北京大学

硕士研究生学位论文

题目：**中国和巴西的新金融科技及其对经济增长的影响**

姓　名：	花涞艺
学　号：	1601215146
院　系：	燕京学堂
专　业：	中国学
研究方向：	政治与国际关系
导师姓名：	周强

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Title： New financial technologies in China and Brazil and their implications for inclusive economic growth

Student's name:	Laís Bueno Sachs
Student's ID:	1601215146
School:	Yenching Academy
Major:	Contemporary Chinese Studies
Concentration:	Politics and International Relations
Advisor's name:	Zhou Qiang

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摘要

过去十年间, 数字新科技已广泛应用于金融领域, 改变了这一领域的面貌。比如数字钱包、电子支付系统、数字现金、加密货币, 正在影响着这个社会对货币和投资的处理方式。中国和巴西也不例外。中、巴两国经济都处于此类金融领域数字新科技崛起引发的巨大变革之中。

为了更好地理解过去十年内在中国和巴西新兴的数字经济环境, 本文的研究问题如下：

“金融新科技能否成为促进发展中国家包容性经济增长的工具？” **以及**

“影响此类金融新科技采用的主要因素有哪些？”

尽管新古典经济理论提供了诸多经济增长预测的工具与数学模型，但到目前为止, 并未重视金融领域内数字新科技对增长的作用。实际上, 经济增长与金融新技术出现间的因果关系目前尚有待建立。此外, 此类新科技对社会经济包容性的影响也有待研究。

本文比较了对此类金融新科技经济影响的理论预测与在巴西与中国观察到的现实情况，旨在阐明对两国经济增长与经济包容性产生影响的自变量。为此，本文采用定性方法对巴西与中国进行比较，两国的金融领域内的数字新科技出现与应用具有相似结果。

通过对前述两大问题的探讨, 本文希望能够对金融新科技, 特别是电子支付平台的应用, 在包容性经济增长的作用, 有所启发。换言之, 本论文旨在就经济增长、经济包容性与新的数字金融科技间的关系提供新的信息与定性分析。

关键词：中国， 巴西， **经济增长， 新金融科技**。

New financial technologies in China and Brazil and their implications on inclusive economic growth

Laís Bueno Sachs (Politics and International Relations)

Directed by Zhou Qiang

ABSTRACT

During the last decade, a whole new set digital technology has been spread in the financial world and transformed it. Digital Wallets, Electronic Payment Systems, Digital cash, Cryptocurrencies, for instance, are affecting the way entire societies deal with money and investments. China and Brazil, in this context, are not exceptions. Indeed, both the Chinese and the Brazilian economies are under intense transformation as a result of the rise of these new digital technologies applied to the financial sector.

In pursuance of a better understand of the digital economic environments that are emerging in these countries, this dissertation discusses the following research questions:

i. *"Do new financial technologies boost Inclusive Economic Growth in developing countries?"* and

ii. *"What are the major factors affecting the adoption of these new financial technologies?"*

Although the neoclassical economic theory provides tools and mathematical models to predict Economic Growth, the role that new digital technologies applied to the financial sector play on this growth has not been properly addressed so far by this approach. Indeed, no casual relation between Economic Growth and the emergence of new financial technologies has been established so far. Moreover, the impact of these

new technologies in a society's economic inclusiveness has not been properly studied either.

By comparing theoretical predictions about the economic impact of these new financial technologies with the reality observed in Brazil and China, this dissertation aims to clarify what independent variables influence Economic Growth and economic inclusiveness in the countries analysed. In order to achieve this objective, a qualitative methodology was applied to compare these two different countries – Brazil and China – that present similar results in regards to the emergence and application of new digital technology applied to the financial sector.

After discussing these two questions, it is hoped that some insights can be provided lightning up how the implementation of new financial technologies – electronic payment platforms in special – can contribute for Inclusive Economic Growth. In other words, it is aimed that this dissertation will bring new information and qualitative analysis of the relation between economic growth, economic inclusiveness and new digital financial technologies.

KEY WORDS: China, Brazil, Economic Growth, New Financial Technologies.

Table of Content

1. Introduction

During the last decade, a new set of technology has been spread in the financial world and transformed it. Digital Wallets, Electronic Payment Systems, Digital cash, Cryptocurrencies, for instance, are changing the way people, institutions and companies deal with money and investments. China and Brazil, in this context, are no exception. On one hand, the Chinese financial system and economy have faced one of the fastest and most intense transformations due to the rise of disruptive technologies applied to the financial sector. On the other hand, Brazil has seen big changes going on in its traditional banking system and payment industry during the last years. No matter the path of these "revolutions", these two countries are certainly experiencing how new technologies can be applied to and alter their economies.

In order to better understand the impact of new digital economic environment that has emerged in these countries during the last decade, this work will compare the eruption and consolidation of Chinese and Brazilian FinTech companies[1] and *startups* – especially those focused on the payment sector. This cross-country comparison based on the most different cases, but with similar outcomes will rely on data collected from different sources such as reports provided by governmental agencies and Central Banks, interviews with Brazilian and Chinese experts, entrepreneurs and policy-makers and other field observations made by the author.

All this effort of collecting, interpreting and comparing data aims to provide enough information to answer the following research questions:

i. *"Do new financial technologies boost Inclusive Economic Growth in developing countries?"* and

[1] Companies that apply new digital Technologies to financial services and products.

ii. *"What are the major factors affecting the adoption of these new financial technologies?"*

Aiming to answer these questions, this research relies on a neoclassical economic framework, as it sees Economic Growth as a product of the interaction between variables such as Labor, Capital, Land, Economic Efficiency, Wage, among others. Additionally, it also understands Inclusive Economic Growth as a particular variation of Economic Growth itself. Indeed, it also recognizes that Inclusive Economic Growth happens when the economic production process involves even the most excluded and poor sectors of a society, allowing them to take part in, contribute to and benefit from this process.

Before drawing any conclusions about the impact of new financial technologies in Inclusive Economic Growth, this work firstly addresses theoretical topics and methodological considerations. After that, it goes deeper in the analysis of the emergence, consolidation and characteristics of FinTechs, firstly in China and, then, in Brazil. In the sequence, two emblematic case studies are presented: the Chinese Ant Financial/Alipay and the Brazilian PagSeguro, both companies focused on the payment sector. After describing these cases and the FinTech ecosystems in these countries, an analytical comparison will be developed in order to check whether the criteria for classifying these countries' economic growths as inclusive growths were observed.

By the end of this Dissertation, it is hoped that a new understanding about the causal relation between Inclusive Economic Growth and the implementation of new financial technologies will be delimitated. Additionally, it is also expected that policy makers can use this paperwork to enhance their knowledge about the topic what might help them to implement more accurate policies and regulations that will allow their

country and population to take the maximum of advantage of these new technologies while they efficiently flourish. Finally, it is also wished that both entrepreneurs, experts and the general public might find the information and conclusions here expressed useful to understand, invest and interact with the FinTech sector that is emerging all over the world.

2. Literature Review and Theoretical Dicussion

For hundreds of years, many economists, politicians and scholars have discussed about the government's role in a country's economy. Should the State intervene in the market? Was this intervention necessary or should governments leave the market and its invisible hand regulate the economy? More specifically, should the monetary and banking systems be regulated by a central authority, for instance, a central bank under the central government's rule?

In this sense, this chapter presents theoretical discussions about the government's role in the economy – mainly, in the monetary[2] and banking systems, and what influences Economic Growth and Economic Inclusiveness. Moreover, review about what has been written so far about Inclusive Economic Growth and the emergence of FinTech companies in Brazil and China will be presented too.

2.1 Monetary Systems and Governmental regulation

Since ancient times, money has been determinant in the development of countries' economies. Indeed, the economic dependence of money is so deep that almost all the countries have thoroughly monetized their economies. "Much (maybe most) of our economic activity requires money, and we need specialized institutions that can issue widely accepted monetary money tokens[3] to enable that activity to get underway."[4] Before analyzing these specialized institutions – mainly the monetary and banking systems -, it is important to understand what money means and how has been its relationship with the market and the State?

[2] Monetary system is a "set of processes and entities involved in providing money to a country's economy." KPMG (2016). *Money issuance: alternative monetary systems*. pp. 4.
[3] Bank token is considered as a synonym of paper cash, cash bills, and sach notes hereafter.
[4] Wray, L. R. (2015) *op. cit*, pp. 7.

According to economists such as Adam Smith and Carl Menger, money seems to have emerged as "a spontaneous creation in archaic barter and market processes for facilitating the exchange of goods."[5] In other words, it can be considered a market-born institution that beholds its own value – likewise a commodity. This explanation is known as either the Commodity Theory of Money or as Market Theory of Money.

Additionally to this epistemological narrative, the classical economists also have contributed to the discussion about the ontological aspects of money. The 4 main functions of money can be summarized as following: i. *unit of account* – providing the terms in which debts are recorded and prices as quoted -, ii. *medium of exchange* – as a way of payment, used to purchase services and goods [6] -, iii. *vehicle for transferring income* that allows real and financial expenditure [7], and iv. *reserve* for payments and investments.[8]

While this ontological aspect is still accepted and respected nowadays in the economic field, the classical epistemological approach presented in the Market Theory of Money has been strongly criticized[9] during the past two centuries. Indeed, many economists consider this theory "largely fictitious, once historical facts back up the concept of money as a public affair and a prerogative of rulers"[10] – concepts lately associated with the State Theory of Money.

Essentially, the State Theory of Money argues "the market economy is a creature of money rather than the reverse; and money is a creature of the state as much as the markets are framed by state powers and law rather than existing in an

[5] Huber, J. (2017) *Sovereign Money: beyond reserve banking. Theory.* Cham: Springer International Publishing AG, pp. 35.
[6] Mankiw, G. & Ball, L. M. (2011). *Macroeconomics and the Financial System.* Worth Publishers: New York, pp. 79.
[7] Huber, J. (2017) *op. cit,* pp. 10.
[8] Hayek, F. (1976). *Denationalisation of Money.* The Institute of Economic Affairs.
[9] Hudson, M. (2004); Graeber, D. (2012); Del Mar, A. (1867, 1880, 1895); Ridgeway, W. (1892); Le Goff, J. (1956, 1986, 2010); Davies, G. (2013); Friedman, M. & Schwartz, A. (1963); Galbraith, J. K. (1975); Vilar, P. (1976); Kindleberger, C. & Laffargue J.-P. (1982); Kindleberger, C. (1993); Hixson, W. (1993); Zarlenga, S. (2002); Aliber, R. & Kindleberger, C. (2015).
[10] Huber, J. (2017) *op. cit,* pp. 36.

extraterritorial private nowhereland."[11] Moreover, it also sustains that "that markets do not emerge and develop in a constitutional vacuum free of state powers. Markets build and rest upon a state's institutional and legal structure, of which the money system is an integral part."[12]

Additionally, as Mankiw & Ball (2011) remind us, the money itself have lost it intrinsic value after the governments gradually started to establish its value during the coinage and emission of cash bills and coins. In the past, most societies used commodities with intrinsic value as medium of Exchange, reserve for payments, unit of account, etc. During the economic history, a couple of commodities have became the main medium of exchange – Gold and Silver, transformed in coins, were the most common ones. Later, the governments while centralizing the money's coinage, slowly started to reduce the amount of precious metals in the composition of each coin, making each coin's actual value lower than the coined amount showed. This was possible only because the value of money started to be assured by central authorities – kings, warlords. This kind of money with no (or few) intrinsic value associated, rather added by government decrees, is known as Fiat Money and have been used by almost all economies during the past centuries.[13]

Some argue that the authority to emit and determine monetary policies[14] is directly related with the principle of Sovereignty. Jean Bodin, who developed the modern of Sovereignty, claimed that the governmental/royal exclusive right of coinage was one of the most important and essential parts of a State's Sovereignty.[15] Indeed, the capacity to control the emission of money and the amount of money circulating in the economy was also a component of the central ruler's power. Coining

[11] Huber, J. (2017) *op. cit,* pp. 38.
[12] Huber, J. (2017) *op. cit,* pp. 37.
[13] Mankiw, G. & Ball, L. M. (2011). *op cit*, pp. 79.
[14] Monetary Policy - "actions of a central bank to influence the amount of money and credit in circulation, in many cases to maintain price stability." *Ibid,* pp.4.
[15] Bodin, J. (1606). *The Six Books of a Commonweale [1576]. London.*

money and determining its value would allow the governments to influence the Economy within a certain territory as well as to collect taxes and tributes.

Furthermore, it also allowed the ruler to exercise monetary sovereignty within the State's boundaries. Indeed, by determining the *currency of the realm, controlling the issuance of money*, and *benefiting from the seigniorage*,[16] the central authorities were able to consolidate both their political and economic power within their frontiers and among their population. Additionally, they were also able to create a clear distinction between their economy – by using the same monetary unit of account, following the same monetary guidance and taxes' imposition established by the same ruler – and other Nation-States' economies surrounding their territory.

Therefore, is possible to sustain that the whole concept of Modern Nation-State is, somehow, related to the ability of the central government to establish boundaries, impose laws and exercise the monopoly of violence and punishment, tax its population, relate with other foreign authorities, as well as to control the emission of money and endorsement of its value through government decrees or other policies – having *monetary sovereignty*.[17]

However, the amount of State's monetary control has varied during time and among locations. During last half millennium, it is possible to notice that the state's control has diminished between the 17th century and the 19th Century. This is related with the allowance for private banks to emit their own private paper money (following government's regulations) and, then, with the emergence of demand deposits – bank money on bank accounts – as a well accepted new way of payment.

[16] *Seigniorage* – gain that accrues from the creation of money. Huber, J. (2017) *op. cit,* pp. 39.
[17] Wray, L. R. (2015) *Modern Money Theory.* Cham: Springer International Publishing AG, pp. 2.

Due to the advent of these new financial tools, controlling the amount of money in circulation – produced both by central banks and private banks, including paper money, coins, banknotes and electronic cash – became harder[18].

Controlling the monetary system became a central concern for the central governments, especially, during and after the Economic Crisis and recession started in 1929. Many scholars, economists and politicians intensified the debate about to what extent and how a government should intervene in the monetary system. While the Banking School argued that money creation and control should be left to banks, the Currency School urged that the State ought to re-establish its control over the monetary system as soon as possible as well as be the only institution responsible for determining the money supply in the Economy.[19]

Despite recognizing the important role that central governments have played in the development of the current monetary system, some economists such as F. Hayek have criticized the amount of influence and control States have had in Economy. Hayek claims that the governments have developed a monopoly of money and says that this monopoly was justified as a necessary action towards the consolidation of the State's sovereign and political power.[20] As he argues, the central governments are the only ones who have authority to control the emission of money – paper money and coins – as well as to control the money in circulation through monetary policies and banking regulations. However, should the central authorities – basically certain individual politicians who detained the power during their mandates for a couple of years – have the monopoly of the provision of money?

[18] Martin, L. (1997) Study Guide for Stiglitz's Economics. New York: W. W. Norton & Company.
[19] Huber, J. (2017) *op. cit,* pp. 42.
[20] Mankiw, G. & Ball, L. M. (2011). *op cit*, pp. 79.

If we agree that monopoly[21] damages the economy, then, the fact that the central government detains the monopoly of money provision is something economists should worry about. The politicians could emit more money or, simply, take it from the economy through open-market operations for instance according with their own political and personal objectives. It is almost impossible to guarantee that this political authorities act focusing in the best economic development of their nations instead of acting politically focused, for example, in the consolidation of their power or in their re-election. If the monetary policies are not properly executed, the money's value can increase or decrease and, therefore, compromise the economy, the consumption, the demand, and the trust in the economy.

Unfortunately, the competition in currencies within a country's economy has not been properly examined so far. According to this Nobel Prize winner[22], there is no definitive answer to "why a government monopoly of the provision of money is universally regarded as indispensable, or whether the belief is simply derived from the unexplained postulate that there must be within any given territory one single kind of money in circulation."[23]

Nevertheless, some experts have argued that the central government's monopoly of money has decreased during the past two decades especially due to the emergence of digital currencies and electronic payment systems. Consequently, the

[21] A monopoly occurs when there is only one firm selling a specific product. As this firm has no concurrent, it is able to control the price of its product. Therefore, it can raise the product's price as it wishes because there is no market competition. The price is usually higher than it would be if there was a competitive market with a couple or many producers. Additionally, the quality of the product as well as the efficiency of production can also be damaged by a monopoly – few incentives to produce more efficiently and with better quality. Finally, the monopoly makes the consumers pay more for the product once they have no alternatives and have to buy that product no matters the price, and, usually, buy less than they would if the price was lower. In other words, the monopoly tends to benefit only the one producer that detains it, but jeopardizes the consumption, and the economy. Mankiw, G. (2017). *Principles of Economics (6ed).* Beijing: Tsinghua University Press.

[22] Friedrich August von Hayek and Gunnar Myrdal received the Nobel Prize of Economy in 1974. They received the prize "for their pioneering work in the theory of money and economic fluctuations and for their penetrating analysis of the interdependence of economic, social and institutional phenomena". Nobel Prize. Acessed on September 17th, 2017. https://www.nobelprize.org/nobel_prizes/economic-sciences/laureates/1974/hayek-facts.html

[23] Hayek, F. (1976). *op cit,* pp. 21.

discussion about money's monopoly detained by central authorities has reemerged and the government's influence in the provision of money has been questioned.[24]

2.2 Banking System, Governmental regulation and Money Creation

Governments print money, but do not create it. Printing is different from creating, but the authorities influences the amount of money created through monetary regulations.

Along with the emergence and consolidation of government-ruled monetary systems, the traditional banking system has grown and expanded also under the central economic authority's rules. Despite having more autonomy and freedom to conduct their own activities, both private and public banks have to follow strict guidelines and operate in accordance with governmental regulations. In general, a bank could only provide financial services if it has been granted an especial authorization issued by the government that would allow it to act like a bank – providing loans, and receiving deposits for example.

Some would argue that if the banking system is only one of the many components of the monetary system, why do many economist sustain that the banking system – banks, credit unions and thrift institutions – "are critical in determining the behavior of the economy"[25]?

The answer for this questions can be found in the following statement: while central monetary authorities – mainly Central Banks – control the money issuance[26] within the economy and implement monetary policies, the money itself is created by

[24] Hayek, F. (1976). *op cit,* pp. 25-31.
[25] Stiglitz, J. & Greenwald, B. (2003) *Towards a New Paradigm in Monetary Economics*. Cambridge: Cambridge University Press, pp. 4.
[26] The process of printing paper currency and coining coins.

the bank system[27]. However, if only the government (or some of its agencies) is allowed to emit money, how could someone argue that the private banks are the responsible ones for creating money? Doesn't this put into question principles such as State's sovereignty and monetary authority?

During centuries, the banking system has evolved and been reshaped constantly. Indeed, there were many improvements on it and, nowadays, we can find many sub-variations in the way this system operates in different countries. Despite these variations, the majority of banks still operate under the central government regulations, in a system that is called *Fractional Reserve System*.

In the *Fractional Reserve System,* banks are constrained by specific governmental regulations concerning to the minimum amount of deposits – fraction – that they must keep "on hand" as reserve. This required reserve ratio[28] defines the amount of assets[29] that has to be held as reserve. As consequence, banks do not have permission to keep fewer assets as reserve than the minimum required by the country's monetary authority.[30]

Nonetheless, these banks are allowed to use the exceeded assets – excess reserves[31] – to provide loans to their customers/borrowers. Those borrowers, for their turn, will invest the money they borrowed and eventually deposit it again – either in the same bank in that they borrowed the loan from or in another bank. When this operation goes over and over, money is generated even though new coins or paper money/cash bills are not issued by the Central Banks or Treasury Agencies.

[27] Martin, L. (1997), *op. cit,* pp. 332; Wray, L. R. (2015) *op. cit,* pp. 6.
[28] Required Reserves = required reserve ratio *x* total deposits
[29] "Assets are the value of what *we* own; Liabilities are the value of what we *owe to others*." Olney, M. (2010) *Macroeconomics as a Second Language*. Danvers: John Wiley & Sons Inc, pp. 195
[30] Olney, M. (2010) *Macroeconomics as a Second Language*. Danvers: John Wiley & Sons Inc, pp. 189-192.
[31] Excess reserves = total reserves - required reserves

Therefore, it is possible to say that "Money is created when banks increase (…) account balances in exchange for IOUs[32]. Put in another way: banks create money by making loans."[33] This is what economists call *money generation* and it has a limit – in each round of new loans, the amount of money created decreases until no money is generated anymore.[34]

The mandatory minimum reserve ratio can be changed by a country's monetary authority in order to adjust the money supply in an economy. The banks, however, can keep their reserves above this minimum required. Having this excess reserves, however, is neither the usual nor the desired by these financial institutions, because the bigger reserves a bank has, the lower these banks will lend through new loans – the reserve ratio is inversely proportional to the amount of money that banks might dispose for offering new loans. The amount of money that is generated by the banking system is, therefore, related with the fraction of deposits (reserve) it has to keep on hand and that it cannot re-lend.

The total amount of money that will be created from an initial increase in the excess reserves (after the first deposit) of ΔER[35] is $\Delta M = initial\ \Delta ER \times money\ multiplier$.[36]

"The *money multiplier*[37] is the relationship between the initial deposits and the ultimate change in total deposits"[38] and predicts the rise in the quantity of money that

[32] IOU is an abbreviation for I owe you; it is a "non-negotiable debt instrument addressed to a creditor (…) that serves as an informal acknowledgment of a debt of a specified sum". Moreover, "due to the informality of IOUs, those issuing the IOU are given free reign when writing and issuing it." Ivestopedia, IOU. Accessed on October 8th, 2017. http://www.investopedia.com/terms/i/iou.asp#ixzz4uuTL7uSi;
Business Dictionary, IOU Definition. Accessed on October 8th, 2017. http://www.businessdictionary.com/definition/IOU.html

[33] Olney, M. (2010), *op. cit* , pp. 194.

[34] Martin, L. (1997), *op. cit;* Mankiw, G. & Ball, L. M. (2011). *op cit*.

[35] ΔER (or Excess Reserves) is the difference between the total reserves (TR) and the Minimum Required Resereves (RR). The equation is the following one: $\Delta ER = TR - RR$

[36] ΔM stands for Money Creation $\Delta M = final\ amount\ of\ money - initial\ amount\ of\ money$

[37] $Money\ multiplier = \frac{1}{required\ reserve\ ratio}$ or $money\ multiplier = \frac{total\ \Delta M}{initial\ \Delta ER}$. Money Multiplier is a diferente concept from Fiscal multiplier $\left(Fiscal\ Multiplier = \frac{1}{marginal\ propensity\ to\ save}\right)$.

might be generate. As mentioned previously, the money multiplier depends on the required reserve ratio – it is an inversely proportional relation, in which $money\ multiplier \propto \frac{1}{required\ reserve\ ratio}$.

If the money creation depends on the amount of initial excess reserves; if the initial excess reserves are the total amount of reserves minus the required reserves; if the required reserves are percentage of total initial reserves and are determined by the governmental authorities; therefore, the money creation is indirectly influenced, determined and mainly regulated by the governmental monetary authority even though the financial institutions responsible for creating money are ultimately the banks. Putting it in another way: the money creation led by banks is ultimately constraint and indirectly defined by the governmental monetary authority once this authority is responsible for defining the required reserve ratio.

As Olney (2010) claims, "The [Central Banks] set a goal for the money supply, but [commercial] banks are the ones who create money. And so it is banks – not the [Central Banks] – that actually determine the money supply. Nevertheless it is [the Central Bank] policy that determines how many excess reserves are in the banking system. And so economists say: the [Central Bank] sets money supply."[39]

Despite having this constraint as well as other restrictions on the types of loans it can make, the banking system still performs a necessary and important role in a country's economy: banks are the responsible institutions for creating and providing money in the necessary scale required by economic activities. As Wray (2015) argues, "While our governments are large, they are not big enough to provide all the monetary IOUs we need to mobilize the scale of economic activity we desire. And we (…) are skeptical of putting all monetized economic activity in the hands of a much

[38] Martin, L. (1997), *op. cit,* pp. 333.
[39] Olney, M. (2010), *op. cit* , pp. 207.

bigger government. I cannot see any possibility of running a modern, monetized (…) economy without (…) financial institutions that create the monetary IOUs needed to initiate much of the economic activity that we prefer to leave to private initiative. There certainly is a role to be played by the public sector in providing finance (including public banks, national development banks, and direct government loans to support small businesses, students, and homeowners), but there is also a role to be played by nominally private financial institutions." [40]

In spite of their influence in a country's economy, the banking system is not 100% spread throughout the economy. According with reports released by institutions such as the World Bank, the OECD and World Economic Forum, there are around 2 billion unbanked people around the world. If the statistics concerning to both unbanked and underserved banking costumers are taken into consideration, this number increases expressively.

In many developing economies, the traditional banking system has faced troubles to reach each corner of the countries' territories. There are still many individuals, micro entrepreneurs and Small and Medium-Sized Enterprises (SMEs) left behind the formal banking system. If those left-behind customers and companies were included in this system, the money creation could be expanded, there would be more people taking loans and/or investing their savings, more payments could be conducted through formal payment platforms, and more people could be formally added to the economic process for example.

The introduction of new technologies can be a solution to shorten the distance between the banking system and those excluded from it. Although many commercial banks are investing in the development of digital tools and technological solutions to

[40] Wray, L. R. (2015) *op. cit*, pp. 7.

existing problems, the inclusion of unbanked is, for instance, still slow. This happens, mainly, because of the bureaucratic constraints these banks face to develop and apply new technologies to their daily activities.

On the other hand, many startups and other IT technologies are getting into the financial market by offering new, simple, easy-to-use and cheap digital solutions to problems faced by many bank clients or by those excluded from the system. Even though these new solutions might transform the way people deal with money, invest it, and contract loans, the traditional banking system is still a powerful political, economic and social institution that is able to influence both the monetary and the financial systems in developing countries.

The relation between the traditional banking system and new financial technologies' providers/startups/companies will be explored later on in this work. Additionally, this research will also explain the impact that new financial tools can bring to a country's banking system and economy. In addition to that, this paper will also analyze the consequences of these technologies' application to a country's Inclusive Economic Growth. However, understanding what economic growth is, what independent variables influence it and how the literature has addressed this topic so far has to be explored first. After that, it will be possible to discuss Inclusive Economic Growth. Only after these deliberations, it will be feasible to look at the development of new financial technologies and their impact on developing countries' economies, in their banking system and in people's lives.

2.3 Economic growth theories

Discussing about both the monetary and the bank system was essential for, now, being able to move towards a better understanding of how new financial

technologies influence a country's economic growth and economic inclusiveness. However, it is still necessary to clarify what is considered economic growth in this paper before doing that. Additionally, it is also important to define which variables influence it, and what economic growth theory will be used to analyze this dependent variable – Inclusive Economic Growth.

There are different ways to explain what "*Economic Growth*" means. Here, it will be defined as an increase in the total amount of output – goods and services – that an economy can produce.[41] Economic growth, however, is not a synonym of better income distribution, because it is possible that a country's economic output keeps growing, and yet its population becomes poorer – the income redistribution is not necessarily directly proportional to the growth of economic output. Additionally, it is important to keep in mind that a growth in the economic output does not always lead to a rise in the consumption. There are cases in which this output is "growing while the consumption is declining. Either because saving is increasing, or because the government is using up more output for its own purposes."[42]

There are many factors and variables that might affect the Economic Growth. These variables can be divided into two groups or levels: proximate variables and ultimate variables. In the later, the analysis observes mainly the impact of ideologies, political and social systems, history and other broad social institutions in the economic growth. The former, however, uses models, concepts and variables to measure, describe and predict economic growth. Some of these explanatory variables that drive to economic growth are labor, physical and human capital, natural resources, trade, technology transfer, scale effects and structural changes.

[41] Olney, M. (2010), *op. cit.*
[42] Lewis, W. A. (1963) Theory of Economic Growth. London: unwin university books, pp. 10.

Additionally, social factors such as human and social influences are eventually taken into consideration.[43]

The first studies about economic growth were majorly concerned with proximate variables especially because of the predictive potential that they add to Economics. For Turgot (1766) and Smith (1776), for example, capital accumulation is seen as the primary source of economic growth while the use of land – natural resources included – and technical changes – technology and knowledge – are treated as secondary sources. The Classical Economic Growth Theory can be summed up in the following equation: $Y = f\ (land, capital, labor)$. Additionally, they argued that savings would lead to capital accumulation (i. people tend to save; ii. what is saved is always invested either by those who possessed these savings or by those who borrowed them; iii. the incentive to save and invest is the profit return expected; iv. the accumulation of capital, then, makes the growth of economic output and employment possible since the economic system works to its full capacity). Finally, the *Smithian* approach also sustains that the population growth is endogenous – is related with the need of labor force – and, thus, it is lead lately by the accumulation of capital and economic growth.[44]

Similarly to Smith, David Ricardo (1817) also understands economic development as a product from the interaction between land, capital and labor. However, he does not have the same vision towards one of these factors of production. When he analyses the role that land plays in the economy, he argues that a) land is limited[45]; b) not all available land will be necessarily used, c) and there are some land-saving technologies that can increase the productivity in the same piece of

[43] Rodrigo, G. C. (2001) Technology, Economic Growth and Crisis in East Asia. Northampton: Edward Elgar Press, pp. 20.
[44] Brewer, A. (2010) The Making of the Classical Theory of Economic Growth. London & New York: Routledge, pp. 8.
[45] Land cannot be created, it can only be used. Therefore, it is considered limited, especially, within national borders.

land, but this will lead to the decrease of the rate generated by this same land. Moreover, Ricardo claims that the addition of new technologies and better machineries could lead to a bigger unemployment rate and, as consequence, a decrease in workers wage. As Heinz Kurz (2012) argues, "The construction and introduction of improved machines into the production system can frequently be expected to lead to the displacement of workers and thus what was later called 'technological unemployment'."[46]

The Neoclassic Economic Growth Theory still uses some core assumptions brought by Smith and Ricardo such as the importance of capital and labor for the economic growth. However, Kendrick and Solow, among others, highlight that "technological progress was an extremely important – perhaps the most important – determinant in the growth in output per man."[47]

The function that is familiarly used by neoclassical economists to describe the relation between Economic Growth and factors of production is the Cobb-Douglas function: $F(K,L,t) = A(t)K^{\alpha(t)}L^{1-\alpha(t)}, A(t) > 0, 0 < \alpha < 1$, where K stands for capital stock, L means labor forces in terms of physical units, t is time period A(t) represents efficiency of labor.[48] This function, for instance, uses the *aggregate production function* as one of its basis: $Y = f(K,L,t)$, where Y is the maximum output produced by capital K and labor L[49] in year t.

