

# World Bank Fast Payments Toolkit

## Case Study: Mexico

**SPEI | 2004**

(24\*7 functionality since 2015)

### Payment Instruments



Credit Transfer



E-money

### Use Cases / Services



Merchant  
Payment



Bulk/Batch  
Payment



Request to  
pay



Bill  
Payment



# Glossary of terms

S. No.	Term	Definition
1	<b>GDP</b>	Gross Domestic Product at current price
2	<b>Income Category</b>	Classification as per World Bank based on Gross National Income (GNI) per capita
3	<b>CPMI</b>	Committee on Payments and Market Infrastructure
4	<b>FPS</b>	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	<b>Oversight</b>	Regulating or governing body supervising the payments system
6	<b>Operator</b>	Institutions responsible for the operation of the payment system
7	<b>Alias</b>	Alternative to bank account numbers for increased convenience of the customer. For e.g., mobile number, national identification number
8	<b>Access Channels</b>	Modes used by customer to initiate transaction on FPS. For e.g., branch, internet, mobile
9	<b>Individual Payment Type</b>	Person to person (P2P) – Payment between individuals for non-business purposes
10	<b>Business Payment Type</b>	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	<b>Government Payment Type</b>	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	<b>Credit transfers</b>	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	<b>Direct Debits</b>	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	<b>E-money</b>	E-money is a prepaid value stored electronically, which represents a liability of the e-money issuer (a bank, an e-money institution or any other entity authorized or allowed to issue e-money in the local jurisdiction), and which is denominated in a currency backed by an authority

# Abbreviations

S.No.	Term	Expanded form
1	<b>CEP</b>	Electronic Payment Voucher
2	<b>CNBV</b>	National Banking and Securities Commission
3	<b>CNSF</b>	National Insurance and Bonding Commission
4	<b>CONSAR</b>	National Savings System for Retirement
5	<b>FMI</b>	Financial Market Infrastructure
6	<b>HVPS</b>	High Value Payment System
7	<b>PFMI</b>	Principles of Financial Market Infrastructure
8	<b>PSP</b>	Payment Service Provider
9	<b>RTP</b>	Request to Pay
10	<b>SIAC</b>	Account Holders Service System
11	<b>SPEI</b>	Interbank Electronic Payment System
12	<b>SPEUA</b>	Extended Use Electronic Payments System

# Select parameters



**GDP**

**GDP – USD 1.26 trillion**



**Income Category**

**Upper middle**



**Population**

**127.57 million**



**Access to mobile phone\***

**64.57%**



**Access to internet\***

**45.41%**



**Bank account\***

**36.93%**



**Branches per 100,000 adult**

**14.13**



**Made or received digital payment in last 1 year\***

**31.74%**



**Received government wages or transfer in account\***

**19.10%**

Source : World Bank – 2019, Income Category: World Bank – June 2019  
Currency Exchange Rate USD 1 = MXN 19.26 <2019 Average, World Bank>  
Others – World Bank 2017

\* For age >15 years

# How to read this report

- This **deep dive report** relates to the **Interbank Electronic Payment System (SPEI)** in **Mexico**
- It has been developed based on **primary interviews** with key stakeholders such as **regulators, operators** and **participants** in the system as well as by leveraging **secondary sources**
- Key secondary sources include Banco de Mexico website and SPEI's PFMI assessment document
- 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

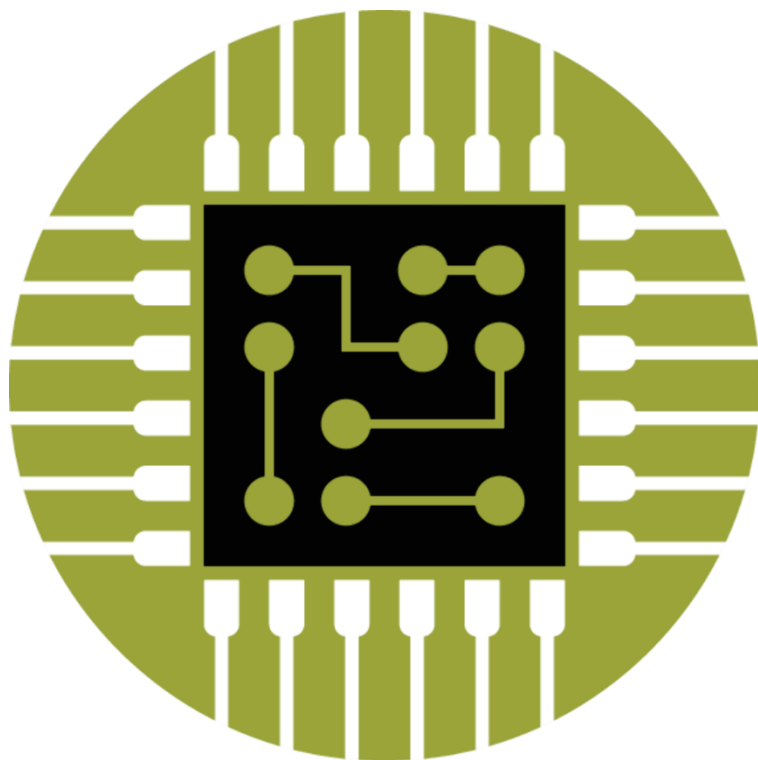


The green box with the adjacent icon indicates **section/sub-section summary across** the report. Reader may choose to read through this for a **high level overview on the selected topic**

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# **A. Executive Summary**



- **Interbank Electronic Payment System (SPEI)** is a real-time electronic fund transfer system which was launched in August 2004, and extended to a 24\*7\*365 service in November 2015
- SPEI enables Mexican consumers, businesses and government agencies to make real-time payments. It is used as a High Value Payments System (HVPS) and a retail payment system in Mexico
- SPEI came about as Banco de Mexico decided to replace the earlier real time gross settlement system, Extended Use Electronic Payments System (**SPEUA**) keeping in mind the growing financial and economic needs in Mexico
- The implementation of the SPEI took approximately **28 months**. Banco de Mexico is the owner of the SPEI. It performs the role of **regulator, supervisor, operator, and user**

#### Key features of SPEI are

- |   |                                  |   |
|---|----------------------------------|---|
| • Both high value and retail payment system | • Proprietary messaging standard | • Direct participation for all regulated financial institutions |
| • Real time payments                        | • Operates 24x7x365              | • Hybrid settlement   |
- Users can make SPEI payments via their traditional and alternate delivery channels (**Branch, ATM, internet or mobile banking platforms**). In 2019, Banco de Mexico launched CoDi which added an **RTP functionality** over SPEI rail. It also facilitates payments through **QR Codes, NFC and messages through internet**
  - Currently, the SPEI supports use cases like **Bulk/Batch payments, Bill Payments, Merchant Payments** and **Request to Pay** (through CoDi)
  - Development of **Customer presented QR code** is under development. Additionally, Banco de Mexico is planning to issue regulations for indirect participation in the system



## **B. Detailed Report**

# 1. Overview

## Chapter sections:

- 1.1. Background & Objectives
- 1.2. System Development
- 1.3. Key Timelines



Source: Banco de Mexico | Primary Interviews

## Chapter Summary:

- SPEI was developed as a result of **regulatory push from Banco de Mexico**. It replaced the earlier RTGS system SPEUA as the central bank adopted a forward looking approach in anticipation of rising financial and economic needs in Mexico. SPEUA was built on a database which would have been unable to handle growing transaction volumes
- SPEI was earlier meant to be **high value payment system (HVPS)** which would have facilitated financial transactions between banking institutions. Over the years, the central bank has decided to extend its usage for retail payments as well
- The key objectives of SPEI are:
  - The system and its participants should process payments in real time
  - The system must not generate credit or liquidity risks
  - The system should offer a high level of service to users and participants, including business continuity plans and adequate risk management
  - The system should facilitate the provision of services and information to its clients regarding sent transfer orders
- SPEI has seen several upgradations over the years. Its service hours were increased from 11.5 hours to 20 hours a day in March 2015 which **were further increased to 24 hours a day in November 2015**
- Despite the extension in service hours, SPEI saw limited uptake for real time retail payments possibly because of the time required to input the necessary information to complete a transfer
- To resolve this, Banco de Mexico introduced a **standardized request to pay (RTP) functionality** on SPEI rail on a 24/7 basis, named CoDi (Cobro Digital or Digital Collection). It was designed to simplify and homogenize the experience of requesting a payment or answering a request to pay for the final users

# 1.1. Background and Objectives



- Mexico had an RTGS system called SPEUA which facilitated inter-bank transactions. It was replaced by SPEI in August 2005
- SPEI has objectives of processing payments in **real time** without generating any **credit** and **liquidity** risks. It should offer **high service level** and provide rich information of payment orders
- In 2019, Banco de Mexico launched CoDi (in form of **RTP functionality**) to enhance the user experience. It also allowed usage of **QR Codes, NFC and messages through internet** for payments

Interbank Electronic Payment System (**SPEI**) is a real-time electronic fund transfer system which was launched in August 2004, though it extended service for **24\*7\*365** in November 2015.

It was developed in order to replace the earlier real-time gross settlement system called Extended Use Electronic Payments System (**SPEUA**). SPEI is Mexico’s main payment system. It processes both the high-value payments of financial institutions and treasuries of large companies, as well as retail payments of the general public. SPEI processes the vast majority of the interbank fund transfers of Mexico, both in number and value.

Banco de Mexico also launched **CoDi, a digital payments platform** in September 2019 to facilitate payments and collection transactions through electronic transfers.

