

## **DEVELOPMENT OF ELECTRONIC MEANS OF PAYMENT: FACTORS AND CHALLENGES IN MEXICO**

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**Abstract:** This article examines the development of electronic means of payment and the challenges associated with its implementation. The approach is focused on identifying the factors that have driven the growth of these media and analyzing the challenges that arise in their adoption. The methodology used consisted of reviewing previous studies and analyzes on the subject, as well as collecting relevant data from reliable sources. The main factors that have led to the development of electronic means of payment include technological progress, which has provided secure and efficient platforms for electronic transactions; the demand for greater convenience by users, who seek to make quick and easy payments; and the need to strengthen security in financial transactions.

However, challenges have also been identified in the implementation of a payment system based on electronic money. These challenges include the protection of personal and financial data, financial inclusion for those without access to traditional banking services, interoperability between different platforms, and the education and awareness of users on the risks and benefits of electronic means of payment. In conclusion, the development of electronic means of payment has been driven by technological, convenience and security factors. However, it is necessary to address the aforementioned challenges to ensure an efficient, secure and accessible electronic payment system for all.

**Keywords:** electronic means of payment, financial technology, security, financial inclusion, interoperability.

## INTRODUCTION

In the digital age, the use of electronic means of payment has become a fundamental part of our lives. More and more people choose to make transactions and purchases through digital platforms, using electronic

payment methods instead of traditional cash.

In this article, we will explore the factors that have driven the development of electronic means of payment and the challenges of implementing a payment system based on electronic money. We will analyze how technology, convenience and security have influenced this evolution, as well as the challenges related to data protection, financial inclusion and interoperability.

In addition, we will examine the impact of these advances on society and how electronic money has transformed the way we carry out our daily transactions. As we move towards an increasingly digitized economy, it is essential to understand the key aspects of electronic means of payment and the challenges we face in order to get the most out of this form of financial exchange.

## I CONCEPT OF PHYSICAL AND VIRTUAL MONEY

In the last decades, all over the world, the payment system has become an increasingly technological system (THOMAS, 2013). This change is the result of innovation in global networks of financial systems and the implementation of information technologies, which has facilitated the adoption of electronic payment systems in countries with different levels of economic development.

The volume of non-monetary transactions has shown significant growth rates in the last decade, with an average increase of 11.2% in the period 2014-2015 (PARIBAS, 2017). This phenomenon has driven the widespread adoption of electronic currency for private use, even without the guarantee of Central Banks at a global level.

According to MasterCard statistics, the amount of global transactions was 2.8 trillion dollars, 91% corresponding to final consumers, while the remaining 9% corresponds to transactions carried out by

government agencies and companies. The total spending of these consumers amounted to 63 million dollars, of which 34% was made in cash and the rest through other payment methods (THOMAS, 2013).

Despite the fact that the proportion of transactions carried out in cash reaches 85%, the relevance and use of alternative methods to cash has increased globally. It is essential to analyze the consequences that the implementation of a fully digital payment system could have, including the social implications and the way in which Central Banks and global financial institutions must respond to a cashless economy.

## EVOLUTION IN MEANS OF PAYMENT

This evolution in payment systems and instruments is the result of technological advances, a growing financial inclusion worldwide and the demand of consumers to have agile and effective ways of interacting with different economic entities. This evolution is manifested in the gradual withdrawal of cash from circulation and its replacement by less conventional payment methods.

The origin of the monetary societies is uncertain, but it is known that already in the year 2200 B.C. payments were made with some form of money (ECB, 2012). Physical money has played a fundamental role in the social order, facilitating the exchange of goods and services, which in turn originated the division of labor and the development of city states. The nature of money has been studied theoretically, and it has been established that it must be universally accepted, portable, divisible and difficult to counterfeit. Hayek (1976) suggests that money is a state prerogative, but only as a validator; the State must certify the weight and purity of the materials that constitute the money.

Hayek (1976) also advocated private

money, that is, fiat currencies issued in the private sector, such as commercial banks. In his opinion, any change in demand must be offset in supply so as not to modify purchasing power. Keynes (1971) presents a different perspective, stating that money must fulfill three functions: means of exchange, unit of account and store of value. For his part, Friedman (1994) considers money as an element of trust that the citizens of a country will accept and that will facilitate transactions between them.

The growing commercial interaction between countries generated the need to design efficient, compatible and mobile payment methods. This led to the popularization of checks, bills of exchange, debit and credit cards, and the formation of a network of debit and credit cards. The transition towards electronic transfers, debit and credit cards, digital money and electronic wallets, along with payment systems using mobile devices, is happening faster and more frequently around the world.

Greater penetration of innovative payment methods, more efficient financial services and easier access to infrastructure and technology allow consumers and companies to have more and better ways to carry out their operations. Authorities can also benefit from the use of new technologies that facilitate the use of alternative means of payment to cash. An “electronic” government can strengthen its institutions and generate security and confidence in the banking system.

For this reason, it can be affirmed that money is a social institution: a tool created and evolved by society, which has shown a great capacity for adaptation over time. It is not surprising that money has been influenced by the latest technological advances and, above all, by the widespread use of the Internet.

## TYPES OF NON-MONETARY MEANS OF PAYMENT:

### A) Plastic

- Debit Cards Debit cards allow the money existing in the holder's account to be available instantly. They have a transaction limit, not allowing you to spend more than what is in your account.
- Credit Cards These cards make it possible to make purchases without exceeding a credit limit provided by the financial institution. For each period or cut-off date, all or part of what was spent in said period must be covered. The financial entity will apply an interest rate on the unpaid balance.
- Prepaid Cards They work in a similar way to a debit card. They have a balance limit that must be topped up before making purchases. These cards are safe for the user and are accessible to people with little or no banking history (LUPU, 2016).