These equations do not seem to express anything related to the importance or the influence of technology in economic growth. However, they are used to check the impact of inventions and technological advances on this growth after they are

[46] Kurz, H. *Innovation, Knowledge and Growth: Adam Smith, Schumpeter and the moderns.* London: Routledge, pp. 15.
[47] Stiglitz, J. & Uzawa, H. (1972) *Readings in the modern Theory of Economic Growth*. Cambridge, MA, & London: The M.I.T. Press, pp. 129.
[48] Uzawa, H. Neutral Inventios and the Stability of Growth Equilibrium. In: Stiglitz, J. & Uzawa, H. (1972) *Readings in the modern Theory of Economic Growth*. Cambridge, MA, & London: The M.I.T. Press.
[49] "Both labor and capital are assumed to be composed of homogeneous quantities. (...) Production is assumed to be subject to constant returns to scale; namely the aggregate production function $Y = F(K,L,t)$". *Ibid,* pp. 138.

deducted to differential equations and to theorems such as the *Equilibrium Theorem*[50] and *Stability Theorem*[51]. In other words, the economic equations and theorems derived from these "basic" equations presented before are a way economists found to calculate the impact of innovation[52] in a certain production process Y in a determined period of time t, assuming that both capital and labor market are *perfectly competitive*.[53]

This, therefore, shows the concern of economists with the need of understanding the role technology and knowledge play in economic growth. By quantifying this influence, they try to create economic models that will be more accurate to predict a country's economic growth. Moreover, they ultimately aim to provide information that might guide policy makers and investors to take advantage of technological developments.

Nevertheless, the Neoclassical School is strongly criticized by Cambridge Economists embedded in the Keynesian approach. According to these economists, the neoclassical approach commits a huge sin when they consider that individuals present rational behavior once they try to allocate their scarce sources – labor force, time, money – rationally and efficiently all the time. The Cambridge scholars, on the other hand, "believe that individuals are not so calculating – in particular in a world of imperfect competition and uncertainty".[54] Their claim, in this sense, is that behavioristic models in which social, political and moral rules determine individuals'

[50] *"Let the initial capital stock K* and labor L* satisfy* $f_k\left[\frac{K^*}{A(0)L^*}\right] = \lambda + \mu$, *where* λ *is the growth in labor* $\left[\frac{\mathbb{L}(t)}{L(t)} = \lambda > 0\right]$, *and* μ *is the rate of growth in the efficiency of labor defined by* $\left[\frac{\mathbb{A}(t)}{A(t)} = \mu > 0\right]$." See more on Uzawa, H. (1972), *op. cit,* pp. 143.

[51] *"Let the growth equilibrium exist. Then the neoclassical growth process (*) is globally stable; namely, for the solution [Y(t), K(t), L(t)] to the process (*) with arbitrary initial K(0) and L(0), the capital-output ratio x(t) = K(t)Y(t) converges to the equilibrium capital-output ratio x*"* See more on Uzawa, H. (1972), *op. cit,* pp. 143.

[52] "If we mesure the quantity of labor forces according to efficiency, the our stability theorem (...) is essencially reduced to the case without technical progress discussed by Solow", in Solow, R. (1956) "A contribution to the theory of economic growth," *Economic Record*, Vol. 32, pp. 334-361. Uzawa, H. (1972), *op. cit,* pp. 143.

[53] Uzawa, H. (1972), *op. cit,* pp. 141.

[54] Stiglitz, J. & Uzawa, H. (1972), *op. cit,* pp. 310.

behavior should be used to understand people's economic behavior, and, lately, economic development.

Furthermore, these economists also object to the concept of a capital aggregation and, as consequence, they question the whole neoclassical production function. Actually, some economists of the Cambridge tradition prefer to refer to "alternative methods of production as the 'Book of Blueprints'; essentially, [they] prefer an activity analysis approach to the study of production"[55] and economic growth.

In spite of criticizing some neoclassical core assumptions, these Cambridge economists never doubted that technology and knowledge play a critical role in a country's economic growth. However, their impact should be taken into consideration from a broader perspective, remembering that individuals do not always behave rationally. Additionally, there are political, social and moral constraints that influence both their behavior and the way technology is applied to economic activities.

In addition to these ideas coming from Cambridge, the Evolutionary Theory of Economic Growth also posed some Neoclassical Theory of Economic Growth's core assumptions in check. As Nelson and Winter (1974)[56] appoint, the neoclassical theory is inconsistent empirically; is based on and focused only in mechanical concepts of equilibrium; do not accommodate some aspects of reality; and presents an inadequate explanation for economic growth.

As an alternative to this neoclassical mechanic approach, Nelson and Winter developed an organic view about economic development. In this theory, the Economic Growth is understood as an evolution of technological advances within the firms. A technology is only applied to a firm's routine if it can lead to an increase in

[55] *Ibid,* pp. 310
[56] Nelson, R. (2005) Technology, Institutions and Economic Growth. Crambridge, MA: Harvard University Press.

the profit, capital formation and growth[57]. After incorporated to the routine, the firm's profit increases and the firm has, now, more comparative advantage in the market. The other firms see this process and try to apply similar or better technologies in their own internal routines. When this innovation's processes go over and over several times, they generate more profit, and increase the industry's productivity. As consequence, there is a boost in the economic growth until new technologies are developed and restart this circle of innovation-profit-economic growth again.[58]

2.4 Inclusive Economic Growth – a theoretical discussion

Although all the approaches mentioned are focused on understanding what Economic Growth is, how it can be studied and what should be taken into consideration in these studies, just recently a deep concern about *Inclusive Economic Growth* has emerged. Indeed, only on mid 2000's governments, international organizations, NGOs and scholars have shift their attention to how they should define *Inclusive Economic Growth*, what are the actions, policies and other requirements that are necessary to promote it, and how institutions could help to foster it.

Although there is not a universally accepted definition for *Inclusive Economic Growth*, there is a consensus that *Economic Growth* and *Inclusive Economic Growth* are not synonyms. While many experts associate the concept of *Inclusive Economic Growth* with poverty and inequality reduction, others, more recently, would define it

[57] "Firm growth generally is suficiente to outweight any decline in employment per unit of output associated with productivity growth, and hence results in a increase in the demand for labor, wich pulls capital-using but labor-saaving innovations now become more profitable, and when by chance they appear as a result of a 'search', they will be adopted, thus pulling up the level of capital intensity in the economy. At the same time that labor productivity, real wages, and capital intensity are rising, the same mechanisms hold down the rate of return on capital. If the profit rises, say because of the creation of especially productive new technology, the high profits will induce an investment boom, which will pull up wages and drive capital returns back down." Nelson, R. (2005), *op. cit.,* pp. 98.
[58] *Ibid*

as the economic process in which even the most excluded and poor sectors of a society take part in, contribute to and benefit from.

Since 1950's, scholars have been discussing what is the role that the poorest people can play in the economic activity and how the advantages of economic growth should be redistributed. During more than two decades, it was believed that the benefits generated by the economic growth would be naturally redistributed and that the income inequality would slowly, but constantly, decline. As Kuznets (1955) claims, "in the early stages of development, growth produces inequality, but as per capita income rises, a turning point causes inequality to decline."

Nevertheless, the decline in inequality did not happen as expected. In fact, during the 25 years after Kozinets' publication, the income inequality increased substantially in many countries, most of them, developing ones. "Though growth may be good for the poor, high economic growth has not been translated into poverty reduction at commensurate rate". Because of this clear contradiction between expectation/theoretical prediction and reality, a whole a new debate about Inclusive Economic Growth emerged during the 1990's and beginning of 2000's. During this period, *inclusive growth* would mean the same as a poor orientated economic growth. In other words, Inclusion could be implied in the concept of a pro-poor approach of Economic Growth.

The broad definition of *Pro-Poor Growth* could be summarized as

> "any growth that benefits the poor and, thus decreases absolute poverty.[59] Under the broad definition, inequality could rise as the absolute income of the non-poor might be increasing at a rate faster than the poor's income. Under the narrow definition of pro- poor growth, also called relative

[59] Ravaillon, M. (2004), "Pro - poor growth: A primer", in *World Bank Policy Research Working Paper,* No. 3242.

pro-poor growth, the poor should benefit proportionally more from growth than the non-poor so that inequality is reduced."[60]

Putting it another way, there are two kinds of Pro-Poor Growth approach: the relative and the absolute. On one hand, the former advocates that the incomes of the poor are expected to – or should – grow faster than the incomes of the non-poor (average income or rich segments). On the other hand, the absolute approach argues that improvements in the absolute income of poor would lead to a decline in inequality and poverty no matter if the income of the non-poor segment increases faster or more expressively than the total income of the poor sector.

Even though this debate influenced the studies about Inclusive Economic Growth and shaped the public policies and projects focused on promoting this kind of growth, the reduction of inequality and poverty during the period was under the expected. As consequence, the concept of Inclusive Economic Growth started to be redefined by reshaping and recycling the Pro-Poor approach.

More than redistributing the outcomes of economic growth among all the sectors of a society, especially the poorest and most excluded ones, the new idea of Inclusive Economic Growth started to focus on how the poor and excluded could become a part of the economic process. While the Pro-Poor Growth approach's emphasis was on growth and on poverty analyses ex-post, the new concept of Inclusive Economic Growth focused on the inequality of assets and opportunities. Moreover, it also claimed that the poorest should be integrated in the formal economic process, otherwise the benefits of Economic Growth would keep being unequally distributed in the society. In fact,

"the focus has shifted from inequality of outcomes (reminiscent of the

[60] Bakker, Martine. Messerli, Hannah. (2017) "Inclusive growth versus pro-poor growth: Implications for tourism develop", in *Tourism and Hospitality Research 2017*, Vol. 17(4), pp. 385.

> growth, then redistribution approach), to inequality of assets and opportunities as input to wealth creation. (…) [There is also] a call for redistribution, broadly defined beyond outcomes to include social opportunities with emphasis on participation in the economic process."[61]

Klasen (2010) also highlights the participation of poor in the economic process as an important aspect of Inclusive Economic Growth. In fact, Klasen claims that Inclusive Economic Growth is a subset of the concept of Economic Growth itself. Additionally, the scholar also defines two criteria that must be measured in order to estimate how inclusive the Economic Growth is in a certain society or country. These two criteria are: (i) the process (number of people participating in the growth/economic process); and (ii) the outcomes of this process (whether economic growth benefits many people or not; whether it benefits the poorest sectors of a society, etc).[62]

The importance of the concept of Inclusive Economic Growth has grown so much that even the United Nations officially proclaimed that this should receive more attention from the governments, policy makers and civil society. Indeed, the 8th Sustainable Development Goal (SDG) talks specifically about Inclusive Economic Growth as one of the requirements for obtaining a sustainable development in the long term – 8th SDG: Promote inclusive and sustainable economic growth, employment and decent work for all. In other words, this goal aims to promote economic growth by integrating people to the economic process, and respecting the environment for example.

In addition to what the 8th SDG sustains, the United Nations Development

[61] Ngepah, Nicholas (2017). "A Review of Theories and Evidence of Inclusive Growth: an economic perspective for Africa", in *Current Opinion in Environmental Susteinability*, v. 24, 52-57, pp. 53.
[62] Klasen, S. (2010) *Measuring and Monitoring Inclusive Growth: Multiple Definitions, Open Questions and Some Constructive Proposals*. Mandaluyong City, Philippines: Asian Development Bank.

Program (UNDP) also appoints some criteria that must be observed in order to evaluate whether the economic growth is inclusive or not.[63] According to the UNDP's understanding, growth is inclusive if: (i) it happens in the sectors that employ the poor; (ii) occurs in regions where the poor live; (iii) employs more efficiently the production factors, especially, unskilled labor; and (iv) results in reducing prices of goods and services consumed by, but not only by, the poor.

> "Indeed, UNDP recognizes this process as being a result of technological and institutional changes that brings about, not only low-skill absorbing opportunities, but increased productivity of the poor. This focus on the poor is highlighted as follows: An improvement in the fraction of bottom half of the population in the mainstream band would indicate inclusion in the mainstream economic activity and vice versa."[64]

The World Bank also follows a similar approach to how Inclusive Economic Growth should be understood and fostered.[65] By linking micro and macro determinants of economic growth, the WB argues that this Economic Growth should embrace equality of gender and opportunities, provide some sort of social protection, and include more and more people in the economic process itself. The organization believes that the solution for improving the inclusiveness of growth lies on growth of productivity and efficiency instead of only redistribution of income. Inclusive Growth

[63] "In the UNDP perspective, inclusive growth is seen as both an outcome and a process. On the one hand, it ensures that everyone can participate in the growth process, both in terms of decision - making as well as in terms of participating in growth itself. On the other hand, inclusive growth is one whose benefits are shared equitably. Inclusive growth thus implies participation and benefit-sharing." OECD (2014) *Report on the OECD Framework for Inclusive Growth.* Accessed on December 1st, 2017.

[64] Ngepah, Nicholas (2017), *op. cit,* pp. 54.

[65] "the World Bank refers to Inclusive Growth to denote both the pace and pattern of economic growth, which are interlinked and assessed together. In the World Bank approach, rapid pace of economic growth is necessary for reducing absolute poverty. But, for this growth to be sustainable in the long run, it should be broad: based across sectors, and inclusive of the large part of a country's labor force. This definition implies a direct link between the macro and micro determinants of growth. In this perspective, Inclusive Growth focuses on productive employment, rather than on employment per se, or income redistribution. Employment growth generates new jobs and income, while productivity growth has the potential to lift the wages of workers and the returns of the self-employed. The World Bank's approach adopts a long-term perspective and is concerned with sustained growth, where inclusiveness refers to equality of opportunity in terms of access to markets, resources and unbiased regulatory environment for businesses and individuals." OECD (2014), *op. cit.*, pp. 9.

would be a labor-absorbing growth, and would be associated with an increasing productivity of those already employed.

The Organization for Economic Cooperation and Development (OECD) also has produced many reports about Inclusive Economic Growth. According to the *Report on the OECD Framework for Inclusive Growth* (2014), the societies perceive multidimensional goals that go far beyond income and economic growths. Therefore, Inclusive Economic Growth should not rely only on income redistribution or pro-poor growth as many proposed during the past decades. Similarly to the UNDP and WB's approaches, OECD proposes a concept of Inclusive Economic Growth that is associated with the increasing insertion of people – especially the poor – in the economic process and, lately, economic outcome. As the report presents, Inclusive Economic Growth can be summarized as

> "a rise in the multidimensional living standards of a target income group in society (also referred to as 'representative' household). For illustration, the note focuses on the median household while the method is general and can be applied to all segments of the income distribution (…), such as lower - income households, to allow for country - specific preferences. In this case, a rise in the multidimensional living standards of the representative household would entail a rise in the mean of multidimensional living standards of the most deprived segment of the population. Multidimensional living standards reflect outcomes in income and non-income components of well-being and their distribution across households. Our approach can be seen as a generalization of the concept of social inclusion, which is understood and measured by the degree to which equality (i.e. in terms of consumption, income, jobs or

housing) is achieved."[66]

While exploring the topics of Economic Inclusiveness and Inclusive Economic Growth, some scholars have also investigated how political institutions affect these variables. Xi (2017)[67], for instance, compares democratic and autocratic governments in order to explain how some political institutions such as rule of law, political accountability and property rights can affect economic growth.

Acemoglu and Robinson (2012)[68] also address the topic of how Democracy and other inclusive institutions can lead to long-term and sustainable economic growth. In fact, they

> "elaborate on the premise that inclusive institutions give rise to a democratic advantage in long-run economic performance. Inclusive institutions are present when societies are featured with equal political participation and widely accessible economic opportunities, which help build a stable expectation for business investors and encourage innovations. Political democracy helps growth simply because it is conducive to inclusiveness. By contrast, in nondemocratic societies, institutions are extractive, i.e. political power is monopolized by a small group of elites, who use power to reinforce their economic privileges and grab rents from the disenfranchised group. In turn, under extractive institutions technological innovation is deterred, and growth unsustainable, because incentives for investments and innovations are undermined by the exercise of political powers." [69]

[66] OECD (2014), *op. cit.,* pp. 10.
[67] Xi, T. (2017) "Inclusive institutions and economic growth: comparative perspective and policy implications for China", *China Economic Journal*, 10(2), pp. 108-127.
[68] Acemoglu, D.; Robinson, J. (2012). *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. New York: Crown Business.
[69] Xi (2017), *op. cit.,* pp. 109.

Although Xi (2017), Acemoglu and Robinson (2012), among others address how political institutions can affect a country's inclusive economic growth, there is still a lack of substantial academic production about how these institutions can affect the development and application of new financial technologies and business models. Actually, more researches should be conducted in order to assess how political institutions, governments, policy-makers and interest groups can influence the development and usage of new financial technologies and, indirectly, to determine how these technologies affect economic inclusiveness.

Theoretically, the democratization of access to bank-related services and products as a consequence of the application of new technologies and business models to traditional financial activities should lead undoubtedly to an expansion of economic inclusiveness. However, the literature produced so far does not provide enough evidence that allow one to prove that this expectation is, indeed, the reality.

2.5 FinTechs, their emergence and impact

Now that the theoretical discussion about Inclusive Economic Growth was presented, it is also necessary to briefly present what has been written so far about the emergence of financial technologies during the last years and how they have impacted Inclusive Economic Growth. Although there are already some productions about the emergence of the so-called FinTech sector in different countries, few academic articles have focused on the analysis of this topic. Indeed, the majority of the work published so far has been written by big consulting firms and have focused in regional FinTech hubs or specific technologies. For example, many reports have focused on the emergence of FinTech companies in countries such as Israel, the UK, the USA, and China. Other works have paid more attention to specific financial technologies

developed by innovative startups and new companies – online payment platforms based on peer-to-peer transfers and on QR codes are some examples.

Central Banks, government agencies, private enterprises and international/multilateral institutions have also developed their own studies about the development of new digital technologies applies to the financial world, the impacts of these technologies' implementation, and what kind of norms and systems should regulate the sector. For instance, a multilateral initiative lead by the Inter American Bank of Development, the Brazilian Development Bank (BNDES) and the Brazilian Securities and Exchange Commission (CVM) has created and financed the Innovation Lab. This Lab has invited different experts and professionals from both the private and public sectors involved with the FinTech sector to discuss how to regulate the sector in order to protect the financial system but also allow the development of new companies and the implementation of low cost and inclusive technologies to this same system. During one of the Lab's last meeting, a working group was created to debate about this topic and write recommendation draft about regulations that should be applied in order to allow the sector flourish in a safe, low-risky and sustainable way.

Unfortunately, there are just few initiatives such this one and the number of reports and academic articles about the topic is still small. Indeed, the academic production about the impact of new digital technologies applied to financial activities and to the traditional banking system is still incipient. Similarly, there are even fewer publications that eventually mention the influence of these technologies in the expansion of a country's economic inclusiveness and in its Inclusive Economic Growth. There are even fewer works that observe this topic in Latin American countries and other developing areas. Although there is a bigger number of consulting firms' reports about the emergence of FinTechs in China, there are just few of them

focusing in Brazil. In addition, the number of academic thesis and papers about the influence of the FinTech sector in Inclusive Economic Growth in these countries – Brazil and China – is, so far, unknown if there is any other besides this dissertation.

3. Theoretical Framework and Methodological discussion

3.1 Research questions

"Do new financial technologies boost Inclusive Economic Growth in developing countries?" and *"What are the major factors affecting the adoption of these new financial technologies?"* are the research questions that will guide this dissertation.

Nevertheless, it is necessary to clarify what assumptions and theoretical framework will be used in this dissertation before answering these questions. Moreover, it is imperative to present the methodology used to conduct this research. Finally, it is also important to define what are the dependent and the independent variables observed in the cases analysed.

3.2 Assumptions

The very first assumption is related with humans' rational nature: Human Beings are considered rational individuals that try to allocate rationally and efficiently their scarce sources such as time, money, and skills. Of course human beings do not act based on their rational decisions all the time. Thus, it is recognized that there are other factors also influencing their economic behavior and choices – social rules, emotions, etc. Despite that, the neoclassical econonomic approach consideres that human beings act rationally in the major part of their time, and, tehrefore, can be considered rational individuals. In addition, this theory pictures these rational individuals foccused on their own interests (self-interests).

Second, Market requires neither a governmental oversight, nor control of its activities. Instead of public regulations, the law of supply and demand is considered

the best way to allocate efficiently the scarce resources that individuals possess and product. Nonetheless, market failures might happen eventually. When this occurs, States should rule selflessly and impartially in order to guarantee a smoothie and efficient allocation of resources by the supply-demand law. The rues, laws, norms and policies should interfere the less possible in the Market's activities and should be only used eventually to correct failures.

Third, Economic Growth is the main key to improve the economic well-being in a society and Economic Growth is considered as a result of the interaction between Labor L, capital K and land Z[70] – including natural resources. Additionally, it is influenced by the efficiency of the economy A[71], and it is affected by the price paid per unit of output p, capital r, land s – rent –, and labor w – wage. Therefore, there are two equations that will be considered:

- $Y = Af(K, L, Z)$, fixing the price of output as 1 and measuring all other prices relative to the price of output;
- $\Delta Y = mp_K \Delta K + mp_L \Delta L + mp_Z \Delta Z + F(K, L, Z) \cdot \Delta$ where m represents the marginal[72] product of K, L[73] or Z. Considering that in a competitive economy with constant returns "all factors get paid the value of their marginal products. Thus the value of the marginal product of labor, mp_L, is just the wage w. Similarly the value of the marginal product of capital

[70] "In any production process there will be in fact be a vast number of inputs. But in the end all these inputs can be reduced to 3 components: labor, land (including natural resources such as oil and minerals) and capital." Clark, G. (2009). Explaining Modern Growth, pp. 2. Accessed on October 17th, 2017. http://faculty.econ.ucdavis.edu/faculty/gclark/ecn110a/readings/growth%20accounting.pdf.
[71] Efficiency of economy A can be only measured by inference. *Ibid,* pp. 2.
[72] "The marginal unit of anything is the unit whose small addition or subtraction is under consideration." Economic Discussion. Accessed on October 12th, 2017. http://www.economicsdiscussion.net/margin/margin-concept-importance-and-roles-economics/25754
[73] "There are many types of labor also of different levels of skill. But this labor input we can assume to consist of a combination of raw labor inputs and of capital invested in transforming the raw labor into labor of various skill levels." Clark, G. (2009), *op. cit,* pp. 2.

will be r, and the value of the marginal product of land the rent s"[74]. Therefore, its is possible to rewrite the former equation as the following:

$$\Delta Y = r\Delta K + w\Delta L + s\Delta Z + F(K, L, Z) \cdot \Delta A$$

Fourth, there are two ways of raising the output per person: i. increasing the amount of land or capital relative to the number of workers[75]; or ii. making improvements in the production process so that the same inputs produce more output. [76] Technological advances, for instance, can contribute with these improvements.

Fifth, the transaction and information costs should not be considered while analyzing a country's economic growth. Indeed, the markets would be able to provide all the information necessary, allowing, thus, individuals and firms to take asserted decisions – the information would be completely delivered to the actors involved in the economic process and, because of this, there would be no additional cost generated by information asymmetry. In addition, transaction costs would be mitigated by the efficient allocation of resources and rational behavior of economic actors.

Sixth, financial markets, investment firms and banking systems are the key institutions of a society. If they are not preserved, economic growth and investments might be jeopardized.

[74] Clark, G. (2009), *op. cit,* pp. 5.
[75] As Land is limited and usually fixed relatively to the number of workers, risen the amount of land per worker might be a quite difficult task. As consequence, economic growth is usually associated with capital accumulation, where capital includes investment in education to increase the productivity of each worker.
[76] This is called efficieny or Total Factory Productivity (TFP) gains; new Technologies, gains of scale, better allocation of resources, better political and economic institutions are some of the main sources of this kind of gain.

3.3 Theoretical framework

In regard to the theoretical framework, this research relies on a neoclassical economic framework, once it sees Economic Growth as a product of the interaction of variables such as Labor, Capital, Land, Economic Efficiency, Wage, among others. Thus, the variation in a country's economic output can be theoretically predicted by applying mathematical models such as the Cobb-Douglas[77] function. Additionally, the work developed by Kendrick and Solow will also be used to understand the impact of technological progress in the growth in output per man.[78]

Furthermore, this research will also use some concepts and ideas developed by different approaches of Inclusive Economic Growth. Indeed, this work considers Inclusive Economic Growth as a particular variation of Economic Growth itself. It recognizes that Inclusive Economic Growth happens when the economic production process involves the most excluded and poor sectors of a society, allowing them to take part in, contribute to and benefit from this process. Although Inclusive Economic Growth is a part of Economic Growth, rarely both the neoclassical approach about Economic Growth and Inclusive Economic Growth framework are used together to evaluate and/or predict a country's variation of economic output and its externalities from an "inclusive" perspective.

Thus, in order to estimate how inclusive the Economic Growth is in a certain society or country, two criteria developed by works about Inclusive Economic Growth must be analyzed: (i) the process (number of people participating in the

[77] Cobb-Douglas function: $f(K,L,t) = A(t)K^{\alpha(t)}L^{1-\alpha(t)}, A(t) > 0, 0 < \alpha < 1$, where K stands for capital stock, L means labor forces in terms of physical units, t is time period A(t) represents efficiency of labor. This function, for instance, uses the *aggregate production function* as one of its basis: $Y = f(K,L,t)$, where Y is the maximum output produced by capital K and labor L in year t.

[78] Stiglitz, J. & Uzawa, H. (1972) *Readings in the modern Theory of Economic Growth*. Cambridge, MA, & London: The M.I.T. Press, pp. 129.

growth/economic process); and (ii) the outcomes of this process (whether economic growth benefits many people or not; whether it benefits the poorest sectors of a society; etc).[79]

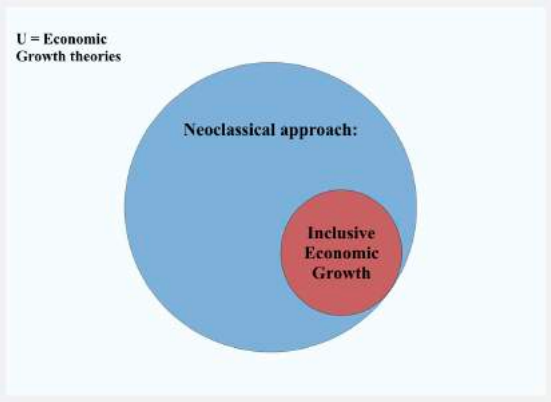


Figure 3.3.1 Theoretical framework. Source: author

This dissertation, therefore, will check (a) if the two countries studied are facing Inclusive Economic Growth according with the criteria established by both the neoclassical economic approach and Inclusive Economic Growth theory adopted here; and (b) if so, how the emergence and use of new financial technologies impacted this growth (or Inclusive Economic Growth's variables).

Theoretically, the implementation of new digital technologies to the financial sector leads to an improvement to a country's economic environment as well as its economic inclusiveness. In other words, if Inclusive Economic Growth is

> *"[an] economic growth that creates opportunity for all segments of the population and distributes the dividends of increased prosperity, both in monetary and non-monetary terms, fairly across society'*[80] *(...) and increases the participation in the formal economic process of the most excluded sectors of the society"*

[79] Klasen, S. (2010) *Measuring and Monitoring Inclusive Growth: Multiple Definitions, Open Questions and Some Constructive Proposals*. Mandaluyong City, Philippines: Asian Development Bank.
[80] OECD. "Inclusive Growth". Accessed on November 27th, 2017. http://www.oecd.org/inclusive-growth/

Then the growth in the number of people accessing formal financial services and the improvement in the quality of this access by providing better products for the historically excluded and forgotten segments – mostly the poor, individual micro entrepreneurs and SMEs – might lead to it.