**SPEI’s introduction was primarily regulator driven as Banco de Mexico adopted a forward-looking approach for development of the system, considering the financial and economic needs of Mexico in the future**

The Banco de México’s law mandates the central bank to ensure **secure** and **efficient** operation of the financial market infrastructures (FMIs) and to **promote well functioning of payment systems**. It also powers Banco de Mexico to strengthen and promote fair competition, as well as foster innovation and the development of better services in their respective market industries, thereby contributing to the public good through increased financial stability, economic efficiency and financial inclusion

**Account Holders Service System (SIAC)** is the real-time gross settlement system through which the central bank administers the accounts of Mexican financial agents

SIAC is primarily used as one of the channels used to provide **intraday liquidity** to the national payment systems including SPEI

SPEUA was a **real time gross settlement system** which was used for financial transactions between the banking institutions. It was replaced by SPEI on **August 19, 2005**

Unlike SPEI, participants were granted credit lines from the other system participants in SPEUA which could have posed credit risks in the system

SPEI has the purpose of settling payments of its participants and participants’ customers in a timely, efficient, secure and inexpensive way, considering both retail payments and those associated with financial markets. The **specific objectives** associated with SPEI are:



Settlement of transfer orders should occur in near-real time for the system, its participants and end users



The system must not generate **credit or liquidity risk**



The system should offer **a high level of service** to users and participants, including business continuity plans, adequate risk management and provide **legal certainty** about a credit on the receipt account



The system should **facilitate the provision of services and information** to its clients regarding sent transfer orders

## 1.2. System Development



- SPEI development was done **in-house** by the Banco de Mexico. Initial set up duration for the system was **28 months**
- SPEI extended its operating hours to 24 hours a day in **2015**. It took **18 months** to upgrade the system operating hours
- CoDi was developed in **16 months** and was launched in **September 2019**

SPEI is still running on the architecture conceptualized 16 years ago. It has been able to meet the growing transaction volumes over the years. SPEI extended its operating hours in 2015. To ensure seamless 24\*7 operation, liquidity management and monetary policy adjustment were required. Major changes were not required in system architecture

### Infrastructure Setup – Key decisions

- SPEI development was done in-house to handle high and low value transactions and provide desired service levels for large volumes. Banco de Mexico wanted to ensure seamless transition for participants to the new system, therefore it **re-utilized the front-end components** from the earlier system SPEUA
- SPEI uses an **open communication protocol** that was specifically designed and does not require any specific architecture, programming language or operating system. Banco de Mexico provides participants with the protocol and all technical characteristics, so participants can choose between developing their own software for connecting internal systems to SPEI or contracting a technical provider for it
- When the operating hours were extended to 24\*7, it was not mandatory for participants to offer this service. In December 2017, Banco de Mexico mandated banks with **more than 3000 accounts to offer SPEI service on 24\*7 basis for payment orders below MXN 8000**. Processing time for all the SPEI transactions have been reduced from 30 seconds to 5 seconds. Since March 2020, processing time for CoDi transactions was also reduced to 1 second

### Development Process

- SPEI's development was done using the **in-house capability** of Banco de Mexico
- As SPEI is the most important payment system, Banco de Mexico consciously took decision to not hire any external vendor for the system development
- Additional factors for in-house development of the system included development **cost** and **efficiency of proprietary communication protocol** used by Banco de Mexico
- **14 resources** were involved in the development of the initial version (2004). SPEI's development team consists of 5 resources nowadays

### Implementation Timelines

#### SPEI Initial setup

- **Requirements and design:** Apr 2002 - Jun 2002
- **Development:** Jul 2002 - Nov 2002
- **Internal testing:** Dec 2002 - Mar 2003
- **Beta testing with participants:** Apr 2003 - Jul 2004
- **Deployment (participants):** Aug 2004

#### SPEI 24\*7

- **Requirements and design:** Jan 2014 - Mar 2014
- **Development:** Apr 2014 - Sep 2014
- **Internal testing:** Oct 2014 - Nov 2014
- **Beta testing with participants:** Dec 2015 - Feb 2015
- **Deployment (participants):** Mar 2015 - Aug 2015

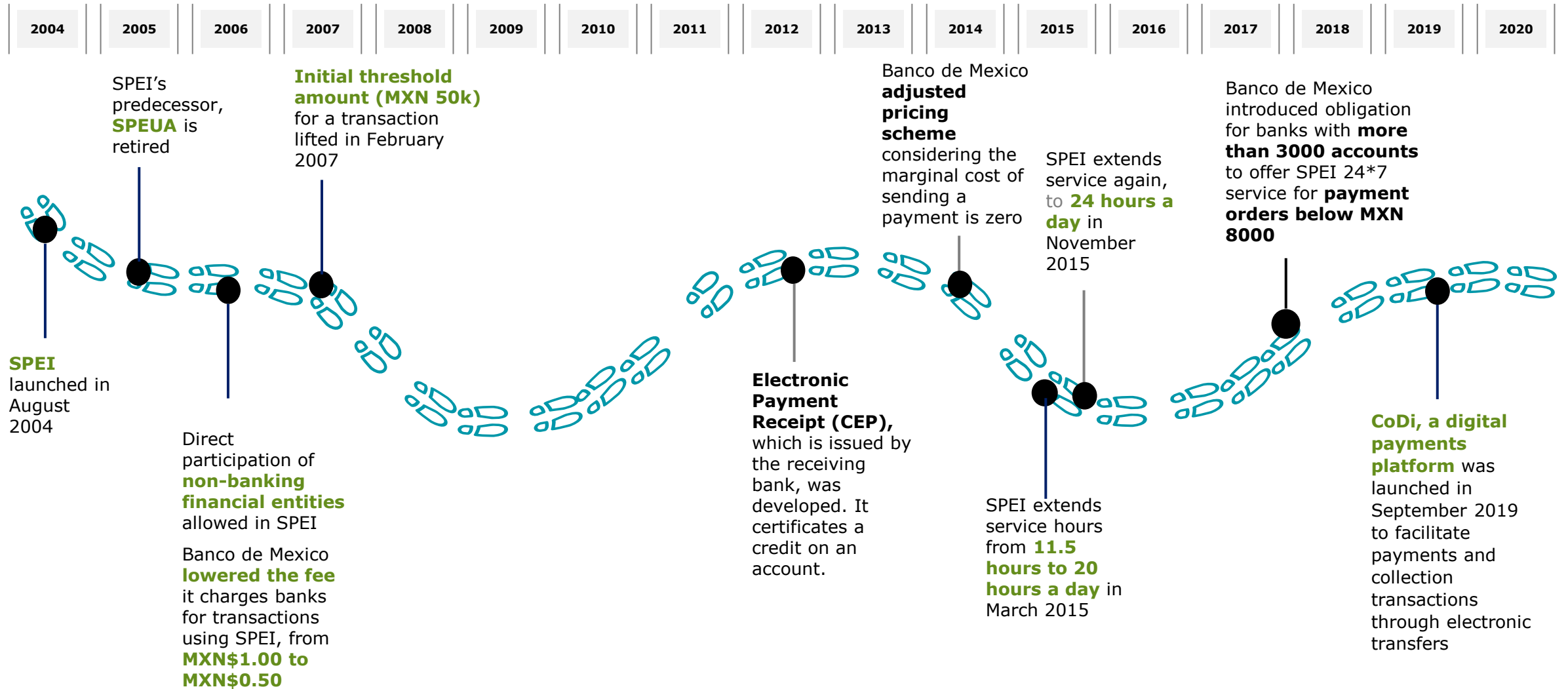
#### CoDi

- **Requirements and design:** Mar 2015 - Jan 2016
- **Development:** Feb 2016 - Jun 2016
- **Internal testing:** Jul 2017 - Dec 2017
- **Beta testing with participants:** Jan 2018 - Mar 2019
- **Deployment (participants):** Apr 2019 - Sep 2019

# 1.3. Key Milestones



There have been a **series of enhancements and innovations** in SPEI. It has evolved from a non real time payment system to a fast batch processing system (hybrid settlement). The system has also expanded its operating hours and participation criteria to meet the growing needs of the Mexican market



Note: Above list is not exhaustive

## 2. Business and Operating Model

### Chapter sections:

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



Source: Banco de Mexico | Primary Interviews

### Chapter Summary:

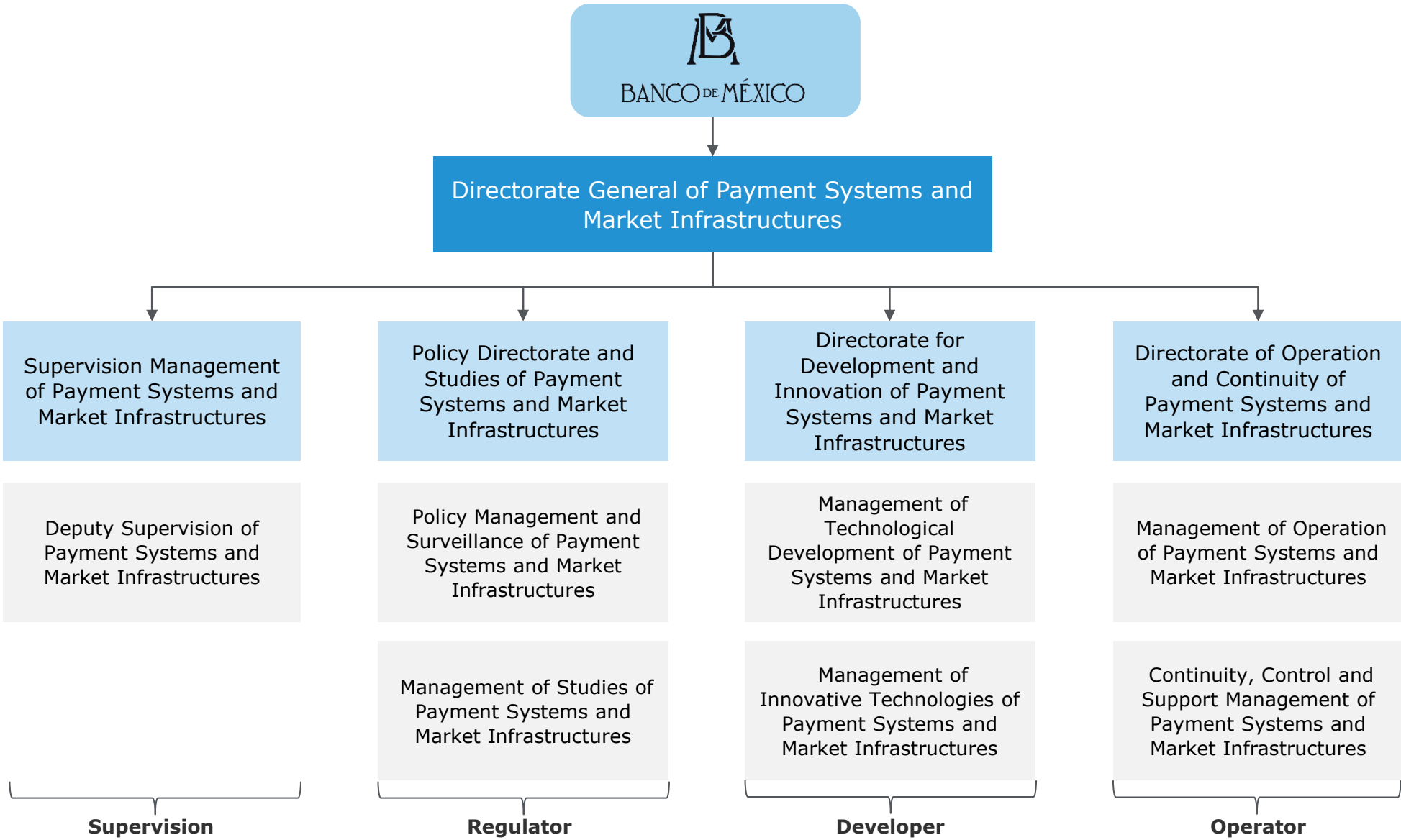
- Banco de Mexico is the owner of SPEI. The central bank performs the following main roles with respect to SPEI: **regulator, supervisor, operator, and user**
- SPEI allowed only banking institutions as participants during its launch in 2004. In 2006, Banco de Mexico allowed non-banking institution to connect with the system. Currently, direct participants in SPEI include **banks** and **non-bank financial entities** regulated by Banco de México and other Mexican financial authorities
- SPEI enables **consumers, businesses and government agencies** in Mexico to make payments in Mexican pesos between user accounts through the channels offered by the participating financial institutions
- SPEI allows **mobile number and debit card number (PAN) as aliases** for completion of payments
- SPEI supports **form-factor neutrality** and allows transactions across both traditional and alternate delivery channels although QR and NFC are supported only through the overlay service CoDi
- Pricing scheme developed for participants aims to cover the full costs of developing, maintaining and operating SPEI. It is combination of both **fixed fee** and **variable fee**. In regard to charges from participants to customers, Banco de Mexico allows **free pricing** for sending payments
- Banco de Mexico has not focused on the development of specific use cases, it is focused on **robust infrastructure development** to facilitate use case development. For example, it developed RTP functionality through CoDi which in turn has complemented the adoption of other use cases like Merchant Payments and Bill Payments