### b) Direct debit

This method is widely used in Europe and it is a type of P2P (peer to peer) loan. It works like credits between individuals, where one person requests a loan from another, and if approved, the second transfers the loan amount. Both participants must have an account in SEPA (Single Euro Payments Area) with currency accepted in the Eurozone.

### c) E-Wallet

It is a digital tool that allows the user to store their money on a server on the Internet, similar to a physical wallet. E-wallets allow you to store credit cards, debit cards, gift cards and provide access to other means of payment, such as online bank transfers (LUPU, 2016). However, security can be an

issue as the username and password are static and therefore susceptible to identity theft.

### d) Wire transfers

These transactions are simply movements of money from one customer's account to another. When made within the same bank, the transfers are made almost immediately. However, when transfers are between different banks, they may take longer depending on the banks involved and the volume of the transfer (LUPU, 2016).

### d) Cryptocurrencies

This means of payment are digital currencies whose transactions and the number of existing currencies worldwide are validated using cryptographic techniques. They are mainly used to secure transactions between individuals. Bitcoin was the first cryptocurrency created in 2009. Currently, there are hundreds of cryptocurrencies around the world, called Altcoins to differentiate them from Bitcoin, which continues to be the cryptocurrency with the highest capitalization value, volume, acceptance, and recognition (LUPU, 2016).

## MEXICAN PANORAMA

This section examines the possibility that Mexico, a country where the use of cash predominates, makes the transition to new alternative means of payment. In addition, it analyzes how the actions of ``Banco de Mexico`` will influence the implementation of monetary policies.

The history of ``Banco de Mexico`` as the institution in charge of the implementation of the national monetary policy is briefly reviewed and how Mexican society has been adapting to the various alternative means of payment instead of bills and coins.

Also, the different alternatives of means of payment that have been given in Mexico and

their favorable evolution in recent years are discussed.

## BANXICO'S HISTORY

The history of central banking in Mexico has a tumultuous past, and several stages can be distinguished until reaching the constitution of a Central Bank based on monetary issue. The study of the background of how ``Banco de Mexico`` became the only bank in charge of the issuance is the subject of other investigations. We will focus on the date of creation of the Central Bank in the first half of the 20th century.

It was not until September 1925 that the ``Banco de Mexico`` was inaugurated as advisor and banker to the Federal Government. From its inception, it was granted the exclusivity of minting coins or issuing banknotes, and was assigned monetary regulation, interest rates, and the exchange rate.

The creation of the new Mexican Central Bank was due to the need to have an institution that would help to establish a solid banking system, to reactivate credit in Mexico and for the Mexican population to regain confidence in paper money, after decades of instability, and economic inflation. ``Banco de Mexico`` had many challenges for its consolidation. Despite the fact that its prestige grew and progressed, the circulation of its banknotes was scarce and few commercial banks accepted the association to the bank.

Starting in 1987, ``Banco de Mexico`` prioritized the reduction of inflation. The central bank and the monetary policy on which it is based are constantly evolving. The definitive modernization stage of ``Banco de Mexico`` began with the obtaining of its autonomy, which was achieved in April 1994. The autonomy of ``Banco de Mexico`` means that no authority can demand the granting of credits, thus guaranteeing the uninterrupted

control of the central bank, on the number of banknotes and coins in circulation. The mission of autonomy is that the operation of the Central Bank leads to the preservation of the purchasing power of the national currency.

``Banco de Mexico`` has made significant contributions by combining innovation with effective techniques and has sought to contribute to the progress of Mexico through the generation of various monetary regulation mechanisms. Today, trust in coins and banknotes is unquestionable. No one doubts the strength of the Mexican peso, nor do we wonder if there is a sufficient supply of bills and coins. ``Banco de Mexico`` also offers Mexican society the development of innovative electronic payment systems, which have gradually been adopted by Mexicans and have gained recognition and reliability in the face of the global reality of modernity.

Mexico is the fifteenth country with the largest economy in the world, according to World Bank data from February 2017. Despite the growth of alternative means of payment to cash and the effort made by ``Banco de Mexico`` to promote the proper functioning of payment systems and promote the development of the national financial system, as established by its internal legislation.

It is customary for Mexicans to make payments in cash. Unlike other alternatives such as debit and credit cards, prepaid cards, online banking and mobile payments, it was estimated that up to 2014, 90% of transactions by Mexican consumers were carried out in cash. These movements represent more than 75% of the value of consumer payments (MAZZOTA, 2014).

Mexico faces a series of factors that limit the adoption of alternative payment methods to cash, keeping economic agents linked to this medium with few options to change their payment method. The main obstacles are the low penetration of banking services in the

population, a large informal sector and a high number of informal workers. Other causes, such as low confidence in financial security and a low level of financial education, have held back the development of demand for alternatives to cash.

Faced with this problem, ``Banco de Mexico`` ensures that the Financial Market Infrastructures (IMF) work correctly. MFIs are multilateral agreements between participating institutions, including the system operator, which are used for the clearing, settlement or registration of payments, securities, derivatives and other financial operations.

These infrastructures establish a set of common rules and regulations, a technological infrastructure and a general framework for risk management. MFIs include payment systems, central securities depositories, securities settlement systems, and transaction repositories.

