

World Bank Fast Payments Toolkit

Case Study: Brazil



Payment Instruments



Credit Transfer



E-money

Use Cases / Services



Merchant
Payment



Bulk/Batch
Payment



Request to
pay



Bill
Payment



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Glossary of terms

S. No.	Term	Definition
1	GDP	Gross Domestic Product at current price
2	Income Category	Classification as per World Bank based on Gross National Income (GNI) per capita
3	CPMI	Committee on Payments and Market Infrastructure
4	FPS	As per CPMI, fast payment System is defined as payments in which the transmission of the payment message and the availability of final funds to the payee occur in real time or near-real time and on as near to a 24-hour and 7-day (24/7) basis as possible
5	Oversight	Regulating or governing body supervising the payments system
6	Operator	Institutions responsible for the operation of the payment system
7	Alias	Alternative to bank account numbers for increased customers' convenience. For example, mobile number, national identification number
8	Access Channels	Modes used by customer to initiate transaction on FPS. For e.g., branch, internet, mobile
9	Individual Payment Type	Person to person (P2P) – Payment between individuals for non-business purposes
10	Business Payment Type	Person to Business (P2B) – Payment from an individual to a business entity Business to Person (B2P) – Payment from a business entity to an individual Business to Business (B2B) – Payment between two business entities
11	Government Payment Type	Person/Business to Government (P/B2G) – Payment from person/Business to a government institution Government to Person/Business (G2P/B) – Payment from government institution to a person or business entity
12	Credit transfers	Credit transfers are payment instruments based on payment orders or possibly sequences of payment orders made for the purpose of placing funds at the disposal of the payee
13	Direct Debits	Direct debits are payment instruments in which the transaction is pre-authorized and funds are blocked in account for a debit to be initiated at a future date. In direct debits, payer's account is debited on execution of mandate by merchant or payee
14	e-Wallets	e-Wallets are payments instruments in which prepaid value is stored electronically, which represents the liability of e-money issuers, and which is denominated in a currency backed by the financial authorities in a particular jurisdiction

Abbreviations

S.No.	Term	Expanded form
1	BCB	Banco Central do Brasil
2	CSM	Clearing and Settlement Mechanism
3	DITC	Transaction Accounts Identifier Directory
4	DOC	Documento de Cobranca
5	EOD	End Of Day
6	FPS	Fast Payment System
7	RTGS	Real Time Gross Settlement
8	STR	Reserves Transfer System, the national RTGS in Brazil
9	TED	Transferencia Electronica de Depositos

Select parameters



GDP
USD billion 1,445



Income Category
Upper Middle Income



Population
213 million



Access to mobile phone*
97%



Access to internet*
74%



Bank account*
70%



Branches per 100,000 adults
18



Made or received digital payment in last 1 year*
58%



Received government wages or transfer in account*
27%

Source: GDP and Population: World Bank – 2019, Income Category: World Bank – June 2019

Currency Exchange Rate 1 USD = 1.35 S\$ <2018 Average, World Bank>

Others – World Bank 2017

* For age >15 years

How to read this report

- This **deep dive report** relates to Brazil
- It has been developed based on **primary interviews** with key stakeholders such as **regulators, operators** and **service providers** in the system as well as by leveraging **secondary sources**
- Key secondary sources include **Banco Central do Brasil** along with their publications
- The table below presents a legend to assist readers as they navigate through different sections of the report

Legend



The first slide of every section includes a chapter summary to provide readers with an overview of the section contents.

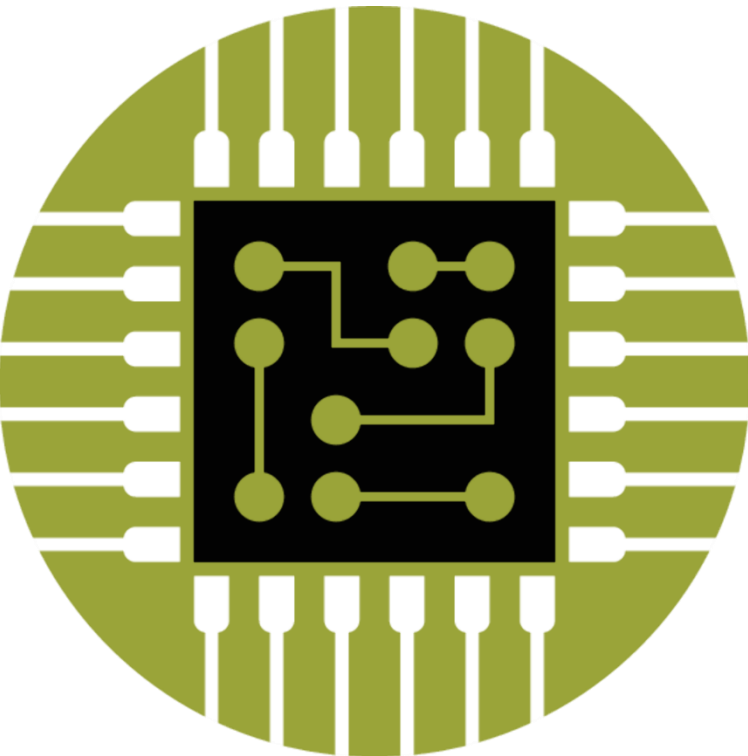


The green box with the adjacent icon indicates **section/sub-section summary across** the report. Reader may choose to read through this for a **high-level overview on the selected topic**.

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A. Executive Summary



Summary

- Payment systems have evolved significantly in Brazil over the last decade, driven by the development of the commercial financial institutions' payment instruments, IT infrastructure, new regulations, and consumer needs. The Brazilian payment market was digitally well developed on the supply side. Nevertheless, cash was still dominant in retail transactions. Meanwhile, a series of Fast Payment system implementations were taking place around the world.
- In May 2018, the Banco Central do Brasil (BCB) initiated the market discussion that led to the development of a new fast payment system Pix. In November 2020, the launch of Pix materialized. It brought an acceleration within the transformation toward digital payments. Pix usage take-up has been strong in the first months after its inception.
- The system, developed by the BCB, embeds multiple functionalities that are convenient for the users, like an articulated and convenient alias system, notifications of the payment receipt, different types of QR codes, and what is considered low pricing in the market. Moreover, a well-developed legal framework provided certainty to participants and consumers. The development process is openly documented.

KEY characteristics

- | | | |
|--|-----------------------------|------------------------------------|
| • Real time payment with notifications | • Multiple Aliases | • Transparent development process |
| • QR code enabled | • Low pricing | • Wide participant access criteria |
| • ISO 20022 | • Clear redressal mechanism | • Linked with open banking |

1. Overview

- **Chapter sections:**
- 1.1. Background
- 1.2. Objectives
- 1.3. System Development and Key Timelines



Chapter Summary:

- The Central Bank of Brazil (Banco Central do Brasil, BCB) has been engaged in significant reforms of the National Payments System (NPS) since the late '90s.
- The Brazilian payment market was well developed digitally on the supply side, nevertheless cash was still dominant in retail transactions. Meanwhile, a series of Fast Payment system implementations were taking place around the world.
- Banco Central do Brasil defined a vision for the market with high adoption level of digital payments to support an efficient economy.
- BCB acted to realize the proposed vision by developing in-house a new system (Pix), ensuring an appropriate legal framework and market stakeholders' participation. The pricing of the service was set to achieve cost recovery for BCB.
- The development process took less than 2 years. Following the launch, the service is successfully growing. New functionalities and services are planned to improve the value proposition.

1.1. Background



- **Long term national payment system strategy developed by the Central Bank of Brazil**
- **Favorable economic and social context domestically and internationally**
- **The use of digital payments for diverse use cases was supported by multiple payment schemes already beforehand the launch of fast payments**

Background information

The Central Bank of Brazil (Banco Central do Brasil, BCB) has been engaged in significant reforms of the National Payments System (NPS) since the late 1990s. In 2002, a real time gross settlement (RTGS) system, named Sistema de Transferencia de Reservas (STR) was launched, following a first major legal update with the enactment of a Payment System Law in 2001. Several subsequent developments brought the Brazilian NPS to a high degree of safety and efficiency, the latter fostered by an increasing attention of the BCB to retail payments and important efforts to increase interoperability by market stakeholders.

In this favorable environment, two main drivers prompted the development of the fast payment solution (FPS) in Brazil:

- The broader country context with Brazil experiencing a technological revolution where an increasing share of the population is getting access to smartphones and the internet and is demanding real time and paper-less services.
- The growing international debate about payments, mainly led by the Committee on Payments and Market Infrastructures (CPMI) and International Financial Institutions (IFIs), has given increasing focus several FPS experiences around the world, showing that FPS was becoming an international trend in the payments landscape.

Brazil has been relatively well served on the retail payment front for many years. Two credit transfer schemes have been traditionally available:

- Transferencia Electronica de Depositos (TED), settling on T0
- Documento de Cobranca (DOC) settling in T+1.