# 2.1. FPS Structure



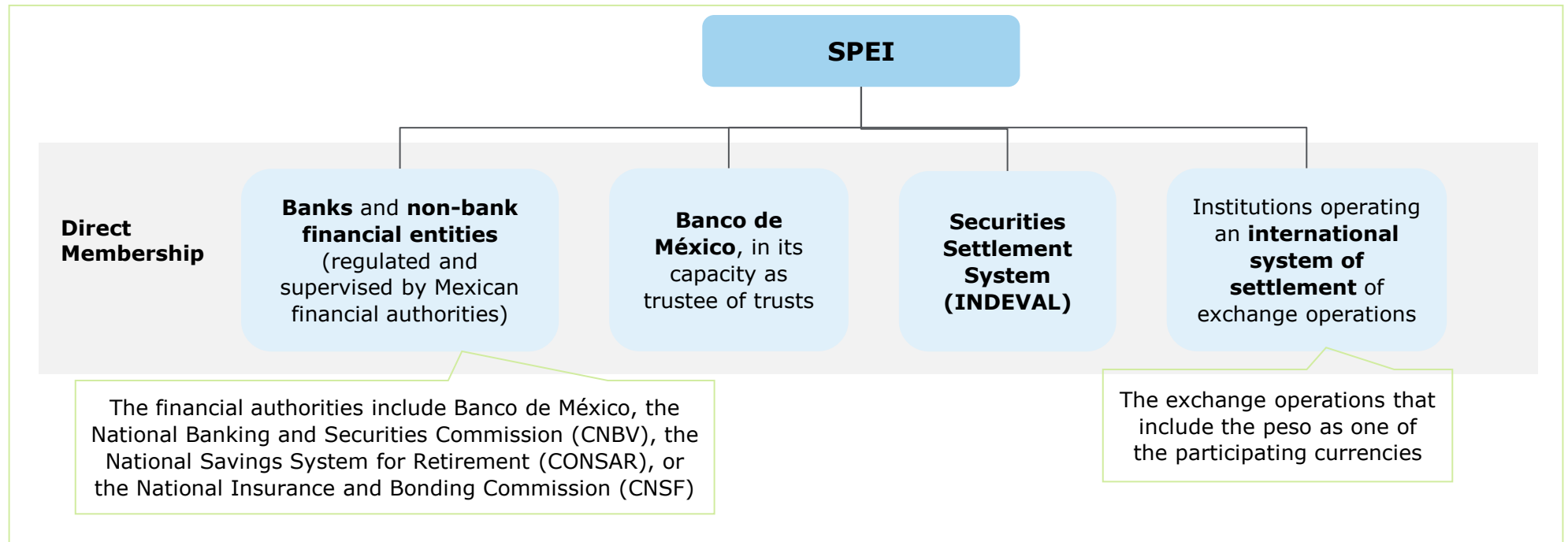
- Banco de Mexico acts as the owner, operator, regulator and supervisor of SPEI
- In 2019, Banco de Mexico restructured Directorate of Payment Systems to **Directorate General of Payment Systems and Market Infrastructures** to avoid conflict of interest and duplication of human capital in these specialized roles
- The central bank also created **different directorates** under the general directorate to fulfil its role as the regulator, operator and supervisor of payment system



## 2.2. Participants (1/2)



- All banks and non-bank financial entities regulated and supervised by **Banco de Mexico** and **other Mexican financial authorities** are eligible to participate in SPEI
- The access requirements are **essentially the same** for all participants considering the risk level, thus ensuring equal treatment for entry to the system



### Requirements for Participants

- Participants need to comply with legal, operational risk management and information security requirements to be eligible to participate in SPEI
- E-money provider's participation in SPEI is optional, but it is enforced in case any of the following criteria is met:
  - E-money provider processes more than 1.2 million of transactions, or sends or receives transactions equivalent to worth MXN 23.56 million at any time in a period of 12 consecutive months
  - E-money provider has more than 100,000 accounts in a period of 12 consecutive months with a positive balance and has sent at least one transaction during this period, or when customers have cumulative funds valued at MXN 1,963.4 million

### Membership Statistics

- Till 2018, SPEI had **98 direct participants** which were:
- 52 banking institutions
  - 36 non-bank financial institutions
  - CLS
  - INDEVAL (Securities Settlement System)



## 2.2. Participants (2/2)



- All the regulated financial entities willing to connect with SPEI have to satisfy the **operational risk management and information security requirements** established by the Banco de Mexico
- After satisfying all the requirements, participants **enter into a contract** with Banco de Mexico
- SPEI allows **full interoperability** between the participants i.e., transfer between banks and non-banks participants

### Regulatory Considerations

- According to the criteria for participation in the SPEI Regulation, the following entities may participate in SPEI:
  - Regulated financial institutions, clearing houses authorized by Banco de México and other entities regulated and overseen by Banco de México, the National Banking and Securities Commission (CNBV), the National Savings System for Retirement (CONSAR), or the National Insurance and Bonding Commission (CNSF), as well as any other entity authorized by Banco de México
- Banco de México requires institutions that intend to participate in SPEI to satisfy the operational risk management, customer protection, interoperability and information security requirements established by Banco de México
- Banco de México has a review procedure to determine whether participating institutions meet the legal requirements for participation established in the SPEI Regulation

- At the start of SPEI's operations in 2004, only banks were allowed to participate in the system. However, given the operative, technological, and risk-management characteristics of SPEI, **Banco de México has allowed non-bank financial institutions to participate in it since 2006**
- The **operational tests** that the participants must comply with, and the **legal conditions** established in the **contracts are essentially the same** for any participant, **ensuring equal access** to the all the potential participants
- Regarding requirements relating to operational risk management and information security, compliance is monitored through an in-site supervision program, both for participants and potential participants
- Banco de México may, at any time **suspend or terminate** the operation with a participant in case it **causes generation of risks** in the operation of payment systems; or else, when participant carries out operations contravening internal regulations of SPEI, or clauses of the contract executed to participate in SPEI

### Onboarding Process

For participation in SPEI, interested financial entity must communicate intention to Banco de México

- ✓ **Certification** testing to verify the technical requirements to operate in SPEI
- ✓ **Operational risk management and information security requirements**, as established by Banco de México
- ✓ **Documentation** (participants must enter a contract with Banco de México)

### Interoperability

- SPEI allows direct participation to all the participants; this allows interoperability between all the financial entities
- Transfer between banks and non-banks participants are allowed

# 2.3. Payment Instruments and Payment Types



- SPEI allows **credit transfer** and **e-money** as payment instruments and is fully interoperable for transactions between these payment instruments
- SPEI enables **consumers, businesses and government agencies** to make payments in Mexican pesos between any regulated financial institutions
- As SPEI is both high value and retail payment system, **no transaction limit** is defined by Banco de Mexico, though participants are free to set limits for any use case and transaction type

## Payment Instruments Supported

	<b>Credit Transfer</b> ✓	<b>Interoperability</b>
	<b>Direct Debit</b>	
	<b>E-money</b> ✓	

- Account to account interoperability is supported in SPEI through credit transfer
- SPEI also supports interoperability between payment instruments. Users can transfer money between bank accounts and e-wallets

## Payment types supported and transaction limit

<b>Transaction Types</b>	<b>Individual</b>	<b>Business</b>	<b>Government</b>
	✓	✓	✓
<b>Transaction Limit</b>	<p><b>As SPEI is both high value and retail payment system, no transaction limit defined by Banco de Mexico</b></p> <ul style="list-style-type: none"> <li>• However, participating financial institutions can set channel / transaction type / customer-wise limits, if they deem it necessary</li> <li>• Banco de Mexico introduced obligation for banks to offer retail payments (for payment orders below MXN 8000) on 24*7 basis</li> <li>• Transaction limit of <b>MXN 8,000 per transaction</b> has been set for CoDi transfers</li> </ul>		

## Transaction Currency

**Mexican  
Peso  
(MXN)**

## 2.4. Aliases, Access Channels and Agent Networks



SPEI allows **mobile number and debit card number (PAN)** as aliases for user accounts. SPEI supports **form-factor neutrality** and allows transactions across both traditional and alternate delivery channels. Agent networks are not supported in SPEI

### Aliases

- Apart from CLABE numbers, SPEI allows **mobile number and debit card number (PAN) as aliases** or proxy for completion of payments. This is done in a decentralized database as customers have to link their mobile number with their bank
- For completing a transaction, customers have to also input reference number beneficiary bank name and concept/reason for payments, as the database is not centralized
- **No additional rules and regulations** issued by Banco de Mexico for payments through alias as it already follows **strong customer authentication** standards (Two-factor authentication)
- Banco de Mexico is considering to allow national identity number as an alias for CoDi transfers