In its supervisory role, ``Banco de Mexico`` ensures that MFIs and their participants comply with established standards. In the case of the largest payment system in the country, SPEI, the Bank acts as operator.

The Interbank Electronic Payment System (SPEI) is the main payment system in the country, since it processes the vast majority of interbank fund transactions safely and immediately. The SPEI is available both for large transfer operations made by companies, banks, financial institutions, the Federal Government and for small transfers made by the general population. SPEI settles transfers practically in real time, executing a settlement cycle that occurs in a maximum of 3 seconds (BANXICO, 2016).

``Banco de Mexico`` implements actions to offer speed, security and low transaction costs. The Central Bank's efforts have focused on promoting the adoption of more efficient means of payment, the elimination of barriers

to competition in instant transfer services, and the establishment of protection mechanisms for system users.

In 2016, changes were introduced to the SPEI regulation, which led to the publication of a new regulation in 2017. One of the main objectives of the new regulation is to better clarify the roles of the Central Bank as operator and authority of the system, which that allows ``Banco de Mexico`` to have better control to ensure compliance with the system rules by the participants, at the same time that risk management measures are strengthened through more specific requirements for access and permanence in the SPEI. The purpose of these modifications is to generate greater benefits for the users of the SPEI system.

The main participants in the SPEI are numerous banks and brokerage firms. Of the 109 participants in the SPEI, almost 50% are Multiple Banks and 20% are Brokerage Firms (BANXICO, 2016). The growth in the number of institutions in the SPEI reduces the need for intermediaries and allows a more efficient transfer of resources at a lower cost, which translates into greater use of the system. The increase in the participation of institutions and the growth in the number of connections between participants has increased competition in the electronic transfer market, benefiting end users.

However, the increase in the number of participants in the SPEI system is not enough to take full advantage of this system. Therefore, a large number of participants is necessary to increase the security of its operation and promote competition in the electronic transfer market.

To take full advantage of the benefits of the SPEI network, it is necessary not only to increase the number of participants and improve the operation of the system, but also to increase the connectivity between the participants. The evolution of operations from

2005 to 2017 in terms of number and amount of operations has been increasing. To illustrate this increase, graph 1 can be seen.

The growing adoption of SPEI by these end consumers represents an important incentive for competition in the retail market for electronic transfers. One way of evaluating this increase in competition can be observed through the Herfindahl-Hirschman Index, which shows a decrease in market concentration, as illustrated in graph 2.

Concentration is measured by calculating a Herfindahl Index, which can take values between 0 and 10,000, where values close to zero indicate low market concentration and a large number of companies with a very low market share. Values close to 10,000 suggest that there is only one participant in the market, that is, that it is a monopoly.

The HHI in graph 2 shows that, in the case of the SPEI transfer retail market, it has experienced a drastic drop, going from 5,000 points in 2005 to less than 1,550 points in 2017. This is due to increased competition and less Market concentration resulting from the entry of companies with SPEI users as final beneficiaries.

Another key element that has driven greater adoption of SPEI transfers has been the continued increase in the number of Internet banking users. The number of users has grown at an average annual rate of 17.4% between 2008 and 2017 (BANXICO, 2018).

Graph 4 presents the distribution of the number of low-value payments according to the schedule. It can be seen that the increase in the number of operations at each time is uniform, highlighting a significant increase for the year 2017 in operations carried out between 6 p.m. and 12 a.m.

Another important factor for users to more frequently adopt means of payment other than cash is the price of transfer operations for end users. Between 2009 and 2016, the average

commission per transaction for individuals has decreased from 7.6 to 3.5 pesos, and for companies from 7.6 to 6.4 pesos (BANXICO, 2016).

## RETAIL PAYMENTS

Some of the retail payment systems include low-value wire transfers, credit and debit card payments, and checks. The evolution of these means of payment will also be analyzed in terms of number and amount of transactions, as well as changes in the structure of the retail payment services market.

### a) *Electronic Funds Transfers*

Electronic funds transfers in Mexico include, according to the definition of Banco de Mexico, electronic transfers of deferred funds (TEF), small amount transfers made through the SPEI system, those made through mobile devices and domiciliation operations, which are increasingly used to pay for services.

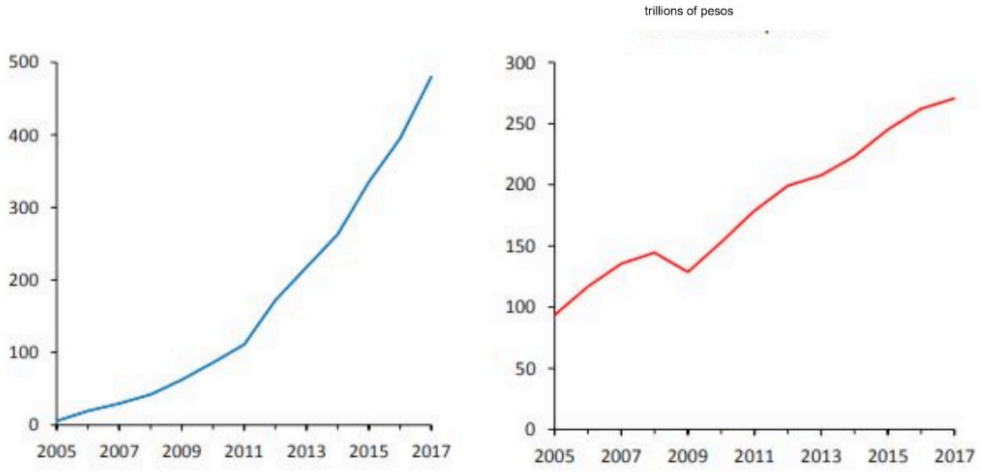
In graph 5 it can be seen that approximately two thirds of the payments made through non-cash options are made electronically. These options have increased their acceptance by the Mexican population as a result of the growing supply of banks, which offer easy access channels for customers and are perceived as more efficient and secure means of payment.