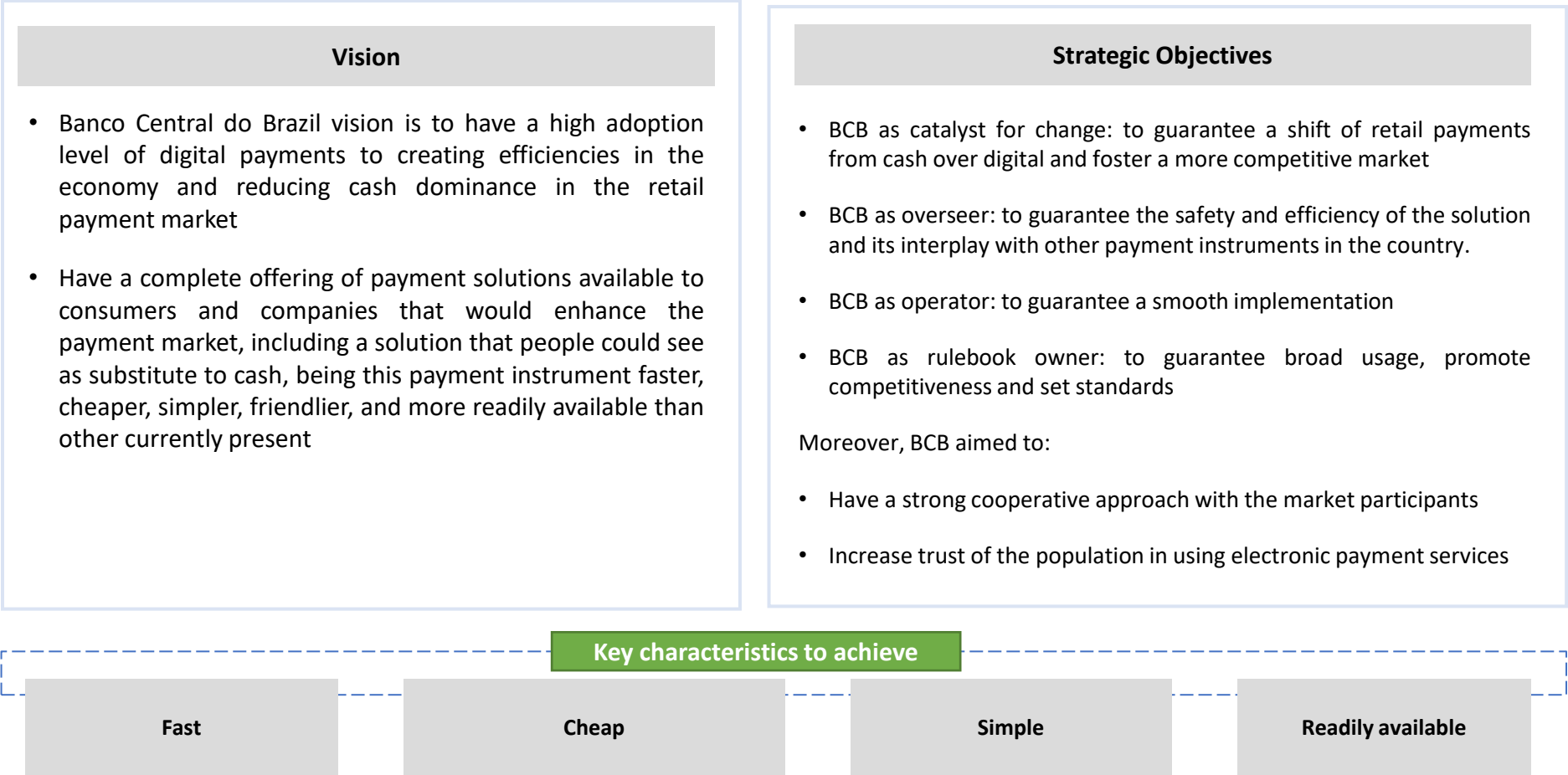
There are specific schemes for bill payments and for tax collection and public services bills (energy, communication and sanitation). Besides these, card payments (debit, credit and prepaid) are very popular for merchant payments and e-commerce. The existing infrastructure for cards, internet and mobile payment is well-developed.

1.2. Objectives



- **Promote digital payment development and sustain the digitization of the economy**
- **Foster competition in the National Payments System**
- **Promote financial inclusion**
- **Cash use was dominant in the market (2019) despite a good development of the payment market offering**
- **Digital payment adoption could bring efficiency to the economy**
- **Have an open access to the new infrastructure**

The introduction of a new infrastructure like Pix is meant to provide a boost to the payment digitalization. This is meant to positively influence a broader digitalization process of the economy.



2. Business and Operating Model

Chapter sections:

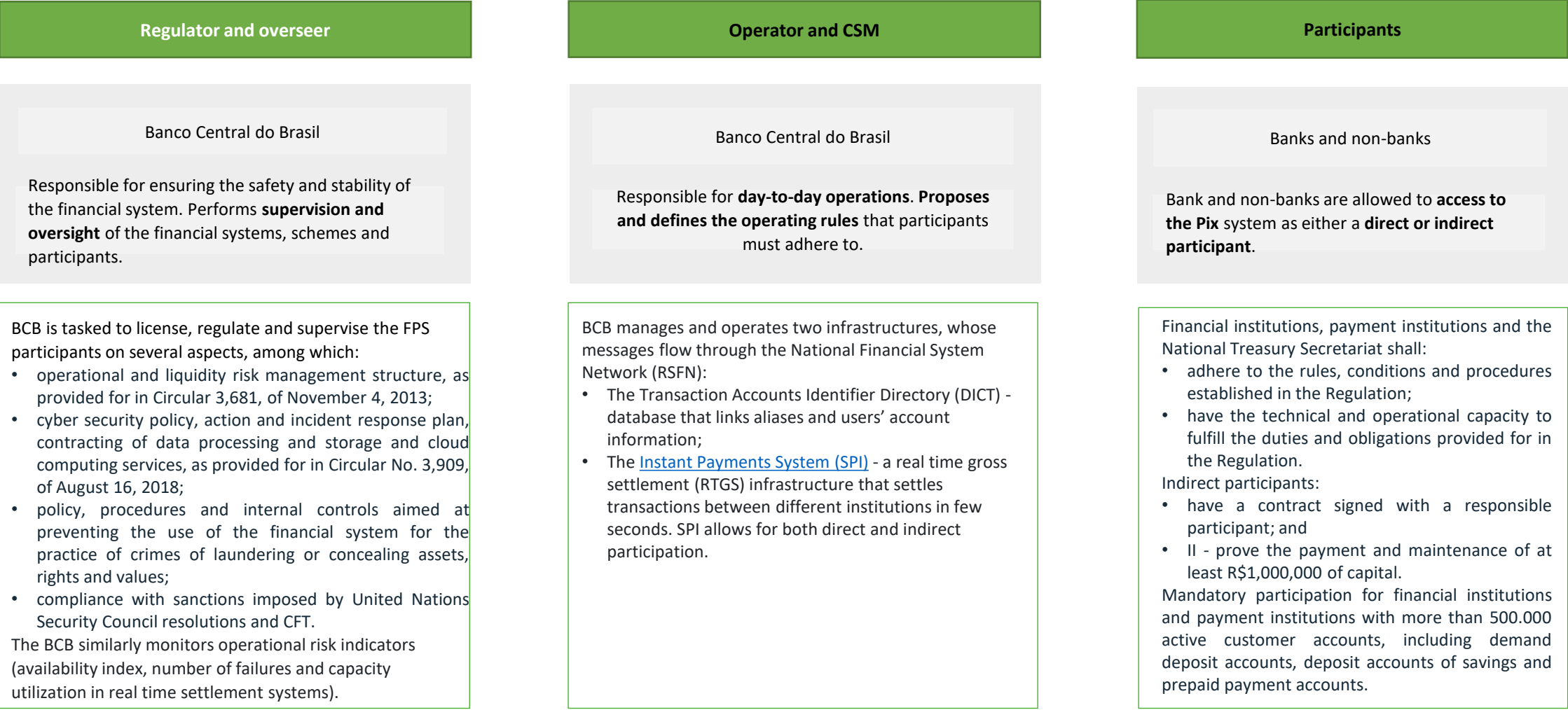
- 2.1. FPS Structure
- 2.2. Participants
- 2.3. Payment Instruments and Transaction Types
- 2.4. Aliases and Access Channels
- 2.5 Scheme Pricing and Fee Structure
- 2.6 Use Cases



Chapter Summary:

- The BCB plays the role of regulator, overseer and operator
- The solution comprises a comprehensive ecosystem consisting of:
 - the financial market infrastructure developed to facilitate and settle instant payment orders, named *Sistema de Pagamentos Instantaneos (SPI)*;
 - The database that links aliases and users' account information, named *Diretório de Identificadores de Contas Transacionais (DICT)*
 - the payment scheme (Pix) with a set of characteristics detailed in a rulebook
- The solution allows both direct and indirect participation

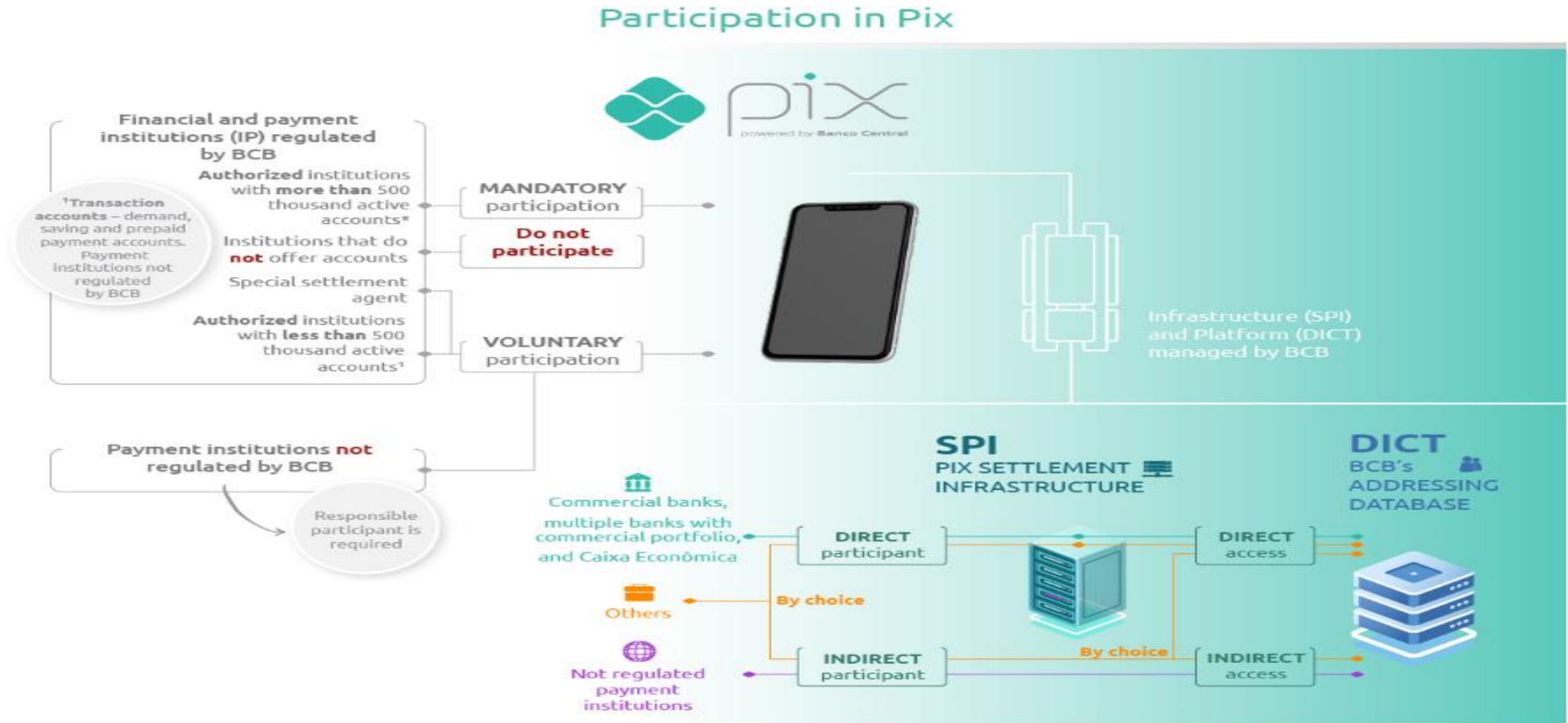
2.1. FPS Structure



2.2. Participants – membership types



Summary: the Instant Payment System (SPI) is the only centralized infrastructure for instant payments settlement (RTGS) between different payment service providers in Brazil. Transactions are settled as soon as they are processed, on a one-to-one basis. Once settled, transactions are final and irrevocable.