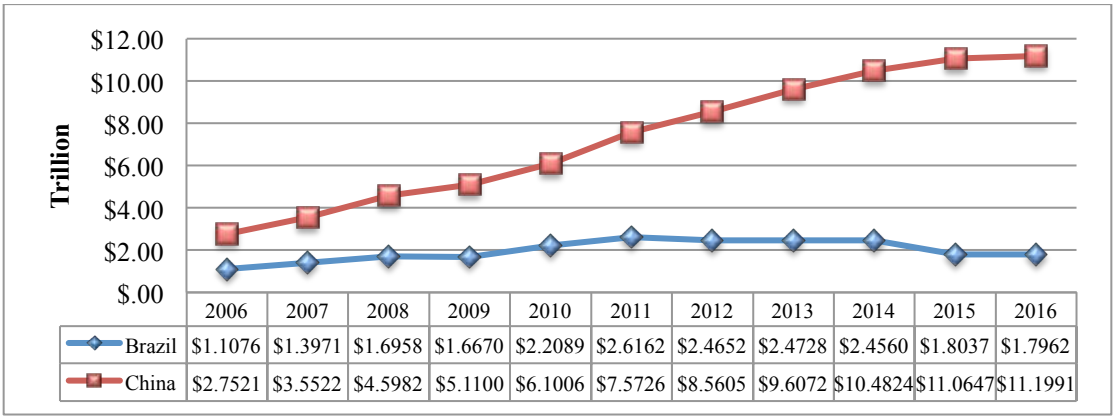
3.4 Methodology

This Dissertation is based on a qualitative cross-country comparative analysis between two different cases with similar results. By using this method, it was possible to use a limited number of cases to analyze the same phenomenon – Inclusive Economic Growth – even though there were not enough quantitative information at disposal.

Indeed, the analysis here conducted was based on the comparison of two different cases regarding to the development of FinTechs and the regulatory framework constraining it. The cases selected for this study were China and Brazil. These two countries, for research purposes, will be considered most different cases that show the same outcomes in regard to the application of new financial technologies and its impacts in economic inclusiveness.

These countries are considered most different cases, because of significant differences in their population and economy's sizes; economic growth rate; consolidation of their traditional banking system; existence and capillarity of their shadow banking system; innovation policies and support to technological development; their regulatory framework; among other aspects.

For instance, Brazil presents a smaller economy and population [81] in comparison to China. The Brazilian GDP has been much smaller than the Chinese during the past decade as it can be observed in figure 3.4.1. Indeed, the country has even faced a negative growth rate in some years as a consequence of the Economic and Political Crisis that Brazil is facing.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Brazil	$1.1076	$1.3971	$1.6958	$1.6670	$2.2089	$2.6162	$2.4652	$2.4728	$2.4560	$1.8037	$1.7962
China	$2.7521	$3.5522	$4.5982	$5.1100	$6.1006	$7.5726	$8.5605	$9.6072	$10.4824	$11.0647	$11.1991

Figure 3.4.1 Brazilian and Chinese GDP between 2006 and 2016. Source: Author based on data provided by the World Bank (World Development Indicators historical series).

Additionally, Brazil presents one of the most consolidated traditional banking system in the world – the regulatory banking framework is minimalist, overseen by well-reputed governmental agencies such as the Brazilian Central Banks and the Securities and Exchange Commission of Brazil. As consequence of this rigid and historically strong traditional banking system, the shadow banking in the country did not develop expressively. Finally, differently from China, this South American country does not present consistent, long-term governmental policies whose aim is to incentivize innovation and the development of new technologies in the country. Brazil not only needs better designed innovation policies, but also urges immediate changes in its tax system applied to new business and industry as well as an expressive reduction in all the bureaucracy related to the development of new technologies, registration of new companies and issuance of new patents.

[81] By 2017, it was estimated that the Brazilian population was 207 million people while the Chinese population was around 1.4 billion people in the same year. CIA World Factbook (2018); Instituto Brasileiro de Geografia e Estatística IBGE (2018).

Despite these expressive differences in their economic, regulatory and innovation scenarios, Brazil and China have shown similar outputs in regard to their FinTech sector. The investment in the sector and the number of companies and startups focused on this segment has grown expressively during the past 5 years. Moreover, both the Chinese and the Brazilian governments are investing efforts to develop a modern regulatory framework that will allow these companies to flourish. In addition to that, there are other positive externalities reaching the society in many areas.

Before moving to the phenomenon's description in the next chapters, however, it is necessary to explain what kind of data was used in this research as well as how it was obtained and analyzed so far. The present work is based on some statistical data collected mainly through secondary sources – consulting companies' and governmental reports, companies' press releases and websites, and newspapers.

As there was a big gap of reliable statistical information for the Brazilian case, this case study was mainly based on information gathered together through interviews [82] with professionals from the Brazilian Central Bank (DENOR and Financial Inclusion department), Ministry of Economy (Secretary of Economic Monitoring SEAE/MF and Secretary of Economic Policy), Institute for Applied Economic Research (Ipea), Securities and Exchange Commission of Brazil (CVM), Brazilian Trade and Investment Promotion Agency, Brazilian Banks Federation (FEBRABAN), Equity Investment Group, Bradesco Bank (Innovation and Research Department), Bank of Brazil (Digital Innovation Department), Redpoint E-venture

[82] The interviews were directly conducted by the author and lasted around 45 minutes each. A list of five intended/standard questions was informed beforehand, and all the professional interviwed were free to answer the questions or not. Moreover, each interview was also individually planed and, besides the basic questions, other questions were also formulated by the author. It is importante to highlight that the interviews were not recorded and the confidentiality of them will be kept. Neither direct quotations will be made nor names will be mentioned. The listo of the standard questions used during the interviews can be found in Appendix C. There are both an English and a Portuguese version of the document.

group, Conexão FinTech Consulting Company, Stone Pagamentos, PagSeguro, Meu Dinheiro, Plug and Play (Sunnyvale, CA), among others institutions and companies. On the other hand, the Chinese case was analyzed mostly relying on statistical and qualitative data collected in the above-mentioned secondary sources and on interviews with professionals working in Plug and Play (Beijing).

In addition to specific data concerning the development of the FinTech sector in these two countries, other quantitative indicators were also used to answer the proposed research questions. Some of these indicators are GDP per capita (PPP) growth, Gini Index, number of unbanked people, among other quantitative data mainly provided by international institutions such as the World Bank, UNDP and the OECD, governmental agencies and consulting companies.

3.5 Independent and Dependent variables

In this work, *Inclusive Economic Growth* is the *dependent variable* while *new financial technologies* and *regulations governing the economic and financial sectors* are the main *independent variables*.

3.5.1 Independent variables

Hereafter, *Economic Growth* will be considered *"the increase in the total amount of output – goods and services – that an economy can produce."* There are many factors that affect Economic Growth and there are also many ways of measuring it. Here, some indicators such as GDP Growth Rate, GDP per capita growth rate, among other data will be used to measure Economic Growth. Additionally, other information acquired through the use of qualitative methods will also be taken into consideration in order to analyze it.

Nevertheless, Economic Growth and Inclusive Economic Growth are not synonyms. As discussed previously, there is no universally accepted definition of Inclusive Economic Growth. However, for research purposes, this paper will use the following definition of *Inclusive Economic Growth*:

> *"'Inclusive growth is economic growth that creates opportunity for all segments of the population and distributes the dividends of increased prosperity, both in monetary and non-monetary terms, fairly across society.'*[83] *Additionally, it also increases the participation in the formal economic process of the most excluded sectors of the society".*

Inclusive Economic Growth, therefore, means that the economic outputs are more equally generated and distributed, and that they reach the most vulnerable and excluded sectors of a society too. This concept is not only about the total growth in an economy's output or GDP but also, and mainly, about how the excluded segments of the society (poor people) are impacted positively by, can benefit from and contribute to this growth. It is also about how inequality and poverty decrease as a consequence of a more inclusive economy – where more people have access to the formal economy, banking and credit systems, and opportunities to invest. Moreover, it can be said that this concept is about how historically excluded groups become part of the process of building up the Economy and taking advantage of this – how the spillover of economic benefits from growth can reach the forgettable segments of a society.

In the same way that there are more than one single way to promote this Inclusive Economic Growth, there are also many ways to evaluate whether a country's economic growth is an inclusive one. In this work, indicators such as GDP Growth rate per capita (PPP), and Gini Index are some of the quantitative data used to

[83] OECD. "Inclusive Growth". Accessed on November 27th, 2017. http://www.oecd.org/inclusive-growth/

check (a) the Economic Growth's distribution among the most vulnerable groups, and (b) the evolution of inequality in a period of time respectively. The reduction of economic inequality and income's concentration, for example, can be used as a way to measure if the Economic Growth has been, in fact, inclusive during a certain period of time.

Other indexes such as unemployment and poverty rates will also be helpful for analyzing the changes in the economic inclusiveness throughout the years. Moreover, other "measures of 'multidimensional living standards'[84] designed to track societal welfare, and analyze the extent to which growth - in a given country and over a given period - translates into improvements across the range of outcomes that matter most for people's lives" will also be observed.[85]

Besides these quantitative data that will be presented in the following chapters, other qualitative analysis will also be conducted to evaluate the impact of the emergence of new financial technologies in a developing country's economy. The main purpose will be to understand whether these new financial technologies can boost an Inclusive Economic Growth by increasing both the total economic output per person (Purchase Power Parity) and the inclusiveness of the economy.

3.5.2 Dependent variables – New Financial Technologies, regulations governing the economic and financial sectors

In this paper, "New Financial Technologies" refers to all the technologies and innovations applied to the financial sector that were developed recently – after the

[84] "It includes an income dimension, measured as average household real disposable income adjusted for inequality between the income of the average household and that of a household at a different decile (e.g. median or bottom 10%). It also includes the non-income dimensions of health and unemployment, chosen based on empirical work on the most significant determinants of subjective well-being." Some of these data will be obtained from the statistical reports released by the Organization for Economic Co-operation and Development (OECD), the United Nations Development Program (UNDP), among other organisations." OECD, "Inclusive Growth". Accessed on November 27th, 2017. http://www.oecd.org/inclusive-growth/

[85] OECD, *op. cit.* Accessed on November 27th, 2017. http://www.oecd.org/inclusive-growth/

1990's. Moreover, this term can also be applied to any innovation in how people transact money and business, but the most expressive innovations are usually associated with the application and the use of computer technology and the Internet to improve transactions, and to offer new financial services for instance. Specifically in this research, new methods of payment such as electronic and online payment platform will receive more attention than other innovations. This will be done in order to systematize the work and the analysis conducted.

In this study, however, other independent variables must be taken into consideration too: *regulations towards the economic and financial fields that constraint or allow the application of those new technologies; public policies*[86] *that incentivize financial innovation; and how established and strong a country's traditional banking system is and how fiercely it has reacted to emergence of new financial technologies brought by incomer players (startups, IT companies).*

[86] Public Policy can be understood as "the various strategies and actions that governments adopt to achieve broadly accepted goals. The public policy process often is conceptualized as a cycle of activities that include problem definition, agenda setting, enactment, implementation, and evaluation." Northeastern University. Public Policy. Accessed on November 27th, 2017. https://www.northeastern.edu/cssh/polisci/public-policy/

4. The development of new technologies applied to the financial sector

Aspiring to understand better the digital environment that is emerging in China and in Brazil and changing these economies, it is necessary to define some essential concepts first. Only after this, it is possible to go deeper in the analysis of the economic impact associated with the emergence and establishment of FinTech companies in these countries.

In this context, this chapter aims to present the definition of some cornerstone concepts for this thesis such as FinTech, E-payment, m-payment systems, and Peer-to-Peer lending. Additionally, it also brings insights about the usage of these technologies and some of the economic advantages and risks associated with it.

4.1 The emergence of FinTechs

The spread of smartphones and cell phones, the advances in Internet, and the growth of wireless connection services around the world have created the perfect scenario for the emergence of mobile financial services.[87] Companies like Google, Apple, Tencent (腾讯控股有限公司), Alibaba Group Holding Limited (阿里巴巴集团控股有限公司)[88], UOL[89], and Mercado Livre, for instance, have invested in the development of digital services and development of new technologies that allow their customers to simplify their daily financial transactions and banking related activities.[90] Paying bills, buying groceries, transferring money to other people, managing wealth and investment funds, among other activities, became more

[87] Daştan, I. & Gürler, C. (2016). Factors Affecting the Adoption of Mobile Payment Systems: An Empirical Analysis. *Emerging Markets Journal,* Vol. 6, N. 1, 17-24.
[88] Hereafter, referred as Alibaba Group or Alibaba.
[89] UOL (Universo Online) is a Brazilian web service, products and content provider created in 1996 by the Grupo Folha.
[90] Daştan, I. &Gürler, C., *op. cit.*

practical, easier, faster, more convenient and less expensive due to the expansion of new technologies applied to the financial arena.

But what does Digital Finance mean and what are the new technologies impacting the financial field? According to Gomber, Koch and Siering (2017), Digital Finance refers to the digitalization of the financial industry. In other words, it refers to the introduction of electronic products and services in the financial sector, such as mobile payments systems, electronic currencies and other financial and banking apps.[91]

In this context, the term "FinTechs" is coined. FinTechs are companies – both start-ups and already established companies – whose business models are innovative and whose products/services are mainly focused on the financial and economic areas. This term can also be defined as "companies that apply technological innovations to increase efficiency and/or expand access to the finance industry."[92]

The birth of FinTechs is deeply connected with the 2008 financial Crisis. Indeed, this period created the perfect scenario for start-ups and other companies to propose new digital solutions for financial problems.[93] In a moment of uncertainty and pessimism, FinTechs brought new ideas that presented themselves as an alternative way to provide more trust, transparency, convenience, accessibility, and inclusiveness to the economy.[94]

FinTechs, thus, could be summed up in one sentence: "Economic Power to the People". By that, it is argued that FinTechs have been successful in providing more autonomy to individuals to control over their own money without relying in a banking

[91] Gomber, P., Koch, J. A. & Siering, M. (2017) Digital Finance and FinTech: current research and future research directions. *Journal of Business Economy,* pp. 537-580.
[92] Guild, J. (2017) "Fintech and the Future of Finance" *Asian Journal of Public Affairs Vol.* 10, N.1, 1-14, pp. 2
[93] Menat, R. (2016) "Why are we so excited about FinTech" in *The FinTech Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries,* ed. Chishti, S. & Barberis, J, pp. 10-12.
[94] Broom, D. (2015). *Innovation in payment: the future is FinTech*. Accessed on October 16th, 2017. https://www.bnymellon.com/_global-assets/pdf/our-thinking/innovation-in-payments-the-future-is-fintech.pdf

system that had failed in prevent and contain the recession emerged in 2008. Moreover, FinTechs companies have also presented a non-banking way to deal with investments and wealth management. They widened the access to investments opportunities, *desintermediated* the access to credit, allowed Peer-to-Peer lending, reduced transaction costs and middlemen fees, and provided easy-to-use financial services.[95]

Furthermore, some would claim that FinTechs are also providing greater inclusion of million of people in the real economy by creating a whole new financial infrastructure. This infrastructure would be placing digital financial services in the hands of consumers who previously could not be reached by the traditional banking system. However, with the consolidation of new financial technologies, it is expected that trillions of US dollars will be generated by the inclusion of million of new customers into the formal economy – previously either unbanked or under-banked individuals.

4.2 Online Payment Systems and Peer-to-Peer online lending platforms

Some of the most impactful technologies applied by FinTechs so far are related to cashless payments methods – E-payment and M-payment systems. These cashless payment methods could be defined as an *electronic* "specialized subset of commercial transactions (…) [that] promote commerce by transferring value quickly and effectively and by imposing a minimum of additional costs or risks on the transacting parties."[96] As any other payment system, these new platforms might be

[95] Menat, R. (2016), *op. cit.*
[96] Winn, J. K. (1999), Clash of the Titans: Regulating the Competition between Established and Emerging Electronic Payment Systems. *Berkeley Technology Law Journal*, pp. 675-709.

> "(…) efficient, pervasive, and trustworthy in order to minimize the costs that the payment function adds. Any new electronic payment system technologies must not only offer innovative features, they must continue to meet these basic requirements."[97]

Within this cashless payment context, there are two popular payment technologies that developed during the last decade: Electronic Payment Systems and Mobile payment system (MPS).[98]

Electronic Payment System, or just E-payment, is a way of purchasing any goods or services electronically with using neither cash nor check. In other words, is a system that allows its users to buy and sell products by digital means instead of doing it either personally or by mailing money. *Electronic Payments* can also be described as a process that covers "the transfer of a certain amount of money from the payer to the payee through location-independent payment mechanism". [99] The demand for these kind of payment has emerged and has been catalyzed mainly by the rise of online shops and e-commerce's expansion.

In addition to that, there is a sub-category of e-Payment that is revolutionizing the way people purchase goods and manage their savings and bank accounts in countries like Kenya, China and India. The Mobile-Payment Systems (MPS) is a way of paying or transferring money performed from or via the use of portable electronic devices like cell phones or smartphones. According to Guo and Bouwman (2016), "M-payment can be defined as [a way of] paying for goods, services and invoices using a mobile device via wireless or other communication technologies."[100]

Another technological innovation that is transforming the financial sector is

[97] *Ibid.*
[98] Daştan, I. &Gürler, C., *op. cit.*
[99] Gomber, P., Koch, J. A. & Siering, M., *op. cit.*
[100] Guo, J. & Bouwman, H. (2016). An ecosystem view on third party mobile payment providers: a case study of Alipay wallet. Digital Policy, Regulation and Governance, Vol. 18 N. 5, 56-78.

Online Peer-to-Peer (P2P) lending systems. Event though "Offline" Peer-to-Peer lending itself is not new[101], its online form is advancing in the the investment's world by providing non-traditional credit origination channels, creating big data about borrowers' creditworthiness, and improving the efficiency of loans.[102]

Less than one decade ago, the Online P2P lending platforms emerged as relatively simple systems whose aim was to facilitate loans between individuals and between individual lenders and Small and Medium-Sized Enterprises (SMEs) through online platforms. Putting another way: online P2P lending brought the possibility of cutting out banks[103] from the traditional lending process by offering alternative sources of loans by connecting potential lenders with potential borrowers and reducing the intermediaries in the lending process.[104]

Indeed, online P2P lending platforms are not only reducing the number of intermediaries involved in the lending process, but are also speeding the whole process up, lowering transaction costs, and raising the liquidity of assets in the financial system. As consequence, these P2P technologies are expanding the access to capital to million of consumers and SMEs' owners who have been historically excluded from the formal lending process embedded in the traditional banking system. These platforms allow that individuals take out small loans and "the risk of default is theoretically spread out and decentralized" in the process of lending.[105]

[101] Since ancient times, individuals can borrow money from other individuals instead of taking loans from the formal banking system. This primitive way of borrowing money has been practiced throughout the centuries, and has been developed in the shadows of the banking system, attending the needs of those left behind[101] the formal and regulated system.

[102] Mateescu, Alexandra. (2015) Peer-to-peer lending. Accessed on October 27th, 2017. https://datasociety.net/pubs/dcr/PeertoPeerLending.pdf , pp. 4-6.

[103] And other traditional intermediaries.

[104] Mateescu, Alexandra. (2015), *op. cit.,* pp. 2.

[105] Guild, J. (2017), *op. cit.,* pp. 8.

5. The emergence of FinTechs in China

During the last years, China has become the world's FinTech Market leader.[106] Peer to peer lending, digital payment and wealth management are the main sub-areas in which Chinese FinTech companies are investing in the most so far. In a society in which digital economy is already embedded in people's daily life, the FinTech companies are flourishing and changing the way people deal with money and investments.

In China, the services provided by FinTechs are majorly related to big data, consumer finance, wealth management and online payment.[107] Moreover, there are 7 key sectors in which these companies are investing in and providing services for:

1. Online payments and e-wallets;
2. Supply chain and consumer finance;
3. Peer-to-peer (P2P) lending platforms;
4. Online funds;
5. Online insurance;
6. Personal finance management; and
7. Online brokerage.

Geographically, these companies are located in specific cities – or regional clusters – such as Beijing, Shanghai, Shenzhen, Hangzhou, Chengdu and Chongqing. This spatial distribution is not random. In fact, it is directly related to local

[106] "Followed by integrated financial services, big data ranked first and second when analyzing the firms included in our rankings on the basis of their business model. Since data is at the heart of recent developments in the financial services sector, companies that seek to harness the power of big data enjoy a significant competitive advantage over their peers." EY and Asian Insights Office DBS Group Research. (2016) "The rise of FinTech in China: Redefining financial services". Accessed on October 27th, 2017. http://www.ey.com/Publication/vwLUAssets/ey-the-rise-of-fintech-in-china/$FILE/ey-the-rise-of-fintech-in-china.pdf

[107] KPMG China (2016) "2016 China Leading Fintech 50". Accessed on October 27th, 2017. https://assets.kpmg.com/content/dam/kpmg/cn/pdf/en/2016/09/2016-china-leading-fintech-50.pdf

governments' incentives and policies such as technological parks and other special areas created for attracting IT companies, and cultivating talents and technologies.[108]

However, why has this sector's expansion been so expressive during the last five years? Among the many factors, wit is possible to list the exponential growth in digital connectivity and infrastructure in China, the deep penetration of smartphones, the impressive development of e-commerce, and the Chinese population and SMEs'[109] unmet financial needs.

Undoubtedly, China is becoming a digital marketplace. The digital infrastructure is developing really fast and it is spreading all around the country, especially, in the urban areas. Private companies along with both the central and the local governments have put efforts to increase and improve this digital connectivity all over the territory.

In fact, China has become the largest and most developed retail e-commerce market in the world – check figures 5.1 and 5.2. In 2016, the country was responsible for 47% of the global digital retail sales and, by 2020, it is estimated that China will be responsible for almost 60% of retail e-commerce's sales in the world.[110] As consequence of this rapid e-commerce's expansion, the demand for new technologies and financial services that allow consumers to purchase goods and services online, for example, is also growing exponentially.[111]

[108] *Ibid,* pp. 7.
[109] SMEs is an ancronym for Small and Medium Enterprises.
[110] In 2012, the sales revenue for online retailers surpassed that of department stores for the first time. Last year, 18.4% of the Chinese total retail sales value was related with e-commerce. For more data, check China Internet Network Information Center (CNNIC). (2017) *Statistical Report on Internet Development in China*. Accessed on March 29th, 2018. http://www.cac.gov.cn/2018-01/31/c_1122347026.htm
[111] China Internet Network Information Center (CNNIC). (2017) *Statistical Report on Internet Development in China*. Accessed on March 29th, 2018. http://www.cac.gov.cn/2018-01/31/c_1122347026.htm

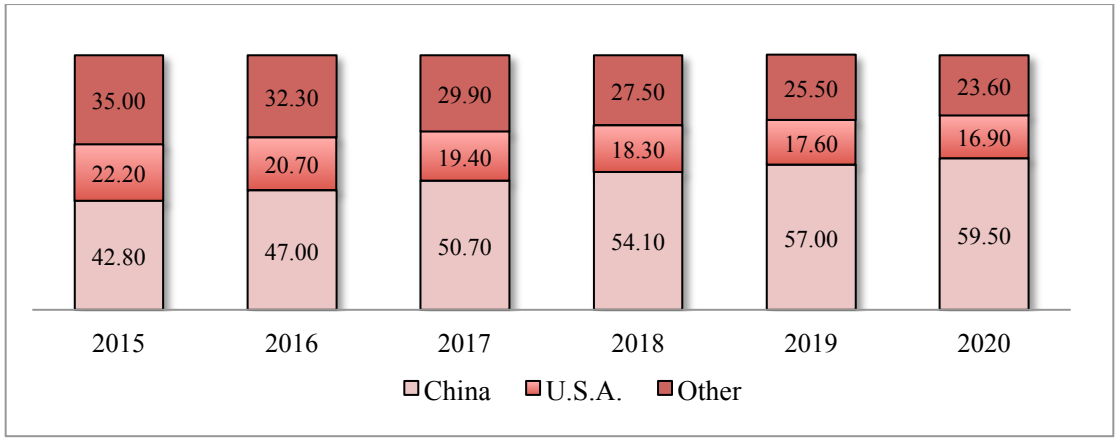


Figure 5.1 Share of global retail e-commerce sales, China vs. U.S., 2015 – 2020. Source: author based on EY and Asian Insights Office DBS Group Research (2016)[112]

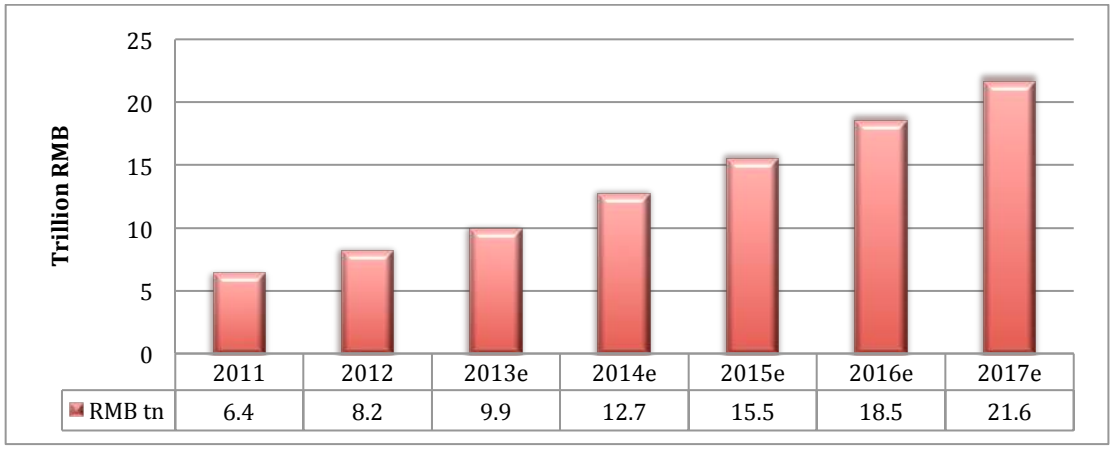


Figure 5.2 China's e-commerce projection, 2011-2017. Source: author based on Li and Yi (2016) [113]

In addition to the demands created by the e-commerce sector, the penetration of smartphones and the big number of netizens have also contributed to the creation of a welcoming environment for FinTech companies flourish. By December 2017, China had around 772 million Internet users – more than the Europe's entire population[114]. Additionally, the Internet penetration rate was 55.8%, higher than the World's and Asia's average of 50.1% and 45.6% respectively. In the previous year, the number of mobile Internet users in the country is also impressive: 695 million people,

[112] EY and Asian Insights Office DBS Group Research (2016), *op. cit.,* pp. 16.
[113] Li, S., Yi, C. (2016) "Impact of Technology on China's Financial System" in *Shadow Banking in China: An Opportunity for Financial Reform*, ed. Sheng, A. & Soon, N. G. Hoboken: John Wiley & Sons, pp. 174.
[114] By 2016, the European population was approximately 741 million.

approximately 95% of Chinese *netizens*[115] using smartphones, tablets and other mobile devices to connect to the Internet.[116]

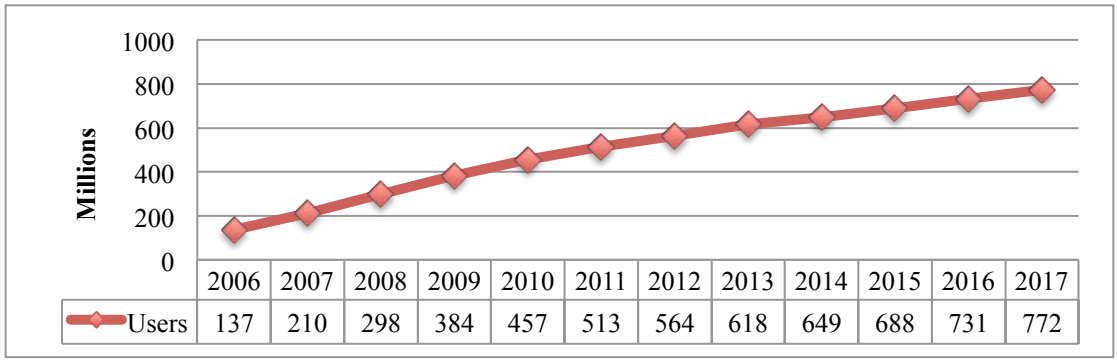


Figure 5.3 Number Chinese Internet Users. Source: author based on CNNIC (2017)[117]

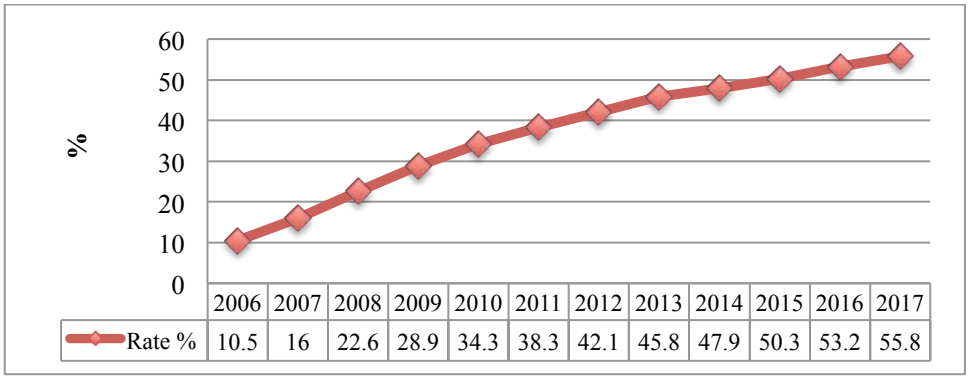


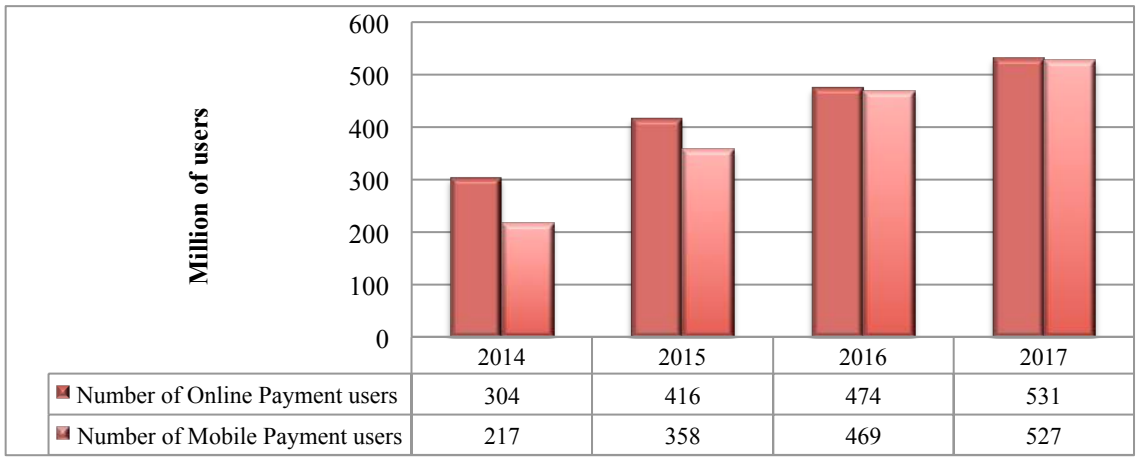
Figure 5.4 Internet Penetration Rate in China between 2006 and 2017. Source: author based on CNNIC (2017).