In graph 6 we can see the annual variation between 2016 and 2017 of the types of payment. As can be seen, the SPEI system as a whole grew by 56%, while checks had a negative variation of 7%.

### b) *Mobile devices*

The use of smartphones in Mexico has increased and with it, the expectations of users for real-time payment services. In order to promote the adoption of this means of payment, ``Banco de Mexico`` has implemented changes in its regulations. With the modifications introduced by the Central

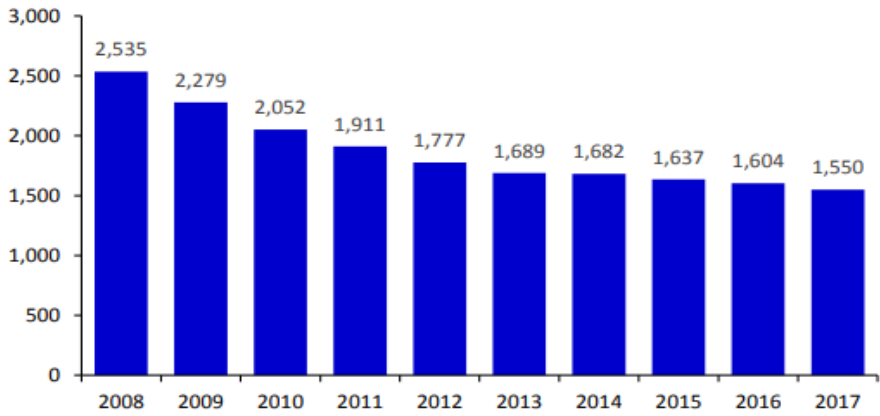
**SPEI**  
**a) Number of Operations<sup>1/</sup>**      **b) Operations amount<sup>2/</sup>**



1/ Accumulated figures during the year.  
 Source: Banco de Mexico

2/ Accumulated flows during the year.  
 Source: Banco de Mexico

Source: (BANXICO, 2018)



Graph 2 Herfindahl-Hirschman Index of transfers in SPEI

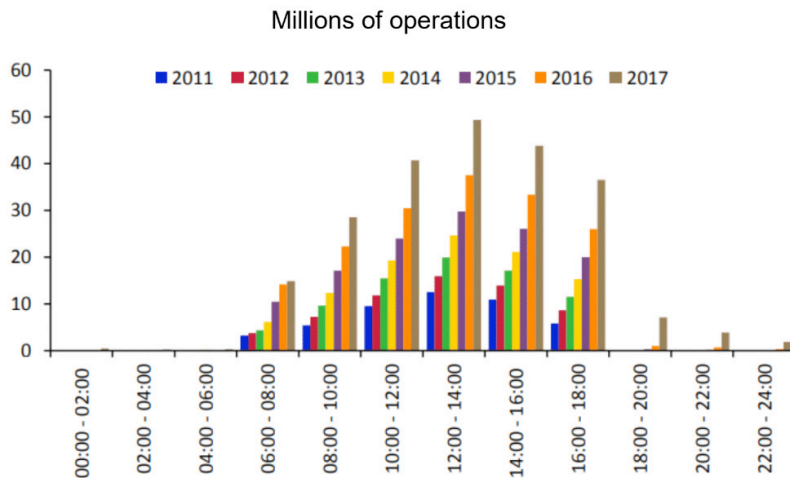
Source: (BANXICO, 2018)

Year	Internet banking users
2008	9
2009	11
2010	14
2011	17
2012	20
2013	21
2014	25
2015	28
2016	32
2017	38

Graph 3 Evolution of the number of Internet Banking users, 2008 – 2017

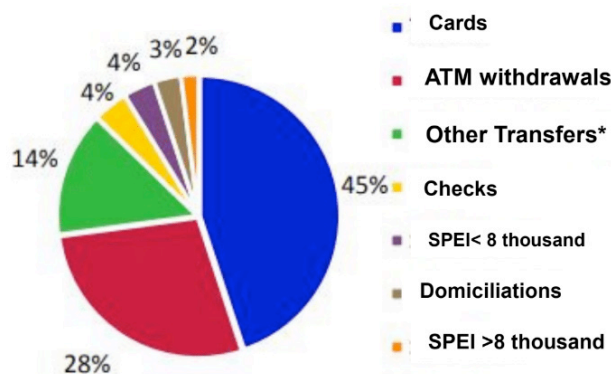
Source: (BANXICO, 2018)





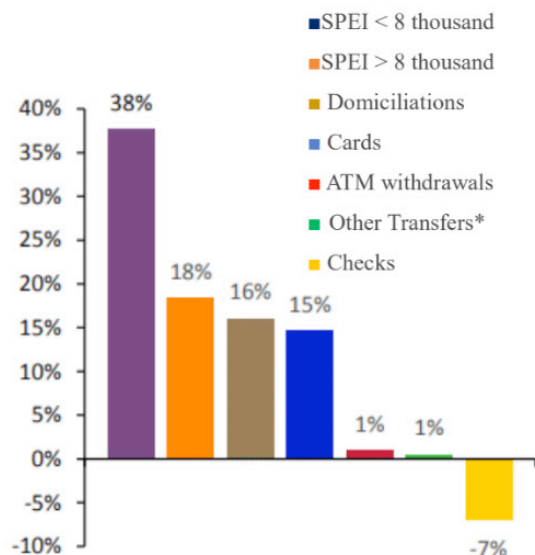
Graph 4 Distribution of the number of low-value payments in the SPEI by schedule