2.2. Participants



Summary: participation to the scheme is broad. Direct and indirect participants are present. Testing during onboarding is mandatory and participants authorized by the BCB big should publish open banking APIs.

The Fast payment solution in Brazil is open to a broad range of authorized participants. Pix payment service providers (Participants) must provide their clients with a transaction account (i.e., deposit account, savings account or prepaid payment account). As non-banks can provide pre-paid payments accounts, they can also be a Pix participant. Consumers and merchants are defined as Pix users. They can send and receive a Pix through a Pix participant (including non-banks).

For example, a consumer can be a non-bank customer and send or receive a Pix through it. There are some additional requirements such as having technical and operational capacity and a minimum of BRL 1 million (approximately USD 200,000) as company capital. Approval on specific tests is also required during the on boarding process.

Non-banks help to reach a larger share of the population, especially those underserved. The design of non-banks access to Pix is key to balance the risks they bring to the system and the benefits associated with their inclusion. Challenges do exist in particular around technical and operational capacity and adherence to specific regulation, such as AML/CFT and cybersecurity. Supervision of non-banks follows the same standards applied in banks supervision. In light of this considerations, there are some categories of non-banks that cannot access FPS directly. These non-banks, that are the ones which do not need a BCB's license to issue electronic money, must establish a commercial contract with any authorized Pix participant (including another non-bank). This Pix participant works as a "sponsor" to the non-bank non-authorized Pix participant. They provide access to FPS and also liquidity. They are also responsible to guarantee non-banks' technical and operational capacity and the integration of company capital (BRL 1 million). As these institutions do not have a BCB's license, this design was built in order to minimize potential risks that these institutions could bring to the ecosystem. Authorized non-banks have the same obligations as banks to access the system. Non-authorized non-banks must comply with the obligations described above.

The only difference between banks and non-banks is access to BCB's liquidity. As BCB, for legal reasons, cannot provide liquidity to non-banks, they do not have access to a specific (costly) liquidity facility that was create to the FPS. Non-banks, just like banks, are subject to BCB's supervision. This includes non-authorized non-banks that join Pix.

Reachability and Onboarding Process

As a matter of fact, BCB assessed that open APIs to third party access promotes competition on the payments landscape. Because of that, BCB is developing rules and standards to allow this access. When implemented, an increase in Pix transactions through third-parties is foreseen.

Access to API will be open just to authorized payment initiation service providers. Open APIs are being specified on a governance structure with all relevant stakeholders, including banks, other financial institutions, and payment institutions. This should ensure that every institution is well equipped and develop agile infrastructures.

Big banks must already publish APIs for data sharing. Other institutions must also publish the APIs if they want to connect with big banks' APIs. For the smaller institutions, data sharing is voluntary. This rule does not apply to Payment Initiation APIs.

Third party access of APIs is live and operational.

Access to payment initiation is an obligation since August 2021, when the open API for payment initiation is expected to be launched. Payment initiation service providers (PISPs) must be authorized by BCB.

There is a specific regulation concerning PISPs. Once they will be authorized institutions, we do not foresee any different obligation to join Pix. By August 2021, PISPs should be able to be a Pix participant.

2.3. Payment Instruments and Transaction Types








All transaction types (P2P, P2B, B2P, P2G, G2P, B2G and G2P) and use cases are supported.





This includes, for example, merchant payments (both at the point of sale and e-commerce), scheduled future payments, request to pay, bill payments, tax collection, and individual transfers.

Transfers between persons (P2P) and between businesses (B2B) are currently the most common use cases. However, merchant payments (P2B) are increasing day by day. Request to pay, bill payments, and tax collections are also increasing.

Payment Instruments Supported

	Credit Transfer ✓	Interoperability Pix is not interoperable with any pre-existing means of payment and interoperability between FPS and other infrastructures is not a goal. Currently, there are no other systems operating in the country which allow real time payments other than the SPI and the STR. However, as Pix is open to participation of a great diversity of agents and is open 24x7, the service is accessible through different means even in absence of direct interoperability across payment instruments. Currently, no plans are in place to change the current architecture of this FPS.
	Scheduled/ future payments ✓	
	Bill payment and tax collection ✓	
	Request to Pay - Dynamic QR code generation to prompt transaction initiation ✓	
	Cash out at POS (Nov 2021) ✓	

Payment Type, Limit and Currency

Payment Type	Transaction Limit	Transaction Currency
 Individual	<ul style="list-style-type: none">No limits were set in the system. Optional an extraordinary limit of 1000 R\$ for night only for operations between individuals only.Pix participants may establish maximum limits for Pix transactions per payer, per day and per month. Pix rules establish minimum parameters for these limits, which participants must comply with, based on risk profile.The account holder may reduce these limits for Pix transactions debiting his account (participants must obey such requests). On the other hand, granting requests for increasing the limits is at the discretion of the participant.	 <div>Brazilian Real</div>
 Business		
 Government		

2.4. Overlay services, Aliases & Channels

Overlay services

Overlay services are offered to the customers and facilitate the experience of initiating, receiving and reconcile a Pix payment:

- Initiation through QR Codes is possible through the presence of a service, accessible through a standardized API, to generate dynamic QR Codes.
- Credit notification in real time are available to merchants as successful payment completion to payers. Successful standardized user experience definitions in app (to customers) are available.

Pix supports the multiple aliases: mobile number, e-mail, tax ID number (for both persons and companies) and a random number generated by BCB. The alias mechanism has worked well, and no issues have been reported. Alias and QR Codes (merchant-presented) are operational.

NFC and consumer presented QR Codes support are currently under assessment. QR Code support was available since Pix launch. QR Codes are essential to allow some use cases, such as merchant payments (both at the point of sale and e-commerce), request to pay, bill payments, and tax collection. Without QR Code support, these use cases would not be available, and Pix would be used only to usual transfers, limiting its usage. The current messaging standard followed in SPI is ISO 20022.

Aliases

E-Mail

✓

Mobile phone number

✓

TAX ID (CPF or CNPJ)

✓

Random number

✓

```
graph LR; Payer[Payer / Customer] -.-> Alias[Alias repository]; Alias -.-> Payee[Payee]
```

Access Channels

Internet Banking

ATM (depending on PSP)

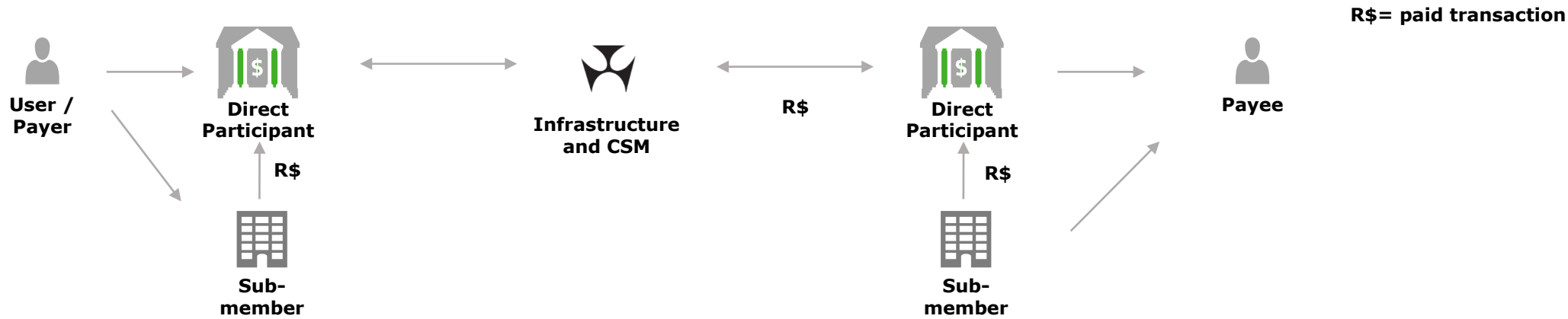
Mobile Banking/Apps

QR Codes

2.5. Scheme Pricing and Fee Structure



Summary: the pricing structure foresees a fee paid by the receiving participant to the infrastructure. Moreover, indirect participant pay a fee to the direct participant.



1

Fee charged by the system to the participants

Fees are charged to bear the costs of operation. **There is a minimal fee only charged to the receiving participant.** Direct participants must access the exclusive network (National Financial System Network – RSFN) Indirect participants connect through direct participants.

2

Interchange fees for cash out

There is a transaction fee for cash out for own ATM and independent ATM.

3

Fee charged by direct participants to sub-members

Commercial contracts can be established with indirect participants.