Nevertheless, having a big number of people connected to the Internet and a growing e-commerce sector are just some of the requirements for the consolidation of a truly digital economy. Safe online payment platforms and other gateways are also required in order to a digital marketplace and economy to be consolidated.

In China, the numbers of Online Third-Party payment companies and online payment platforms' companies, services and their users have increased exponentially during the past five years. In fact, the amount of online payment platforms' users

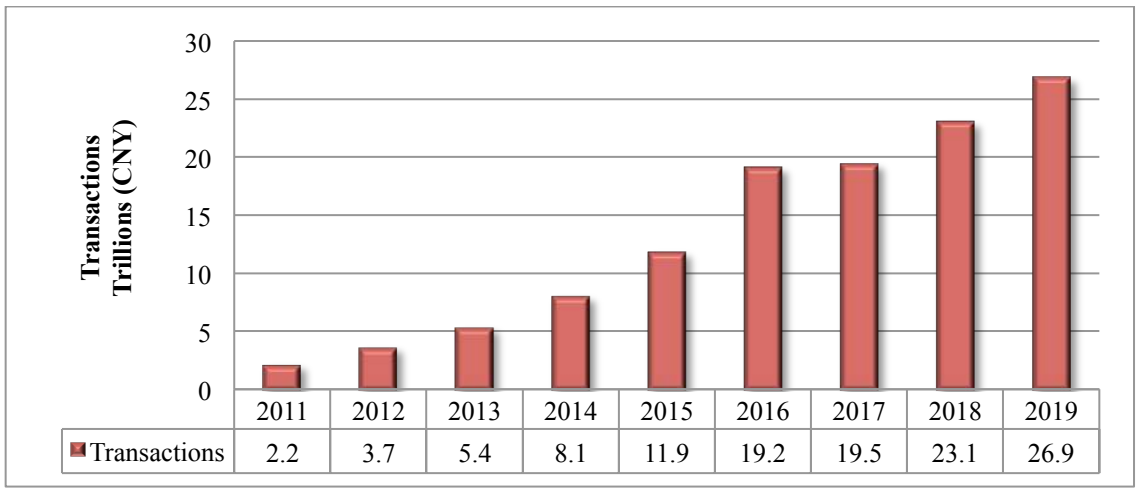
[115] Netizen ia an active particiapnt in the online community of the Internet.
[116] China Internet Network Information Center (CNNIC) (2017) *Statistical Report on Internet Development in China*. Accessed on March 29th, 2018. http://www.cac.gov.cn/2018-01/31/c_1122347026.htm
[117] *Ibid,* pp. 39.

reached a peak 475 million people by the end of 2016[118]. Moreover, it is expected that the total transactions made through them will surpass CNY19 trillion in 2017.[119] A brief evolution of the number of users, the amount of money transacted through these platforms and the Third-Party Online Payment Growth Rate in the country can be observed in the figures 5.5, 5.6 and 5.7 below.



	2014	2015	2016	2017
Number of Online Payment users	304	416	474	531
Number of Mobile Payment users	217	358	469	527

Figure 5.5 Online payment users in China, 2014 and 2017. Source: author based on 中国互联网络信息中心 (CNNIC) (2018)[120]



	2011	2012	2013	2014	2015	2016	2017	2018	2019
Transactions	2.2	3.7	5.4	8.1	11.9	19.2	19.5	23.1	26.9

Figure 5.6 Third-Party Online Payment in China, 2011-2019 (estimated numbers for 2018 and 2019). Source: author based on China Internet Watch (2017)[121]

[118] The number of people using online payment systems in mobile devices such as smartphones, tablets, and smartwatches was around 470 million according with the *Statistical Report on Internet Development in China.* China Internet Network Information Center (CNNIC). (2017), *op. cit*., pp. 71.

[119] Li, S., Yi, C. (2016) "Impact of Technology on China's Financial System" in *Shadow Banking in China: An Opportunity for Financial Reform*, ed. Sheng, A. & Soon, N. G. Hoboken: John Wiley & Sons, pp. 176.

[120]中国互联网络信息中心(CNNIC). (2018) "中国互联网络发展状况统计报告" Accessed on March 29th, 2018. http://www.cac.gov.cn/2018-01/31/c_1122347026.htm

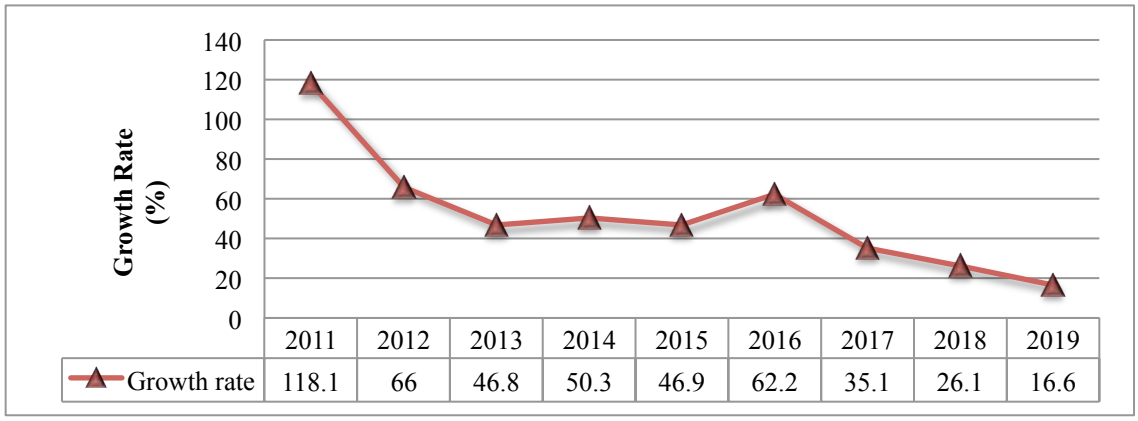


Figure 5.7 Third-Party Online Payment in China – Growth rate YoY (%) between 2011 and 2019 (estimated). Source: author based on China Internet Watch (2017).

Indeed, the expansion of Third-Party Online Payment platforms in China is deeply is a result of the cooperation between these companies, the Chinese Government (in all levels), public service agencies and local communities

> "(…) to launch services of public utility payment, building and promoting an all-round online payment system for public service (…), which greatly improves the efficiency of public service agencies and effectively minimizes the payment inconvenience of the public. In terms of offline payment, e-payment companies vigorously develop the market and greatly enrich payment scenarios, prompting consumers to initially develop the habit of using mobile payment tools to pay bills when shopping at physical stores (…). The payment habit is rapidly developed among consumers living in low-tier cities, with a "no wallet" era quietly initiated. Online payment brings shopping users convenience and minimizes the inconvenience of merchants in reducing operating costs and managing cash, greatly promoting the use of

[121] China Internet Watch (2017) "China third-party online payment overview 2011-2019" Accessed on October 31st, 2017. https://www.chinainternetwatch.com/20154/online-payment-2011-2019/#ixzz4wyycS09Q

offline payment Apps."[122]

The advantages associated with the usage of these platforms are, in fact, transforming the business models adopted by many companies and the service and goods merchants have been selling. Small and middle-sized enterprises, for instance, are benefiting from this safe, fast and low-cost payment methods. Consumers are buying[123] using digital payment systems such as Alipay, WeChat Pay, UnionPay Quick, and QQ Wallet more and more. As figure 5.8 shows, Alipay has been used more often than cash for paying for goods in first-tier cities. In Second and Third-tier cities, it has been the second most used payment method just slightly behind the use of cash. Additionally, some researches indicate that both spend[124], the number of credit and debit cards in circulation, and these cards penetration rate per capita[125] are decreasing in China.[126]

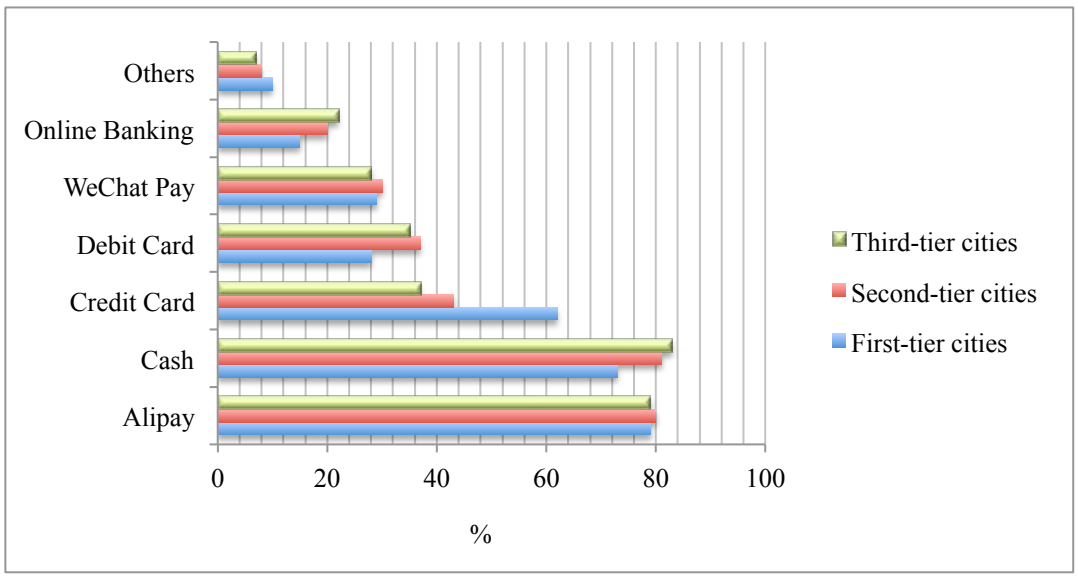


Figure 5.8 Payment methods used most regularly between February and March 2016. Source: author based on EY, DBS Group Research (2016)[127]

[122] Li, S. & Yi Tin, C. (2016), *op. cit.*, pp. 171-172.
[123] Here, both online, online-to-offline and offline purchases are taken into consideration.
[124] Spends made through the use of credit cards as payment method.
[125] There were 0.29 credit cards per capita in circulation by the end of 2015. In the previous year, the average was 0.34 cards per capita according with People's Bank of China (PBOC). For more information, check EY and Asian Insights Office DBS Group Research (2016), *op. cit*.
[126] EY and Asian Insights Office DBS Group Research (2016), *op. cit.,* pp. 16.
[127] EY and Asian Insights Office DBS Group Research (2016), *op. cit.,* pp. 17.

Another big stimulus for investing in digital payment platforms and other financial services in China is related to unmet financial citizen's needs[128], especially, coming from the middle class sector. During the past decades, the Chinese economy grew expressively and China's middle class has followed this path. Nowadays, the country's middle class is the main engine of consumerism in the country. In 2012, the mass middle class' urban private consumption was 54% of the Chinese total consumption. By 2022, the projection of the upper middle class' consumption is 56% of the total consumption.[129]

Nevertheless, the banking traditional system has accompanied neither the middle class growth nor its purchasing power. One fifth of China's adult population remains unbanked. Furthermore, the credit system fits neither the demand nor the needs of million of Chinese citizens, especially, those in the middle and lower classes, because of the "lack of qualified collateral and credit repayment track records. In fact, many Chinese do not have existing banking relationships as evidenced by the fact that national credit bureau only has information on less than 20% of the population."[130]

Actually, the traditional banking system in China is seen by many people as a provider of "homogeneous, uncompetitive, unimaginative financial products that are pushed out to customers, rather than responding to customers' needs." as the figure

[128] As the traditional banking system tends to lend mostly to Stately Owned Enterprises (SOEs), many Small and Medium Size Enterprises are left behind – around 80% of the total of loans is directed towards SOEs while SMEs receive only around 20% of it. Indeed, not only SMEs, but also individuals have to overcome many obstacles in order to take a loan in the traditional banking system. Even when individuals can borrow money from the traditional and big banks, the interest rate they have to pay for it can be forbiddingly high – because of those high interest rates, many individuals and SMEs prefer to look for loans' alternatives in the shadow banking system, for example. Many experts say that the unmet citizens financial needs are a decisive variable for the emergence and establishment of both the shadow banking system and FinTech companies that provide new ways of obtaining credit in the Chinese Economy. Besides the access to credit, other financial limitations/unmet needs are related with those citizens being able to take part into the formal economy and banking system itself. Million of people, indeed, do not even have bank accounts or credit/debit cards.

[129] EY and Asian Insights Office DBS Group Research (2016), *op. cit.,* pp. 17.

[130] EY and Asian Insights Office DBS Group Research (2016), *op. cit.,* pp. 13-14.

5.9 shows.[131]

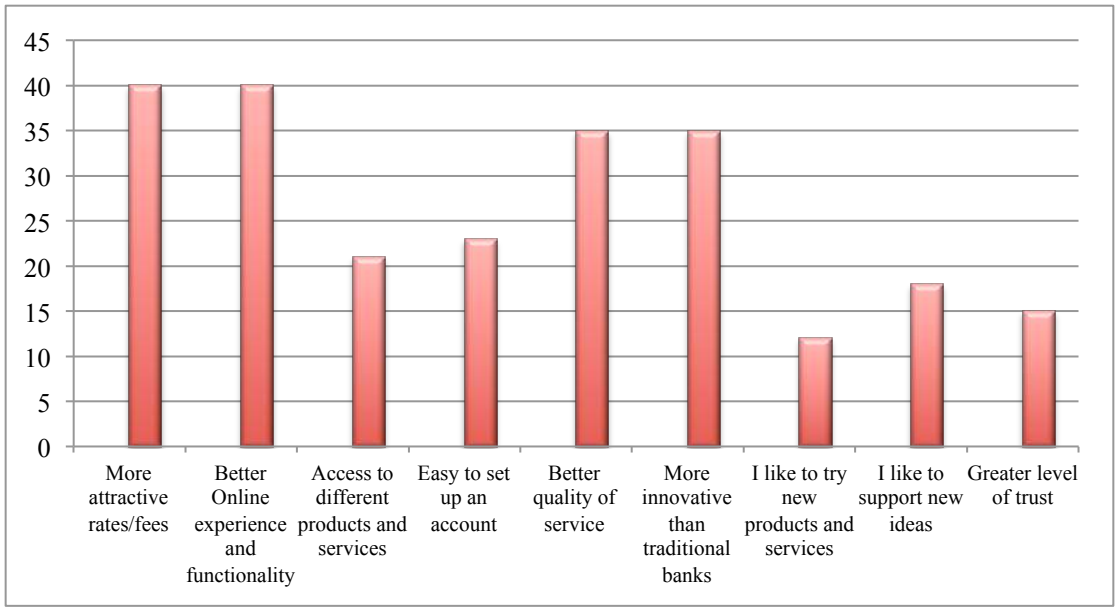


Figure 5.9 Reasons for using a non-bank rather than traditional banking system in China. Source: Author based on EY, DBS Group Research (2016)[132]

Additionally, it is also known that large Chinese banks generally prefer to focus on State Owned enterprises (SOEs) and large clients rather than on private individuals and Small and Medium Enterprises. In fact,

> "the existing financial sector has long been dominated by the formal banking sector, where large state-owned banks (SOCBs) typically serve SOEs, leaving the SMEs underserved, although they account for a large share of GDP, employment and innovations. Moreover, banks also prefer to serve high-net worth customers, imposing stringent investment thresholds for wealth management- related financial services that preclude low- and middle-income savers/investors."[133]

Unfortunately, this misallocation of credit in the Chinese Economy has led to

[131] *Ibid*.
[132] *Ibid.*
[133] Li, S. & Yi Tin, C. (2016), *op. cit.*, pp. 171

a big credit gap in the country. Consequently, a non-official banking system has emerged in the shadows and has dealt with these needs not properly addressed by the traditional system. Although the majority of companies operating in the shadow banking system are usually not properly registered as financial institutions, the whole shadow banking system does not necessarily challenge the traditionally banking system status quo. Actually, it is possible to argue that shadow banks' activities compliment the traditional banks' ones, because they offer financial services to the unserved segments of the society – individuals and SMEs that are responsible for 80% of the economic output and 65% of the GDP, but receive only 20% of the credit generated by official banks and other financial institutions.

> "In the context of China, non-bank finance and shadow banking thus capture both the essential elements that we now see in the P2P sector, namely the need for alternative forms of financing to support non-State growth, particularly among SMEs whilst at the same time addressing potential risks to consumers and the financial system." [134]

Attracted by the potential efficiency and market share gains offered by online P2P (lending and payment) platforms, typical shadow banking institutions, Internet companies and private investors have invested substantially in the FinTech sector. Because of the big amount of credit being delivered in a non-conventional and regulated way to these online-related financial sectors, the Chinese Central Government issued the Internet Finance Guidelines in July 2015. The document aimed to decrease the risks and uncertainties involved in "shadow", non-official financial and, payment and investment transactions by providing a core of "good practice" regulation and accountability. Despite these efforts, the rules guiding peer-

[134] Barberis, Jànos & Arner, Douglas. (2016) "FinTech in China: From Shadow Banking to P2P Lending" in Tasca, Paolo et al (eds.), *Banking Beyond Banks and Money.* Cham: Springer International Publishing AG, pp. 69.

to-peer lending, digital wallets and payments made via online third-party platforms in China are yet under developed.

Nevertheless, the uncertainty that embeds the loans made through these online lending platforms seems to scare neither borrowers nor investors. In fact, there is still a huge demand from the SMEs and population in general for low-cost, and accessible financial services such as wealth management, online payment systems, loans, etc. In this scenario of high demand for financial and banking services and low offer from the traditional banking system, it is not surprising that online P2P lending companies are flourishing in China.

Some would argue, however, that precaution is necessary while dealing with both new payment and p2p lending platforms. From too-small-to-care to too-big-to-fail, these FinTech alternatives are challenging, complimenting and changing the Chinese financial system as a whole.

In fact, a movement from a cash society towards a digital economy based on online payments, online p2p loans, and other financial technologies can be observed in China. On one hand, all levels of government are encouraging Chinese citizens to use those new tools and are also providing incentives for FinTech companies develop innovative solutions for the financial sector in the country. On the other hand, the impressive growth and penetration of these technologies question the financial system's capacity of adaption to new demands and disruptive technologies.

6. Ant Financial and its Alipay

Analyzing the Chinese FinTech ecosystem and the impact of those new financial tools would have been, at least, misguided if the biggest online payment company had not been studied. Therefore, this dissertation will now discuss about the most important Chinese online payment platform that provide, in fact, provides not only payment solutions, but also other financial services too: Ant Financial Services Group. Indeed, this company's online payment service (Alipay 支付宝) will be the main focus of this study, because this is one of the most innovative, disruptive and spread online payment platform in the world.

6.1 Ant Financial Services Group

Ant Financial Services Group is the official name of the company that, since 2014, is responsible for managing all financial services from the Alibaba Group, including, Alipay 支付宝 and Yu'E Bao 余额宝. However, it is necessary to look to the emergence and consolidation of Alibaba's business model first in order to understand what Ant Financial's Alipay is and why this is such a disruptive financial service.

The Alibaba Group was founded in 1999 by a group of 19 people. The main purpose of the company was to better connect consumers and sellers within China and facilitate the commerce between Chinese sellers and consumers abroad. The tool chosen to accomplish this goal was e-commerce. By that time, online marketplaces were still beginning to be developed and there were just few online platforms providing this electronic marketplace.[135]

[135] Alibaba Group. "History and Milestones" (2017). Accessed on April 2nd, 2018. http://www.alibabagroup.com/en/about/history

Taking advantage of the opportunity window to establish an online marketplace in China, Alibaba Group created two shopping websites: alibaba.com and 1688.com. The former's goal was to create a global wholesale marketplace where Chinese Small and Medium Size Enterprises could sell their products online in an easy and direct way. The later had the same goal, but its focus was the Chinese domestic market.[136]

In 2000, Alibaba Group raised US$ 20 million from SoftBank and kept investing in the development of technologies that would facilitate and boost this Consumer-to-Consumer (C2C) online marketplace. As a result, TaoBao 淘宝 was officially launched in 2003. This online shopping website was able, then, to connect million of Chinese consumers to small and medium size sellers all over the country by using an easy-to-use interface and delivering the goods rapidly and efficiently.[137]

Nevertheless, this C2C platform sill lacked trust between buyers and sellers. On one hand, how would a merchant be sure that he or she would be paid by a buyer who he/she had never met physically? On the other hand, how would the buyer be assured that the seller would delivery his/her purchase and that the good acquired online would be what he/she was expecting in terms of quality, size, shape?

Aiming to overcome this mutual distrust, Alibaba Group took two complimentary solutions: i. improvements were made in TaoBao ecosystem; ii. an online payment system – Alipay 支付宝 - was created in 2004 to assure the reliability and security of online transactions and purchases. While TaoBao developed a seller's reliability rank to help buyers to decide in which shop they would buy a good, Alipay started to act as a safe channel that processed payment transactions between merchants and consumers. In this way, the trust in TaoBao online marketplace began

[136] Alibaba Group (2017), *op. cit.*
[137] Alibaba Group (2017), *op. cit.*

to be strengthened. Buyers could verify sellers' reliability and their products' quality by checking TaoBao rank's score and, in case of fraud or any other problem with the product or its delivery, Alipay would reimburse them. Meanwhile, sellers could be sure that they would receive the money related to the purchase even if the costumer had not paid – Alipay system would also reimburse the merchants. [138]

Also in 2004, TaoBao's number of users skyrocket and this platform became the largest consumer-to-consumer platform in China. In 2008, another online platform was created within Alibaba's environment: TaoBao Mall (Tmall), a dedicated platform for third-party brands and retailers. This new Business-to-Consumer (B2C) online marketplace kept focusing in the trade between SMEs and individuals, and matched the still growing buyers' demand for goods made by these companies.[139]

After one decade, Alibaba Group was already controlling

"four-fifths of all China's e-commerce and was the largest online and mobile commerce company in the world in GMV terms. [By 2013,] there were 279 million active buyers and 8.5 million active sellers using Alibaba's online services [per] year and 14.5 billion annual orders were made via Alibaba e-platforms."[140]

The business model developed by this company allowed TaoBao and Tmall to be used as "middle channel" connecting buyers and sellers in a practical, fast and reliable way. The facilitation of transactions brought by Alibaba was essential to boost e-commerce in China. [141]

Entering into the financial arena turned to be a natural consequence of Alibaba's desire of keeping growing. Besides providing a security way to transfer

[138] *Ibid*.
[139] *Ibid*.
[140] Chen, L. (2016) "From Fintech to Finlife: the case of Fintech Development in China". *China Economic Journal*, 9(3), pp. 229.
[141] Alibaba Group (2017), *op. cit.*

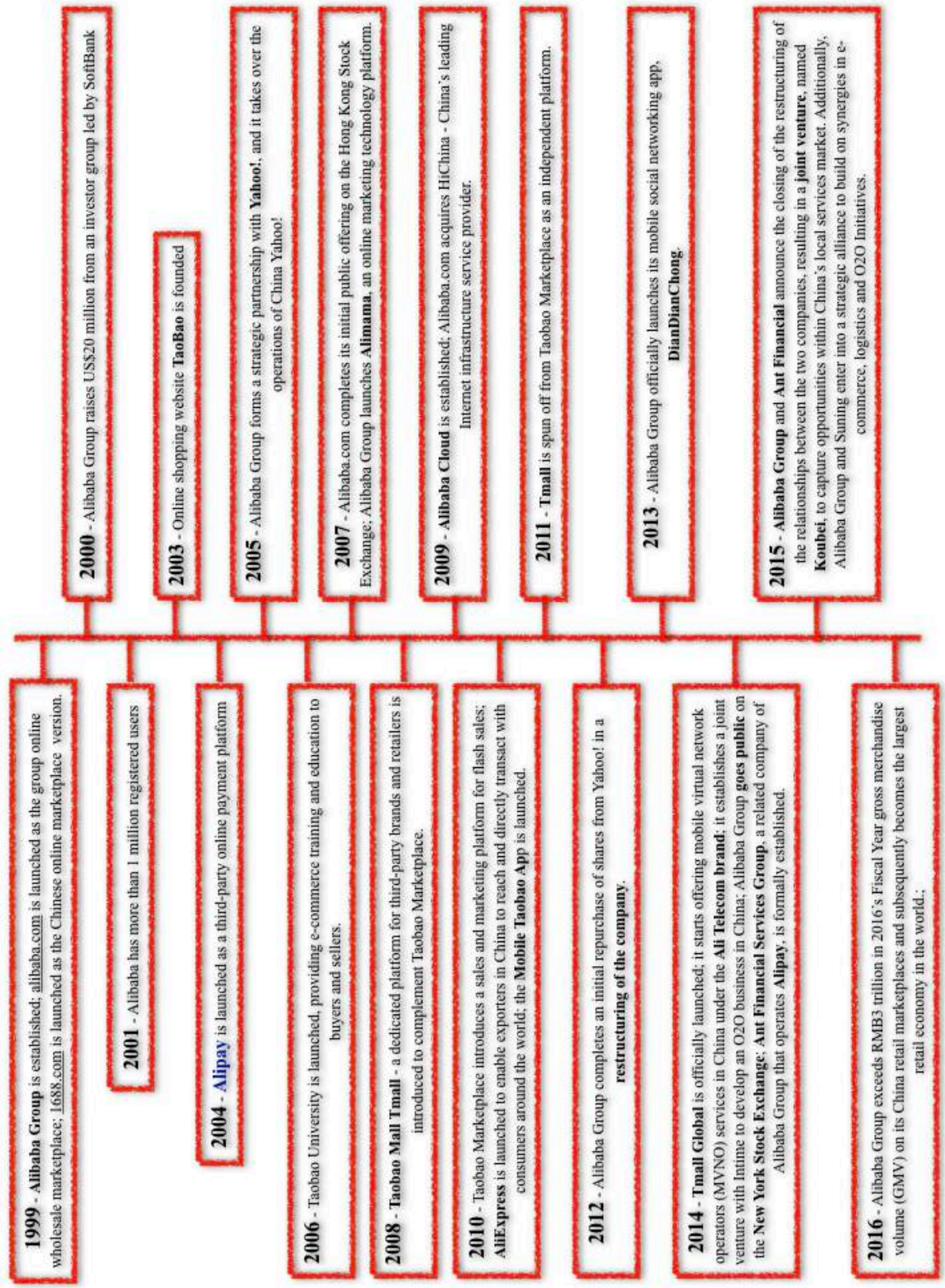


Figure 6.1 Alibaba Group's business model evolution. Source: author based on information gathered from Alibaba Group's official website.[142]

[142] *Ibid*.

money, there were still specific financial demands from SMEs and other users not fulfilled. In fact, many financial needs of TaoBao and Tmall's sellers and consumers were still underserved by the traditional "offline" banking system. Once again, there was a window of opportunity opened: it was time to invest in Alipay, to expand the services offered by this platform, and to adapt it to new regulations governing online payment platforms in China.[143]

Because of the rapid growth of this platform, the implementation of new rules regulating online payment transactions, and other managerial issues, it has been decided that it was necessary to spun Alipay out from Alibaba Group. If this were properly done, Alibaba Group[144] would still influence Alipay's business model and would be able to indirectly control its operations, expansions and all decisions concerning the platform. Additionally, this would mean that Alibaba Group[145] could go public in the New York Stocks Exchange and Hong Kong Stocks Exchange, for example, without making Alipay public. Strategically, it would provide more capital through the IPO, but would allow Alibaba Group and its main owners to keep their exclusivity in one of the most rentable services provided by the group.

Although Alipay was formally "separated" from Alibaba Group, it kept as the platform responsible for all transactions made in that marketplace.[146] After

[143] In July 2015, the Internet Finance Guidelines were launched by the Central Government and issued rules of how Internet Financial Services' providers should act.

[144] In fact, Mr. Jack Ma intended to keep controlling Alipay's operations, but he was not willing to share this control with other big investors such as SoftBank and Yahoo!. After a complicated – and questionable – court process, Mr. Ma was able to separate Alipay and other financial services from the main core of Alibaba Group's products. In practical terms, it meant that Yahoo!, SoftBank and other big investors would not possess Alipay anymore. From that moment on, these financial services would be controlled by Ant Financial Services Group (or Zhejiang Ant Small and Micro Financial Services Company Ltd. as it was called at that time). Mr. Ma, however, would still control and possess Alipay, for example, because this was the main majoritarian investor of Ant Financial. This movement made by Mr. Ma was largely criticized inside and outside China. Many experts questioned the legality of it and affirmed that it weakened the rule of commercial law in China as well as the confidence of foreigners concerning to invest in China.

[145] More precisely, Jack Ma – Alibaba Group's main founder, investor and CEO.