#### Procedure to link a mobile phone number to a bank account

Each participant is free to determine its own linking procedure. However, in general terms, the procedure to link a mobile phone number to a bank account includes the following steps:

- The user must request the service directly at the bank branch or by electronic media such as internet or mobile banking. In case of mobile banking, it must be done from the number that is going to be linked to the account. This request is free of charge
- The bank will have to notify its user that the mobile phone number has been linked to the account, no longer than one business day, after the request is received

#### Major obligations for participants while linking a mobile phone number to a bank account

- Notify the customer when the mobile phone number registered to the account has been linked, cancelled or changed
- Participants cannot request that the mobile phone service be provided by a specific company to link the mobile phone number to an account

### Access channels



**Branch**



**ATM**



**Internet Banking**



**Mobile Banking/Apps**



**QR**



**NFC**

- SPEI supports **form-factor neutrality** and allows transactions across both traditional and alternate delivery channels
- QR and NFC are supported using the overlay service CoDi

### Agent Networks

- Agent networks (assisted mode of transfer) are not supported in SPEI

## 2.5. Scheme Pricing and Fee Structure



Pricing for any payment system is an important aspect that directly affects the adoption of the system. Banco de Mexico has adopted a pricing scheme which **aims to cover the full costs** of developing, maintaining and operating SPEI without affecting its adoption adversely



1

### Fee charged by Banco de Mexico

- Prices charged by Banco de Mexico to participants **reflect marginal zero processing costs**, to incentivize among participants an efficient use of SPEI and reduce entry barriers
- In order to incentivize SPEI adoption and recover the costs involved in operating this system, Banco de México has established a scheme in which participants pay Banco de Mexico **a fixed fee that allows them to send and receive an unlimited amount of payments**
- This fixed fee varies for different participants and is calculated by distributing among participants the system costs on the basis of the **relative proportion of each participant's payments** in the total number of payments done through the system during a **specific period (last 5 years)**
- Participants must also pay an operations fee, calculated on the basis of the number of returns for which a participant is liable, money transfer orders done through CLS, and the amount of bytes retransmitted by SPEI at a participant's request

2














### Fee charged to users/payee





- In regard to charges from participants to customers, Banco de Mexico forbids charges for receiving payments, but it allows participants to **decide user charges for sending payments**
  - All the participants are required to **register their customer fees** at Banco de Mexico
- Fee structure for CoDi:**
- Banco de Mexico has **waived off** end user charges including MDR for payments through CoDi. Participants **do not charge** any fee to both sender and receiver











## 2.6. Use Cases / Services










Banco de Mexico has not focused on the development of specific use cases, it is focused on infrastructure development to facilitate use case development. For example, it developed RTP functionality through CoDi, which in turn has complemented adoption of use cases like Merchant Payments & Bill Payments

 <b>Request to Pay</b>																			
<ul style="list-style-type: none"> <li><b>Request to pay functionality on SPEI is provided on a 24/7 basis by CoDi</b></li> <li>CoDi's introduction has resolved problem of inputting a lot of information as <b>security elements</b> are embedded in the RTP message, which is sent to customer for authentication</li> <li>Once a message is received, user will be redirected in the app to last step of the sending process of a traditional SPEI transfer order in which all the information of the recipient account has been pre-populated and only the final validation by the buyer is required</li> <li>Banco de Mexico has mandated banking institutions that offer a mobile phone application and have <b>more than 3000 accounts</b> to provide RTP functionality</li> </ul>	<table border="1"> <thead> <tr> <th colspan="2">Payment Instruments</th> </tr> </thead> <tbody> <tr> <td colspan="2">Credit transfer, E-money</td> </tr> <tr> <th colspan="2">Access Channels</th> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>Mobile</td> <td>Internet</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td>QR</td> <td>NFC</td> </tr> <tr> <th colspan="2">Pricing Scheme</th> </tr> <tr> <td colspan="2"> <ul style="list-style-type: none"> <li>No charges on using CoDi</li> </ul> </td> </tr> </tbody> </table>	Payment Instruments		Credit transfer, E-money		Access Channels				Mobile	Internet			QR	NFC	Pricing Scheme		<ul style="list-style-type: none"> <li>No charges on using CoDi</li> </ul>	
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 <b>Bulk / Batch Payments</b>															
<ul style="list-style-type: none"> <li>Bulk/Batch payments (e.g., salaries, etc.) are supported <b>using the third-party clients</b>. These clients are used to sequence the bulk payments into a transaction with multiple payment orders</li> <li>All the participant banks are required to <b>appoint third party client</b> for this purpose to facilitate bulk/batch payments</li> </ul>	<table border="1"> <thead> <tr> <th colspan="2">Payment Instruments</th> </tr> </thead> <tbody> <tr> <td colspan="2">Credit transfer</td> </tr> <tr> <th colspan="2">Access Channels</th> </tr> <tr> <td colspan="2"></td> </tr> <tr> <td colspan="2">Internet</td> </tr> <tr> <th colspan="2">Pricing Scheme</th> </tr> <tr> <td colspan="2"> <ul style="list-style-type: none"> <li>No special charge</li> </ul> </td> </tr> </tbody> </table>	Payment Instruments		Credit transfer		Access Channels				Internet		Pricing Scheme		<ul style="list-style-type: none"> <li>No special charge</li> </ul>	
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 <b>Merchant Payments</b>																			
<ul style="list-style-type: none"> <li><b>Merchant Payments have been allowed in SPEI</b>. Although it had seen limited uptake in adoption as users have to input an array of information for a transaction</li> <li>CoDi allows merchants to initiate RTPs from registered servers (allowing any type of e-commerce) or mobile phone applications, which could be developed <b>by the Banco de Mexico, a financial institution or any other PSPs</b></li> <li>Once the RTP message is generated, CoDi allows for three ways of transferring the amount, using, QR codes, NFC and through the internet</li> </ul>	<table border="1"> <thead> <tr> <th colspan="2">Payment Instruments</th> </tr> </thead> <tbody> <tr> <td colspan="2">Credit transfer, E-money</td> </tr> <tr> <th colspan="2">Access Channels</th> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td>Mobile</td> <td>QR</td> <td>NFC</td> </tr> <tr> <th colspan="3">Pricing Scheme</th> </tr> <tr> <td colspan="3"> <ul style="list-style-type: none"> <li>No special charge on using SPEI</li> <li>No charges on using CoDi</li> </ul> </td> </tr> </tbody> </table>	Payment Instruments		Credit transfer, E-money		Access Channels					Mobile	QR	NFC	Pricing Scheme			<ul style="list-style-type: none"> <li>No special charge on using SPEI</li> <li>No charges on using CoDi</li> </ul>		
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### 3. User Adoption



#### Chapter Summary:

- Being the most prominent system in Mexico, SPEI is used for both high value and retail transactions. In 2019, SPEI has seen **~2% growth** in medium to high value payments vis a vis **~70% growth** in retail payments
- Till October 2020, overlay service CoDi had **5.7 million** registered users and processed cumulative **transactions worth MXN 857 million**
- There is scope for uptake in retail payments through SPEI as Mexico is still cash dependent economy with **85-90% of retail payments** are done still in paper currency

### 3. User Adoption

Being the most prominent system in Mexico, SPEI is used for both high value and retail transactions. SPEI has seen **2% growth** in medium to high value payments (>MXN 30k) which is comparable with economic activity growth. In terms of retail payments, despite growing **58% in 2019**, there is huge scope for increasing the adoption as currently **85-90% retail payments are primarily cash payments**.



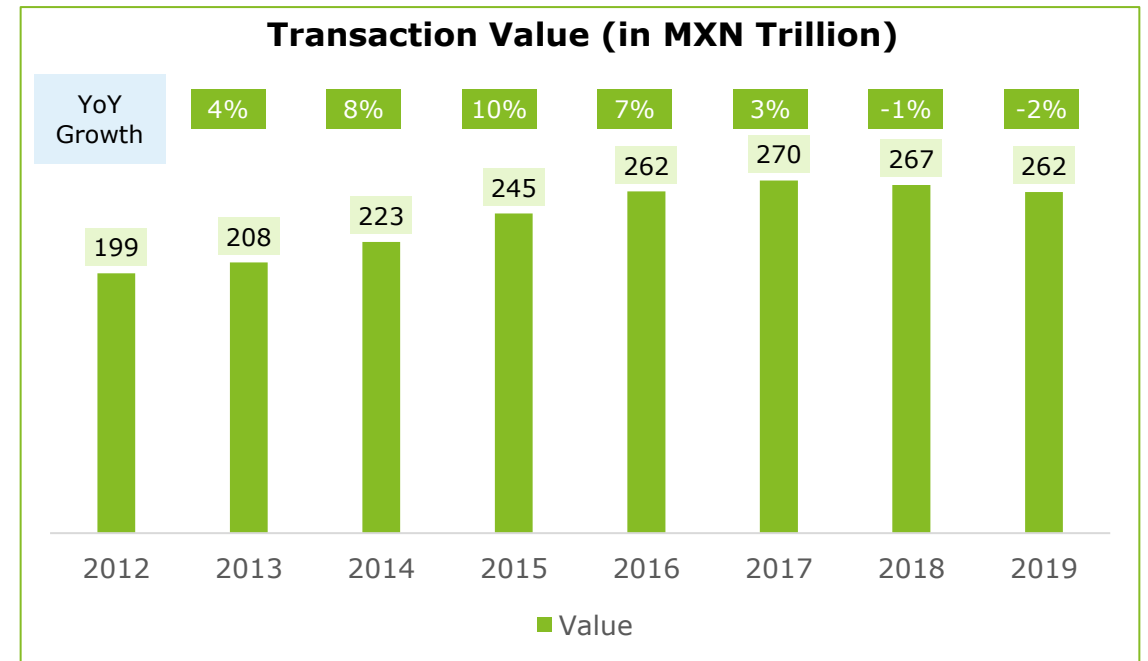
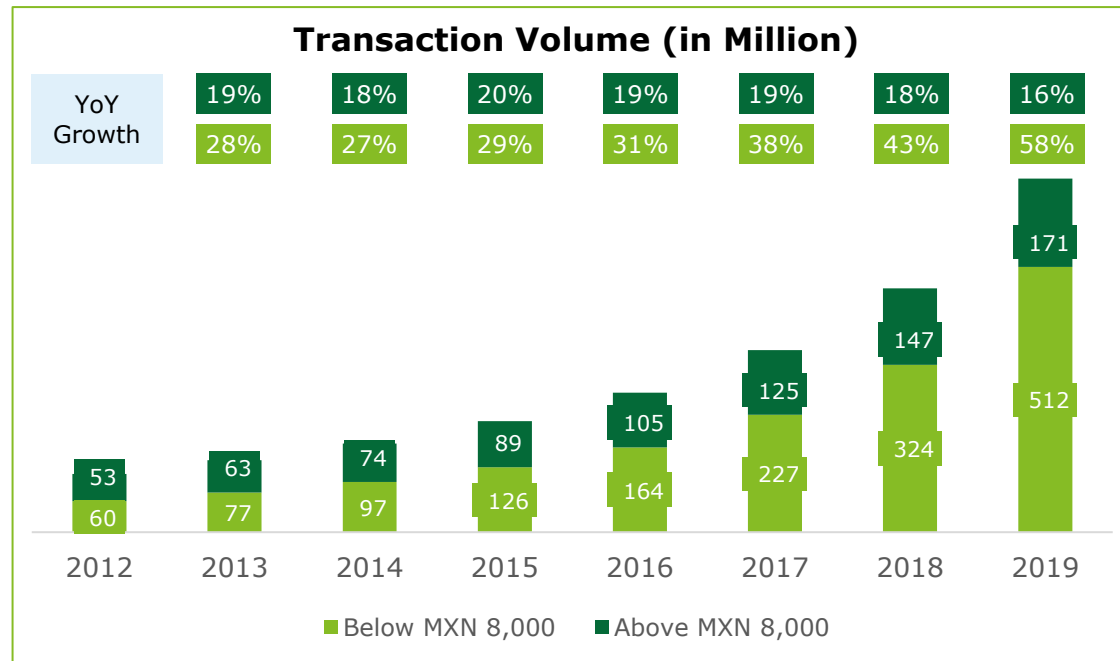
**SPEI processed the highest daily transaction volume of approximately 11 million payment orders without its capacity being fully utilized**