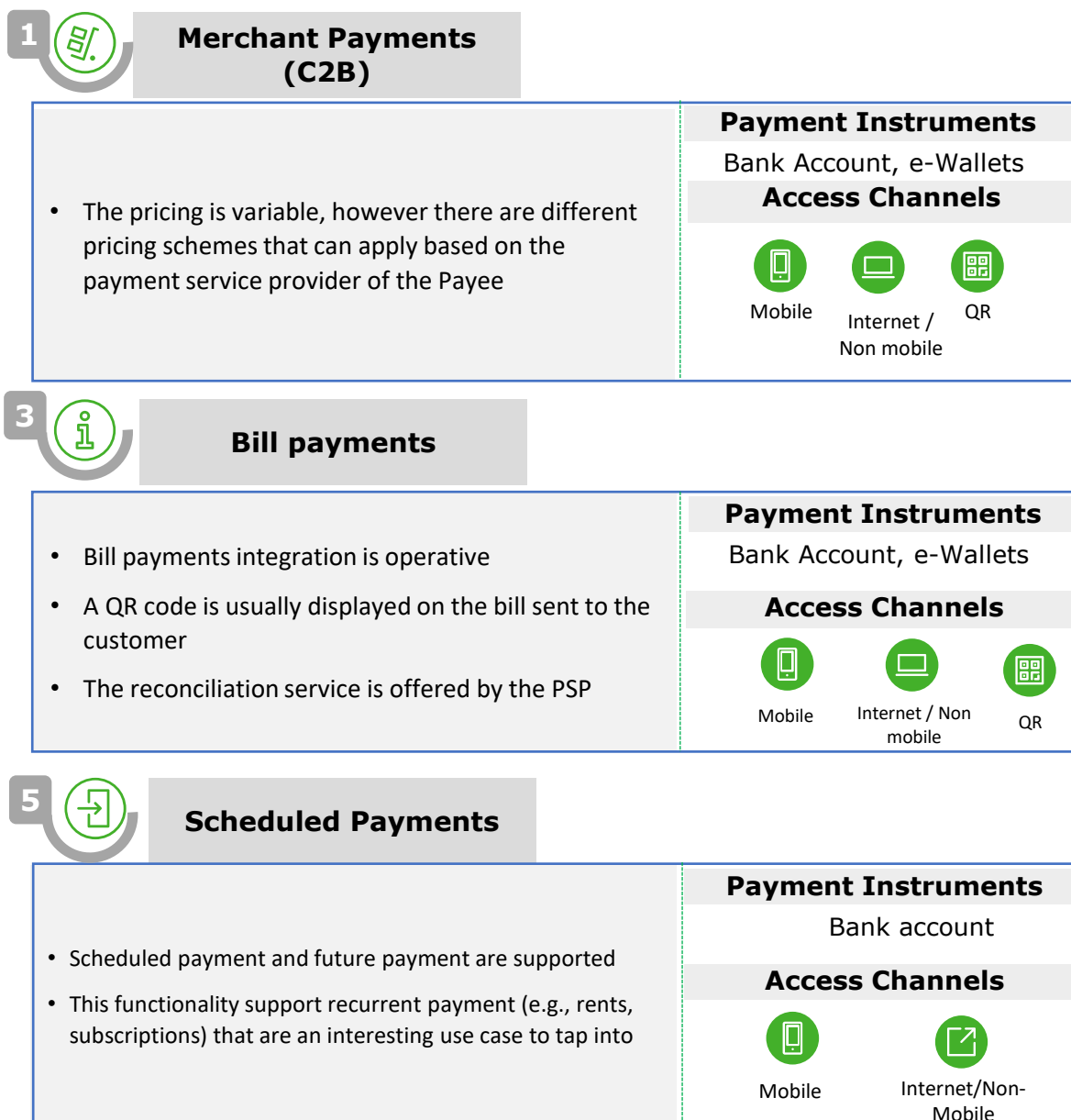
4

Fee charged to users/payee and merchants

For pricing policies to users, the general approach is that individuals cannot be charged any fee to send Pix transactions. However, the 31st and additional Pix transaction received in a month can be charged. Participants are free to determine the charges. Depending on the case, companies can be charged to send and/or receive a Pix. Participants are free to determine the charges.

Prices to merchant are variable with an average cost of 0.15%. The merchant acquiring offering are structured in different ways.

2.6. Use Cases / Services



3. User Adoption



Chapter Summary:

- **Pix usage is rapidly growing both in terms of number of transactions and the associated value.** 109.8 million Brazilians (59% of the population) have already made or received at least one Pix. Meanwhile, 8.5 million businesses have been reached.
- **By the end of 2021, the use of Pix exceeded the use of all other payment instruments.**

3. User Adoption (1/2)



The take up

After few months of operations, it is possible to talk of a Pix “Revolution” in the country: Pix has been widely accepted since the very beginning and its numbers are astonishing.

After a relatively slow start which was partly physiological and partly by design, the numbers have skyrocketed. In terms of volumes, Pix already exceeds the other two traditional credit transfer instruments summed up (TED and DOC). However, It is too soon to state Pix influence over the other means of payments, particularly on cash and cards.

109.8 million Brazilians (66% of the population) have already made or received at least one Pix. Meanwhile, 8.5 million businesses have been reached.



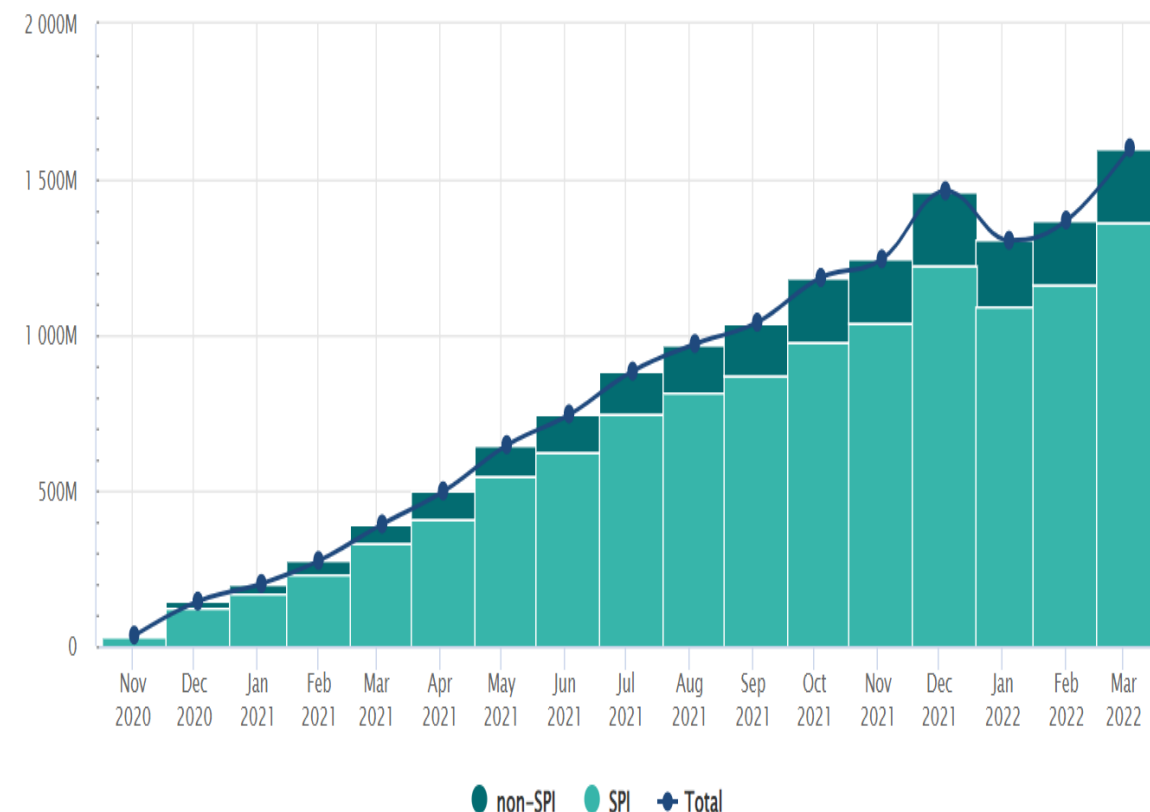
The trend

Usage is increasing day by day. Use cases are also increasing. Anecdotal evidence shows that it is becoming more and more common even for small and informal merchants and individual entrepreneurs to sell their goods and services through Pix.

Pix has been easing the access to an electronic means of payments for a share of the population that was not well-served. Although an official assessment of Pix effects on financial inclusion, digital penetration, and economic development is not yet available, a preliminary analysis indicates that Pix has already impacted digitization of payments positively.