[146] It is possible to say that Alipay, for instance, was Alibaba's daughter that left her father house in order to get married. After the marriage, she would have her own new family, but would keep being a member of her father's family too. The marriage would change the degree of influence her father would have on her life. However, she would be able to visit him as much as she wishes and could help him whenever it was necessary. If we apply this

establishing a partnership with the Zhejiang Ant Small and Micro Financial Services Company Ltd., all Alipay's financial became to be operated by this company. In October, 2014, Zhejiang Ant was renamed and rebranded – Ant Financial Services Group, from that moment on[147]. Despite this renaming, Jack Ma, Alibaba's CEO, founder and main shareholder, acquired a substantial amount of stocks from the former Zhejinag Ant Small Company. This, thus, allowed Mr. Ma to keep controlling Alipay's business model and services. [148]

Although Alipay is still one of the most important services offered by Ant Financial, other five[149] financial products/platforms were also developed by the company and, now, integrate Alipay's ecosystem. While Alipay is the largest mobile payment platform in the world since 2013, Alipay Wallet is a digital wallet integrated with many types of e-commerce and other online services' platforms such as TaoBao, Tmall, Eleme, Ofo, Mobike, and Public Services' providers. Ant Micro is a micro-loan provider, ZhaoCai Bao is a third-party financial services platform, Yu'E Bao is a revolutionary money market fund whose focus are SMEs and individual investors, and MY Bank is one of the first totally online banks in China.[150]

Ant Financial timeline can be observed in figure 6.2 below.

story to Alibaba-Alipay relationship, Alipay would be the daughter who got married, but did not cut relations with her father and other family members.

[147] According its official website, Ant Financial main mission is to "bring the world equal opportunities". Therefore, the company is "dedicated to creating an open, shared credit system and financial services platform through technology innovations, and to provide consumer and small business with safe and convenient inclusive financial services globally." Ant Financial. Accessed on November 17th, 2017. https://www.antfin.com/index.htm?locale=en_US

[148] Ant Financial. (2018) "History". Accessed on April 2nd, 2018. https://www.antfin.com/history.htm

[149] The six services offered by Ant Financial are: Alipay, Alipay Wallet, Ant Micro, ZhaoCai Bao, Yu'E Bao and MY Bank.

[150] Ant Financial. (2017) Accessed on November 17th, 2017. https://www.antfin.com/index.htm?locale=en_US

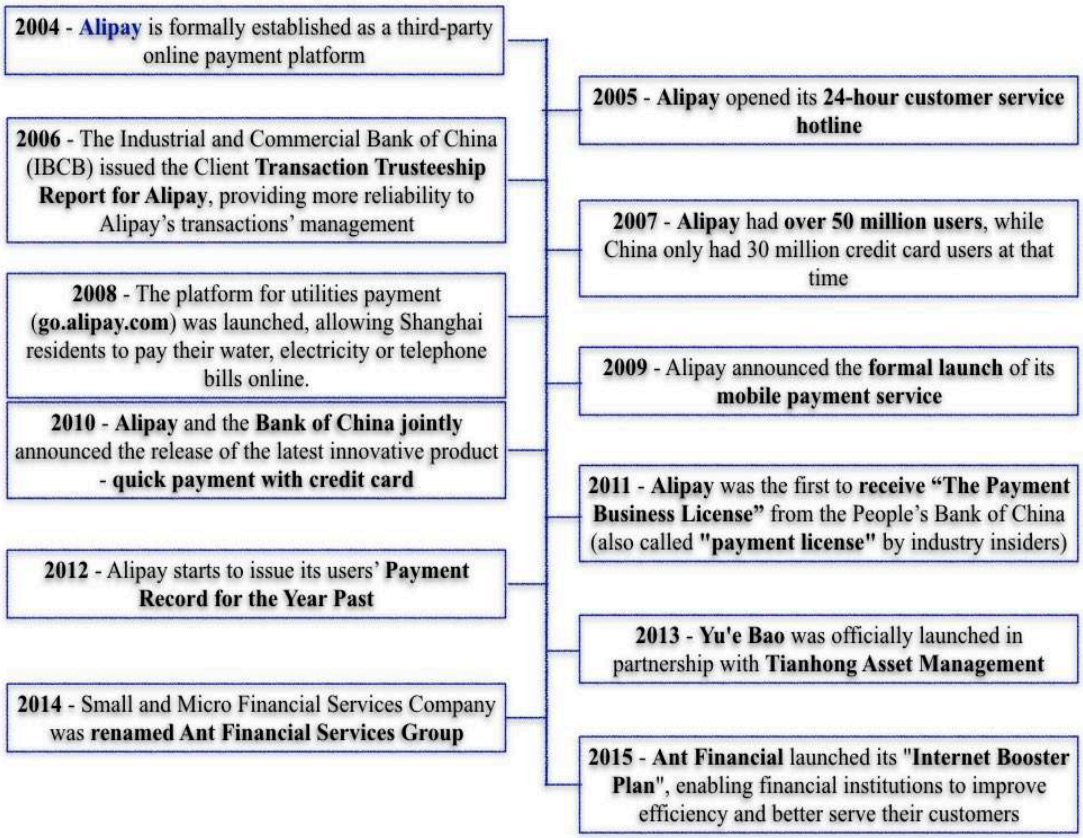


Figure 6.2 Ant Financial History and Milestones. Source: author based on Ant Financial official website.

6.2 Alipay 支付宝

Alipay, as mentioned previously, is Alibaba's third-party payment platform created to process and to secure money transactions between seller and buyers inside TaoBao's ecosystem. In 2010, Alipay reached the number of 300 transactions per second. On May 26th, 2011, Alipay was able to expand its services after being granted a Payment Business Permit by the People's Bank of China. Since then, intra-users payment transactions were allowed as well as payment to mobile phone companies (mobile top-up), purchase of prepaid cards, and payment of municipal services – water, heat, and electricity bills and other services' fees. This permission, in addition to the implementation of proprietary cloud-computing technology, made the number

of transaction reaches a new peak of 15,000 per second.[151] By 2013, Alipay was already the world's largest mobile payment platform and was dealing with more than 85,000 transactions per second as it can be observed on figure 6.1.1 below.[152]

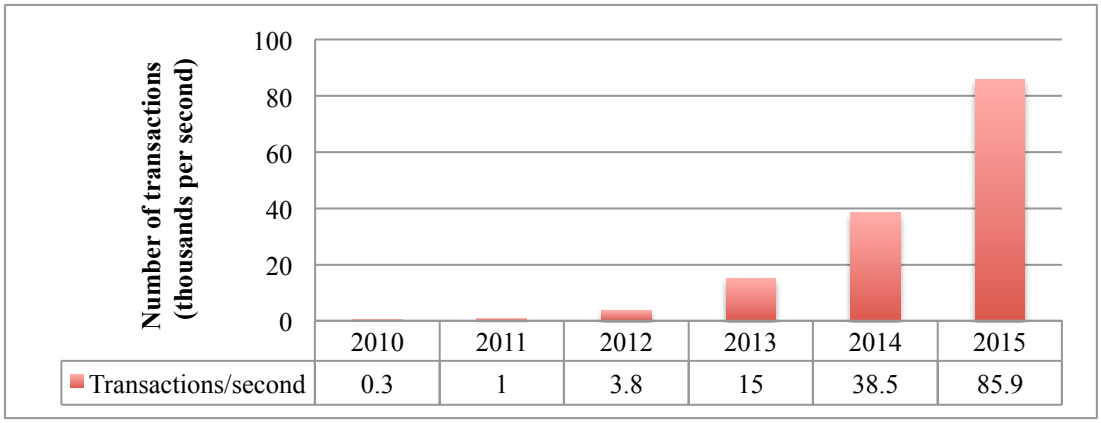


Figure 6.3 Numbers of transactions per second processed by Alipay between 2010 and 2015. Source: author based on Chen (2016).

Years later, Alipay registered an amount of more than 450 million active users, and more than 200,000 offline retail stores in Mainland China accepting it as a payment method in 2017. One of the reasons for this impressive growth was Alipay's transactions-security assured to its users. According to UnionPay, "in 2015, the rate of fraud in China's bankcard industry was about 0.02 percent, and for debit cards the rate is 0.01 percent; both numbers are much lower than the industry average in the world. In comparison, Alipay's fraud rate is under 0.001 percent."[153] Because of this low fraud rate, the platform has gained many adepts.

Additionally, Alipay is considered a cheap mechanism for money transactions and payment. While transaction fess are applied for both credit/debit cards' users and merchants, Alipay presents a system that does not charge consumers and that only

[151] Chen, L. (2016) From Fintech to Finlife: the case of Fintech Development in China, China Economic Journal, V. 9, N. 3, pp. 229.
[152] Meanwhile, Visa Card was far behind Alipay. By 2015, the company's transaction peak was around 14,000 transactions per second.
[153] Chen, L. (2016), *op. cit.*, pp. 230.

applies a small transaction fees for its merchants. In fact, the average transaction fee applied for merchants is 0.6% while the highest – no more than 1.2% – is applied only to specific industries such as gaming, computing and lottery.[154]

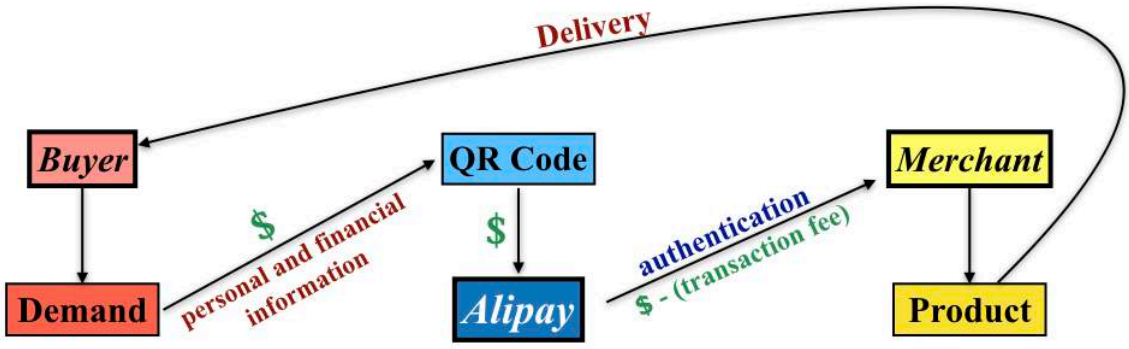


Figure 6.1.2 Alipay's business model and payment flow. Source: author.

If any problem happens during the purchase process described above, Alibaba (via Alipay) guarantees the money reimbursement to the buyer and/or to the merchant according with the type of problem or fraud faced. Also, a purchase record is generated and added to the buyer's credit and buying historic. The same happens with the seller, generating, then, a purchase historic and a reliability score for both costumers and merchants.

Because of the reliability and security ensured by its business model, Alipay conquered both offline sellers and services providers' trust. Consequently, there are more than 200,000 merchants using Alipay as a payment platform in their businesses and shops in a daily basis. Indeed, Alipay's evolution has only been possible because of the development and the implementation of low cost digital technologies such as

[154] Kow, Yong Ming; Gui, Xinning & Cheng, Waikuen. (2017) "Special Digital Monies: The Design of Alipay and WeChat Wallet for Mobile Payment Practices in China." In R. Bernhaupt et al. ed., *INTERACT 2017,* Cham: Springer International Publishing AG, pp. 140.

Quick Response Codes (QR Codes).[155]

6.2.1 Alipay *versus* Credit and Debit Cards

By using Alipay, both merchants and costumers save money, energy and time. According to data released by the People's Bank of China (PBOC), China has a low credit card penetration rate - there were 0.29 credit cards per capita in circulation by the end of 2015 and 0.34 cards per capita by the end of 2014.

In fact, the low number of credit cards being used in the country posed some barriers to goods and services' purchases. Costumers had to either have credit cards or carry enough cash to purchase them. Additionally, online shopping was quite restricted to those that were able to pay online via their bankcards or Internet banking systems. However, due to the emergence of Alipay, more people were able to buy online and offline without having to rely on the traditional Chinese banking system – as mentioned previously, it did not reach all the Chinese consumers, leaving behind million of citizens unserved or underserved. By using this new platform, merchants did not have to pay big transaction fees for their banks and/or credit card companies – Alipay's fees were much lower.

Moreover, buyers also did not have to go through all the bank's bureaucratic procedure in order to apply for having a credit card or access to Internet banking. The information required to create an Alipay account was much simpler and realistic, the bureaucracy was reduced to only the necessary, middlemen were cut off from the account's creation, digital technologies were applied to faster the process and to

[155] Instead of using credit card, debit card or money/cash, a consumer can go to a shop, scan the seller's Alipay QR Code, confirm the amount of money to be transacted, put his/her password or his fingerprint and finalize the purchase. After a couple of seconds, the seller will receive the money coming from his consumer's Alipay personal account. After debiting a small transaction fee – less than 1.5% – the seller's Alipay account will register the transaction and it will add the new amount of money to the seller's balance. If he/she wishes, it is possible to withdraw this money to his/her bank account quickly by pressing a couple of buttons. The money, then, will be transferred to his/her bank account in a couple of minutes – or even seconds – and no transaction fee is charged.

assure the security of the account and to protect the users' personal information. In a few seconds, the account was created, the user could both pay and be paid through Alipay mobile app, invest money, pay for municipality services, access wealth management services and transfer money to friends and acquaintances.

Because of the easy-to-use interfaces in the app, its low entry-barriers standards, its reliability and safeness, Alipay system spread fast and effectively throughout the country. Especially in the major urban areas, it has been used as a payment method by taxi drivers, shop sellers, services' providers and even by the local/municipal governments.

6.2.2 Using Alipay in different cities, contexts and situations

In some cities such as Guangzhou, Alipay has been used to purchase subway and bus tickets. Without using coins or bills, the user approaches the machine; chooses the destination; confirms the number of tickets the he/she wants to purchases; clicks on Alipay's logo; uses the mobile app to scan the QR Code; puts his/her password or fingerprint; and receives the ticket. This seven-steps process can be observed in the pictures presented later on in the appendix to this chapter.

Actually, people no longer even need to add money physically to their transportation cards. In fact, they can use Alipay's "city card service". By clicking in this button, they can use their Alipay mobile app to scan the transportation card via NFC technology and, then, add money to the card scanned via their Alipay's account. In this way, Alipay's users can easily top-up their transportation card in a convenient and efficient way, avoiding waiting in lines or wasting time for recharging money to their cards. This process can be observed later in the chapter's appendix.

Nevertheless, if they do not want to recharge their transportation cards, they can use the NFC technology via Alipay mobile app to pay for their ticket directly in

the exit of the subway or bus ride. They just have to scan their own phones at the subway's entrance machine and do it again in the exit one. The trip cost/ticket will be directly deducted from their Alipay account after receiving the NFC signal. Guangzhou's subway's machines that have this function can be seen in the pictures shown in this appendix A.[156]

6.2.3 A symbiosis between Alipay and Sharing Economy

Besides the ticket purchasing machine, it is possible to find many other machines and services integrated to Alipay inside the subway station. For instance, at Guangzhou Botanical Garden Subway Station, it is possible to rent an umbrella before leaving the place. In one of its entrances, there is a machine that allow people to rent umbrella[157] in case it is raining outside and the person has forgotten to bring his/her own. After scanning the QR code through Alipay App, the user pays an initial deposit fee of 30 CNY and, based on the GPS location and Alipay account's information, the machine opens one of its lockers and allows the costumer to take one umbrella. After using it, the person can either return it in the same machine or in another one located in different locations such as hotels, shopping malls, and other subway stations. After scanning the machine's QR code again, the locker is opened and the umbrella can be placed there. If the user does not return it, his/her Alipay account can be charged an extra time.

Another impressive example of sharing economy being boosted by the use of Alipay is the following one: bike sharing. During the last 2 years, a couple of bike sharing companies such as Ofo 小黄车, 小蓝单车 XiaoLanDanche, and 永安行 Yong'an xing have emerged and they have been spread all over the country. Indeed,

[156] Pictures taken by the author between November 4th and 8th, 2017. The pictures were taken at the Botanical Garden and Guangdong Tower subway stations, Guangzhou, Guanfdong, China.
[157] See the Picture of the Umbrella's rental machine later on in the appendix of this chapter.

during the past months, some companies have even reached other countries such as the United States, and United Kingdom.

Without having Alipay, however, it would be impossible to use those bikes. In order to create an Ofo or XiaoLanDanche account, for example, the person has to provide personal information, take a picture of her/his ID, Passport or Student ID Card and pay an initial deposit – in case he/she breaks the bike, steals it or damages it somehow. This initial deposit – between 100 and 200 CNY in general – is paid via Alipay mobile app. Relying not only in the information provided by the person, but also on the guarantees and security brought via Alipay's use, the bike sharing companies were able to manage the risk involved in lending bikes to people they would never meet personally. Alipay was used, then, as both a payment method and a final guarantor of the physical lending. Putting it another way, Alipay securitized a high-risk physical loan, allowing the whole bike-sharing ecosystem to flourish.

The example of how mobile payment apps such as Alipay have created an economic environment where sharing-economy based companies could flourish strengthens the argument that FinTechs in China are disrupting not only the country's economy, but also its cities[158], and its citizens' mobility and access to formal economy. Without Alipay, for instance, the bike-sharing companies would not be able to spread to so many locations and cities, their users would have to pay physically for the rental, etc. Only because of the existence of this mobile payment platform, those

[158] Although there is no universally accepted definition of the term "Smart City", the British think-tank Center for Cities brings a couple of definitions that might be useful for this paper: "[Smart City is] a process rather than a static outcome, in which increased citizen engagement, hard infrastructure, social capital and digital technologies make cities more liveable, resilient and better able to respond to challenges; IBM defines a smart city as 'one that makes optimal use of all the interconnected information available today to better understand and control its operations and optimize the use of limited resources'; [and] According to the Manchester Digital Development agency, 'a 'smart city' means 'smart citizens' – where citizens have all the information they need to make informed choices about their lifestyle, work and travel options'." Center for Cities. "Smart Cities". Accessed on November 17th, 2017. http://www.centreforcities.org/reader/smart-cities/what-is-a-smart-city/1-smart-cities-definitions/

companies could emerge and consolidate themselves in a short time – less than 3 years – and could become an integrated and essential part of the "Smart Cities" that are emerging in the country.

Although the shared-bikes unblocked via Alipay are catching people's attention in the streets of Chinese Cities, there are also other situations involving payment through this app that are impressing both foreigners and locals. Purchasing via Alipay's QR code became so common that newspaper stands, street food vendors, and charity organizations use their own personal Alipay QR code to receive money. Some pictures showing those examples can be found in the appendix to this chapter.

Because of its unprecedented characteristic, it is interesting to explain how charity organizations or even beggars are taking advantage of Alipay app to collect some donations around the city. It is not that unusual to see some beggars with their Alipay's QR codes – in general printed in a piece of paper, but sometimes, in their own smartphones – asking for financial help and telling people that they can donate via Alipay in case they don't have money with themselves. In this way, beggars were able to overcome the standard excuse made by those who did not want to give them any money: "sorry, I do not have any money/cash/coins with me right now". Through Alipay or, sometimes, WeChat QR code, beggars could collect money in a more technological and, perhaps, effective way.

In fact, the utilization of Alipay by beggars confirm the fact that this online payment system has reached not-accessed and unserved segments of Chinese society that were left behind by the traditional banking system. Actually, this example also proves that new technologies can be used to improve the economy's inclusiveness too, giving access to new ways to transact and store money that are not necessarily via bank accounts for instance.

Another curious example of how people are intensively using Alipay even in the remote areas is this one: an old lady whose work was to make bamboo rice in the middle of the mountains in the Guilin rice terraces had Alipay account and used it to charge her costumers. Despite not having toilet in her home, she had Alipay and used it constantly as a way to receive payments, manage her income and make purchases online. Once again, Alipay was used to integrate to the formal economy a person who was left behind by the traditional banking system or was underserved by it. In fact, this old lady did not have to look for a bank agency in the nearest city, she could just invest and manage her money through her own smartphone. She just needed to have an account in the app and access to Internet. Everything else could be easily done via Alipay and she, suddenly, was not in the margin of formal economy anymore.

Indeed, Alipay is getting bigger and popular not only within China, but also abroad. During the past years, Ant Financial has invested in the internationalization and expansion of its third-party online payment platform. In countries such as Vietnam, Philippines and Australia, Ant Financial is establishing partnerships with local banks[159] in order to export Alipay to these markets.[160] The current strategy is to allow mostly Chinese tourists to use their Chinese Alipay account via its partner local banks in order to pay for goods in services in those places. After this partnership gets consolidated, both the local banks and Alipay start to work together so the local customers can create Alipay accounts and, then, use it to purchase on Alibaba Group's online marketplaces like AliExpress – TaoBao's international version. Lately, the idea is to allow the local customers to pay for goods and services in local –

[159] In Vietnam, Alipay has established a partnership with the National Payment Coorporation of Vietnam (NAPAS). As part of this partnership, Alibaba's online marketplaces might start to accept NAPAS' credit card as a way of payment too. In Australia, the partnership was established between Alipay and the Commonwealth Bank of Autralia.

[160] Bindi, T. (2017) "Alipay enters Vietnam through partnership with NAPAS: The agreement between Ant Financial and NAPAS will allow Chinese tourists visiting Vietnam to use Alipay in the country" Accessed on November 18th, 2017.
http://www.zdnet.com/article/alipay-enters-vietnam-through-partnership-with-napas/

both physical and online – shops as it is done in China by using Alipay's QR code for instance.

Besides the partnership between Alipay and local banks, Ant Financial is also investing in making alliances with other third-part payment platforms in other to access new markets and reach new users. In July 2017, an alliance between Alipay and Stripe was launched.[161] A couple of months before, however, another big alliance has been forged in order to get into the payment U.S. market. In May, Alipay inked a deal with First Data, an American payment processor firm. This joint venture enabled Alipay to be used as the payment method at point-of-sale in more than four million retail partners in the country.[162]

6.2.4 Credit scores and assessment of loans' risks

After a couple of transactions, Ant Financial is able to draw its users' financial profile by analyzing their preferences, purchases' historic, loans' payments among other information. The big data collected can – and will – be used later to determine people and SME's credit. These scores are, then, showed by the Zhima Credit platform (one of the wealth management services offered by Ant Financial Services), and are used to determine whether Ant Micro – another Ant Financial service – should provide loans to certain Alipay users (both consumers and merchants) or not.

Indeed, after analyzing a borrower's credit scores and financial behavior, Ant Financial is able to determine not only the creditworthiness of the person requesting a loan, but also the probability of receiving the loan's money back. In this way, the company is able to better determine the interest rate of each loan in accordance with

[161] Stripe docs. "Alipay Payments with Sources: Use Sources to accept payments using Alipay, the most popular payment method in China". Accessed on November 18th, 2017. https://stripe.com/docs/sources/alipay

[162] Russel, J. "Alipay, China's top mobile payment service, expands to the U.S." Accessed on November 18th, 2017. https://techcrunch.com/2017/05/09/alipay-first-data-us-point-of-sale-expansion/

more accurate risk assessments and other financial predictions. In other words, this big data usage and creditworthiness scores have been used as a way to fight against information asymmetry and its negative externalities. As consequence, big data and credit profiles have been responsible for pushing down interest rates and other transaction costs that previously had been used as a way for compensating the risk and the incertitude related to lending issuance and information asymmetry.

6.3 Alipay and its contributions to economic inclusiveness

Because of being considered safe, efficient, fast, reliable and easy-to-use, Alipay's mobile app is one of the most frequently used apps in China and it is ranked as the most used online payment method in the country. While WeChat, Chinese messaging and social network app, is the most accessed app, Alipay counts with 14.4% of total access and TaoBao counts with 24.1% of them according to the CNNIC Report (2017). As a remind, it is important to notice that the frequency of usage of online payment platforms is much lower than the time spent for the use of social network and messaging apps. Putting another way, the amount of time and the number of access Alipay receives every single day in China is impressive.

Indeed, Alipay has contributed to economic inclusiveness in China once it has spread the access to formal financial and banking services such as payment platforms and microloans. All over China, there already more than 490 million people using Alipay to pay for goods and services, receive payments, manage wealth and invest, etc. Many merchants were able to accept online payments and to access credit via Ant Financial ecosystem (Ant Micro, Zhima Credit's scores) for the very first time. Before Alipay, millions of sellers would accept payment only by cash and could not provide proof of their credit worthiness in order to contract a loan/credit. Now, they are

integrated not only to a formal online payment system, but also to other financial and bank-related activities such as wealth management services, investment funds and credit.

The digital financial inclusion lead by Alipay has reached even the most remote Chinese locations. Provinces and municipalities that did not have any physical bank agency/office are, now, directly integrated to the rest of the country via online payment platforms and digital financial services provided by the company. Instead of having to travel to other cities or regions to access basic banking services, costumers and merchants can pay bills, receive payments, invest money and manage their savings all via Alipay. All they have to have is a smartphone connected to the Internet.

Although some could argue that financial technologies can be exclusionary[163] once they require a certain degree of knowledge and basic digital skills from users, Alipay and Ant Financial are considered inclusive technologies, because they have developed easy-to-use interfaces and solutions that can be used even for those people that had never accessed Internet or used computers before using the company's app. Indeed, the mobile app layout is quite simple, intuitive, full of illustrations and step-by-step explanations of each function. As consequence, the lack of knowledge and digital skills expected natural entry barriers are intentionally reduced by the app's interface and layout.

[163] The usage of technology can also be exclusionary once many technoogies can replace human labor by automating or, simply, replacing some activities in a cheap and eficiente way. Indeed, digital Technologies and other automating innovstions can even contribute to the growth of social and income inequality. Although this topic brings a really important and interesting discussion, this dissertation will not address it. The author, in fact, hopes to explore the issue later in other articles and papers. For more information about the topic, see Eubanks, V. (2018) Automating Inequality: How High-Tech Tools Profile, Police, and Punish the Poor. New York: St. Martin's Press.

7. The emergence of FinTechs in Brazil

Differently from China, Brazil has just started to face the eruption of the FinTech sector. Why, how, and when are they arising? What are their main focus, their target consumers and their main obstacles? Are these companies impacting the country by bringing new solutions to financial problems?

These are some of the questions that will guide the present chapter. Only after discussing these sub-topics, the impacts of FinTechs in the Brazilian Payment market will be addressed – the case study about PagSeguro can be found in the next chapter.

7.1 An overlook at the sector

Although some so-called "FinTech" companies emerged as early as 2009, just in 2014 the sector started to experience a significant growth – both in the number of companies being created and in the amount of money invested and generated. In 2015, for instance, it is estimated that the total amount invested in the FinTech sector was around R$[164] 200 million[165] (50 million USD[166]), and, by 2016, this investment grew up to R$ 515 million (USD 161 million) – Brazil became the 8th biggest destination for investments in FinTechs.[167]

Also during 2016, there were already 309 Brazilian FinTechs[168] and almost 70% of them were already in operation – they had already customers paying for their

[164] R$ stands for Brazilian Real, the Brazilian currency since 1994.
[165] FINTECH LAB (2016). "FinTech Lab Report Brazil 2016". Accessed on February 20th, 2018. http://fintechlab.com.br/wp-content/uploads/2017/02/Report_FintechLab_2016_alta.pdf
[166] On December 31st, 2015, the exchenage rate between R$ and USD was USD 1 =3,94 R$ although there was an intense rate's variation during the same year – the Exchange rate in January, for instance, was around 1 USD = 2,97 R$ in February.
[167] CONEXÃO FINTECH (2017). "Brazil reaches 309 fintech startups in a new mapping of the ecosystem". Accessed on February 20th, 2018. https://conexaofintech.com.br/en/brazil-reaches-309-fintech/
[168] CONEXÃO FINTECH (2017). "Confira os investimentos em FinTechs Brasileiras em 2017". Accessed on February 20th, 2018. https://conexaofintech.com.br/guia/investimentos-fintechs-no-brasil-2017/

products and/or services. Moreover, the annual revenue of more than a half of those companies was exceeding the mark of R$ 1 million of Brazilian Reais each by the same year; around 2/3 of the companies received investments by that year (38% of the total number of companies obtained more than 1 million Brazilian Reais each); and the number of employees had already surpassed 20 people in almost 20% of the FinTechs in operation by that time.[169]

Even though there is an expressive interest on developing B2C solutions, the Brazilian FinTechs do not focus on providing products only for final consumers. Indeed, just 31% of the services provided between 2015 and 2016 were directed towards individual consumers (*pessoa física* in Portuguese). Solutions created for companies and business represented 27% of the services and products offered by these FinTechs (B2B solutions). 42% of the services and products, however, were offered for both Business and Individual Consumers. This multifocal approach aimed to provide a bigger market share for those new companies and startups getting into the Brazilian financial sector.[170]

The multifocal approach of Brazilian FinTechs can be explained as the solution found to survive in a financial market historically dominated by few big financial institutions and traditional banks. Indeed, the consolidation of many startups and small size FinTechs still require a big amount of investment and support from big investors in order to keep their solutions alive, competitive and appealing to the consumers. Unfortunately, many companies bankrupt in their first years or are just acquired by bigger companies and established banks - reducing, then, the competition and the number of new players one more time.