Banco de Mexico has extended system operating hours and reduced threshold amount for a transaction through SPEI over the years. Overlay service CoDi is further expected to boost user adoption especially for retail payments. Till October 2020, CoDi has processed **0.8 million** cumulative transactions worth **MXN 857 million**

**CoDi was launched as an overlay service to facilitate easy and fast retail payments**



**5.7 million registered users till October 2020**





## 4. Technical Details and Payment Process

### Chapter sections:

4.1. Technical Details | Messaging Format and QR Codes

4.2. Technical Details | APIs and Customer Authentication

4.3. Payment Process (Customer Registration, Transaction Fulfilment, Liquidity Management and Settlement)



### Chapter Summary:

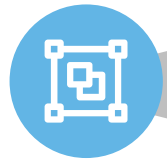
- SPEI has adopted **proprietary messaging standard** designed and developed by Banco de México
- Banco de Mexico considers its proprietary standard quite efficient and has **no immediate plans for migration** to ISO 20022. Additionally, the SPEI participants have also not expressed a desire to adopt any international standard
- Banco de Mexico developed **customized QR specifications** to account for enhanced security measures
- SPEI allows use of **limited purpose APIs** for value added service such as checking transaction status, fetching transaction details, etc. Although it does not support transaction instructions through APIs or web services
- CoDi, the overlay service also runs on an array of APIs or web services, which can be adopted by the participants
- Banco de Mexico has established **two factor authentication** for its service. These standards comply with the strong customer authentication standards. It is similar to European standards (something you have, something you are, something you know)
- The payment process includes one-time customer registration, payer-payee transaction fulfilment and inter-participant settlement
- SPEI has a **hybrid settlement scheme** (every 3 seconds or a configurable number of payment messages). SPEI uses a multilateral offsetting algorithm running in quick successions to clear and settle transactions



## 4.1. Technical Details | Messaging Format and QR Code



SPEI has adopted **proprietary messaging standard** designed and developed by Banco de México. **Customized QR specifications** have been developed and merchant presented static and dynamic QR codes are allowed for payments



### Messaging Format

#### Proprietary – Lean content

- Communication between SPEI and its participants is based on a **proprietary protocol** designed and developed by Banco de México.
- This protocol was established with the purpose of making the exchange of information efficient and includes security checks that validate the authenticity of the participant that generates instructions
- An assessment was carried out by Banco de Mexico to compare ISO 20022 with currently used proprietary standard; the **weight/size ratio** between these standards was **7:1**
- Banco de Mexico **considers its proprietary standard quite efficient** and has no immediate plans for migration to ISO 20022. Additionally, the SPEI participants have also not expressed a desire to adopt to an international standard
- Operations held with CLS Bank are managed in SPEI through SWIFT, so Banco de México translates the messages from SWIFT to SPEI protocol and vice versa



### QR Code

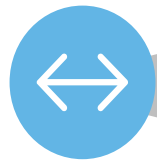
#### Static and Dynamic QR Codes

- QR codes for retail payments supported using **overlay service CoDi**, which was launched in September 2019
  - **Custom-built specifications** were preferred for Mexico's CoDi to cater to customized needs
  - While the strengths of EMVCo's specifications were acknowledged, CoDi developed their specifications to account for **enhanced security measures**
  - Existing specifications were observed to be designed to cater to the needs of more developed countries with limited fraud.
  - The main security elements set by Banco de Mexico were:
    - Avoid the impersonation of individual or business entity
    - Encryption of request to pay (RTP) messages to avoid the information security breach
  - Onboarding happens through an electronic certificate to eliminate the possibility of change in name in an RTP message
- Currently only **merchant presented codes** are supported. Development of customer presented QR codes is under development

## 4.2. Technical Details | APIs and Customer Authentication



SPEI allows use of **limited purpose APIs** for value added service such as checking transaction status, fetching transaction details, etc. Banco de Mexico uses two factor authentication for its services which complies with the strong customer authentication standards



### APIs

#### Limited APIs provided by Banco de Mexico

- SPEI allows use of **limited purpose APIs** for value added service such as checking transaction status, fetching transaction details, etc. It **does not support transaction instructions** through APIs or web services
- CoDi, the overlay service also runs on an array of APIs or web services, which can be adopted by the participants
- RTP message generation API or web service on CoDi is **open to all the participants in SPEI** and **interested third parties**. Although availability of a particular web service for the participants might vary based on nature of that web service
- Banco de Mexico is **considering to allow third party open APIs access**. The central bank is currently analyzing the impact of allowing Open API access to third parties



### Customer Authentication

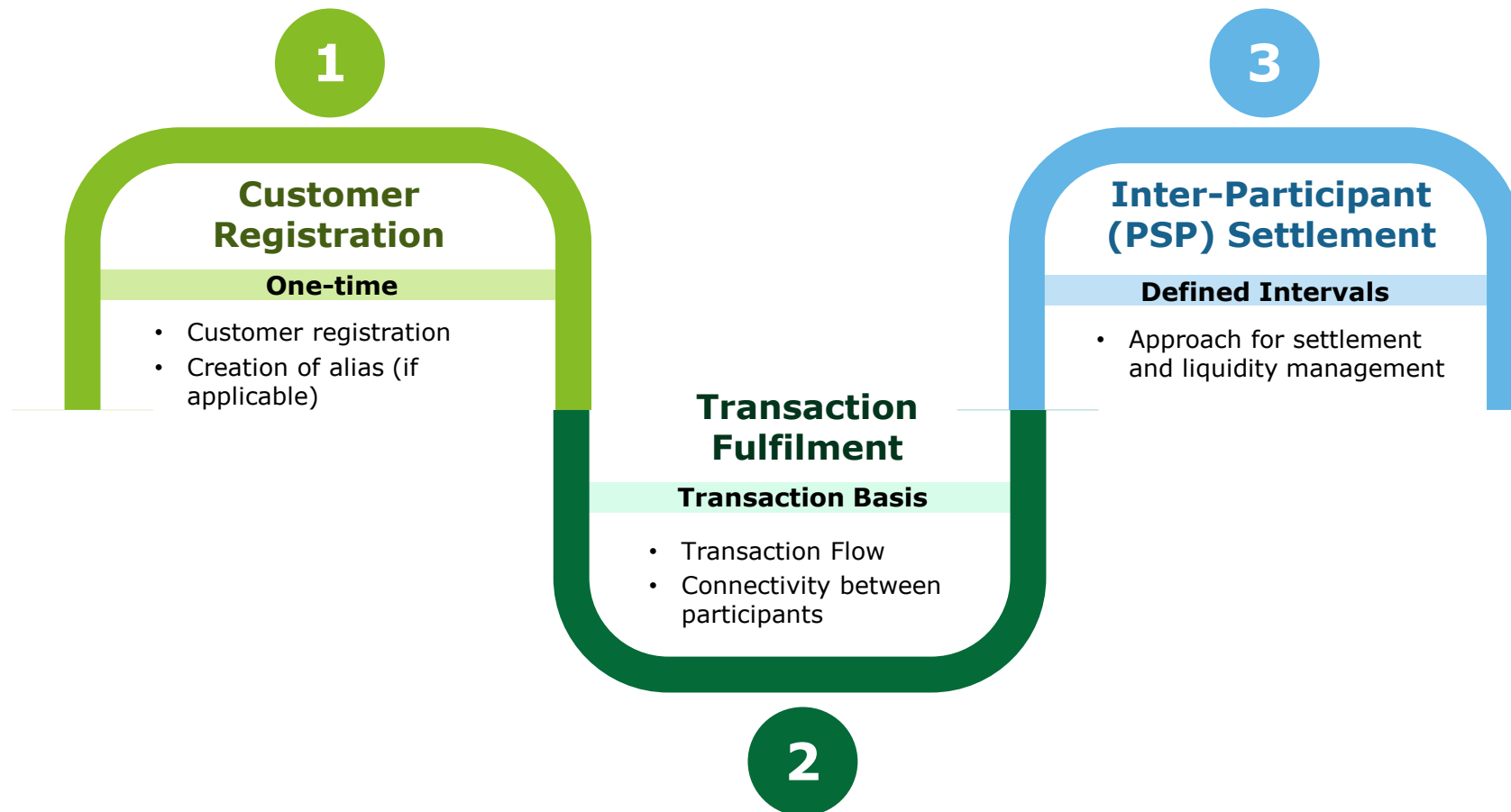
#### Two factor authentication

- In order to send a SPEI transfer through electronic channels, end-customers have to use a **two-factor authentication (2FA)**. These standards comply with **strong customer authentication standards**
- All SPEI participants are required to provide secure electronic channels and use two factor authentication schemes according to regulatory guidelines from **National Banking and Securities Commission (CNBV)** and **Banco de Mexico**:
  - CNBV has issued guidelines for credit service institutions regarding the customer authentication standards. These institutions need to adopt the 2FA for customer authorization for all the services including SPEI
  - SPEI Rules published by Banco de Mexico establish requirements for institutions other than credit services institutions. Also, SPEI Rules reinforce the guidelines for banks and credit services institutions issued by CNBV
- CNBV is considering the homogenization of customer authentication standards as these standards currently vary based on nature of the participant