Pix Transactions

Amount of Transactions

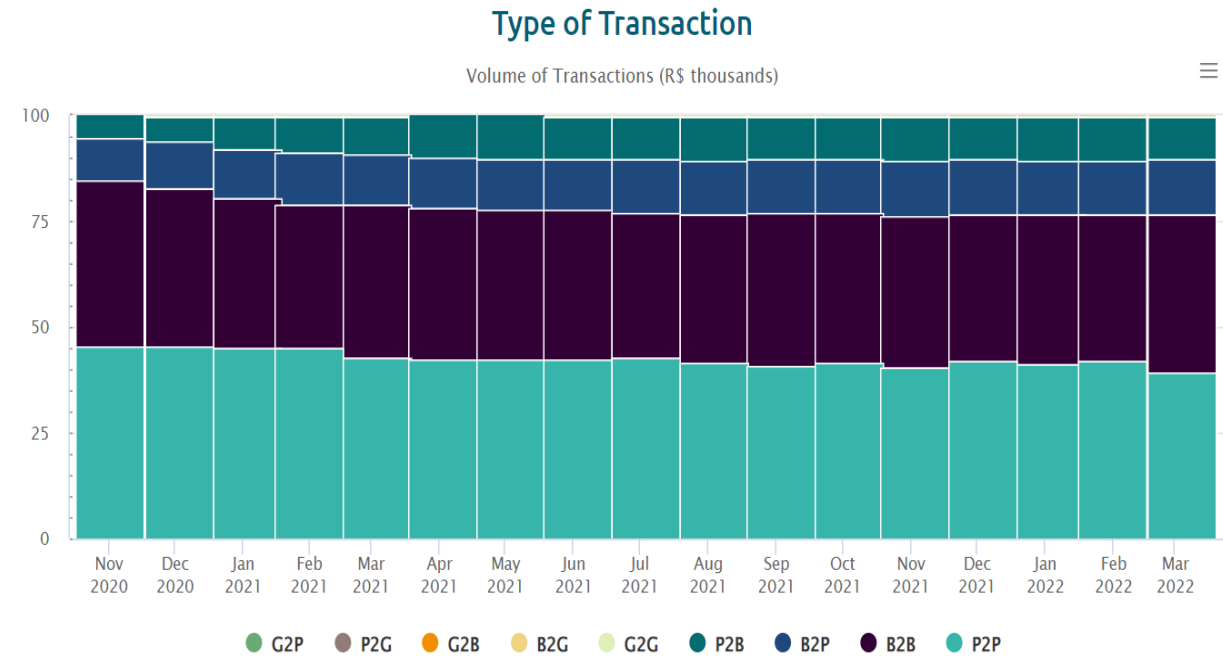
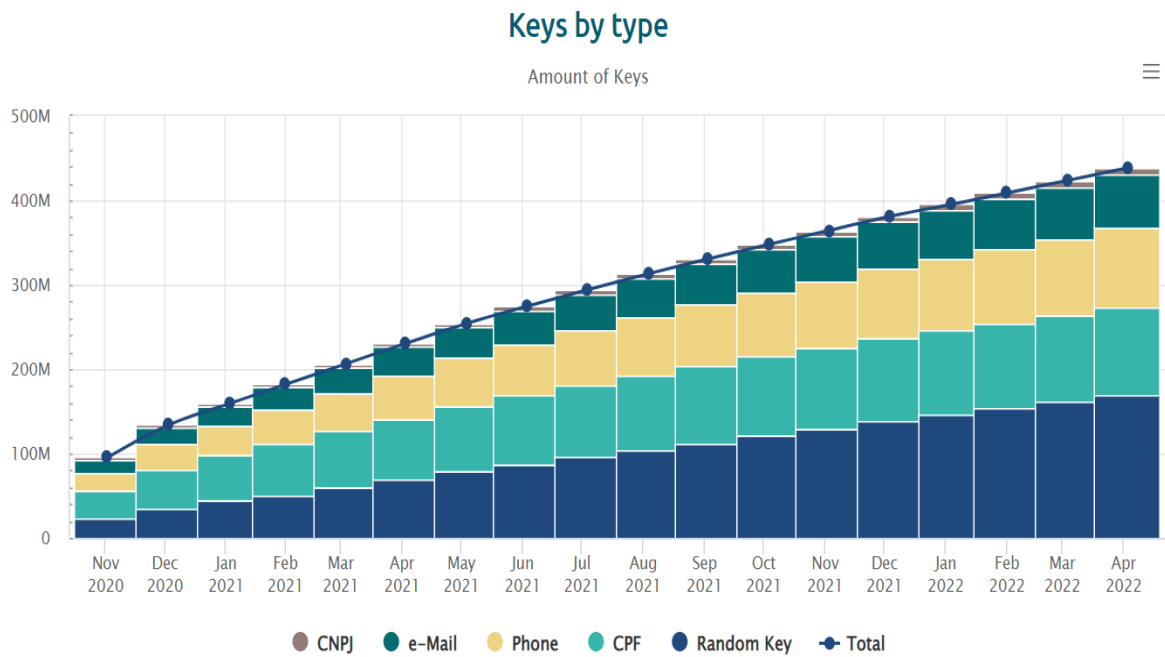


User adoption (2/2)



Ample data availability on the aggregate use of the system is available and it allows to monitor the use cases and the used channels.

- Several types of aliases are commonly used for generating Pix keys.
- In terms of transaction value, B2B and P2P transactions account for the majority of them. Meanwhile, in terms of transaction number, P2P transactions account for approximately 80% of the total.



4. Technical Details and Payment Process

Chapter sections:

- 4.1. Technical Details | Messaging Format and QR Codes
- 4.2. Technical Details | APIs, Customer Authentication and Tokenization
- 4.3. Payment Process (Customer Registration, Transaction Fulfilment, Liquidity Management and Settlement)



Chapter Summary:

- The messaging standard used in Pix/SPI is ISO 20022.
- QR codes are used as communication channel between payers and payees. Both dynamic and static QR codes are available and used. The use of QR codes has proven to be very successful. Payer QR codes will be developed after the payee QR.
- Pix authentication is regulated by the rules defined by the BCB. The model foresees consumer authentication at account holding financial institution or at third-parties Payment Initiation Service Providers (PISP) when the institution that provides this service is different from the one that holds the paying user's account.
- APIs are used within the Open banking framework to initiate payment transactions.
- The registration and the payment process are simple.

4.1. Technical Details | initiation technology & Customer Authentication



Initiation technology (QR Code)

QR code supported the initiation at the point sale

QR codes are used as communication channel between payers and payees. Both dynamic and static QR codes are available and used. The use of QR codes has proven to be very successful.

QR Code support was available since Pix launch. QR Codes are essential to allow some use cases, such as merchant payments (both at the point of sale and e-commerce), request to pay, bill payments, and tax collection. Without QR Code support, these use cases would not be possible, and Pix would be used only to usual transfers, limiting its usage.



Messaging Format

ISO 20022: The messaging standard used in PIX/SPI is ISO 20022.



Payment Initiation APIs

PIX IS API ENABLED

Third party access of APIs was launched at the end of 2021 and is operational.

As a matter of fact, BCB assessed that open APIs to third party access promotes competition on the payments landscape. Because of that, BCB is developing rules and standards to allow this access. When implemented, an increase in Pix transactions through third-parties is foreseen. Access to API will be open to authorized payment initiation service providers.

Open APIs are being specified on a governance structure with all relevant stakeholders, including banks, other financial institutions, and payment institutions. This should ensure that every institution is well equipped and develop agile infrastructures.

Big banks must already publish APIs for data sharing. Other institutions must also publish the APIs if they want to connect with big banks' APIs. For these smaller institutions, data sharing is voluntary.

Access to payment initiation was launched in October 2021 and became fully operational in March 2022. Payment initiation service providers (PISPs) must be authorized by BCB. There is a specific regulation concerning PISPs. By August 2021, PISPs should be able to be a Pix participant.

4.1. Technical Details | Messaging Format, Tokenization and APIs



Customer Authentication

Consumer authentication takes place within the payer payment application

Pix authentication is regulated by the rules defined by the BCB. The model foresees consumer authentication at account holding financial institution or at third-parties Payment Initiation Service Providers (PISP) when the institution that provides this service is different from the one that holds the paying user's account. PISP services may be offered by financial, or payment institutions authorized by the BCB that participate in Pix in the transaction account provider mode, as long as they are certified in the scope of open banking.

The payment transaction initiation service on Pix seeks to further facilitate payments and transfers with Pix, increase competition, strengthen the use of Pix in cases involving businesses, especially in electronic commerce, and foster innovation.

“Paying the Pix by reading the QR Code, for example, depends on the user opening the bank's application, choosing the Pix option, reading the QR and then authenticating the transaction. With the arrival of the payment initiation service, the experience in some situations will become more agile, with the user being directed directly to the authentication screen in your bank's *app*. The process is much more fluid and takes fewer steps to finalize a payment, while maintaining a high level of security.” Carlos Brandt, deputy head of CBC Department of Competition and Structure of the Financial Market.

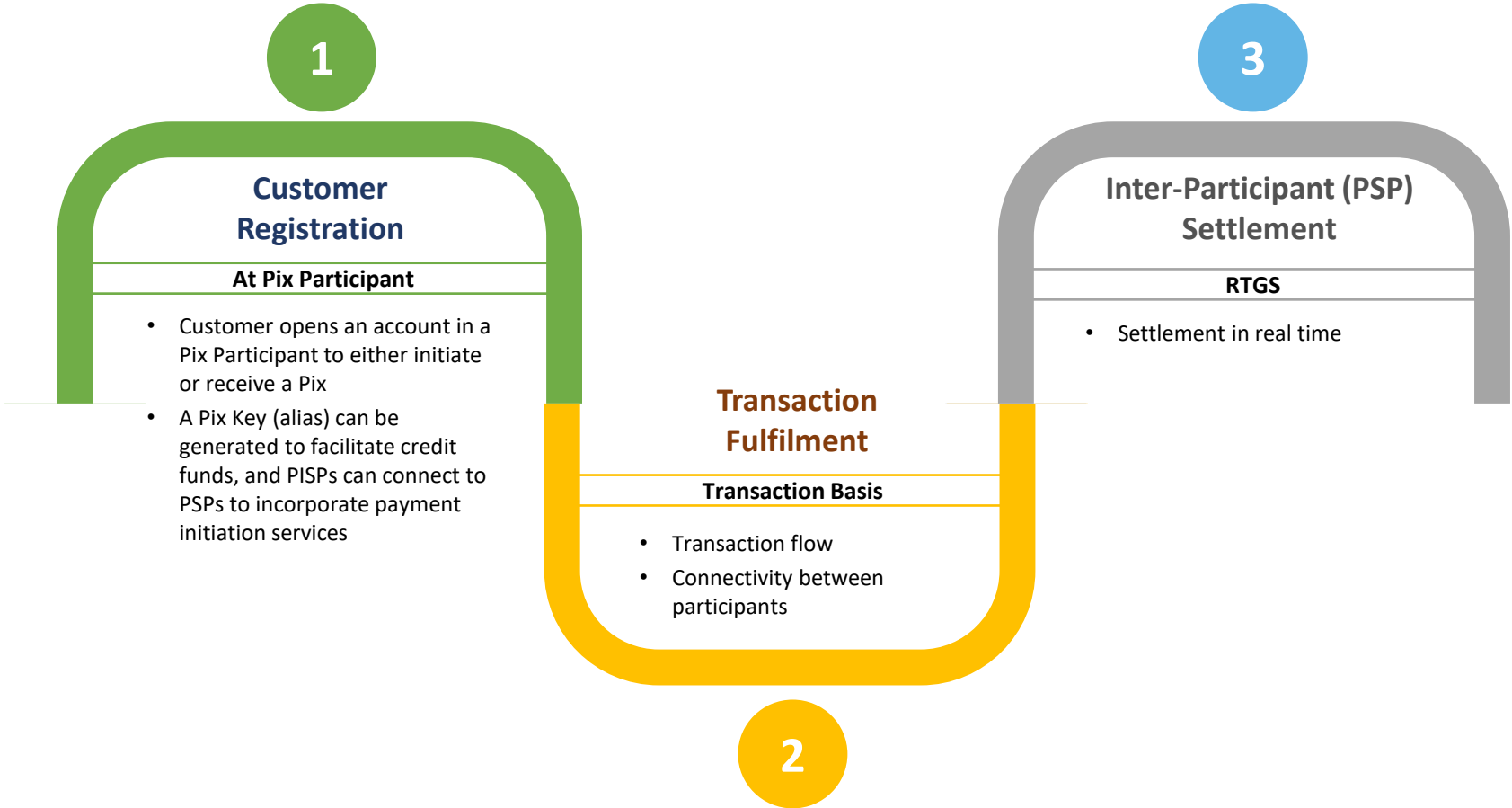
In order for Pix to be made from the initiation service, it will be necessary for the user to consent to sharing the service, a step that is governed by the rules defined in Open Banking. Several dynamics can be used in the initiation service. For example, when performing a transfer using a specific application provided by the initiator (applications for financial management, messaging, social networks, etc.), it will be possible to launch a Pix from within the application itself, which will automatically direct the user to their bank's application to authenticate the transaction.