Source: (BANXICO, 2018)



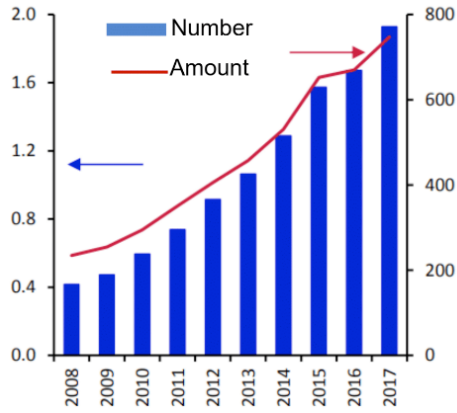
Graph 5 Participation in number of operations

Source: (BANXICO, 2018)



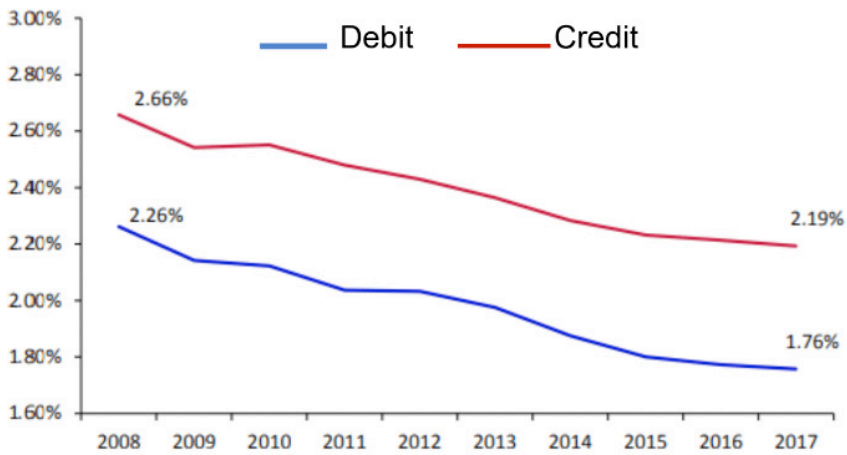
Graph 6 Annual variation 2016-2017 according to type of payments.

Source: (BANXICO, 2018)



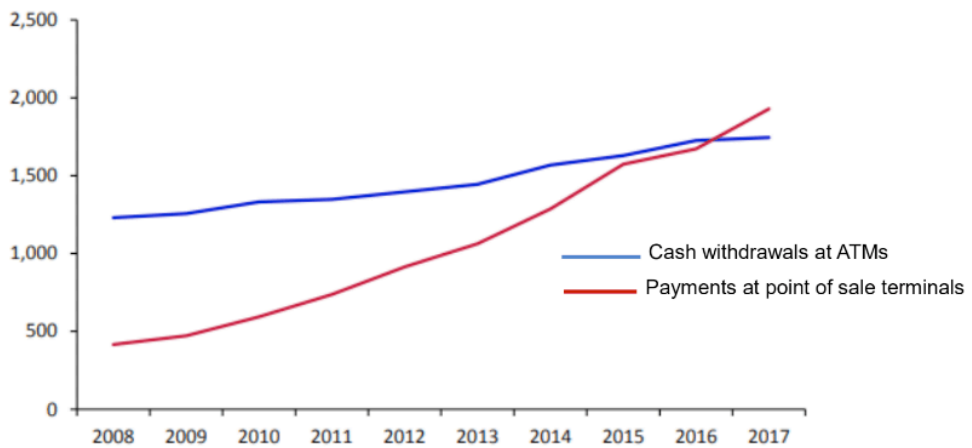
Graph 7. Billions of operations, billions of constant 2010 pesos

Source: (BANXICO, 2018)



Graph 8. Evolution of weighted average discount rates, 2008-2017

Source: (BANXICO, 2018)



Graph 9. Payments with debit cards with respect to withdrawals with debit cards 2008-2017

Source: (BANXICO, 2018)

Bank in its regulation of the SPEI system, it is now much easier for users to make transfers from mobile devices.

``Banco de Mexico`` has required credit institutions in the SPEI system to associate mobile phone lines with customers' money deposit accounts, thus allowing transfers to be received by identifying the beneficiary's accounts through mobile phone numbers. associated with them.

Users only need to specify the amount to be transferred, the ten digits of their mobile phone associated with their bank account and an identification code from the financial institution.

At the national level, the presence of smartphones in the population reached 99.3 million devices in 2017, which represents 86 percent of all existing mobile lines in the country at that time (ALAMILLA, 2018). The vast majority of Internet banking users already have a smartphone and have access to the Internet from it, either through WiFi or a cellular network. 56% of the population that has access to mobile banking believes that "in the future, no person will carry cash, having a mobile phone will be enough to pay" (CITIBANAMEX, 2016).