[169] FINTECH LAB (2016), *op. cit.,* pp. 10.
[170] *Ibid.*

In spite of that, Brazil is still considered the leader in the number and in the impact of FinTechs in Latin America[171]. The geographical distribution of FinTechs, however, is asymmetric in its territory. By far, São Paulo city is the place that has the biggest concentration of FinTech companies and startups (around 65%) as well as the biggest infrastructure and ecosystem for their development – incubators, investment funds' offices, financial institutions headquarters, technology companies, among other elements. During the past 5 years, the city has become a natural FinTech hub. Other cities such as Rio de Janeiro, Belo Horizonte, Florianópolis, and Recife are also developing their own FinTech Ecosystem and public policies to attract and/or to incentivize the establishment of this kind of company.[172]

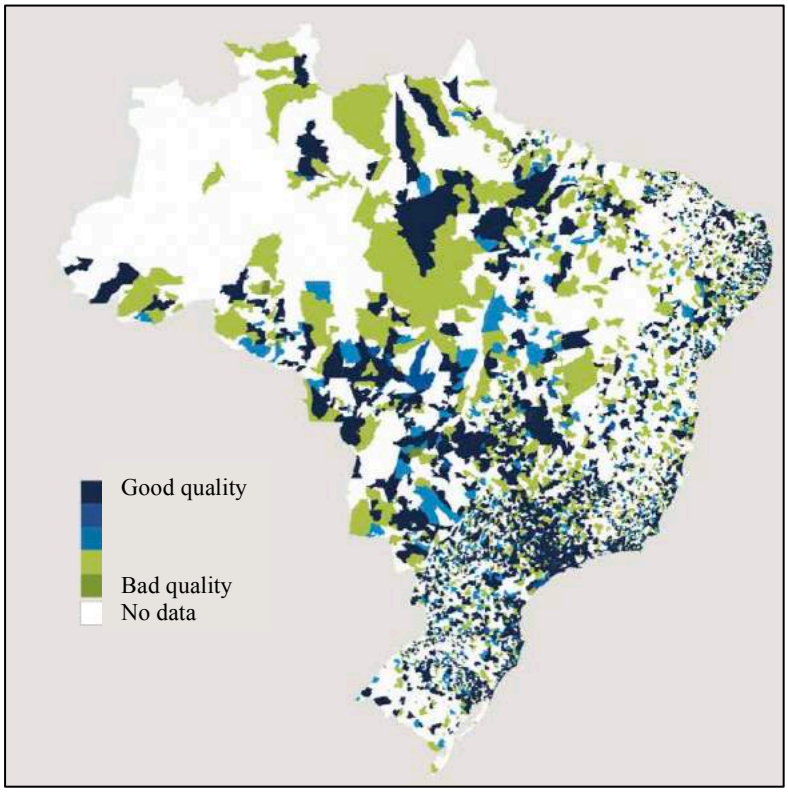


Figure 7.1 Map showing the quality of access to the Internet in Brazil in December, 2016. Comitê Gestor da Internet no Brasil (2017).

[171] In the Latin Amrica Fintechs' rank, Brazil occupies the first place with almost 250 Fintechs by 2016. The second place is occupied by Mexico with 158 FinTechs registered by the same year. Other countries that are under the spotlight in the region are Colombia (around 80 companies), Argentina (60 companies) and Chile (56 FinTechs). The FinTechs providing payments solutions are the most expressive ones both in terms of revenue and number.

[172] FINTECH LAB (2017). "Report Brazil 2017". Accessed on February 20th, 2018.

The quality of Internet access and the amount of people connected also play a decisive role in the development of those local hubs. As it can be seen in the figure7.1, there are more Internet users in the Southeastern region (mostly, Minas Gerais[173], São Paulo and Rio de Janeiro States). Therefore, the number of FinTechs emerging in São Paulo, Belo Horizonte and Rio de Janeiro is also related with the big demographic concentration of Internet users connected through a considered good Internet infrastructure – the best in the country and one of the best in Latin America.

Similarly to Colombia, Chile, Mexico and Argentina, the main focus of FinTechs in Brazil is the payment sector – accounting for more than one third of the services and solutions offered. PagSeguro Uol, Mercado Pago, Stone Pagamentos, Bebuble and NuBank are the biggest, most famous and most expressive companies in payments sub-sector. The types of products and services offered by Brazilian FinTechs can be found in figure 7.2 below.[174]

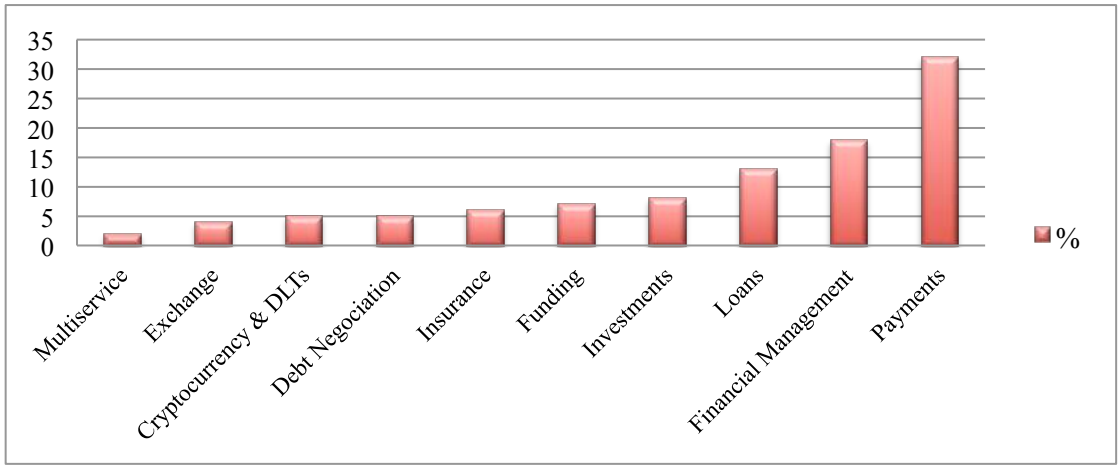


Figure 7.2 Types of Service Provided by Brazilian FinTechs between 2016 and 2017. Source: author based on APEX BRASIL (2017).

After payment solution, the second largest offer of services is related to Wealth Management solutions. Companies such as GuiaBolso, Contabilizei,

[173] Belo Horizonte is the capital of Minas Gerais State.
[174] APEX BRASIL (2017). *Corporate Venture in Brazil: About Corporate Venture in Brazil & Industry Information*. Brasília: Apex Brasil, pp. 27.

ContaAzul and Simplifica are some examples of Brazilian Fintechs that are offering this kind of service. Magnetis (robot-advisory company for investments), E-Dinheiro (multiservice platform), StartmeUp (fundraising), and Nexoos (loans) are some other examples of Brazilian Fintechs.

7.2 Brazilian FinTechs

The development of FinTechs in Brazil did not follow the same path observed in other countries such as China, United States, United Kingdom and Singapore. Indeed, the emanation of new business models applying new technologies to the financial system is a quite recent phenomenon. The first Brazilian FinTech – a Peer-to-Peer lending platform called *FairPlace* – started its business in 2009. However, it faced some regulatory constraints that blocked its business model and services' offer, and, unfortunately, the company was not able to keep its activities.

This happened because the Brazilian regulatory scenario. According to Brazilian laws – law # 4.595/1964 (art. 17)[175] and law # 7.492/1986 (art. 16)[176] – loans and other financial services cannot be offered by non-financial institutions and/or by financial institutions that are not properly and formally registered in the

[175] "CHAPTER IV
OF THE FINANCIAL INSTITUTIONS
SECTION I
Characterization and subordination
Art. 17. For the purposes of the legislation in force, the following are considered financial institutions: public or private legal entities whose principal or accessory activity is the collection, intermediation or application of financial resources of their own or of third parties, in national currency or foreign currency, and the custody of third-party property value.
Single paragraph. For the purposes of this law and of the legislation in force, individuals who exercise any of the activities referred to in this article, whether permanent or contingent, shall be considered as financial institutions." Translation made by the author. Presidência da República: Casa Civil - Subchefia para Assuntos Jurídicos. "LEI Nº 4.595, DE 31 DE DEZEMBRO DE 1964". Accessed on February 21st, 2018. http://www.planalto.gov.br/ccivil_03/leis/l4595.htm

[176] "Art. 16. Fazer operar, sem a devida autorização, ou com autorização obtida mediante declaração (Vetado) falsa, instituição financeira, inclusive de distribuição de valores mobiliários ou de câmbio: Pena - Reclusão, de 1 (um) a 4 (quatro) anos, e multa."
It is considered a crime: "Art. 16. Operating, without proper authorization, or with authorization obtained by false declaration (Vetoed), financial institution, including distribution of securities or exchange: Penalty - Imprisonment, from 1 (one) to 4 (four) years, and fine." Translation made by the author. Presidência da República: Casa Civil - Subchefia para Assuntos Jurídicos. "LEI Nº 7.492, DE 16 DE JUNHO DE 1986". Accessed on February 21st, 2018. http://www.planalto.gov.br/CCivil_03/leis/L7492.htm

Brazilian Central Bank. Furthermore, all the financial activity might be regulated and/or supervised/inspected by other governmental agencies such as the Conselho Monetário Nacional CMN (National Monetary Counsel in English), the Securities and Exchange Commission of Brazil (CVM), among others. These two laws, associated with other regulations released by the Central Bank throughout the years, contained partially the eruption of the FinTech phenomenon in Brazil.

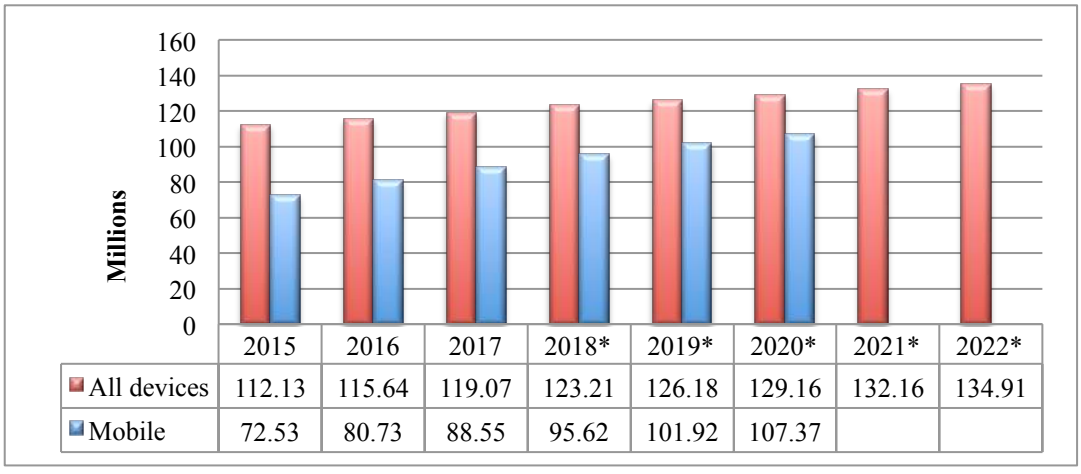
Because of the regulations applied, any company must be registered at and approved by monetary authorities in Brazil if it provides financial services such as loans and payment platforms within the Brazilian territory. This process of registering and getting the license to operate is bureaucratic and takes a long time. As consequence, entrepreneurs need to overcome this "entrance barrier" by either applying and waiting for a new financial license or associating with an already established financial institution or bank.

Since 2009, however, the federal government has reviewing the legal framework concerning digital financial activities. In 2011, the CMN authorized banks and other specific financial institutions to operate bank accounts only by electronic means – opening bank accounts and making all the transactions exclusively through digital means was, then, allowed. As consequence, the total time spent by clients while opening their bank accounts, contracting services and paying bills, for instance, decreased.

Although some transaction costs were reduced due to the implementation of low-cost digital technologies, the reduction of bank fees charged did not happen as it was expected. Indeed, many banks kept charging high transaction fees to their clients,

which allowed them to maintain an exorbitant profit margin even during one of the most severe economic crisis that the country has ever faced.[177]

Not only the big profit margin, but also the lack of good, accessible and easy-to-use financial services' offers also contribute to create an economic macro system where many costumers' needs were not satisfied. Taking advantage of both the dissatisfaction and the unmet costumers' needs, startups and other technology companies started, then, to provide financial services by applying new digital technologies and channels to the old-fashioned banking system's activities. Indeed, knowing the weaknesses of the current legislation and understanding the new demands coming from the unserved – or underserved – bank clients, entrepreneurs and IT companies shifted their focus to the financial sector and started to provide new digital solutions to existing banking problems. Instead of offering an illegal – or not registered – service, these entrepreneurs used the current legislation in their favor as much as they could. They interpreted the laws and used their legal blurred gaps in order to establish new – and legal – companies and solutions.



	2015	2016	2017	2018*	2019*	2020*	2021*	2022*
All devices	112.13	115.64	119.07	123.21	126.18	129.16	132.16	134.91
Mobile	72.53	80.73	88.55	95.62	101.92	107.37		

Figure 7.2.1 Number of Internet Users in Brazil between 2015 and 2022.[178] Sources: Author, based on APEX BRASIL (2017) and Statista (2017).

[177] In 2015, the five biggest banks in Brazil – Banco do Brasil, Bradesco, Itaú-Unibanco, Caixa Econômica Federal, and Santander – reached R$ 70 billion. This happened during the edge of the Brazilian Economic Crisis. Estadão – Finanças Mais. "Mesmo em meio à Crise, bancos mantêm lucros invejáveis". Accessed on February 21st, 2018. http://publicacoes.estadao.com.br/financasmais2017/2017/06/29/mesmo-em-meio-a-crise-bancos-mantem-lucros-invejaveis/

By 2015, not only the number of dissatisfied bank clients was getting bigger, but also the numbers of Internet users and of smartphone devices were increasing expressively in the country. As it can be seen in figure 7.2.1, Brazil had more than 110 million netizens in that year, 72.53 million of them accessing the Internet mostly by their mobile devices (either tablets or smartphones). Indeed, the number of users has not stopped growing during the last years. In 2017, it reached a historic peak of 119 million people and, by 2022, it is expected that the total amount of netizens will surpass 130 million all over the country. Additionally, the percentage of population accessing the Internet has also risen during the last decade. As figure 7.2.2 shows, the percentage of the Brazilian population using the Internet has more than doubled between 2006 and 2016.

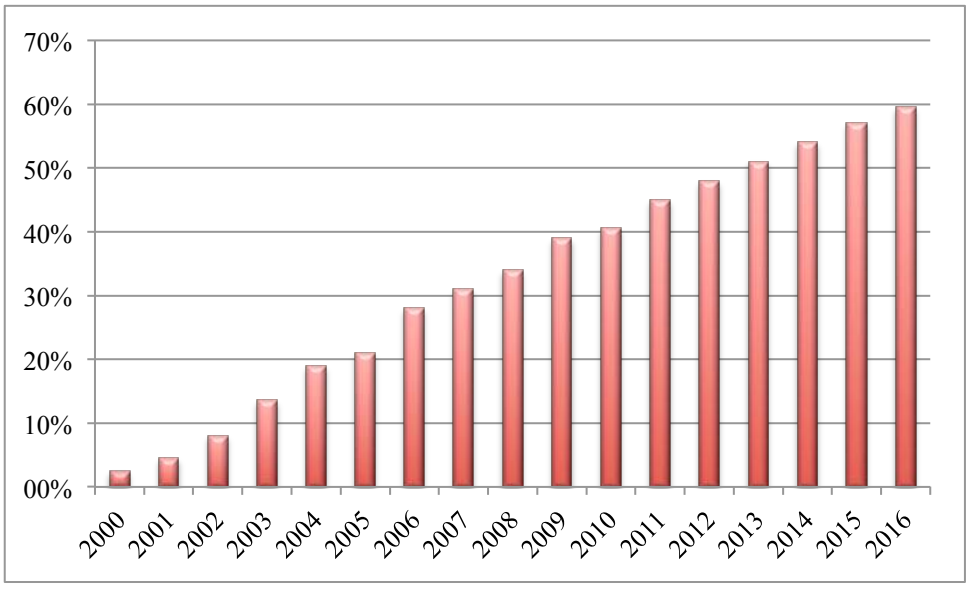


Figure 7.2.2 Percentage of individuals using the Internet in Brazil from 2000 to 2016. Source: author based on Statista (2017).

Following a similar path, the usage of Internet and Mobile Banking has also shown a strong growth since 2011. In fact, the number of transactions made through these digital channels grew 138% between 2014 and 2015. In 2014 there were 4.7

[178] Estimated values for 2018, 2019, 2020, 2021 and 2022.

billion of transactions made through mobile devices in Brazil and, during the following year, this number increased to 11.2 billion transactions[179] – around 21% of the total 54 billion transactions made in the country.[180]

In this context, having a big number of Internet users as well as of bank clients, shop owners and enterprises using their mobile devices to connect to their bank accounts and hire bank services worked as another incentive for startups come along with new digital solutions for old financial obstacles. In order words, the big fat bank fees charged, the high number of dissatisfied bank costumers, and the convenient access to the Internet and to mobile banking platforms in Brazil were decisive for FinTechs flourish in the country.

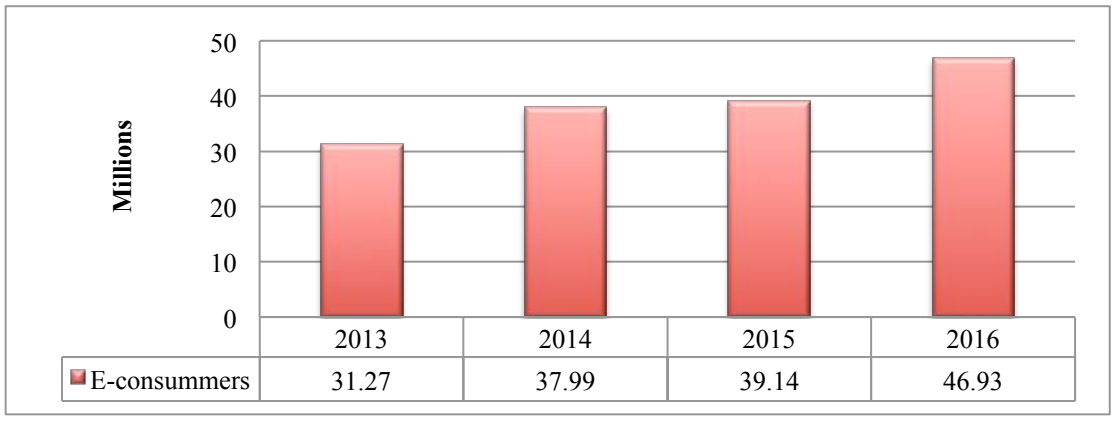


Figure 7.2.3 Number of active e-consumers in Brazil. Source: Author based on APEX Brasil (2017).

Furthermore, the number of people already using digital marketplaces – both national and international based ones – to purchase goods and services also increased significantly during the last decade. As it can be observed in the figures 7.2.3 and 7.2.4, the number of active e-consumers in Brazil has jumped from 31.27 million in

[179] Federação Brasileira de Bancos (FEBRABAN); Deloitte (2015). Pesquisa FEBRABAN de tecnologia bancária 2015, pp. 13. Accesed on February 22nd, 2018. https://cmsportal.febraban.org.br/Arquivos/documentos/PDF/Relatorio%20-%20Pesquisa%20FEBRABAN%20de%20Tecnologia%20Banc%C3%A1ria%202015.pdf

[180] IDG NOW (2016). "Uso do Mobile banking no Brasil cresce138% em um ano". Accessed on February 21st, 2018. http://idgnow.com.br/ti-pessoal/2016/05/31/uso-do-mobile-banking-no-brasil-cresce-138-em-um-ano/

2013 to 46.93 million in 2016, an expansion of approximately 15 million people in three years. Moreover, the e-commerce total amount of sales rose from around R$ 6 billion in 2007 to almost R$ 45 billion in 2016.

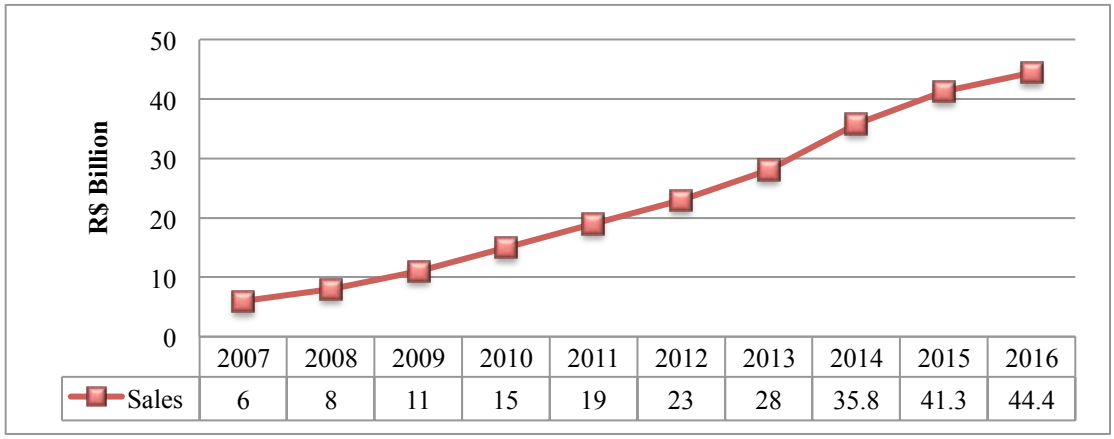


Figure 7.2.4 E-commerce sales revenue in Brazil. Source: Author based on APEX Brasil (2017).

Nevertheless, there also other crucial factors that must be taken into consideration when studying the blooming of the FinTech sector in Brazil – especially those focused on Payment. The two most important that were not properly addressed so far in this analysis are the following: the imbalance in the demand-offer of financial and banking services/products; and the negative externalities of a consolidated, rigid, low competitive and protected credit card and payment sector.

As China, Brazil also faces a big imbalance between the offer of financial and banking services by the traditional banking system and the demand for those products from different segments of the society. For instance, the country still has a big number of unbanked people – 60 million people, all as old as or older than 18 years old. This amount represents approximately half part of the Brazilian economic active

population –110 million people in 2017. In 2016, the unbanked population was responsible for 665 billion of R$ in (informal) transactions, sales, etc.[181]

Not only the number of Brazilian unbanked people is high[182], but also the number of underserved and/or dissatisfied bank clients is enormous. Million of bank clients complain about the lack of good credit offers for Small and Medium Sized enterprises (SMEs), the high price it is charged for bank transfers[183], the loans' big interest rates charged[184], the few individually customer-designed investment options offered, the long time spent to solve problems related to bank accounts and payments, the old fashioned bureaucracy[185] that surrounds almost all the banks' sectors, the waiting time for transferring money[186] during weekends and holidays, among many other issues.

[181] Exame (2017). "Desbancarização traz oportunidades ao varejo no Brasil". Accessed on February 22nd, 2018. https://exame.abril.com.br/negocios/dino/desbancarizacao-traz-oportunidades-ao-varejo-no-brasil/

[182] According with a research made by Data Popular, the Brazilian unbanked distribution among the social class is as the following: 11% belongs to the upper class; 48% resides in the middle class and 37% is found in the lower segments of the society. Exame (2017). "Desbancarização traz oportunidades ao varejo no Brasil". Accessed on February 22nd, 2018. https://exame.abril.com.br/negocios/dino/desbancarizacao-traz-oportunidades-ao-varejo-no-brasil/

[183] According to the Brazilian Central Bank, the average transfers' costs are as it follows:

Type of transfer (only applicable for individuals, not for enterprises)	Transfer fee	
	R$	USD*
Personal DOC/TED	15.00	4.61
Personal DOC/TED (via Internet/mobile)	5.00	1.5
Between accounts in the same bank	4.46	1.37
*Exchange rate 1 USD = R$ 3.25(rate of the same day this fees were realized by the Central Bank)		

Source: author based on Brazilian Central Bank (2018). "Consolidado – Bancos Privados + Bancos Públicos + Caixa Econômica Federal". Accessed on February, 22nd, 2018. http://www.bcb.gov.br/fis/tarifas/htms/htarco03F.asp?idpai=TARBANVALMED

[184] According to the Brazilian Central Bank, the average interest rate charged are as it follows:

Type of Loan (only applicable for individuals, not for enterprises)	Interest Rate	
	Per month (%)	Per Year (%)
Good acquisition	3.87	61.73
Cheque Especial (associated with the bank account, easy to contract)	7.97	184.99
Consigned loan (via INSS)	2.00	26.88
Consigned loan	3.3	48.36
Personal loan not consigned	11.91	324.28
*Exchange rate 1 USD = R$ 3.25(rate of February 21st, 2018)		

Source: author based on Brazilian Central Bank (2018). "Taxa de Juros de Operações de Crédito". Accessed on February, 22nd, 2018. http://www.bcb.gov.br/pt-br/#!/c/TXJUROS/

[185] Usually, the whole processo of openning a bank account takes around 90 minutes and it demands the customer to go to the specif bank agency he/she wants to open the account in. Additionally. The "future" cliente also must to bring a couple of documents such as National ID, proof of residency, among many others.

[186] If a transfer is made during the weekend or holidays, it is necessary to wait until the next business day to have it completed – the other person or enterprise's bank account get the Money.

Another issue some people have to face regarding to accessing bank services in the country is that, in some locations, there are neither bank agencies nor banks' representatives. Indeed, there are cities – especially in the Northern and Northeastern regions – that do not even have ATMs. Even though the government tried to spread the access to bank agencies and ATMs by establishing partnerships between banks and the post office pubic system, the amount of people lacking physical access to banking services and transactions is still impressively big. Unfortunately, this public-private partnership did not promote the banking inclusion it was intended and the number of underserved and unbanked citizens remains high.

The second important point that must be highlighted when one studies about FinTech in the country – especially those acting in the payment area – is this: historically, there is a consolidated, bank-linked and credit card-based payment system in Brazil densely spread all over the territory. In other words, there is a historically established payment system based on Credit and Debit card transactions in Brazil that acts as a barrier to the consolidation of new companies that provide digital payment solutions and alternative money transferring methods. Despite being spread throughout the country, this system does not encompass all Brazilian costumers and merchants, it charges high transaction fees and interest rates from both sellers and buyers, and it also maintains a market reserve in the payment sector – these topics will be better addressed in chapter 8.

8. Brazilian Payment-focused FinTechs

When one thinks about the traditional payment system in Brazil – mainly based on credit and debit card transactions – usually the picture of a closed market with just few big players and low competition is drawn in their minds. In addition, some other characteristics of the credit and debit card market in Brazil should also be taken into consideration: there are big fat fees[187] that sellers have to pay for the credit and debit card issuers (the banks) and for the "acquirers"[188]; there were basically two big "acquirers" that owned more than 90% of market share until 2010; it is a vertical and excluding industry – for a long time, only two main credit card companies were able to provide credit and debit services as long as they were somehow in accordance/partnership with Brazilian banks; it is one sector that is expanding its frontiers – the number of cards issued and the amount of business accepting this mean of payment keep growing despite the economic crisis –; among others.

However, it is necessary to understand how the credit and debit card industry evolved in the country before explaining each of those characteristics. Only after that, it will be possible to analyze why there are so many Brazilian FinTechs interested on providing payment solutions, and having success in their attempts. Finally, this chapter will present a brief analysis of the Brazilian payment company PagSeguro that have been using new technologies to develop merchant-tailored services and to change the payment market in Brazil, especially, in the country's Credit & Debit card industry.

[187] Merchant Discount Rate (MDR) is the conjunct of fees paid by the sellers in order to be allowed to use credit and debit cards as a mean of payment in their shops and enterprises.
[188] Acquirer are companies licensed by Visa, Mastercard and/or other credit&debit card companies to accredit merchants

8.1 Credit and debit cards industry in Brazil – a brief analysis

The relationship between the Brazilian population and the credit and debit card industry has more than fifty years of history. The first Credit/Debit card (the American branch Dinners Club) arrived in Brazil in 1954. In 1968, cards started to be issued by Brazilian banks such as Bradesco for the first time. In the same year, Brazil was already considered the 3rd biggest franchising of Dinners Club. In the 1970's, Citibank launches its own credit/debit card (Citicard) and comes to an agreement with Banco Itaú and Unibanco in order to create their "acquirer" – the Credicard company that would process all the transactions done via Citicard.

By 1971, there were already 180 thousand credit/debit cards emitted in Brazil and more than 15 thousand business and shops receiving payments via credit/debit card. During the next decade, the number of cards' emission kept growing despite the economic and hyperinflation crisis. As a result, the credit/debit card company Visa decided to enter the Brazilian market by associating with Credicard. A contract granting exclusive rights to Credicard to emit Visa cards in Brazil and to process all Visa's transactions was signed. In 1987, however, this contract was breached, which lead Credicard to sign another exclusivity contract, now, with MasterCard.

In 1988, Credicard had more than 50 partner banks that could emit cards under the control and supervision of this acquirer company. Moreover, the company had already emitted more than 1 million cards in the country by that time.

During the next decade, Visa returned to Brazil after establishing a new exclusivity contract with Banco do Brasil, Bradesco and Banco Nacional. Visa's new strategy was to approach to small and medium size banks, especially, the regional and local ones in order to compete with Credicard and its MasterCard. By 1994, there

were more than half million business and shops already accepting credit/debit card as a mean of payment.

In the next year, Visa created its own acquirer called Visanet under the supervision, support and investments of Banco do Brasil, Bradesco, Banco Nacional e Banco Real. By that same time, Redecard was created by Citibank in association with Itaú and Unibanco in order to replace the old Credicard and to manage Citicard, MasterCard and Hipercard cards' transactions.

Only on December 16th, 2009, the Administrative Counsel for Economic Defense (CADE) determined that the contractual exclusivity established between MasterCard-Redecard-Itaú/Unibanco/Citibank and between Visa-VisaNet-Banco do Brasil/Bradesco/Banco Nacional/Banco Real had to end. The counsel argued that the contractual exclusivity was jeopardizing both consumers and merchants as well as creating market reserves and market distortions.