Another possible case is from an online purchase on a website or in the use of home delivery apps, transport and purchase of goods in which instead of scanning or copying the QR code and using Pix “copy-paste”, the user will automatically be directed to the transaction authentication screen in their bank's application and, upon completion of the transaction, will automatically be directed back to the online store or app.

4.2. Payment Process



Summary: the steps in the payment process include the registration at account holding institution or PISP, payer-payee transaction fulfilment has different channels and interparticipant settlement takes place in real time.

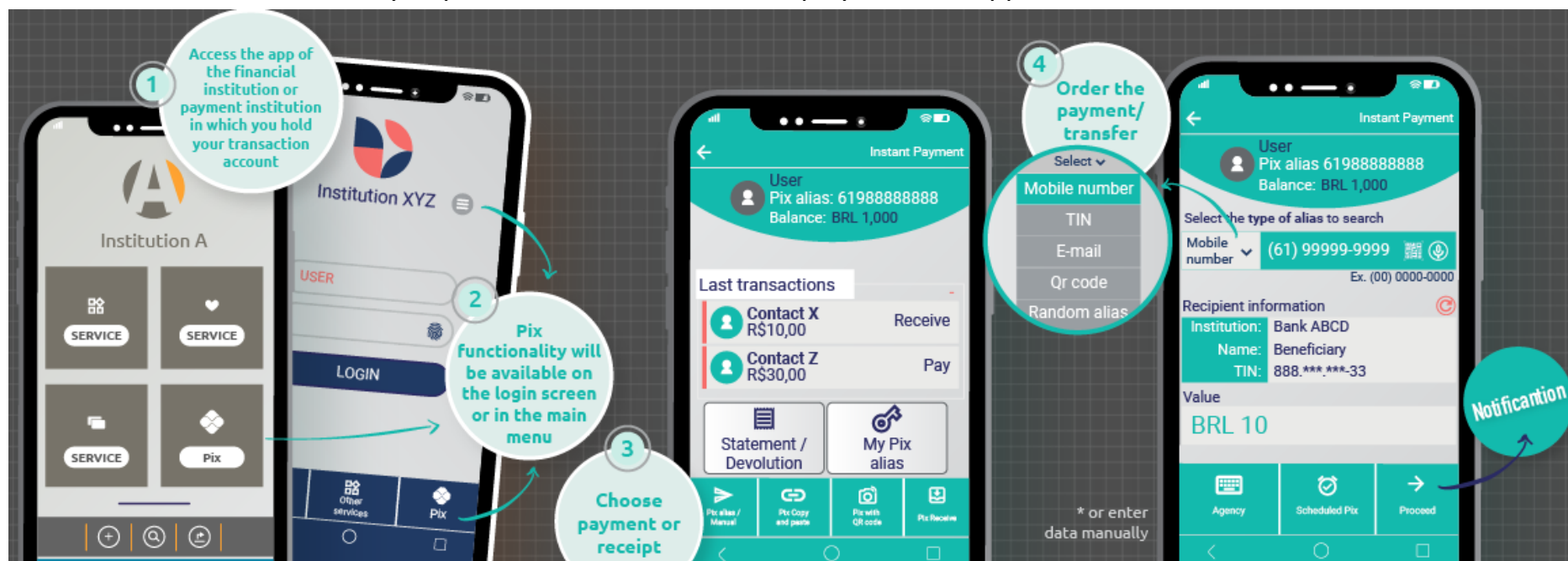


4.2. Payment Process | Customer Registration and payment initiation



Summary: the functionality is embedded in the digital access channel of participant, mobile and internet banking applications.

- Customers access the app of the Pix participant where they hold an account or the application of the Payment Initiation Service Provider.
- The Pix functionality will be present in the application.
- The PSP customer requests the generation of a Pix key, associated to an Alias.
- Customers can initiate a payment by defining the funding account, searching or inputting the beneficiary alias (PIX key), defining the amount and ordering the payment. Payment initiation can take place also by scanning the merchant QR (next slide).
- Following the transaction execution summary of performed transaction is displayed in the application.



4.2. Payment Process | Payment initiation at POS and Bill Payment



Summary: the functionality is embedded in the digital access channel of participant, mobile and internet banking applications. The payment takes place using the mobile banking application.

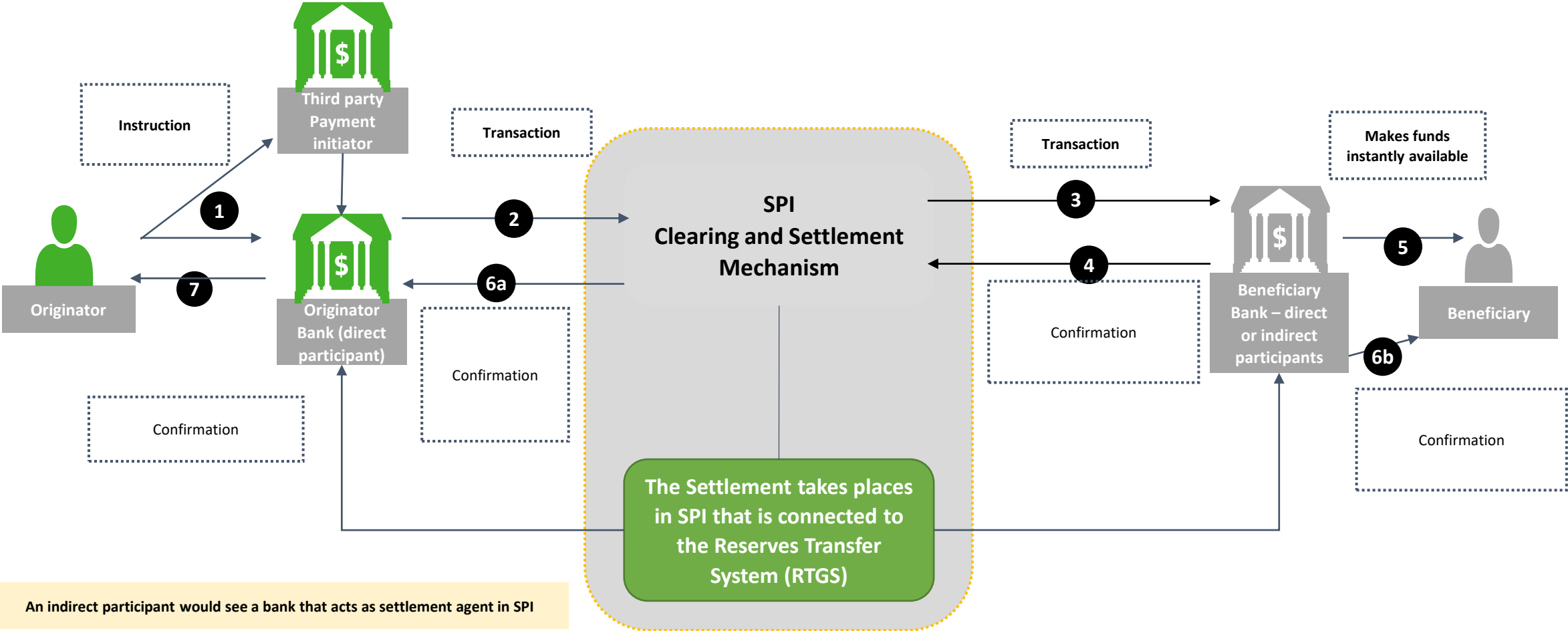
- Once selecting the funding account, customers can also initiate a payment by scanning a QR code presented by the merchant. The QR code contains the necessary information for creating the payment order on the payer side.
- The use of the QR code on bills allows to facilitate the payment completion from the payer. In fact, following the receipt of the bill, the payer doesn't need to input manually the bill payment credentials into its mobile banking application but can simply scan and acquire the necessary information.



4.2. Payment Process | Transaction Fulfilment



Summary: the transaction fulfillment takes place through system participants. Pix has in place a system of notifications that support the user experience.