## 4.2. Payment Process



The steps in the payment process include **one-time customer registration, payer-payee transaction fulfilment and inter-participant settlement**. Subsequently, various aspects related to these areas are covered





## 4.2. Payment Process | Customer Registration



Below is the typical process for customer registration process for SPEI and CoDi. User can register for SPEI using channels such as bank branches, mobile banking application and internet banking application whereas CoDi allows user registration only through mobile phones

- Customers need a financial institution account with internet account management service or mobile banking service for SPEI payments. Users also need standardized bank code (CLABE) of the account or debit card number or the cell phone number (10 digits) associated with the account of the receiver
- SPEI registration can be performed using channels such as **bank branches, mobile banking and internet banking**



Users can register for CoDi using mobile phones

### CoDi Registration process

Step 1: User chooses the CoDi option in mobile application and accepts the terms of use agreement

Step 2: User enters the registered mobile number with account

Step 3: A security code will be sent to the user's mobile phone for confirmation of registered mobile number

Step 4: User chooses the account for making payments through CoDi

Step 5: User's account is validated; can take up to 5 minutes

Once the account is verified, user will be able to access CoDi menu

User can access the service in one of three ways, depending on mobile device: with a username and password generated in digital banking, with Face ID, or with Touch ID, to then sync the device with CoDi

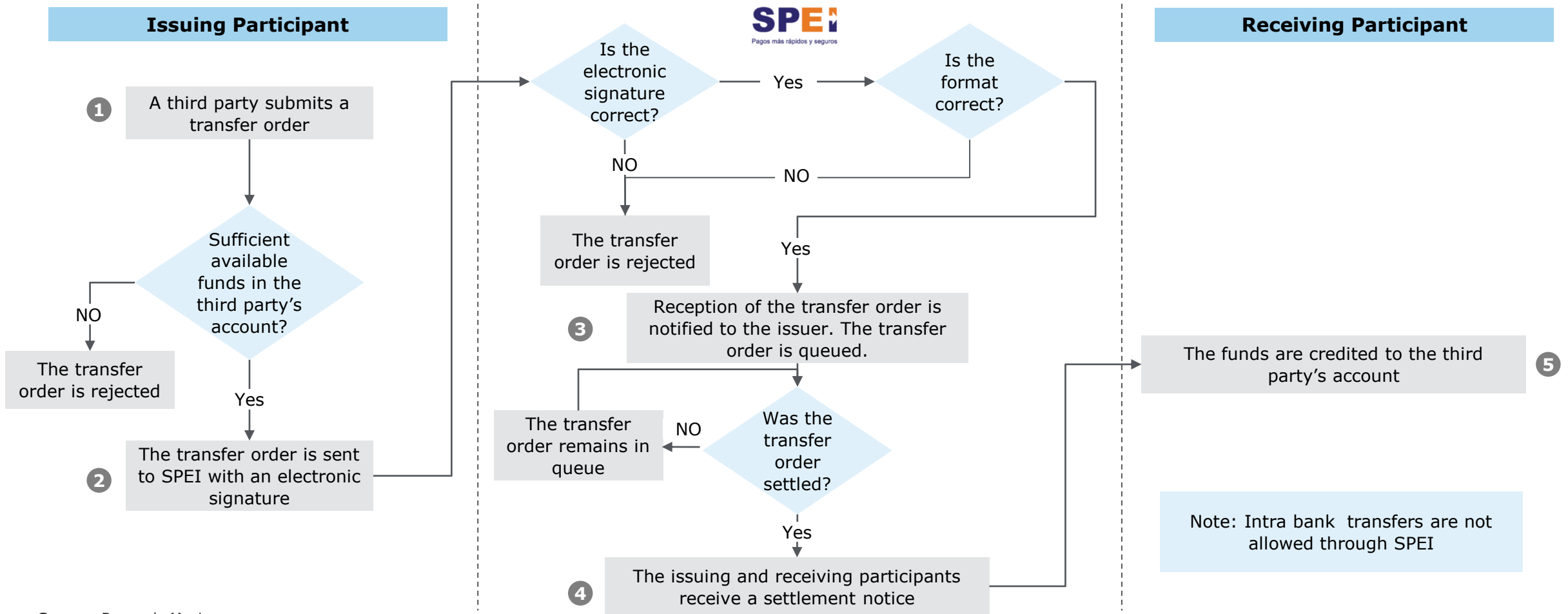


# 4.2. Payment Process | Transaction Fulfilment



Typical transaction fulfilment process that is followed for **SPEI third party to third party transactions** has been described below. Intra-bank transfers are not supported by SPEI

When SPEI receives a payment instruction, it verifies the size and structure of the message and the validity of the digital signature. If the payment structure is correct and the signature of the issuing bank is valid, the payment orders in the instructions enter the settlement process that identifies a set of payments that can be settled without overdrawing the issuing bank's balance



Source: Banco de Mexico



## 4.2. Payment Process | Liquidity Management and Settlement



SPEI functions practically in real-time and has a **hybrid settlement scheme** with an algorithm that helps make efficient use of participants' liquidity. SPEI uses a multilateral offsetting algorithm running in quick successions to clear and settle transactions in a topology chosen by the initiating participant

### Direct Member Settlement

**Approach**



**Hybrid**

**Type | Time**

Hybrid Settlement

Every 3 seconds or a configurable number of payment messages

- SPEI is a near real-time **hybrid settlement system** for payments. It uses a multilateral offsetting algorithm running in quick successions 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. The transactions that cannot be settled because of lack of liquidity remain in the queue except CoDi transfers
- At the start of operations, participants transfer funds from their Account Holders Service System (SIAC) account 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
- During the operating day, participants' accounts can be funded through transfers settled in their favor or through transfers between SIAC and SPEI
- Participants can classify transfer orders through SPEI as high priority. SPEI attempts to settle high priority payment orders first, providing access to the balance reserved for this purpose
- Liquidity transfer operations with SIAC can be conducted from 19:00 hours to 18:00 hours of the following banking day. Between 18:00 and 19:00 hours, Banco de México carries out operations for the implementation of monetary policy
- SPEI Rules establishes maximum processing times for transactions. Participants are required to adequately develop their infrastructures to address throughput needs related to the timely credit of beneficiary accounts based on SPEI rules and estimated payment orders

## 5. Governance Framework

### Chapter sections:

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



### Chapter Summary:

- The legal framework supporting SPEI activities is comprised of the **Banco de México's Law**, and the **Payments System Law**. Additionally, Circular No. 13/2017, Circular 14/2017 (SPEI Rules) and the SPEI Operating Manual complete SPEI's legal basis
- SPEI is subject to the governance arrangements of Banco de México, supported by the Banco de México Law, the Banco de México Internal Regulations, and the Banco de México Administrative Units Ascription Agreement. For SPEI, the responsibilities fall under the **Directorate General of Payment Systems and Market Infrastructures**
- Banco de México has a **risk management framework** to identify and manage the risks to which SPEI is exposed. This framework enables Banco de México **to identify** and **routinely assess** the risks that might arise from SPEI's operation, from its interdependencies with other systems and the **risks that participants pose** to the system
- SPEI is **not exposed to credit risk** as it does not extend credit to participants, nor does it establish procedures for participants to extend credit among themselves. The FPS is **not exposed to liquidity risks** as well, since it only settles payments that do not rely on overdrafts of their accounts
- SPEI rules establish guidelines on the **service level** for the end-customers. Guidelines on compensation of damages have been issued in SPEI rules and SPEI participant agreements

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



SPEI legal basis are comprised of the Banco de México's Law and the Payments Systems Law. Circular No. 17/2010 (SPEI Rules), the Operating Manual, and the Contingency Manual for Operations with CLS Bank International (CLS) complete SPEI's legal basis.

### Institutional and Governance Framework

#### Legal Framework:

Payments System Law, Banco de Mexico's Law and other applicable financial legislations

#### Regulator and Overseer: Banco de Mexico

Governor and Board of Governors

#### Owner and Operator: Banco de Mexico

Directorate General of Payment Systems and Market Infrastructures

- The transactions that take place through payment systems in Mexico are under the Payments Systems Law, as well as under the financial legislation applicable in each case. In all instances, these rules are federal in nature. The legal basis of SPEI consists of:
  - **Payments Systems Law and applicable financial legislations**
  - **Circular 13/2017**
  - **Circular 14/2017 (SPEI Rules)**
  - **SPEI's Operation Manual**
  - **Contracts between Banco de México, in its role as SPEI's administrator, and its participants**
- **Banco de México's Law which regulates the central bank, contains several provisions with regards to payment systems.** Following are the key elements covered in the Law:
  - Promotion of a sound development of the financial system and the proper functioning of payment systems (Article 2)
  - The functions of Banco de México include the regulation of payment systems (Article 3)
  - Power to issue provisions whose aim is to promote the sound development of the financial system, the proper functioning of payment systems, and protection of the public's interests (Article 24)
  - Power to regulate credit institutions' funds transfer services (Article 31)
  - Power to monitor financial intermediaries and financial entities subject to its regulation (Article 35 Bis)
- The legal basis of SPEI underpins the system's activities and gives them a high degree of legal certainty. Its main features are described below:
  - **Settlement finality and irrevocability** Chapter II of the Payments Systems Law defines the conditions to achieve settlement finality and irrevocability, which occur once a payment has been accepted by the system. The provisions of the Payments Systems Law on settlement finality are further articulated in the SPEI rules (Circular No. 14/2017)
  - **Netting arrangements**
  - **Clarity of the Legal Basis**
  - **Communication of the legal basis**
  - **Enforceability in all relevant jurisdictions** All Mexican financial regulation is federal in nature, so regardless of where participants or administrators are located, operations among them and their actions are subject to the same laws and the same authority