By imposing the interoperability of the credit/debit card machines, the CADE and the Central Bank tried to stimulate more competition and costs' reductions. Due to this interoperability of card machines (Point of Sales machines – POS) and to the breaching of the contractual exclusivity clause, both Redecard/Rede [189] and Visanet/Cielo's credit machines would have to start processing transactions made by any branch of credit/debit card.

By applying these measures, the Brazilian authorities expected that other credit/debit cards acquirers would enter the Brazilian market, compete on it and offer better quality-lower costs services. As it can be observed in the figure 8.1.1, the number of business and shops accepting credit card as payment method has grown

[189] Redecard is now known as Rede while Visanet by the name of Cielo.

significantly since 2009. Moreover, the number of new acquirers has increased especially between 2010 and 2013.[190]

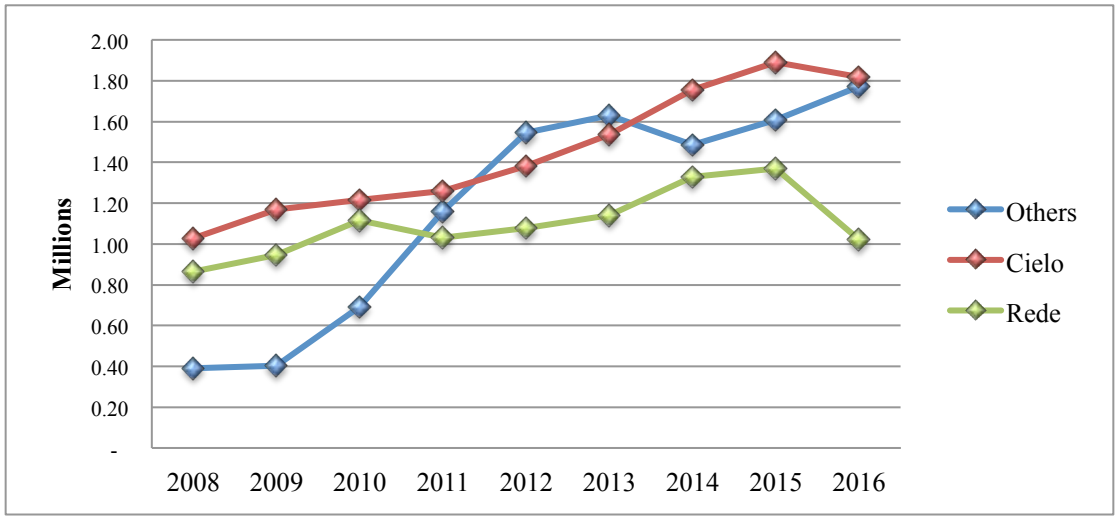


Figure 8.1.1 Number of business and shops (in millions) accepting credit cards according to the acquirer companies in Brazil between 2008 and 2016 Source: Author based on data collected by the Brazilian Central Bank (2017).

Moreover, the average Merchant Discount Fee charged by the acquirers decreased since the end of the contractual exclusivity clause. The figure 8.1.2 shows how was the evolution of this fee paid by merchants (business and sellers) to the acquirers. Although it has decreased since 2010, this fee is still considered high (around 2.80% for credit cards and 1.60% for debit cards in 2012). By 2016, the Merchant Discount average fee for credit cards was 2.36% per transaction and 1.56% for debit cards – see table 8.1.2.

[190] It is importante to higlight that all the companies at the "others" group were allowed to use niether MasterCard nor Visa. Indeed, some companies there listed such as Hipercard and Bankpar (acquirer responsible for American Express transactions) were both the issuers and acquirers of their own credit/debit cards. However, both Bankpar and Hipercard established partnerships with Bradesco Cartões and Rede respectively. In other words, the biggest credit/debit card brands (besides MasterCard and Visa) were included within Rede and Bradesco Cartões (big investor of Visanet/Cielo), reducing the competition among Brazilian acquirers. This explains why Rede and Cielo were able to expand their market share between 2013 and 2014 as chart 8.2 shows.

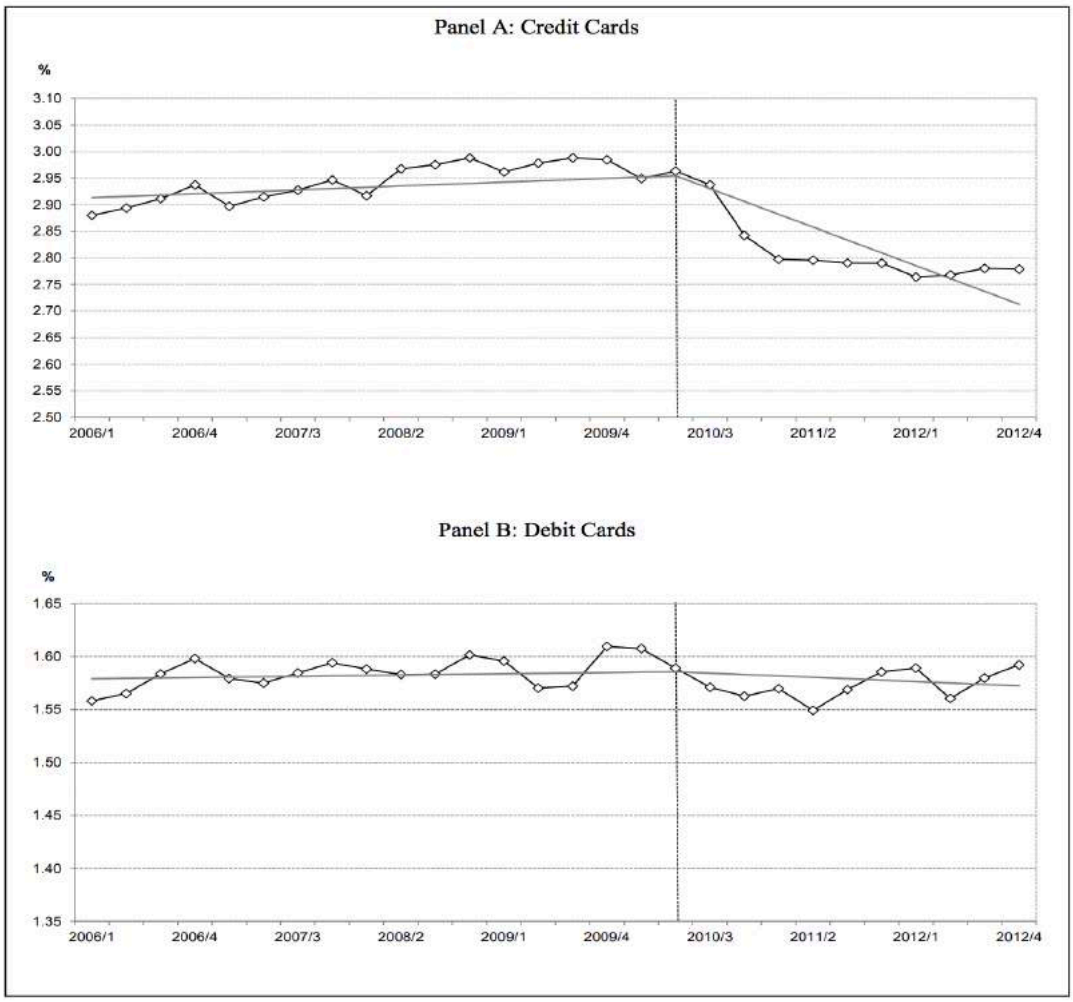


Figure 8.1.2 Average Discount Rate in Brazil between 01.2006, and 04.2012. Source: Garber, Gabriel and Nakame, Márcio (2015):11.

Year	Average Merchant Fee per transaction	
	Credit Card	*Debit Card*
2008	2,67	1,58
2009	2,36	1,50
2010	2,43	1,69
2011	2,51	1,62
2012	2,64	1,63
2013	2,50	1,59
2014	2,49	1,70
2015	2,38	1,59
2016	2,36	1,56

Table 8.1.1 Average Discount Rate in Brazil between 2008 and 2016. Source: Author based on data collected by the Brazilian Central Bank (2017).

Indeed, the Merchant Discount fees (MDF) are the main profit source of acquirers. Although these fees have been reduced mostly due to the growth of competition among acquirers, the revenue of these companies keeps increasing substantially – see figure 8.1.3. In other words, it is possible to affirm that this is happening, because the number of costumers and business using credit and debit card as payment method has increased even though the MDF applied to both credit card transactions have decreased a little since 2010 and the MDF applied to debit cards was quite stable.

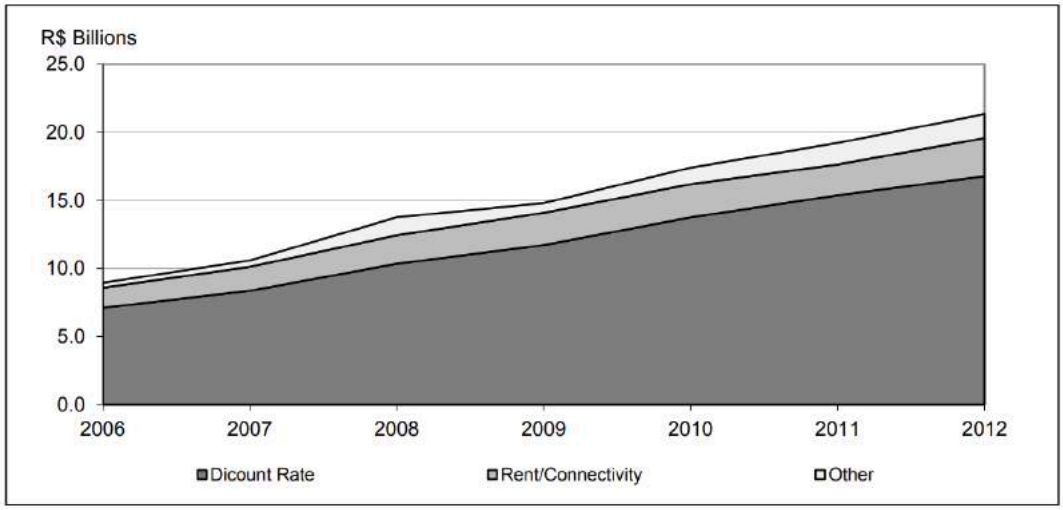


Figure 8.1.3 Composition of Brazilian acquirers' revenue (in R$ billions) from 2006 to 2012. Source: Garber, Gabriel and Nakame, Márcio (2015):10.

Despite of the increasing in the competition among acquirers and the short reduction in the average MDF, the so-called "duopoly" of the two main Brazilian acquirers – Rede and Cielo (formerly Visanet) – remains. There is still a predominance of these two companies as the ones that possessed more than 60% of

the entire credit and debit card market share in 2016 as it can be observed in figure 8.1.4.

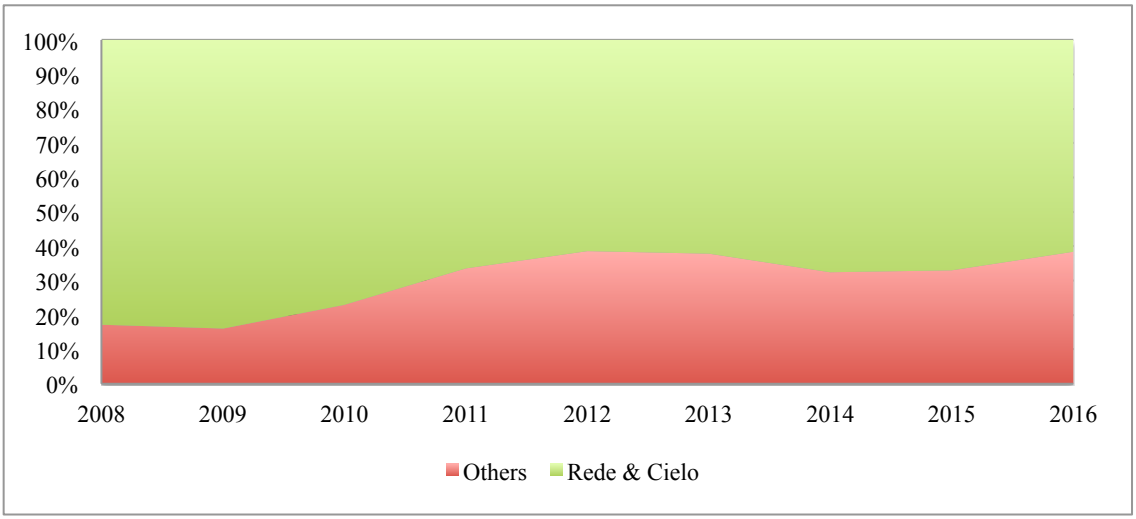


Figure 8.1.4 Market share of Rede, Cielo and other Brazilian Acquirers between 2008 and 2016 Source: Author based on data collected by the Brazilian Central Bank (2017).

Although the two biggest acquirers still dominates the biggest part of the Credit & Debit Cards market in Brazil, this scenario has started to lightly change during the last three years. Indeed, it is observed that the duopoly has been slowly reduced due to the creation and consolidation of Payment FinTechs – NuBank, Mercado Pago, Büblue, Stone Pagamentos and PagSeguro[191] – since 2013. The growth of these companies can be considered the beginning of a disruption in the traditional credit and debit card payment system in Brazil. In fact, not only the payment ecosystem has been impacted by the eruption of those companies, but also the traditional banking system has been forced to change in order to compete in a market with a bigger number of modern, innovative and customer-oriented players.

8.2 PagSeguro

[191] In this work, PagSeguro is considered and analyzed as a FinTech although it was created inside an Internet and Internet content-related company: UOL.

PagSeguro is the Brazilian acquirer and card services' provider that growths the fastest in the country. Born from/in the main Brazilian Internet and Interne-related content provider, the company started its activities focusing on proving online payment services for the e-commerce ecosystem that was emerging in Brazil during the 2000's. Rapidly, PagSeguro became one of the safest and most efficient online payment platforms in the country.

After the acquirer-credit/debit card companies contractual exclusivity clause came to an end in 2010, PagSeguro decided to expand its frontiers and invest in the development of low cost and business-tailored payment solutions for not-served or underserved off-line merchants. The previous acquirers' duopoly created a market distortion by leaving the majority of Micro entrepreneurs and SMEs totally or partially behind the credit and debit card payment solutions and platforms. The high Merchant Discount Fees and the Point of Sale (POS) devices' rental paid to the acquirers did not allow many micro, small and medium-sized business to benefit from the advantages and conveniences of using credit and debit card as a mean of payment.

These left-behind business and merchants, thus, became the market target of the expanded PagSeguro. Aiming to fit the needs of its target market, PagSeguro expanded its products beyond the digital payment channels it had used until that 2012. In 2013, it started to offer new services such as free digital accounts and prepaid cards to its clients. Additionally, the company also disrupted the credit and debit card market by providing in-person payment solutions via efficient, low-cost and modern Point of Sale (POS) and Mobile Point of Sale (mPOS) devices throughout the entire country. In less than five years, PagSeguro was able to conquer approximately 3% of the Brazilian card-based payments market.[192]

[192] NASDAQ (2018). "PagSeguro Digital LTD. (PAGS) IPO". Accessed on March 4th, 2018. https://www.nasdaq.com/markets/ipos/company/pagseguro-digital-ltd-1040831-85689

Indeed, the key of PagSeguro success and expansion relied on the association of POS and mPOS devices' offer with the provision of digital, business-tailored digital services such as free digital accounts, digital wallets and wealth/profit management tools. Some products and services associated with PagSeguro digital free account can be seen in the figure 8.2.1.

This end-to-end digital payment ecosystem created and provided by the company challenged the traditional Brazilian credit & debit card industry for the first time. Before PagSeguro, a couple of companies tried to challenge the status quo, but failed mainly due to the lack of expertise and the absence of big and powerful investors behind the initiatives – competing with the two main acquirers, for instance, was not an easy task even after the CADE and Central Bank's interventions pro-competition.

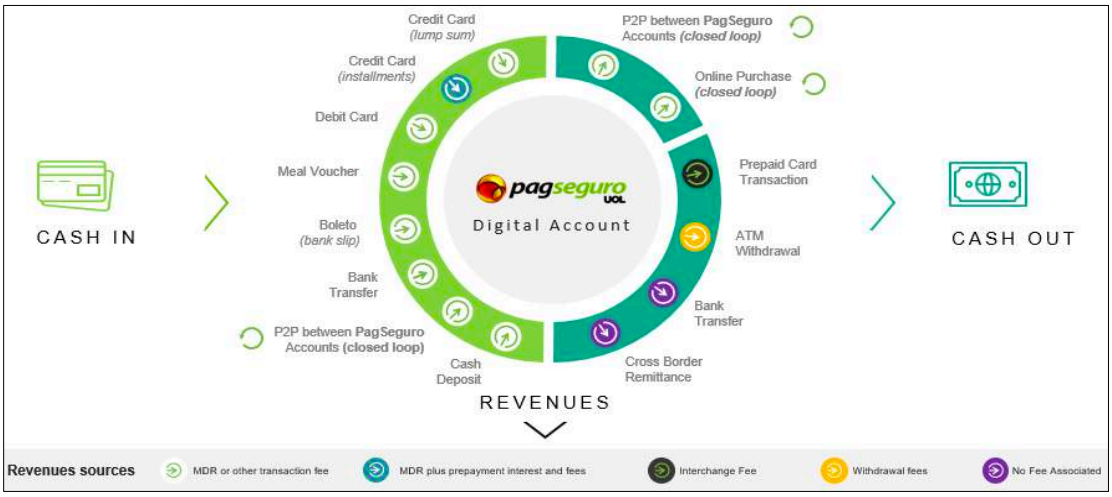


Figure 8.5 PagSeguro's Digital Account ecosystem. Source: PagSeguro (2017).

The impact of the new technologies and payment solutions provided by PagSeguro was so intense that, in four years, the company had more than 2.5 million of merchants using PagSeguro's POS and mPOS devices as well as other services

offered by the company such as sales reports and inventory control tools (management tools). Moreover, it is estimated that 75%[193] of PagSeguro's merchants – around 1.87 million business – accepted payments neither by credit nor by debit cards before signing the contract with the company. The impact of PagSeguro becomes even bigger when one remembers that there are around 11.3 million of companies in the country – the addition of 1.87 million of businesses into the credit/debit card payment world represents the inclusion of 15.8% of the total number of business/companies in Brazil[194]. The evolution in the number of merchants using PagSeguro's products can be seen in the figure 8.2.2.

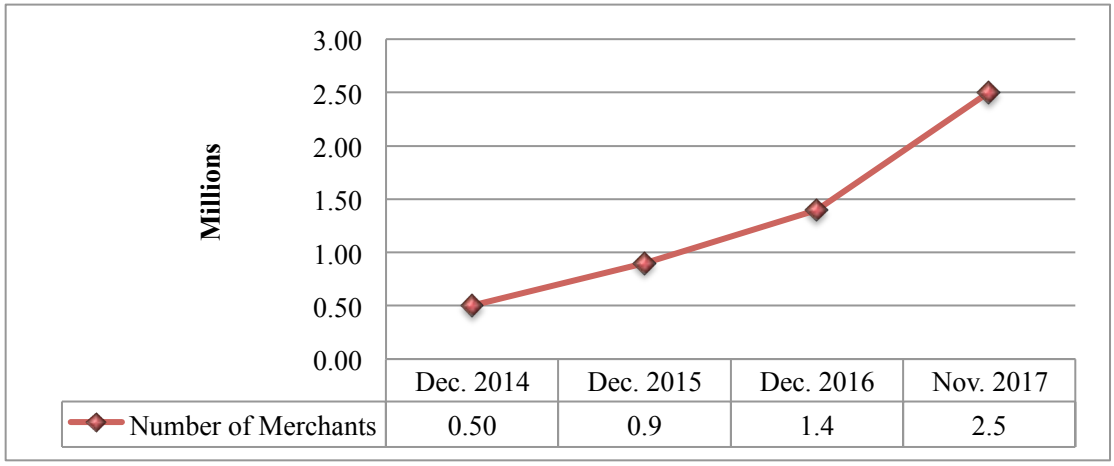


Figure 8.2.2 Number of PagSeguro's customers (business, companies and micro entrepreneurs connected via the company's services and products) from December 2014 to September 30th, 2017. Source: Author based on information provided by PagSeguro (2017) to Nasdaq.com.

The company's total revenue and income also grew significantly between 2013 and 2017, even during one of the most severe and deepest economic crisis the country ever faced. In September 2017, the revenue was estimated in R$ 1.69 bi just

[193] *Ibid.*
[194] According with researches made by SEBRAE, there are approximately 11.3 million business and companies in Brazil. The majority of them belong to individual micro entrepreneurs – around 7.1 million of this kind of business. Moreover, there are 3.9 million micro companies, 0.1 million SMEs and 0.2 million large companies in the country. The addition of 1.87 million business to the credit and debit card payments paltorms represents 15.8% of the total number of business and companies in the country.

during the first nine months of that year. The year before, the total revenue was R$ 1.13 billion while the numbers of 2015 and 2014 were R$ 0.67 bi and R$ 0.32 bi respectively.[195]

According to reports released by the company, the main source of its profit relies on POS and mPOS devices sales and on the attractive merchant discount fees. The main difference between PagSeguro and other acquirers in Brazil relies on the following: instead of renting the POS or mPOS to the merchants, PagSeguro sells them with a really competitive price. In fact, the price paid for each POS or mPOS device corresponds to 3 to 6 months of rental paid for using other acquirers' POS. Moreover, this price can be paid in up to 12 monthly installments which allows the new and micro merchants to get access to the companies services in a smoother and more feasible way that fits better each merchants own economic needs.[196]

Indeed, PagSeguro has invested in offering not only cheap POS devices options, but also in developing different models of those devices – each one of them designed to fulfill specific needs of micro entrepreneurs and SMEs. For instance, there are the Minizinha (entry-level mPOS device, the cheapest one), the ModerninhaPro, the Moderninha Wifi, the Minizinha Chip (the mPOS device Minizinha connected to the Internet either via SimCard or wifi), PlugPag (the POS device Moderninha or the mPOS device Minizinha connected with a business automation/payment system), and the PagSeguro TEF (POS device used by big shops such as supermarkets, drugstore chains, etc). These Point of Sales devices and their respective prices can be found in Appendix C.

In addition to the POS and mPOS devices' lower prices and different models, PagSeguro also offers Merchant Discount Fees cheaper then its competitors. If the

[195] NASDAQ (2018), *op. cit.*
[196] PagSeguro (2018). "Our products and services". Accessed on March 4th, 2018. http://investors.pagseguro.com/our-products-and-services/Index?KeyGenPage=1073753119#rmcl

payment is made via *debit* card, the merchant will pay only 2.39% as MDF in each transaction. If a credit *card* is used instead, the MDF will be 3.19% (no installments) or around 3.79% if the merchant's customer requires installments and if the merchant receives the payment's money 30 after the purchase (the most common case in Brazil). In case the merchant needs to receive the money paid by its customer in on business-day[197] after the purchase, then, the MDF raises up to 4.99% (no installments) or 5.59% (if installments are required by the customer).[198]

Acquirer	POS device	Rental per month (R$)	Adhesion fee (R$)	Debit	Credit Operation		Installments
					Credit (30 days)	Credit (2days)	2-6 installments
PagSeguro*	Moderninha	-	R$838.00	2.39%	3.19%	4.99%	3.79%-5.59%
	Moderninha Wi-Fi	-	R$478.80				
	Minizinha	-	R$118.80				
	Minizinha chip	-	R$298.00				
Cielo**	Mobile POS	32.90	R$9.90	3.19%	4.05%	4.99%	6.99%-7.99%
	LIO	189.90	R$89.90	-	-	4.99%	
	POS 3G+Wi-Fi	179.00	R$89.90	2.70%	4%	4.99%	4.75-5.50%
Rede***	POS	From 69.00 to 379.00	-	2.96%	4.36%	4.36%+ 1.79%	5.51%
	POS 3G	From 99.00 to 409.00	-	2.96%	4.36%	4.36%+ 1.79%	5.51%
	mobile POS	From 114.90 to 214.90	-	5%	5%	5.00%+ 1.79%	5%
*Allows its merchants to anticipate their payments in 29 days (receiving after 1 business-day); Adhesion fee = POS device purchase paid only once (can be paid in up to 12 installments)							
** Offers different plan sets for their merchants. In some cases, the rental + plan fee is higher, but no MDF is charged							
*** The rental price might vary according with the volume of transactions/payments received							

Chart 8.2.1 Comparisons between PagSeguro, Cielo and Rede's fees. Source: Author based on public information released by these companies in their official websites.

[197] Depending on when the Merchant wants to receive the Money paid by its customers via credit/debit card, diferente MDF can be applied. In Brazil, the acquirers transfer to Merchants the Money paid by customers via credit/debit 30 days after the purchase. If the Merchant wants ro antecipate this payment, he/she will have to pay a higher Merchant Discount Fee – usual Merchant discount fee + antecipaçãoo de recebíveis fee (type of loan).

[198] These are the fees applied to the main credit and debit cards such as MasterCard, Visa, Elo, Hipercard, and Hiper cards. If the payment is via American Express or Dinners Club, then, the fees raise up to 3.59% (on installments) or 4.19% (if installments are required by the customer).

As it can be observed in the comparisons found in table 8.2.1, all the fees – MDFs, adhesion – applied by PagSeguro are lower than its biggest competitors. According to a formal report released by the company before its IPO in the New York Stock Exchange in the beginning of 2018, the company has achieved its main goal of providing low cost, (not-served or underserved) merchant-tailored payment solutions. So far, the company has spread its network throughout all the 26 Brazilian states and the Federal District.

Many merchants using PagSeguro have shown contentment with the services provided by the company – especially those that were underserved by the other big Brazilian acquirers. In addition, some big drugstores, supermarket chains, and department stores have also shown interest in migrating from their current acquirer to PagSeguro.

In order to compete with PagSeguro, Rede and Cielo are trying to reshape their products and services offers. Indeed, Cielo and Rede started to offer different kinds of merchant retention/ merchant loyalty plans – plans that do not request the payment of MDFs up to a pre-established limit of transactions as long as the merchant agrees to pay a higher monthly rental/plan. These new offers of plans with reduced MDFs, however, do not seem to democratize the access of not previously served or underserved merchants to credit and debit card payment ecosystem. The number of not previously served merchant signing contracts with Cielo and Rede, for instance, has not increased expressively so far differently from what has happened with PagSeguro (around 1.8 million not previously served merchants started to accept card payments after signing a contract with the company).

Despite this growth, some could argue that increasing the number of merchants accepting credit and debit cards payments, *per se*, is not enough to increase

the inclusiveness of a country's economy as a whole. Indeed, the number of people connected to payment systems and, consequently, to the formal economy is not enough to assure the democratization of financial services mostly provided by banks, financial institutions or acquirers for instance. However, PagSeguro has not only democratized the access to both online and credit-debit card payment platforms, but also offered this kind of service to a historically excluded and forgot portion of Brazilian merchants. In addition to this inclusion, the company has also created a way of enabling merchants to use these payment platforms without requiring that they possess a bank account. By creating a system where the merchants can receive the money paid by their costumers via PagSeguro prepaid card, the company allows the sellers to get into the financial world – paying bills and suppliers, buying products, making financial transactions – without necessarily linking them to the traditional banking system that historically has never paid enough attention to the needs of micro entrepreneurs and SMEs for example. As consequence, more merchants got into the formal economic process because they now both produce (sell goods and services) and have access to different payment channels and services in the formal economic system.

It is possible to claim that PagSeguro has contributed with Inclusive Economic Growth in Brazil as it allowed previously excluded/underserved economic actors such as micro entrepreneurs and SMEs' merchants to get into the formal economic process. Moreover, the company also lowered the fees charged for each credit/debit card transaction, allowing the merchants save more income/profit generated in each sell and permitting them to invest more capital (savings) in their own business or in other investment options – the money used to pay high MDFs, for instance, could be better applied/invested by the merchants that now would be able to save more money as the

fees were reduced. In addition, PagSeguro also applied different technologies and digital products – management tools and digital free accounts – to its merchants business. In other words, it offered different resources and services to help each merchant to understand his/her own business better – there are tools analyzing the merchant's income composition and evolution, the shop's sells and profit – and, in this way, to increase his/her productivity and potential profit.

9. The FinTech sector in China and Brazil: an analysis of government's regulations and their impact on the usage of new financial technologies

Determining whether new financial technologies influence Inclusive Economic Growth in developing countries is not an easy task. So far, the emergence of both Chinese and Brazilian FinTech sectors were addressed. In addition, two case studies about FinTechs focused on the payment sector were presented. The first one analyzed one of the most impressive, fast growing and innovative Chinese payment companies: Ant Financial (more specifically, the Alipay case). The second case study focused on a similar payment company that is growing expressively and offering new technological solutions to financial obstacles faced by millions of Brazilian individual entrepreneurs, micro merchants and SMEs.

Although these companies were born in different regulatory and economic ecosystems, it was observed in this research that there were similar economic outputs coming from the consolidation and expansion of the FinTech sectors there. Indeed, by comparing the economic externalities generated by Ant Financial/Alipay and by PagSeguro, this research found similar results:

i. There was an expansion in the number of merchants included in the formal economy or accessing financial services for the first time;
ii. A reduction of transaction costs and payment fees was observed after these companies integrated new digital tools and other technologies to their financial services and products;
iii. The dominance and influence of big traditional banks and/or financial institutions have diminished due to the emergence of FinTechs and their new customer-merchant-tailored solutions; and

iv. There was a democratization of the access to means of payment such as Peer-to-Peer transactions, card-based transactions and online payment platforms.

Even though the access to financial services was improved quantitatively and qualitatively by the usage of new digital technologies in the financial sector in the countries analyzed, how did these technologies affected the economic growth? Did the governmental regulations play an important role in the emergence of FinTechs and in the application of new digital tools in the financial sector?

