use instant payments only for transactions with high trust and lower expected chances of needing dispute resolution or fraud protection. Although cash has essentially the same problem, it is at least seen as more private. A big part of the population still prefers to use cash to avoid transactions that government authorities could observe.

Reaching places with poor internet connectivity and low digital literacy: It is still challenging to conduct Instant Payments transactions because a significant percentage of the population still lacks access to the internet, smartphones, or digital literacy. Moreover, merchants don't want to integrate new payment solutions without a critical mass of users; consumers don't want to use payment methods that are not universally accepted.

Aside from these challenges, these new payment solutions have opened up a plethora of new opportunities for bad actors to scam people and evade taxes. Since it is now so easy to sell a product or service and get paid instantly, many private individuals and businesses end up making sales and not generating invoices, thus avoiding the payment of taxes. Also, given the transactions' instant nature, it becomes easy for scammers to transfer money from one account to another, spreading the transaction value to many other accounts and making it difficult to track.

Conclusion and limitations

As we showed in the graph in Section 3, the adoption of PIX in Brazil has been four times as fast as that in India, reaching $1 billion transactions per month in about 11 months since its launch, while India's UPI took about 44 months, and Thailand's PromptPay took about 56 months (Mexico's CoDi never reached the mark).

Through our analysis, we understand that adoption boosters are the most important criteria to enable a high adoption of instant payments. However, there are some potential limitations to our study.

First, the possibility that Mexico's lack of success is not necessarily due to their failures in designing significant adoption booster strategies but rather the fact that Mexico has a very large unbanked population that highly prefers to use cash. Second, the possibility that the reason for the success of India and Thailand stems from the fact that both governments carried out a huge initiative to increase mobile phone penetration and push digital payments before launching instant payments.

It is also worth mentioning that we have only analyzed four emerging countries amongst 60 other cases of Instant Payments solutions operational across the globe. These four countries can serve as relevant examples to learn from, but this is — by no means — an exhaustive analysis. For instance, UPI and CoDi have required that nobody can be charged for using the Instant Payments solution. This can be useful to drive user and merchant adoption, but it might require government support to enable the economic sustainability of the system. Additionally, the benefits of this strategy (as shown in Section 3) could only be reaped if there is sufficient openness to enable competition among the players trying to provide a cheaper and more effective interface. Otherwise, the high entry barriers are expected to promote monopolies that can stifle innovation, as happened with CoDi in Mexico.

Given the recent developments around the world and the success stories we've seen so far, we are probably going to see a lot of innovation and disruption in this market going forward.

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