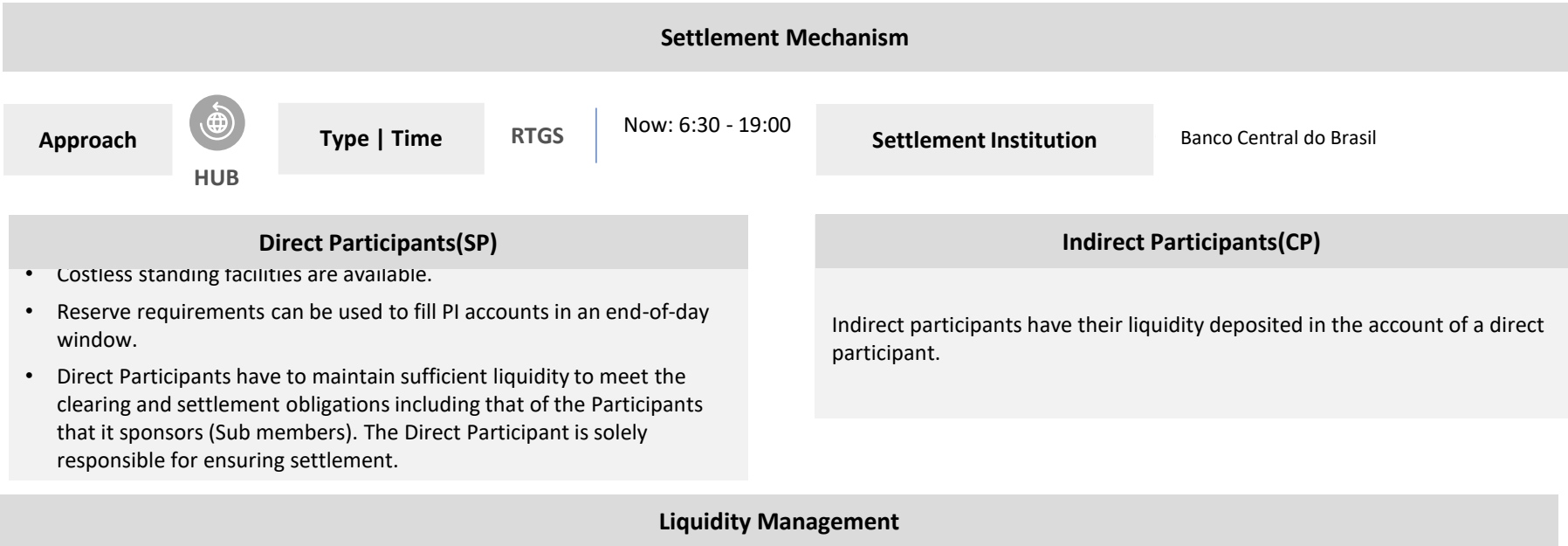


4.2. Payment Process | Liquidity Management and Settlement



Summary

- The BCB opted for real time gross settlement mechanism for all payments
- No collateral and guarantees, participants should prefund a PI account that used for Pix
- Costless standing facilities are available



The SPI is a real-time gross settlement system.

- The BCB did benchmark other FPS settlement mechanisms. Because of potentially large credit risk emerging from deferred net systems in an environment like Brazil, the BCB chose to opt for the real time gross settlement mechanism for all Pix payments.
- The BCB provides liquidity during the STR working hours (6h30 to 18h30). Costless standing facilities are available to financial institutions. Payment institutions can freely move the balances that their customers have on payments prepaid accounts. The BCB opened a new window (18h30 to 19h) where financial institutions can use their reserve requirements balances to fill Pix account (named PI account). They can also use a new credit facility (repurchase agreement) that costs 90% of Brazil’s monetary policy rate (Selic rate). Payment institutions can fill their account with the balances that their customers have on payments prepaid accounts.

5. Governance Framework

Chapter sections:

- 5.1. Legal and Regulatory Aspects
- 5.2. Risk Management
- 5.3. Dispute Resolution



Chapter Summary:

- Pix success has been underpinned by a very solid legal and regulatory framework developed over the years. In fact, none of the incumbent legal provisions had to be amended or modified to implement Pix.
- The BCB has extensive oversight authority on the National Payments System and has exercised it also by playing a catalyst role in the development of the Pix.
- As regards operational risk management, the BCB devotes maximum attention to data protection, operational reliability and cyber security using the same principles that apply to all financial market infrastructures.
- The BCB has created a set of rules and systems to ensure extremely high-level security standards.
- Pix has a specific dispute redressal manual, part of the Pix rulebook.

5.1 Legal, Regulatory and Governance Aspects (1/3)



Summary: Pix success has been underpinned by a very solid legal and regulatory framework developed over the years.

Institutional and Governance Framework

Legal Framework

Primary source and Central bank's circulars

Regulator and Overseer

BCB is the regulator and the overseer

Owner and Operator

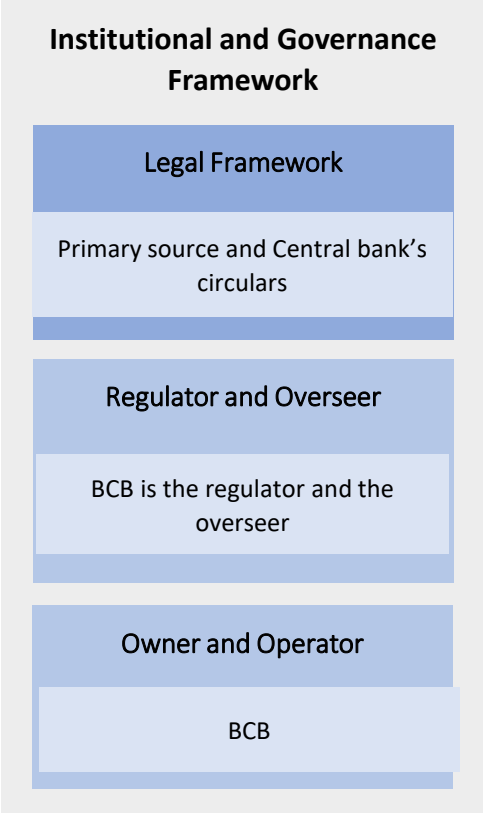
BCB

- Brazil has had a comprehensive National Payments System Law since 2001 given legal certainty to the key payment and settlement concepts. There is also a full set of regulations from the National Monetary Council (CMN) and BCB regarding payment systems and services.
- In addition, for a long time, agent banking in Brazil has been permitted and regulated which brought to the expansion of a network of access points for financial services, securely managed by authorized financial institutions under the control of the central bank.
- Starting in 2013, after a new federal law was enacted giving BCB regulation and supervision powers over payment service providers (including non-financial ones), a new set of BCB Regulations, has provided further openness to the retail payment sector regulating access to the payment infrastructure to an increasing set of payment institutions and the provision of payment services to the general public. It is worth noting that as the legal and regulatory framework is deemed to be complete and applicable to all existing and new payment arrangements, **none of the incumbent legal provisions had to be amended or modified to implement Pix.**
- Collection of laws and BCB's circulars from the BCB:
 - Lei nº 4.595/1964, art. 10, inciso IV.
 - Lei nº 10.214/2001, art. 10.
 - Lei nº 12.865/2013, arts. 7º, 9º, 10, 14 e 15.
 - Resolução CMN nº 4.282/2013.
 - Resolução BCB nº 1, de 2020
 - Resolução BCB Nº 150, de 2021
 - Resolução BCB Nº 175, de 2021
 - Resolução BCB Nº 195, de 2022
 - Instrução Normativa nº 243, de 2022
 - Resolução BCB Nº 19, de 2020
 - Carta Circular nº 4.056, de 2020
 - Comunicado nº 32.927, de 2018
 - Comunicado nº 34.085, de 2019
 - Resolução nº 3919, de 2010
 - Instrução Normativa nº 203, de 2021

5.1 Legal, Regulatory and Governance Aspects (2/3)



Summary: The BCB has extensive oversight authority on the National Payments System and has exercised it also by playing a catalyst role in the development of the Pix.

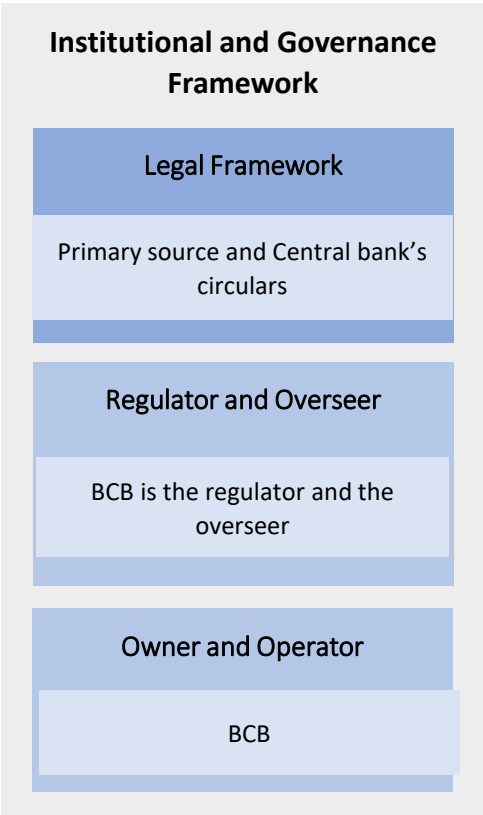


- Payment institutions are regulated by BCB in its capacity as NPS overseer. They are subject to specific regulation, including on financial and operational risks. They do not need to be incorporated as banks.
- Brazil also has specific regulation over financial market infrastructures. As the FPS is just another FMI, the same regulation applies to SPI. SPI is not designated as a systemically important payment system at the moment. However, there is a regulation that sets the criteria by which a payment system should be considered systemically important. If FPS reaches these criteria, it will be designated as systemically important.
- BCB is in charge of FPS oversight as part of its NPS oversight mandate and powers. There is not a separate legal license or authorization required for the operator. BCB operates the FPS, but a separate area within the central bank exercises direct oversight over the FPS.
- BCB monitors and supervises Pix participants in order to check if they are compliant with Pix rulebook. There are some automatic red flag non-compliances for problems in participants' connection to the FPS and excessive rejection of payment orders, including timeouts. There is also regular supervision over participants.
- There is a specific regulation for the on-boarding process. On-boarding tests must be fulfilled before going live. Timeline depends on each participant capacity on be approved in the homologation tests. One to two months is the usual timeline for approval on homologation tests.

5.1 Legal, Regulatory and Governance Aspects (3/3)



Summary: As regards operational risk management, the BCB devotes maximum attention to data protection, operational reliability and cyber security using the same principles that apply to all financial market infrastructures.