#### c) *Bank domicile*

This is a service offered by banks in which a company that provides goods or services is authorized to collect for them through an electronic collection instruction that is periodically transferred to the deposit account of its customer. Another modality, the recurring charge, is a direct debit service in which the client uses his credit line to apply for periodic payments. These services are a way to schedule your payments in a timely manner, thus avoiding late payment of interest or penalties.

If company and customer accounts are at different banks, direct debit charges or

recurring charges are called interbank. Although this payment method is the least used non-monetary means of payment in Mexico, like the various means of payment other than cash, it has experienced constant growth in recent years.

#### d) *Card payments*

Credit cards are a payment instrument associated with a line of credit granted by banks to their customers. Debit cards are associated with customer accounts at banks. The debit card is one of the means of payment with the greatest presence in Mexico.

That is why its growth rate in the country has been exponential. The issuance of debit cards from 2016 to 2017 increased at a rate of 5.3%, while that of credit cards grew by 4.8%. In December 2017, there were 144 million debit cards and 33 million credit cards (BANXICO, 2018).

As shown in graph 7, the use of debit cards has experienced greater growth in the number of transactions than in the amount thereof. This indicates that debit cards are being used to make smaller payments.

According to graph 22, from 2005 to 2016, the average annual growth rate of the number of operations was 21%, while the total number of operations was 16%. On the other hand, the use of credit cards presented an annual increase of 13% in the volume of operations and 11% in the amount thereof (BANXICO, 2018).

Another factor that promotes the use of credit and debit cards is the discount rates for companies that accept card payments. These percentages have decreased at a compound annual rate of 2.1% since 2008 (BANXICO, 2018), generating an ecosystem conducive to an increase in the number of companies willing to accept card payments (Graph 8).

The drop in basis points in these rates is notable in Graph 8, especially in the indices

related to debit cards, which are the payment method most used by the general public, which creates a favorable environment to maintain the money on the card.

It was at the end of 2016 when the use of credit cards as a means of payment exceeded the number of transactions to withdraw cash at ATMs. This indicates that the population is migrating towards electronic means of payment, reducing the use of cash.

## FINTECH LAW

It is evident that the competitiveness in this market has increased due to numerous variables, one of the most relevant is the incorporation of new participants that offer innovative collection systems. An example of the progressive use of digital payment methods and alternatives to cash is the regulation of Electronic Payment Fund Institutions through the Fintech Law.

The regulations proposed by the Fintech Law address the issuance, administration, redemption, and transmission of electronic payment funds that are made through mobile applications, Internet pages, and other electronic platforms.

Based on the law published in the Official Gazette of the Federation on March 9, 2018, Mexico has positioned itself as the first and only country in Latin America to have legislation that seeks to promote financial inclusion, provide legal security and certainty to the Mexican population in relation to technological financial services, generating greater competition in the financial services market and, therefore, increasing the number of participants in it, preventing illegal operations with private resources, and regulating transactions with assets virtual.

The term Fintech is the conjunction of "Financial Technology", and refers to companies that offer financial services based on digital technology. Electronic Payment

Fund Institutions are those that allow the user to make electronic transfers that replace cash, and in accordance with article 22 of the Fintech law, they are those that operate "in the issuance, administration, redemption and transmission of payment funds through computer applications, interfaces, Internet pages or any other means of electronic or digital communication, services provided by legal persons authorized by the CNBV, previously agreed upon by the Inter-institutional Committee, such as electronic payment fund institutions.

In addition, the Fintech Law allows us to carry out financial operations linked to virtual assets. It refers to virtual assets such as cryptocurrencies (Bitcoin, Ethereum, Ripple, among others) and other assets that are used through the use of blockchain technology. According to article 30 of said Law, a virtual asset will be considered "the representation of value registered electronically and used by the public as a means of payment for all types of legal acts and whose transfer can only be carried out by electronic means" (DOF, 2018).

It is also emphasized that a virtual asset is not a legal tender in Mexico and Financial Technology entities must only operate virtual assets that are already accepted by Banco de Mexico. Said law empowers "Banco de Mexico" to define the attributes of such virtual assets, the conditions and limitations of the operation or act in which they participate.

Despite the fact that virtual assets are not legal tender, credit institutions may, based on Article 89 of the aforementioned Law and the authorization of Banco de Mexico, "carry out operations with virtual assets that are classified as such by the "Banco de Mexico" itself through its general provisions. These operations will be subject, in terms of conditions and limitations, to the general provisions issued by "Banco de Mexico" for that purpose.

A large presence of the Internet and smart mobile telephony, a solid system of entrepreneurship and electronic commerce, a scarce presence of banks and an unsophisticated offer of consumer credit, are some of the particularities of the market in Mexico that make it a one of the most fertile fields for the development of the Fintech industry.

Likewise, this Law protects the clients of financial technology entities, as established in article 47 of the Law: "The ITF will make available to its Clients, through its platforms, the receipt for each operation carried out or the status account that guarantees, among other things, the holder's right to payment and the instruction issued electronically, so that users can be aware of the funds they have deposited in any institution" (DOF, 2018). This protects the resources of the participants and makes the system more reliable, increasing the number of clients who prefer to use this technology.

238 new Fintech companies have already been identified in 2017, which means an increase of 50% since 2016 (FINNOVISTA, 2017). This positions Mexico as the country with the largest and most fertile economic system in Latin America.

## **MONETARY AGGREGATES AND THE QUANTITY THEORY OF MONEY**

The ``Banco de Mexico`` classifies the money supply into four categories known as monetary aggregates, which represent different levels of liquidity. These aggregates are intended to quantify the amount of money available in the country. The inclusion of different modalities in each aggregate will depend on the extent to which the instruments are less liquid or are subject to a greater variation in their value.