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



Being the designated authority under the Payments Systems Law and Banco de Mexico's Law, the Central Bank has issued various regulations and guidelines for payment systems and participants, and has also been performing the oversight function through offsite and onsite inspections

### Institutional and Governance Framework

#### Legal Framework:

Payments System Law, Banco de Mexico's Law and other applicable financial legislations

#### Regulator and Overseer: Banco de Mexico

Governor and Board of Governors

#### Owner and Operator: Banco de Mexico

Directorate General of Payment Systems and Market Infrastructures

#### Payment System Oversight and supervision:

- The Payments Systems Law empowers Banco de México to issue provisions to promote the sound development of the financial system and the proper functioning of the payment systems, as well as protect the public interest
- As a regulator, the central bank both proposes and issues regulation. Additionally, it authorizes the internal rules governing the operation of financial market infrastructures (FMIs) and their participants
- Banco de Mexico has an institutional planning scheme which includes defining medium-term priorities for the institution (planning horizon of five years). Among the institutional priorities, the most directly related to SPEI are the following:
  - To foster the use of electronic payment systems by promoting a regulatory framework that boosts efficiency and competition
  - To strengthen the internal control scheme, risk management, as well as physical and information-security of the Bank
- '**Principles of Financial Market Infrastructure**' (PFMI) is implemented in Mexico for regulation and supervision of FMIs
- Oversight and supervision is primarily a **combination of offsite supervision and onsite inspection**
  - Offsite supervision:
    - Supervision activities include the collection and analysis of qualitative and quantitative information, monitoring of operations and market development, and authorization of internal rules and operating manuals of FMIs
    - Whether the operation and administration of each FMI adheres to best practices for its type and thus ensure its secure and efficient operation
    - Ensure that FMIs comply with the best practices established in the PFMI; to achieve this, the central bank uses the assessment methodology developed by the CPMI and IOSCO
  - Onsite supervision: Banco de México uses on-site visits to inspect compliance with regulations regarding payment systems so that supervision activities can be conducted in a deeper and more thorough manner

#### Governance and oversight

- SPEI is subject to the governance arrangements of Banco de México, supported by the Banco de México Law, the Banco de México Internal Regulations, and the Banco de México Administrative Units Ascription Agreement
- SPEI's responsibilities are entrusted to the Governor, the Board of Governors and the administrative units that report to them. In this regard, Banco de México Law establishes the following:
  - The performance of the functions and administration of Banco de México shall be trusted to a Board of Governors and a Governor within their respective scopes of duty (Article 38)
  - The powers of the Board of Governors (Article 46)
  - The powers of the Governor (Article 47)

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



SPEI is subject to the governance arrangements of Banco de México, supported by the Banco de México Law, the Banco de México Internal Regulations, and the Banco de México Administrative Units Ascription Agreement. For SPEI, the responsibilities fall under the **Directorate General of Payment Systems and Market Infrastructures**

### Institutional and Governance Framework

#### Legal Framework:

Payments System Law, Banco de Mexico's Law and other applicable financial legislations

#### Regulator and Overseer: Banco de Mexico

Governor and Board of Governors

#### Owner and Operator: Banco de Mexico

Directorate General of Payment Systems and Market Infrastructures

#### Governance arrangement mechanism:

- The Banco de México Administrative Units Ascription Agreement defines the lines of responsibility. **For SPEI, the responsibilities fall under the Directorate General of Payment Systems and Market Infrastructures**
- Additionally, other administrative units of Banco de México are related to the system, such as the Directorate General of Information Technology, the Directorate General of Comptroller and Risk Management, the Directorate General of Legal Affairs, and the Audit Unit
- Banco de México's Internal Regulations dictate the functions of each administrative unit. **As for the functions related to payment systems, including SPEI, the Directorate General of Payment Systems and Market Infrastructures has the following attributions:**
  - Monitor the behavior of the payment systems.
  - Design, prepare and implement the policies for the development and proper functioning of the payment systems
  - Develop and maintain the payment systems that are administered by Banco de México, as well as other computer systems that are necessary for the correct operation of the former and keep them technologically updated
  - Process and operate the payment systems and provide advisory and support services to their participants
  - Execute and monitor the proper functioning of the payment systems administered by the Bank
  - Arrange, execute and monitor the transactions of the participants of the payment systems administered by the Bank.
  - Establish policies to ensure the operational continuity of the payment systems
  - Participate in the issuance of provisions, authorizations, opinions, observations and vetoes in the matters of digital signatures, payment systems, exchange fees and commissions for the use of means of payment.
  - Supervise compliance with the provisions, authorizations, observations and vetoes outlined in the previous section, as well as the fulfillment of delivery and accuracy of information requirements that the Bank requests of institutions and financial intermediaries in matters within its scope
  - Provide the Directorate General of Financial System Issues and the Directorate of Regulation and Supervision, within the scope of its duties, with the necessary documents and information so that they may impose sanctions or corrective measures in terms of the Law, together with other competent Directorates
- Banco de Mexico has established advisory committees to fulfil the functions entrusted to it. Among the different committees that deal with issues closer to SPEI are the **Risks Committee** (decision-making), **Security Committee** (consulting), **Committee on Information Technology** (consulting) and **Audit Committee** (referred to in the Internal Regulations)

## 5.2. Risk Management



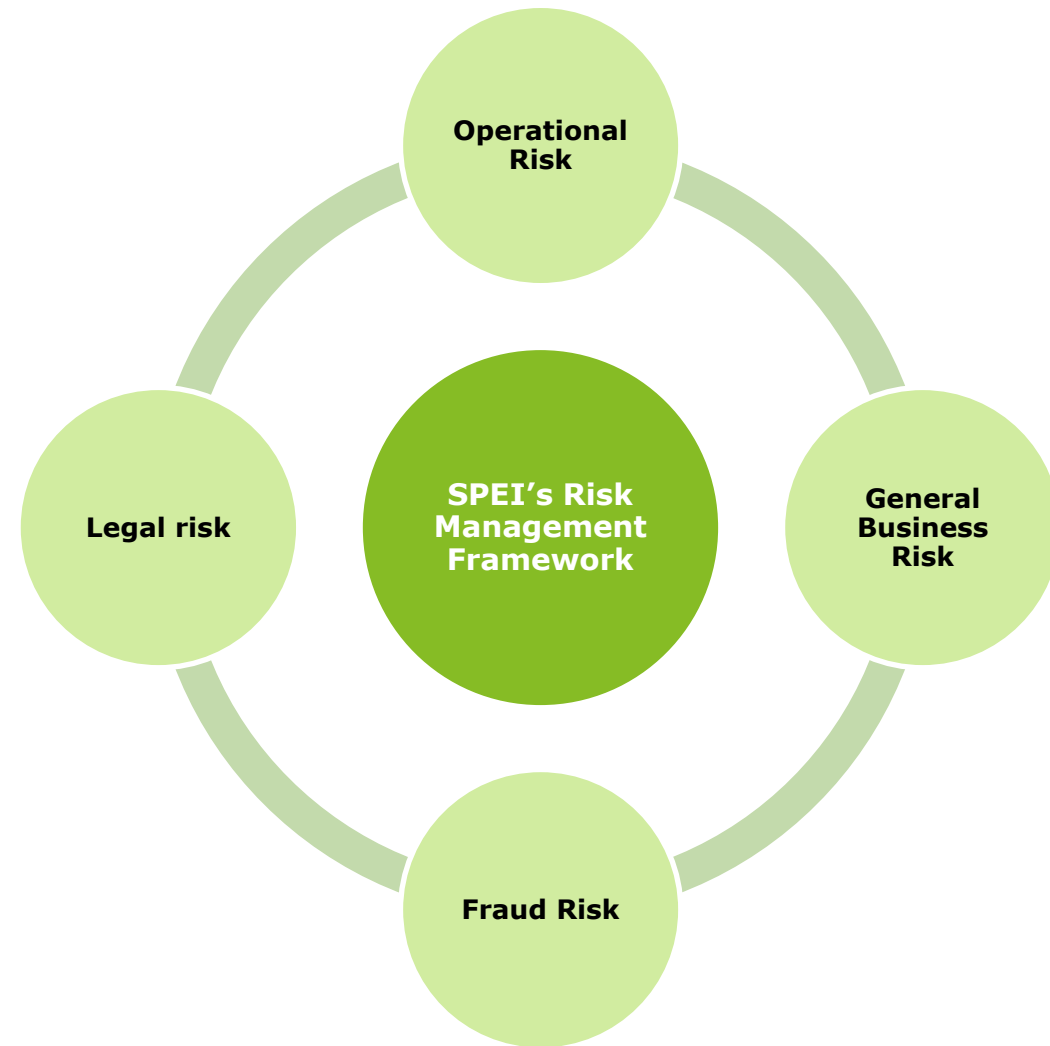
Banco de México has a **risk management framework** to identify and manage the risks to which SPEI is exposed. Banco de Mexico's senior management has established policies, procedures, and controls consistent with SPEI's risk management framework

### Risk Management Framework:

- Banco de México has a risk management framework to identify and manage the risks to which SPEI is exposed
- This framework enables Banco de México to identify and routinely assess the risks that might arise from SPEI's operation and the risks that participants pose to the system
- In addition to basis regulatory requirement, SPEI is aligned with **PFMI guidelines** of applicable principles. This ensures that SPEI has effective systems and controls in place to identify, measure, monitor, manage and report risks arising in and across its operations, business and business enabling functions
- Banco de México reinforces the assessment by internal and external program audits to support the risk's identification

### Identification of risk scenarios:

- Banco de México periodically evaluates the risks that could affect its ability to perform or provide services as expected, particularly material risks reported in the monitoring process, and the observations arising from internal and external audit programs
- Consequently, Banco de México has implemented preventive and corrective controls to minimize the effects of a materialized risk in the availability of SPEI and aims to ensure that the system has sufficient capacity in these scenarios



## 5.2.1. Credit and Liquidity Risk Management



SPEI is **not exposed to credit risk** as it does not extend credit to participants, nor does it establish procedures for participants to extend credit among themselves. SPEI is **not exposed to liquidity risks** as well, since it only settles payments that do not rely on overdrafts of their accounts