- All Pix participants are subject to BCB’s ordinary regulation on business continuity. There is nothing specific added to the regulation because of Pix. BCB ensures Pix participants’ business continuity through supervision in every Pix participant.
- FPS is also subject to business continuity, as stated in the specific Brazilian Financial Market Infrastructure regulation. The BCB oversees FPS’s business continuity based on CPMI’s Principles for Financial Market Infrastructures.
- Services of data processing and storage and cloud computing can be contracted from firms from abroad (data can be stored outside the geographical boundaries of BCB’s jurisdictions).
- Pix participants must adopt robust mechanisms to ensure the security of (i) the authentication process of payers and of the identification of payees; (ii) the Pix initiation procedures; and (iii) the process of opening transactional accounts. Any problem related to security is a liability of the Pix participant. The standard remedial planned for all data security breaches apply also to the FPS.
- There are specific regulations regarding operational risk management, and cybersecurity policy, action plan and incident response, hiring data processing and storage services and cloud computing.
- Brazil has also its own General Data Protection Regulation (specific federal law). BCB supervises all Pix participants regarding data protection. FPS runs simultaneously in two distinct sites that have separate infrastructures. Both sites are always simultaneously active and processing transactions at the same time. An unfortunate cyber security breach should reach both sites simultaneously in order to create a significant damage to Pix operations.

5.2 Risk Management



Summary: the BCB has created a set of rules and systems to ensure high-level security standards.

Security guidelines and Framework	<ul style="list-style-type: none"> The same safety measures, such as forms of authentication and encryption, adopted in the execution of other payment methods, such as TEDs and DOCs, will be adopted by participating institutions for the treatment of transactions via Pix. The personal information transmitted in Pix is protected by banking secrecy, as governed in Complementary Law 105, and in the provisions of the General Data Protection Regulation (LGPD).
Fraud Risk Monitoring and Management Solution	<ul style="list-style-type: none"> BCB ensures that FPS is not abused for any criminal economic activity through the regular supervision of Pix participants and transactions. Pix has "anti-fraud engines" operated by the institutions that offer the service, which allow the identification of atypical transactions, outside the user's profile, blocking suspicious transactions for analysis for up to 30 minutes, during the day, or 60 min at night and rejecting those that do not represent a secure transaction. Pix transaction data is encrypted on the National Financial System Network, which is a data network operated by the Central Bank and extremely secure and resilient. Pix has, in its DICT database, protection mechanisms that prevent scans of personal information and "fraud markers", in which a transaction (and the fraudster) is marked as "fraud" in the event of suspected fraud or consummated fraud and sends the alert to all institutions participating in the system. Institutions may establish maximum limits for transactions based on the profile of each client, period, account ownership, service channel and initiation procedure. Such limits are anchored in the limits established for other payment instruments. The payer's identity is digitally authenticated, by password, token, biometric recognition, or other security method adopted by the related institution, before any payment or transfer. Pix presents superior security than other payment instruments in crimes "without personal contact", considering the requirements of robust authentication using password, biometrics or facial recognition.
KYC / AML	<ul style="list-style-type: none"> All Pix participants are also subject to BCB's ordinary regulation on AML/CFT. There is nothing specific added to the regulation because of Pix.
Credit Risk	<ul style="list-style-type: none"> No credit risk is present in Pix as the settlement can take place only using the funds available on the dedicated PI account.
Cybersecurity	<ul style="list-style-type: none"> All Pix participants are subject to BCB's ordinary regulation on cyber security. There is nothing specific added to the regulation because of Pix. The BCB ensures Pix participants' data and cyber security through supervision in every Pix participant. FPS is also subject to data and cyber security regulation, as stated in the specific Brazilian Financial Market Infrastructure regulation. The BCB oversees FPS's data and cyber security mechanisms based on CPMI-IOSCO Principles for Financial Market Infrastructures.

5.3 Customer Complaints and dispute resolution



Summary: customers can complain to their PSPs for a transaction and to the central bank in regard to their PSPs conduct. A dispute redressal manual is provided.

Reversal process and customer complain	Dispute resolution
<ul style="list-style-type: none">• Pix has a “return” functionality that shall be agreed by the recipient of a wrong payment. Such functionality supports the resolutions of issues related to clerical errors. The return for the transaction can be made in part or in totality.• When trying to make a Pix transaction, if an error occurs, the payer will be warned about the reason for the transaction failure. As soon as the situation which caused the error is normalized, the payer will be able to try again.• In case of identified fraud, It will be up to the payment service provider to evaluate the case of fraud and the possibility of reimbursement, similar to what occurs today with frauds in the banking sector.• The BCB provides a series of recommendations to avoid frauds and users generated errors.• A consumer can register a complain against a Pix participant using the “Contact us” function from the Central Bank, within 45 days from the occurrence of the facts that motivated the complaint. Documents and evidence must be provided The request will be processed through the Citizen's Demand Registration System (RDR). Examples of commercial disputes: receipt of product that was different from specifications, cancellation of an event or reservation, dissatisfaction with the product, among others.• The Special Refund Mechanism was introduced in November 2021, through which a payer that was subjected to a proved fraud by an ill-intended beneficiary can request a refund.	<p>Pix has a specific dispute redressal manual, part of the Pix rulebook.</p> <ul style="list-style-type: none">• The BCB is responsible for any final decision on any dispute that emerges between participants.• The principles of legality, finality, motivation, reasonableness, proportionality, morality, ample defense, adversarial procedure, legal security and efficiency guide the conduct of BCB's work in the dispute redressal process.• BCB ensures that FPS is not abused for any criminal economic activity through the regular supervision of Pix participants and transactions.• Dispute resolutions between Pix participants begins with the request for a dispute resolution about the case questioned by the party who feels aggrieved. It only occurs after all possible negotiations between the parties involved, without the possibility of opening multiple requests for dispute resolutions related to the same case. Disputes between customers and participants must be solved in the judiciary system if an agreement is not reached in the context of the Pix redressal procedures. After the registration on the <u>Digital Protocol</u>, the Central Bank (BCB) sends the request for resolution to the other party. Then, the 15-day period starts for the parties to sign a conciliatory agreement, ending the dispute in question. If no agreement is reached, the dispute resolution committee established by the BCB will decide and communicate the dispute decision within 40 calendar days (extendable for an equal period). The decision can be appealed by the parties involved.

6. Clearing & Settlement Mechanism

- **Chapter sections:**
- **6.1. CSM**



Chapter Summary:

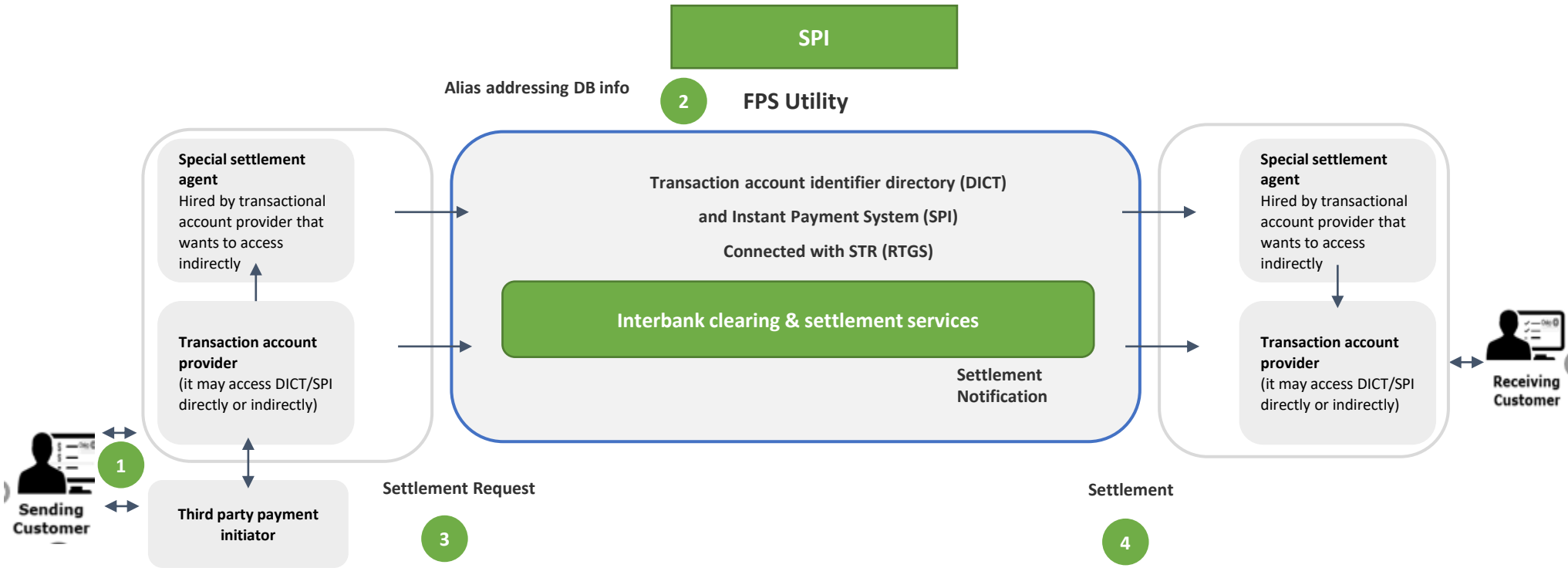
- BCB is the owner of Pix and operator of SPI, the fast payment system.
- The Pix FPS scheme is supported by the SPI RTGS system.
- Pix payments are settled in specific purpose accounts held at the BCB by the direct participants of the system. In order to safeguard the resilience of the system, no overdraft is allowed, which means the account cannot have a negative balance.

6.1. CSM Structure



Summary

- The DICT allows to identify the payee and his/her account
- The clearing and the settlement takes place in a dedicated FMI for Pix
- The transactional account PSP can be a direct or indirect participant of SPI
- The sending customer can initiate the payment from the transactional account provider or from a third party
- The settlement agent is present only when the transactional account provider is not a direct participant
- The settlement takes place in SPI, operational 24/7
- SPI is connected to STR the RTGS



- The SPI is a Real Time Gross Settlement (RTGS) system, which means transactions are settled as soon as they are processed, on a one-to-one basis. Once settled, transactions are final and irrevocable.
- Pix payments are settled in specific purpose accounts held at the BCB by the direct participants of the system. In order to safeguard the resilience of the system, no overdraft is allowed, which means the account cannot have a negative balance.

Technical information

- The system is based on a traditional technology architecture with connection through messages between participants and BCB in an exclusive payment network.
- The system uses messages developed using the ISO20022 standard.