The M1 monetary aggregate has been defined by ``Banco de Mexico`` as the only

limited aggregate that is made up of highly liquid instruments held by residents who have money. In particular, it includes bills and coins in circulation issued by the ``Banco de Mexico`` and immediate demand deposits in financial institutions.

The monetary aggregate M2 is defined as the sum of M1 plus term monetary instruments held by residents who have money. This includes term deposits with a residual maturity of up to 5 years, as well as investment fund shares and creditors for securities repo operations.

The M3 monetary aggregate encompasses M2 and also considers securities issued by the federal government or the IPAB (Institute for the Protection of Bank Savings) held by residents who have money. The monetary aggregate M4 refers to M3 plus non-resident holdings of all instruments included in M3.

In summary, these monetary aggregates provide a more detailed view of the money supply in Mexico, considering both highly liquid instruments held by residents and securities issued by the federal government and the IPAB. These categories allow us to better understand the amount of money available in the economy and its distribution among the different economic sectors. The quantity theory of money supports the importance of these aggregates by establishing a relationship between the amount of money in circulation and the levels of prices and economic activity in the country.

## **COSTS AND BENEFITS OF REDUCING THE USE OF CASH**

For a long time, cash has been believed to be the easiest and cheapest means of conducting transactions. However, the Mexican Institute for Competitiveness (IMCO) points out that these advantages of cash have diminished (IMCO, 2016).

Despite this, cash remains the most popular

means of conducting commercial transactions worldwide, thanks to its unique features such as ease of use, the absence of transaction costs, almost universal acceptance, ease of verifying its security and, above all, everything, privacy in transactions.

One of the biggest benefits of cash compared to modern means of payment is that you do not incur direct costs when carrying out any monetary transaction. The use of cash is practically costless, but a closer analysis of its use reveals that there are acquisition costs and sometimes they are very high. An example of this is trying to get cash from an ATM.

In the United States, the cost of money is higher for the low-income population. Americans without access to financial institutions use a lot of cash and pay higher fees. Therefore, people who have access to different types of non-monetary means of payment obtain lower costs compared to their counterparts, since they do not incur any costs due to the distance they must travel to obtain cash and, in terms of fees, they are likely to find none (CHAKRAVORTI, 2013).

Some of the costs related to cash include:

- Approximately, companies spend 2% of their monthly income just to accept cash payments (ROUBINI, 2017). This percentage is associated with the costs of transporting cash, bank costs for the company and, when necessary, insurance of the money.
- On the other hand, there are cash management, counting and processing costs that companies assume, depending on the volume of money that enters the business. On average, companies spend around 68 hours a week handling cash (ROUBINI, 2017). In addition to handling, another cost of cash for various businesses is transportation, an expense that could be avoided if transactions were deposited

directly into business bank accounts. Another important aspect to mention is the costs associated with business theft and the false or fraudulent money that is sometimes received.

- The high cost to businesses of only accepting cash is a reality. Consumers sometimes choose to carry small amounts of cash with them, which means they don't always carry the cash required to make a purchase, but instead may have funds on a bank card. As a result, businesses that only accept cash lose the sale for this reason. According to the company VISA, the average consumer makes one less purchase per month because they do not carry the necessary physical money with them (ROUBINI, 2017).

## **FACTORS THAT HAVE LED TO THE DEVELOPMENT OF ELECTRONIC MEANS OF PAYMENT**

**Reduction of Transaction Costs** To reduce transaction costs, businesses could free themselves from the obligation to receive cash, and at the same time, increase the costs of withdrawing large amounts of cash at ATMs. The average cost of an electronic payment for banks is one third to one half of the average cost of its cash equivalent (HUMPHREY, 2006). Several studies indicate that countries could save around 1% of GDP by switching from a fully cash-based mode of payment to an electronic payment mode. In addition, savings could be increased by stopping using bank branches and preferring ATM units for banking (HUMPHREY, 2006).

**Better Record of Business Activities** With the increasing use of electronic means of payment, it will be possible to generate more secure and improved databases. By using an electronic means of payment, it is possible to know who made the transfer and

who was the beneficiary of the payment. With this information, an accurate record of the transfers made by both consumers and companies will be kept. From this record, it will be possible to increase tax revenue, reduce illegal transactions and make the market more efficient.

**Elimination of the Cost for Central Banks Associated with the Issuance and Supply of Money** By reducing cash transactions, electronic means of payment make it possible to reduce the cost for central banks of supplying money to society. Costs, such as printing banknotes and minting coins, could be kept to a minimum, thus achieving a more economically efficient monetary system.

**Increase in Tax Revenue** To increase tax revenue from the increased use of electronic means for the payment of products and services, it is first necessary to reduce the cost of access and use of point-of-sale terminals (POS), and have a less stringent tax regime to discourage taxpayers from evading taxes. In addition, electronic payments provide governments with greater scope to collect additional tax revenue, by reducing the number of unreported transactions in the informal economy (ZANDI, 2016).

**Increase in Private Savings** To increase private savings, the distribution of social and inclusion programs through cards and wallets is required (IMCO, 2016). The Mexican Institute for Competitiveness points out that these actions will contribute to efforts to bank and include people in financial systems. Likewise, the use of basic deposit and savings accounts must be promoted, which since 2007 have been mandatory for credit institutions that receive deposits, in accordance with the Credit Institutions Law (IMCO, 2016).