### Legal and Regulatory Basis

- In accordance with the **SPEI Regulation and its Operational Manual**, once SPEI settles a payment and sends a settlement notice to both the issuing and receiving participants, the transaction acquires the status of accepted transfer order which, by **the Payments System Law**, is final, irrevocable, enforceable and binding before third parties

### Credit and Liquidity Risk Mitigation

- SPEI is **not exposed to credit risk** as it does not extend credit to participants, nor does it establish procedures for participants to extend credit among themselves
- SPEI is **not exposed to liquidity risk** since it only settles payments that do not rely on overdrafts of their SPEI accounts. Participants cannot fail to comply with their obligations because the central bank does not extend credit on SPEI accounts
- SPEI requires its participants to keep sufficient funds that allow the appropriate flow of payments in the system. In this regard, participants are responsible for holding sufficient resources to settle their payments
- Despite not being exposed to credit and liquidity risks, these are considered significant by Banco de Mexico. It mitigates these risks through two mechanisms to provide banks with enough resources to enable them to settle their obligations promptly:
  - Obtain credit up to the value of assets that are deposited with Banco de México
  - Deposit liquid securities issued by the Federal Government, the Institute for the Protection of Bank Savings and Banco de México itself under a repurchase agreement
- SPEI runs an algorithm that determines which payments can be settled with the participants' balances held at the moment. To better manage their liquidity, participants can reserve part of their balances. The liquidity saving algorithm first tries to settle high-priority transfer orders, which can use the reserved account balance

### Settlement finality and guarantee mechanism

- Finality of accepted transfer orders is guaranteed **regardless of insolvency procedures** or **judicial sanctions** concerning civil or commercial matters in which the participant may have engaged, including any insolvency resolution or bankruptcy declaration concerning any participant
- Issuing participants are allowed to send instructions to cancel transfer orders. Nevertheless, the system **only cancels orders which have not been settled**, as settlement is final and irrevocable

## 5.2.2. Operational and Fraud Risk Management (1/2)



SPEI's operational risk management framework comprises a **continuous process** of analysis, evaluation and mitigation of risks. Risk management includes design & implementation of controls to mitigate the frequency & impact of a risk's occurrence & the periodical evaluation of the controls' effectiveness

### Defined guidelines and framework

- The **operational risk management framework** for SPEI comprises a continuous process of analysis, evaluation, and mitigation of risks. The risk analysis starts with the identification and evaluation of the risks in the processes; the evaluation considers the frequency of the risk materialization and its impact
- Once a risk has been assessed, it is determined whether it is acceptable considering the **risk tolerance policy established by Banco de México**. The risk tolerance policy, among other considerations, takes into account SPEI's availability goals, in addition to business continuity measures and controls that are implemented in the operation of payment systems
- Risk management includes the **design and implementation of controls** to mitigate the frequency and/or the impact of a risk's occurrence and the periodical evaluation of the controls' effectiveness
- Banco de Mexico has an automated risk management tool for mitigating operational risks. There is constant monitoring through timers and when system is not able to meet desired service level, back up system gets activated to ensure the business continuity of the system. There is no automated tool for fraud detection

### Operational risk management

- According to the institution-wide criteria and methodologies established by the Directorate General of Comptroller and Risk Management, each administrative unit is responsible for the identification and administration of the operational risks inherent to their processes
- **Directorate of Operation and Continuity of Payment Systems and Market Infrastructures** specializes in risk assessments and operational continuity measures

### Fraud risk management

- SPEI has two main fraud reporting mechanisms, which are based on three key components: prevention, detection and response. The mechanisms are summarized as follows:
  - **Alert system:** This was implemented in July 2018. The aim of the alert system is to exchange and notify information about potential fraudulent behaviors
  - **Co-operation agreement:** This was implemented in February 2018. It contains process and communication schemes among SPEI's participants for jointly managing frauds. It also keeps the rules and policies to correct and stop fraudulent behaviors

### KYC / AML

- **Ministry of Finance** and the **National Banking and Security Commission (CNBV)** are responsible for issuing the KYC/AML/CFT laws and regulations. Banco de Mexico has not issued any specific regulations for SPEI
- Banco de Mexico is considering issuing rules & regulations for indirect participation in SPEI. These guidelines will mandate fulfilment of certain KYC/AML requirements for participants which are connected with system through sponsor participants

## 5.2.3. Cyber Resilience and Data Management



As SPEI is the most prominent payments system in Mexico, Banco de Mexico has adopted several measures to ensure the cyber resilience of the system. These measures are **fully compliant with BIS cyber resilience guidelines**

### Cyber Resilience

- Banco de México has established institutional information security policies aligned with international standards, such as **ISO/IEC 27001**, a standard to manage information security
- The Information Technology Internal Administrative Rules define security guidelines for users, system operation and support, management of infrastructure services, and system and infrastructure development. Among other elements, these rules establish general policies on information security, access control, connection restrictions, backups, reports on security incidents, and monitoring and assessment of the infrastructure
- SPEI has **two back up systems** in case there are some security issues with main system. One of the backup system has all the functionalities of SPEI to ensure continuous operation in case of failure whereas other back system has critical functionalities of SPEI
- Another element is non-similar facility structure with provision of backups operating on different operating system. This has been done to ensure continuous operation of system in case one of the operating system fails or corrupts. There is also an provision of **SPEI Zero** which allows the system to operate with **limited liquidity available** with the participants in case of data corruption within the system
- Participants are able to connect clients for processing certain transaction types. In case they are not able to connect with their client, Banco de Mexico allows them to connect with backup clients. Also, participants can instruct most important or prioritized transaction on manual basis if they are not able to communicate it with the payment order
- Sensitive and relevant files related to SPEI are encrypted to protect their content. Additionally, there is a systems access control policy in place as a security measure. SPEI uses **digital signatures to protect the transactions** that the system processes. These mechanisms are based on international security standards for authentication, signature and encryption of information, such as:
  - X.509v3 (RFC 3280) standard for certificate's formats
  - PKCS #1 (RFC 2313) standard for RSA type private keys
  - PKCS #1 standard for the creation of digital signatures and its validations
- Banco de México has adopted **physical security policies** under the responsibility of the Directorate of Security, part of the Directorate General of Currency Issuance. These policies determine the procedures for access to high security facilities, entry and exit of goods, suppliers and contractors and the coordination of physical safety measures

### Data Management

- Banco de Mexico maintains transaction records for past years with the central database. **No additional regulations** have been issued by Banco de Mexico for the participants with regards to storage and sharing of transaction data

## 5.3. Dispute Resolution and Customer Complaints



SPEI rules establish guidelines on the **service level** for the end-customers. Fraud based disputes are handled by participants with the customers. Guidelines on **compensation of damages** have been issued in **SPEI rules and SPEI participant agreements**

### Dispute Resolution

- Guidelines on compensation of damages have been issued in **SPEI rules and SPEI participant agreements**
- As per SPEI rules, participants are also required to enter into a **collaboration agreement to protect senders of SPEI transfers**. This works as a resolution mechanism for transfers that, according to the sender, were not initiated by the sender
- By using **digital signatures** for all transactions, SPEI's programming protocol **ensures the authenticity** of the information and that the issuer cannot repudiate payments once they have been sent
- Furthermore, participants are connected to SPEI through a private network that uses **encrypted communications**. As the payment orders sent by the participants are pre-signed, this acts as a mechanism to avoid the inter-bank disputes
- SPEI follows **strong customer authentication** standards. Participants are required to maintain records of customer authorization for every transaction. In case of any dispute between participants and customers, authorization record needs to be presented by the participant
- Participants are liable to refund customer in case no such authorization record exists for a particular transaction
- Payments through SPEI are **final and irrevocable**. Customers are liable for payment order in case authorization record exists with the participant

### Customer complaints

- SPEI rules establish guidelines on the **service level** for the end-customers. Fraud based disputes are handled by participants with the customers

### Regulatory Initiatives

- **Electronic Payment Voucher (CEP)** is an electronic voucher or document issued by Banco de México to guarantee the completion of a payment. CEP is generated with the information that receiver bank sends to SPEI as confirmation of the payment deposit
- Banco de México has introduced **SPEI Information Module (MI- SPEI)** which enables customers to monitor the status of payments
- This information unit allows customers to find out, for example, whether the payment was returned for some reason or whether it was never made. With this information, users can check with bank to find out more details on the status of payment and then follow through



## 6. Annexure



### Chapter sections:











#### 6.1. Key Features













# 6.1. Key Features

## 👤 Features

### Key Highlights

	<b>Operating hours</b>	<ul style="list-style-type: none"> <li>• 24*7 including weekends and bank holidays (from November 2015)</li> </ul>
	<b>Payment speed</b>	<ul style="list-style-type: none"> <li>• Real time (Average transaction time: 10 sec)</li> </ul>
	<b>Transaction limit</b>	<ul style="list-style-type: none"> <li>• No limit defined by the Central Bank as it was initially meant to be a large value payment system; participants are free to limit the value of retail payments</li> </ul>
	<b>Alias</b>	<ul style="list-style-type: none"> <li>• Mobile number and Debit card number (PAN)</li> </ul>
	<b>Channel</b>	<ul style="list-style-type: none"> <li>• Branches, Internet and Mobile,</li> <li>• NFC and QR Code (using CoDi)</li> </ul>
	<b>User charges</b>	<ul style="list-style-type: none"> <li>• At participants' discretion to charge customers for sending payments</li> </ul>
	<b>Infrastructure setup</b>	<ul style="list-style-type: none"> <li>• New system</li> </ul>
	<b>Messaging format</b>	<ul style="list-style-type: none"> <li>• Proprietary – lean content</li> </ul>
	<b>Use of Open APIs</b>	<ul style="list-style-type: none"> <li>• Open APIs not available</li> </ul>
	<b>Authentication</b>	<ul style="list-style-type: none"> <li>• Two factor authentication</li> </ul>

### Payment Types & Use Cases/Services

			
Individual	Business	Government	
	<b>Merchant Payments</b>		<b>Bulk / Batch Payments</b>
	<b>Cross-border payments</b>		<b>Request to Pay</b>
	<b>Schedule future payments</b>		<b>Bill payments</b>
	<b>Direct Debits</b>		

### Settlement

<b>Approach</b>	 Hub  <b>Hybrid</b>  Distributed clearing
<b>Type   Time</b>	Hybrid Settlement   Every 3 seconds or a configurable number of payment messages

Source: Banco de Mexico website | ACI Report | BIS Report | FIS Report