**Reduction of Illegal or Informal Transactions** In order to reduce the informal economy, illegality and corruption, three strategies can be implemented:

1. Eliminate the circulation of high-denomination banknotes.
2. Minimize cash operations carried out in vulnerable activities, in accordance with the provisions of the Federal Law for the Prevention and Identification of Operations with Resources of Illicit Origin (IMCO, 2016).
3. Force the government to set an example and completely limit public purchases, payrolls and contracts with cash.

Electronic transactions are controlled and leave a clear trail of who has spent and received money. This is helpful for audits as it greatly reduces unreported transactions, which in turn increases tax collection.

**Best Alternative to Carrying Large Sums of Money** People who use cash in their daily operations may be limited in funds for certain operations. And businesses may find it difficult to accept large-value bills or checks for very large amounts, as there may be a risk of fraud. Electronic payments solve this problem. They solve the problem of access to large funds or lines of credit for operations that require it, and provide security to commercial establishments that the payments they receive will be guaranteed.

**Facilitates Financial Inclusion** Financial inclusion has become a very important element for the development of today's economy. For developing economies, consumers are required to pay bills or send money in an accessible and convenient manner. Digital means of payment are an essential element used as a link between economic development and financial inclusion (VILLASEÑOR, 2015).

**Increased Market Efficiency** Non-monetary means of payment benefit both the consumer and the producer of the market. The evolution of electronic means of payment, in many cases, has favored the relationship between these economic agents (ZANDI, 2016). The

fact that electronic payments are within the reach of the general public leads to an increase in consumption and, therefore, to an increase in production, which translates into more and better jobs in the economy, with a higher income from the population, which ultimately translates into higher economic growth.

In conclusion, the factors that have driven the development of digital currencies have also influenced the evolution of traditional payment methods. The two most relevant factors in this development process are low cost and speed, in the areas of electronic commerce and transactions between different countries.

### **CHALLENGES OF A PAYMENT SYSTEM BASED ON ELECTRONIC MONEY**

**Heavy Initial Investment** One of the main obstacles to the implementation of a payment system based on electronic money is the considerable initial investment required. The technological infrastructure required to support such systems can be expensive, and development and maintenance costs can also be significant.

**Compatibility Issues** Business transactions require mobile technology, such as mobile phones, tablets, and laptops. To ensure the smooth operation of these systems, there must be a consensus on technology standards. At the same time, it is crucial to ensure that the majority of the population can have access to these devices to avoid financial exclusion.

**Security Risks** Electronic payment systems and electronic currencies are not without security risks. Criminal organizations could compromise the electronic security of transactions by hacking into operational networks. Security breaches can undermine user confidence in the digital currency system. These security issues can not only affect the system itself, but also the intermediaries with

which an end consumer trades in digital currency operations.

**Increase in the Informal Economy and Illegal Activities** The modernization of payment instruments has paradoxically allowed the existence and growth of the informal economy, tax evasion, corruption and the growth of illegal activities (IMCO, 2016). It is therefore important to have adequate policies and controls in place to minimize these risks.

**Lack of Financial Inclusion** Additionally, the slow progress of strategies to reduce the use of cash has limited the possibility of including more people in the global financial system. To overcome this challenge, it is necessary to promote and facilitate access to electronic means of payment for those who are still excluded from the formal financial system.

### **CONCLUSION**

The article has addressed the issue of electronic money and its relevance today. We have explored different aspects related to the use of electronic money, including the various forms of digital payment, the regulation and the financial institutions involved, as well as monetary aggregates and the quantity theory of money.

In the first place, the growing digitization of society and the advancement of technology have been key factors in the development of electronic means of payment. The convenience, speed, and accessibility offered by these media have led to an increase in their adoption, both by consumers and businesses. In addition, the expansion of electronic commerce has driven the need for secure and efficient payment methods. Electronic money provides a convenient and reliable alternative to cash, allowing for fast and secure online transactions.

However, the electronic money-based



payment system also faces significant challenges. One of them is security, since the digitization of transactions carries risks of fraud and cyberattacks. It is essential to implement robust security measures, such as two-factor authentication and data encryption, to protect the integrity of transactions and the privacy of users.

Another major challenge is financial inclusion. Although electronic money offers advantages in terms of accessibility and convenience, it is necessary to ensure that all people, especially those in rural or low-income areas, have access to these services. Adequate infrastructure, financial education and the promotion of inclusive solutions are required to ensure that no one is left out of the financial system.

In addition, interoperability between different platforms and providers of electronic money services is essential to guarantee the smooth flow of transactions and avoid fragmentation of the system. Collaborative efforts and standardization are necessary to promote interoperability and facilitate widespread adoption of electronic means of payment.

The Fintech Law has played a fundamental

role in the regulation of technological financial institutions and in the promotion of financial inclusion in Mexico. Thanks to this law, the country has positioned itself as a leader in the region in terms of fintech legislation, providing legal certainty and promoting competition in the financial market.

We have also explored monetary aggregates and the quantity theory of money, which allow us to better understand the money supply and its relationship to price levels and economic activity. These aggregates provide a more detailed view of the amount of money available in the economy and its distribution among different sectors.

In conclusion, electronic money has transformed the way we interact with the financial system. Its increasing adoption and the implementation of appropriate regulations demonstrate the importance and potential of electronic money to boost financial inclusion and foster economic development. As technology advances and appropriate regulatory measures are promoted, the use of electronic money will continue to expand, bringing benefits to both users and society in general.

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