According with neoclassical economic assumptions[199], the implementation of new digital technologies to the financial sector leads to an improvement in the country's production process (more outputs produced with the same amount of inputs for example). This improvement, then, contributes to a growth in the total economic output produced (Economic Growth). If these new digital solutions impact positively not only the total economic output, but also the number of people accessing formal financial services and the quality of this access, the Economic Growth can be theoretically considered inclusive.

In addition to that, this approach also argues that governments rule in a selfless and impartial way in order to contain market distortions that could potentially arise. Therefore, the governments are expected to interfere only minimally, by creating and implementing norms and regulations that protect the market from distortions at the same time that stimulate market efficiency's improvements due to the application of new technologies and the establishment of new companies and innovative business models.

[199] Neoclassical assumptions considering everything else (besides Technologies applied) constant. A perfect Market condition is assumed (perfect competition, minimal governamental intervention).

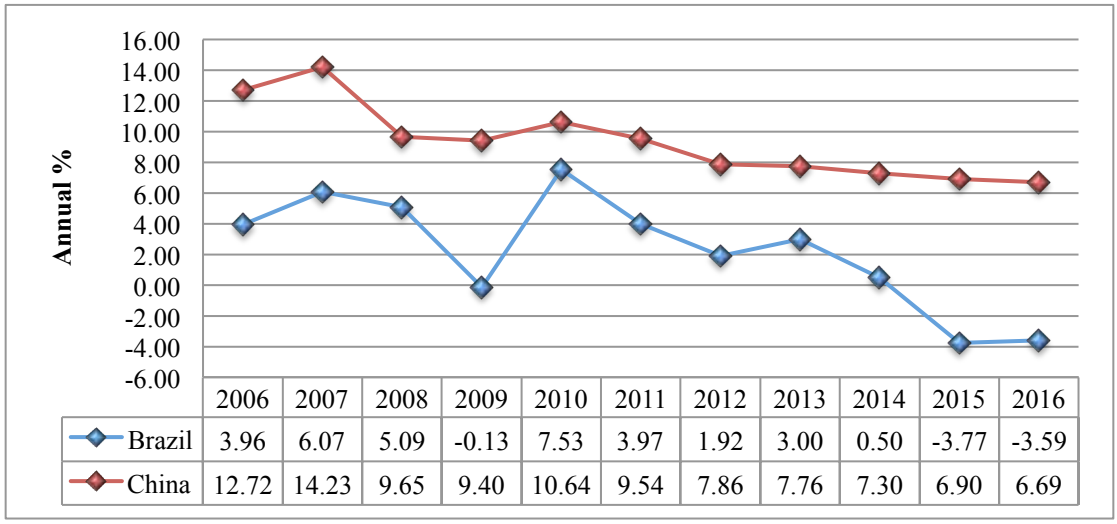
However, some of these predictions related to the emergence and impact of the FinTech sector were not totally confirmed by data collected from the cases here analyzed. Indeed, the reality has presented deviations from these expectations. The influence of state regulations was, for example, significantly different from the ones recommended by neoclassical economic theory. Moreover, these regulations were shaped substantially this sector's growth and externalities.

9.1 GDP, GDP per capita growth rates and Gini Index

With the emergence and usage of these new financial technologies by FinTech companies, it was expected that the economic efficiency and production would be impacted positively. By using new tools, spending less time managing bank-related tasks, paying lower transaction fees and democratizing the access to formal payment methods, the whole productive process could be optimized for instance. As consequence, firms would produce more with the same – or even less – inputs and would be able to sell better products with lower prices. These results would naturally spread throughout the country's economy and, indirectly, would stimulate economic growth and economic inclusiveness.

According with this predictions, it would be accurate to assume that both the GDP and GDP per capita annual growth rates would increase in Brazil and China as an indirect consequence of the more democratic usage of new financial technologies. A positive evolution of these countries Gini Index would also be expected once these technologies were democratizing the access to formal bank-related services.

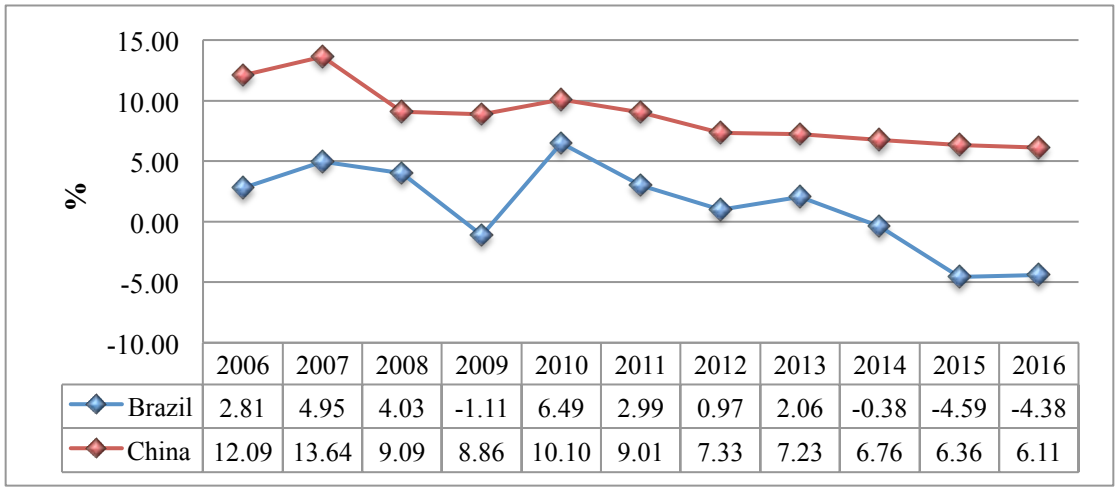
Nevertheless, the Brazilian and Chinese GDP, GDP per capita growth rates did not behave as it was expected they should have behaved according with these neoclassical predictions[200].



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Brazil	3.96	6.07	5.09	-0.13	7.53	3.97	1.92	3.00	0.50	-3.77	-3.59
China	12.72	14.23	9.65	9.40	10.64	9.54	7.86	7.76	7.30	6.90	6.69

Figure 9.1 Brazilian and Chinese Gross Domestic Product (GDP) annual growth[201] rate between 2006 and 2016. Source: author based on World Development Indicators provided by the World Bank (2018).

As it can be observed in Figures 9.1 and 9.2, the GDP and the GDP per capita annual growth rates in Brazil have decreased significantly since 2010. In fact, these rates even reached negative levels after 2014/2015.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Brazil	2.81	4.95	4.03	-1.11	6.49	2.99	0.97	2.06	-0.38	-4.59	-4.38
China	12.09	13.64	9.09	8.86	10.10	9.01	7.33	7.23	6.76	6.36	6.11

[200] When all the other variables except technological changes were considered constant.
[201] "Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources." World Bank (2018).

Figure 9.2 Brazilian and Chinese GDP *per capita* annual growth[202] rate between 2006 and 2016. Source: author based on World Development Indicators provided by the World Bank (2018).

Despite China's GDP and GDP per capita annual growth rates kept positive, the country's economic growth path slowed down during the past years. Since 2011, the GDP annual growth rate has not exceeded 10% a year and, by 2016, this indicator reached its lowest point in the decade (6.69%). The GDP per capita also followed this trend: after 2010, the official GDP per capita annual growth started to diminish and it reached its lowest point in 2016 (6.11%).

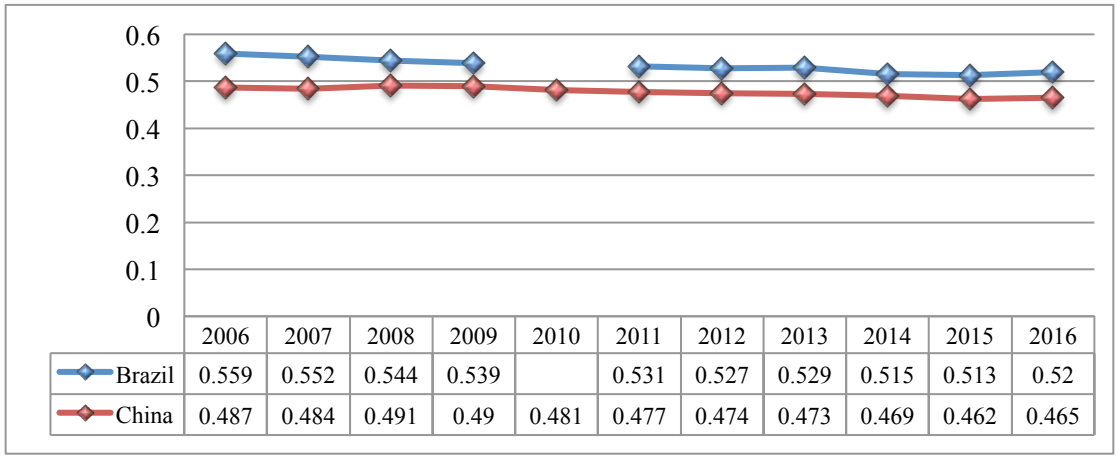
Similarly, the Gini Index[203] did not present the variations that could be expected as a result of new technologies being applied to financial transactions and as a consequence of the growth in the number of people accessing financial and banking services in these countries for the first time. As it was mentioned during the case studies, the number of people using formal payment channels and other financial services[204] offered by FinTechs such as Alipay and PagSeguro has grown significantly. Millions of merchants are now able to receive payment through formal payment channels and platforms even though some of these merchants still do not have bank accounts. Additionally, the transaction fees and Merchant Discount fees paid by them were reduced significantly when they started to use these new services offered by Ant Financial, WeChat Pay, PagSeguro, NuBank, among others. As

[202] "Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources." World Bank (2018).

[203] "Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality." World Bank (2018).

[204] Many of them were historically excluded from formal financial and banking services. However, they started to access these services for the first time by using the platforms and products offered by FinTechs such as Alipay.

consequence of the access to formal economic channels, it was expected that income would be more equally distributed in China and Brazil, because more people had been added to the formal economic process for instance.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Brazil	0.559	0.552	0.544	0.539		0.531	0.527	0.529	0.515	0.513	0.52
China	0.487	0.484	0.491	0.49	0.481	0.477	0.474	0.473	0.469	0.462	0.465

Figure 9.3 Gini Index in Brazil and China between 2006 and 2016. Source: author based on World Bank estimate Gini Index[205] (2017).

Nevertheless, the Gini Index for Brazil and China between 2013 and 2016 did not improve as much as expected. Indeed, the income distribution inequality decreased just slightly between 2013 and 2015 in both cases (reduction of 0.016 and 0.011 in the Brazilian and in the Chinese cases respectively), and even grew between 2015 and 2016 as it can be observed in figure 9.3.[206]

If the application of new financial technologies theoretically should lead to improvements of the productive process[207], reduction of transaction costs[208] and

[205] "Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality." World Bank (2018).

[206] In fact, the Gini Index for both countries remains quite high, meaning that their societies are still unequal considering income and wealth distribution.

[207] The services and products offered by FinTechs improve the productive process both directly and indirectly. They positively affect the productive process by increasing the efficiency of the producers and consumers (they can allocate more time and capital to economic activities once they have to spend lees time and money dealing with bureaucracy and banking-related activities – FinTechs offer a whole new set of Technologies and services that reduce transaction costs and the time spent to manage wealth, making payments, etc).

[208] The application of new digital technologies to financial and banking activities can reduce transaction costs and intermediaries. In other worlds, FinTechs have developed a new business model based on low-cost digital tools that allow merchants and costumers to pay lower transaction and payment fees. Moreover, these technologies also

growth of economic efficiency[209], why did the GDP, GDP per capita and Gini Index did not behave in the cases analyzed as predicted by neoclassical economic theory?[210]

According with data collected during this research, it is accurate to affirm that the governmental regulations ruling how new technologies could be applied to financial activities, for example, played a decisive role on how the implementation of these new technologies could lead to improvements in the productive process and economic efficiency and could impact Economic Growth. Moreover, it was also observed that these regulations also influence indirectly a country's economic inclusiveness, once they shape the way the new technologies could be legally used and applied.

9.2 State regulations' impacts on economic growth and economic inclusiveness

In fact, the role played by state regulations is much deeper than it is usually assumed by the neoclassical approach. Additionally, the way these regulations are created (the policy making process) is not as impartial as this theory usually considers

reduce the number of intermediaries and the whole bureaucratic process associated with financial and banking activities.

[209] Because the services and products offered by FinTechs can reduce transaction costs, information asymmetry costs, intermediaries, and include more people to the formal economic proces, new financial technologies can also lead to a growth in a country's economic efficiency. Indeed, both producers, merchants and consumers could have either more time or more capital to invest in the productive process, once they were able to save these scarce resources while using digital tools such as wealth management apps, online payment platforms and peer-to-peer lending channels to efficiently allocate their resources and to save the time that, otherwise, they would have spent in banking-related activities *in loco*.

[210] Although this research recognizes that many variables affect a country's economic growth and economic inclusiveness, it has focused mainly on the effects of new digital technologies applied to financial and banking activities had in regards to inclusive economic growth. In other words, this dissertation aims to examine whether there is a causal relation between the usage of new financial technologies and inclusive economic growth. Because of that, it did not It is known that, for example, Brazil is facing an economic and political crisis since 2013. The negative Brazilian GDP and GDP per capita growth rates can be explained considering the recession the country is facing. Even though the technological advances usually increase economic productivity and lead to economic growth, it would be inaccurate to assume that the usage of new financial technologies have not impacted positively the country's economic efficiency. It is necessary to keep in mind that other variables have played a more decisive role in Brazil's economic growth and economic inclusiveness. The same can be assumed concerning to the Chinese case. Despite the GDP and GDP per capita growth rates kept positive, they slowed down especially during the 2010's.

it. In reality, there are different groups pressing policy makers to rule in favor to their own goals and objectives. Depending on what group influences the country's policy-makers the most, the rules gshaping how technology can be applied to the financial sector can be more restrictive (pro-status quo/ pro-traditional banking system) or more supportive (pro-FinTechs/innovation).

Although the neoclassical approach recommends that States should not intervene in the economic activity except in order to correct market failures, the big majority of countries do intervene in their economy and financial activities. Actually, many governments establish several rules, laws and norms in order to guarantee that no market distortion will arise and that, therefore, all economic actors will allocate efficiently their scarce resources. In many cases, the amount of regulations and governmental interventions surpasses profoundly the minimal intervention standard prescribed by neoclassical and neoliberal economists and scholars.

Brazil is an example of a country where the government has been intervening in the economy regularly and deeply. Brazilian governors often assumed that the market could not allocate properly and equally the scarce resources and that inequality, poverty, unfair trade and other distortions would arise if they did not regulate the whole economic and financial activities. Because of these premises, the Brazilian Constitution promulgated in 1988 empowered both the federal government and the Central Bank to regulate and intervene in the economy in order to prevent market failures and to assure fair practices. In other words, the Brazilian Constitution entitled the government and the Central Bank as the main responsible authorities to protect Brazilian economy and conduct it.

As it was the State's prerogative to protect its citizens and its economy, many financial regulations were developed. In fact, these rules, laws and norms were

established having this duty in mind and considering the country's economic history. In order to prevent economic and hyperinflation crisis, the government and the Central Bank worked together to create a solid and reliable financial system, ruled by norms that would protect the Brazilian citizens and ensure a sustainable economic growth.

As a result, Brazil has developed a financial system highly regulated and protected by many specific laws and regulations. These regulations, in many cases, work in a preventive way, blocking the application of new technologies and the development of new business models until the economic and monetary authorities are convinced that the benefits brought by them are bigger than the risks they offer. On one hand, these regulations ensured a reliable and trustworthy financial system in the country. On the other hand, they also created barriers and obstacles to the development and implementation of new financial technologies and innovative business models. These technologies and business models could only be legally implemented, for instance, after the Central Bank and federal government have established the norms regulating them and this would be done only a couple of months or even years after the emergence of these innovations.[211]

Actually, the desire to protect its economy, prevent crisis and reduce negative externalities associated with the application of new technologies and business models were not the only factors influencing policy-making process related to the financial regulations. Indeed, traditional banks and financial institutions have also played a decisive role in the process of creation and implementation of these rules and laws. This interest group has historically pressured both the Central Bank and the central

[211] The exception to this is the following: in some cases, the Central Bank agrees to allow new business models and new financial Technologies to be applied in the Brazilian Market as long as they don't exceed the limits previously established by the Central Bank itself and the risks associated with these Technologies seem to be low (they don't threat the economy).

government (legislative and executive powers) to regulate the financial sector in a way that the norms would not only protect the whole system, but would also protect banks' privileges, prerogatives and interests.

Instead of ruling impartially and selflessly, the federal government and the Central Bank were deeply influenced by the pressures received from traditional financial institutions. This interest group constantly pressured policy-makers evoking the urgency and moral duty of protecting the economy against the unknown risks that could arise due to the implementation of new technologies and the establishment of new business models. In fact, it mostly argued that FinTech companies could misuse their clients' personal information to generate big data and credit scores, that P2P lending platforms could lead to development of loan sharks, that online payment platforms should increase the population's indebtedness level and allow room for more frauds.

Consequently, many regulations were created and imposed to "protect" both the Brazil's financial system and its population. However, entrepreneurs and some experts (including policy-makers) interviewed argued that many of these regulations shaping the emergence and usage of new technologies and business models applied to financial activities are, indeed, a mechanism used by traditional banks and financial institutions to protect their activities, to keep their market share shielded from new incomers, to maintain their high profit margin and to avoid the growth of competition among financial services' providers.

Similarly to the Brazilian case, the Chinese financial system and economy have also been deeply governed by many norms, laws and other monetary, fiscal and financial regulations implemented by the central government. Differently from many other countries, however, China did not assume that the market was capable of

regulate itself and promote inclusive economic growth. Indeed, it assumed that the interests and goals of those possessing the means of production and capital ruled the market. As consequence of class struggle and unequal distribution of income, for instance, the market is considered an economic institution that will inevitably lead to the perpetuation of the elite that has always concentrated the economic and political power.

In order to avoid these distortions, the Chinese Communist Government considers its duty to conduct and plan the economy, assuring both economic growth and a fair distribution of economic outputs generated. Therefore, the government has intervened in the country's economy to assure that it will keep growing and that this growth will be equally distributed among its citizens.

Nevertheless, it is inaccurate to say that the policy-making and regulations creation processes were impartially conducted. Indeed, the government has received many inputs from different entrepreneurs, bureaucrats, scholars and experts in order to better address the norms-creation process.

Among all the groups proving these inputs, the traditional banking system tried to pressure the government to rule in favor of this group's interests. In fact, it fought for the maintenance of the financial status quo in which the big commercial banks and financial institutions already established would keep their dominance even though millions of people were either underserved by or excluded from this formal banking system.

Despite all the efforts made by traditional banks and financial institutions, the government decided to pursue an innovation-oriented approach while establishing and implementing financial regulations. This decision is, actually, a result of two main factors: pro-innovation interest groups influencing the decision-making process more

efficiently than the traditional institutions' interest group did; and the government desire of stimulating technological research and innovation throughout the country as one of the main engines for Chinese sustainable economic growth during the next decades.

The group here called pro-innovation interest group is mainly composed by Tech or Internet-related companies such as Tencent, Alibaba, Ant Financial and Baidu. In fact, these companies and their high profile businessmen have been in touch with many local and central government officials in order to convince them that innovation and the implementation of new technologies would be the key for Chinese Sustainable Economic Growth during the next decades.

The new services, products and platforms developed and implemented by these companies should not only be legally allowed, but also supported and protected by the government. Containing these innovations would not extinguish the risks associated with their application. Instead, it would refrain the benefits associated with their application and reduce the comparative advantages that could arise from their implementation. Additionally, it would also lead to a technological exodus and to a brain drain from China towards other pro-innovation countries such as Israel, Singapore, Korea, United Kingdom, and United States. In other words, this group managed to convince policy-makers and government officials that supporting innovation and allowing companies to apply them in the financial and economic fields would contribute significantly with Chinese Economic Growth during the next years.

Furthermore, adopting a new approach towards innovation, research & development, and education had become necessary to China to improve its economic advantages in comparison to other developing and developed countries. The Chinese government, therefore, should not only support, but also incentivize innovation and

technological developments. Supporting and encouraging its citizens to innovate, create new business models, invest in R&D and apply new technologies to their products, for instance, became a national policy.[212]

Indeed, "In the recent years, the Chinese leadership has been keen to implement a portfolio of comprehensive structural reforms to encourage innovation and the growth of private sectors."[213]

Because of these state interventions and regulations in both cases, the way new technologies were developed by companies and assimilated by the financial sector were not the same as it could be predicted by neoclassical theorists. Actually, these regulations and the interests behind them shaped significantly the usage of these new technologies, the implementation of new business models and, indirectly, the impact of new financial technologies on Inclusive Economic Growth.

[212] Xi (2017), *op. cit*, pp.110.
[213] *Ibid.*

Conclusion & Prospects

For centuries, economists, political scientists, politicians and other professionals have tried to understand what variables lead to economic growth and whether governments should intervene in the market to promote this growth or not. Although there is no universally accepted conclusion about these topics, the neoclassic theoretical model and explanations have become one of the most accepted and used theory to study them.

According with this theory, Economic Growth is a product of a set of variables such as Labor, Capital, Land, Economic Efficiency, Wage, among others. Thus, the variation in a country's economic output can be theoretically predicted by applying mathematical models such as the Cobb-Douglas[214] function. As the phenomena studied by this theory are neither static nor constant, theorists and scholars have to keep adapting the neoclassical model so it could predict the reality in a more accurate way. As consequence, the neoclassical model has evolved and other variables such as technological advances/new technologies started to be considered too in order to understand what influences Economic Growth and how it happens.

In this context, this research has focused mainly on understanding *if* and *how* new digital technologies applied to financial and banking activities can lead to an inclusive economic growth. In other words, this dissertation aimed to examine whether there was a causal relation between the usage of new financial technologies and inclusive economic growth even though knowing that that other variables – capital, land, labor, and economic efficiency – also affect a country's economic growth and its inclusiveness.

[214] Cobb-Douglas function: $f(K,L,t) = A(t)K^{\alpha(t)}L^{1-\alpha(t)}, A(t) > 0, 0 < \alpha < 1$, where K stands for capital stock, L means labor forces in terms of physical units, t is time period A(t) represents efficiency of labor. This function, for instance, uses the *aggregate production function* as one of its basis: $Y = f(K,L,t)$, where Y is the maximum output produced by capital K and labor L in year t.

In order to accomplish this goal, this dissertation was guided by the following research questions:

i. *"Do new financial technologies boost Inclusive Economic Growth in developing countries?"* and

ii. *"What are the major factors affecting the adoption of these new financial technologies?"*

During almost one year, data were collected, interviews were done[215] and a deep analysis of the FinTech sectors in Brazil and in China was conducted. Two specific cases of companies innovating in the online payment sector – Alipay in China and PagSeguro in Brazil – were studied. The comparison between the emergence, application, impacts and regulations of the application and usage of new financial technologies in these countries contributed to the following conclusions:

i. There was an expansion in the number of merchants included in the formal economy or accessing financial services for the first time due to the emergence and usage of new financial technologies provided by the companies analyzed;

ii. A reduction of transaction costs and payment fees was observed after these companies integrated these new digital tools and other technologies to their financial services and products' offers;

iii. The dominance and influence of big traditional banks and financial institutions have diminished due to the emergence of FinTech companies and their new customer and merchant-tailored solutions;

[215] More than 30 professionals were interviewed by the author. The suggested questions used to conduct each interview can be found in Appendix D. All the interviews were done in a confidential way, therefore, no name was revealed and no direct quotation was written.

iv. There was a democratization of the access to means of payment such as Peer-to-Peer transactions, card-based transactions and online payment platforms all over these countries;

v. The government financial regulations played a decisive role on how the new financial technologies were developed, applied by companies and used by costumers. These regulations also affected indirectly the impacts of these new financial technologies and business models on Inclusive Economic Growth; and

vi. The decision-making process involving the creation of these regulations was not impartial. Indeed, different interest groups pressured government officials and policy-makers to legislate in favor of their interests and goals. In the Brazilian case, the most influential group was composed by representatives of the traditional banking system and financial institutions (pro-status quo/ pro-traditional finance). In the Chinese case, however, Internet and technology-related companies were able to influence the central and local governments to establish financial regulations supporting the development and application of innovations to the financial sector (pro-innovation).

Additionally, it is possible to affirm that new financial technologies can certainly work as a tool to boost Inclusive Economic Growth in developing countries. However, there are other independent variables that might affect a country's economic growth and economic inclusiveness in a more determinant and impacting way. For instance, it was noticed that government regulations and the interest groups pressuring policy-makers are two variables that have shown especial ability to influence how new technologies and innovative business models are applied to the

financial field and, therefore, can be considered indirect independent variables affecting a country's inclusive economic growth.

Unfortunately, it was not possible to determine quantitatively how these two indirect independent variables affect this research's dependent variable. Moreover, assessing mathematically how new technologies applied to the financial sector affected inclusive economic growth was not possible either. However, it is expected that more studies about this topic will be conducted in the future either by the author or by other scholars and researchers.

Besides investigating about the potential causal relation between Inclusive Economic Growth and the independent variables observed in this dissertation, there are still other new financial technologies-related topics that were not addressed here due to time and research constraints. For instance, some interesting topics that could not be discussed in this thesis are the following: "how new financial technologies affect the Brazilian and the Chinese economic productions and international trades", "how new financial technologies such as cryptocurrencies affect a country's monetary power and its monetary regulations and decisions", "how Brazil and China's governments and central banks are dealing with the emergence of cryptocurrencies and the usage of blockchain technologies applied to financial activities", "how new financial technologies can be used in criminal activities and how the governments should prevent cybercrimes and frauds associated to the usage of new digital tools in financial activities", "how personal information, data and privacy can be violated by companies using big data collected via new financial apps, platforms and tools", "how privacy and information can be protected and, still, allow companies to use big data and other information from their costumers in an efficient and legal way", "what risks the development and usage of new financial technologies can bring to a country's

economy and society", among others. It is expected that these important topics will be discussed in the future either by the author or by other scholars and experts.

Finally, it is hoped that the present work contributes with the development of better public policies and regulations towards the financial field, in special, towards the FinTech sector. In addition, it is also desired that the case studies, the analysis and the conclusions drawn here can help policy-makers, entrepreneurs, scholars and other professionals to understand better the FinTech niche emerging in Brazil and in China. Certainly, more research and studies about the impacts of financial innovation and their impact on inclusive economic growth must be developed in order to better asses these innovations' impacts in a country's economic growth and economic inclusiveness.

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Appendix A - TaoBao（淘宝) and Alipay（支付宝) mobile apps and its usage in China

A.1 Purchasing goods via TaoBao Mobile app

In order to better understand this process, let's look at a hypothetical example: suppose a consumer called Bob wants to buy a pillow. He opens his TaoBao mobile app, types "pillow", search for the kind of pillow he likes, check the sellers' position in customers' evaluation rank, and decides to purchase the "Dr. Pillow".

Figure A.1.2 Purchasing process via TaoBao mobile app. Source: author (2017).

After confirming the type, the color, the size and the final price, Bob clicks on the purchasing bottom. TaoBao, then, redirects him to a confirmation page, and he clicks in the purchasing bottom again.

Figure A.1.2 Purchasing process via TaoBao mobile app. Source: author (2017).

As a last step, a popup emerges in the screen and shows a couple of Bob's personal data such as mobile phone number/Alipay IS, bank accounts and bank's card info. Finally, he has either to type his Alipay's password or position his finger allowing its fingerprint to be scanned to confirm the money's transaction.

Figure A.1.3 TaoBao mobile app's payment confirmation. Source: author (2017).

After receiving the purchase request, the merchant called Tina waits for the money transaction's confirmation. Alipay has to secure the whole process and assures that the money will be properly transferred from Bob's Alipay account to Tina's shop Alipay account. As Tina sells only pillows, and mattress, Alipay charges her a transaction fee of 0.6%. A couple of seconds after Bob paid CNY 168.00, Tina will receive around CNY 166.99 (the total price minus the transaction fee) and will start all the procedures to delivery the pillow until Bob's address as soon as possible.

A.2 Buying subway ticket via Alipay in Guangzhou, Gaungdong, China.

Step #1: Approaching the machine and clicking in the button 购票 (purchase ticket);

Figures A.2.1 and A.2.2 Subway Ticket Purchasing Machine in Hangzhou. Source: author (2017).

Step #2: choosing the final destination;

Figure A.2.3 Ticket Purchasing Machine in Hangzhou. Source: author (2017).

Step #3: confirmation of the number of tickets and the final price;

Figure A.2.4 Ticket Purchasing Machine in Hangzhou. Source: author (2017).

Step #4 and #5: Clicking on Alipay's logo and letting the machine to scan the Alipay QR Code generated in the phone.

Figure A.2.5 Ticket Purchasing Machine in Hangzhou. Source: author (2017).

Step #6 and #7: confirming the purchase and getting the ticket.

Figure A.2.6 People using CR Codes to pay for their subway ride in Hangzhou, China. Source: author (2017).

After getting the ticket, thus, he/she goes to the subway or bus' entrance, uses the ticket and gets in there. As this purchasing method has been well spread and welcomed by the local public transportation' users, the municipal government started

to implement a new set of subway entrance/exit machines that are able to scan users' cellphones and/or Alipay QR Codes instead of only scanning the traditional subway's ticket.

Figure A.10 QR Code reading machine in Hangzhou's subway, China. Source: author (2017).

A.3 Topping-up the public transportation card via Alipay mobile app.

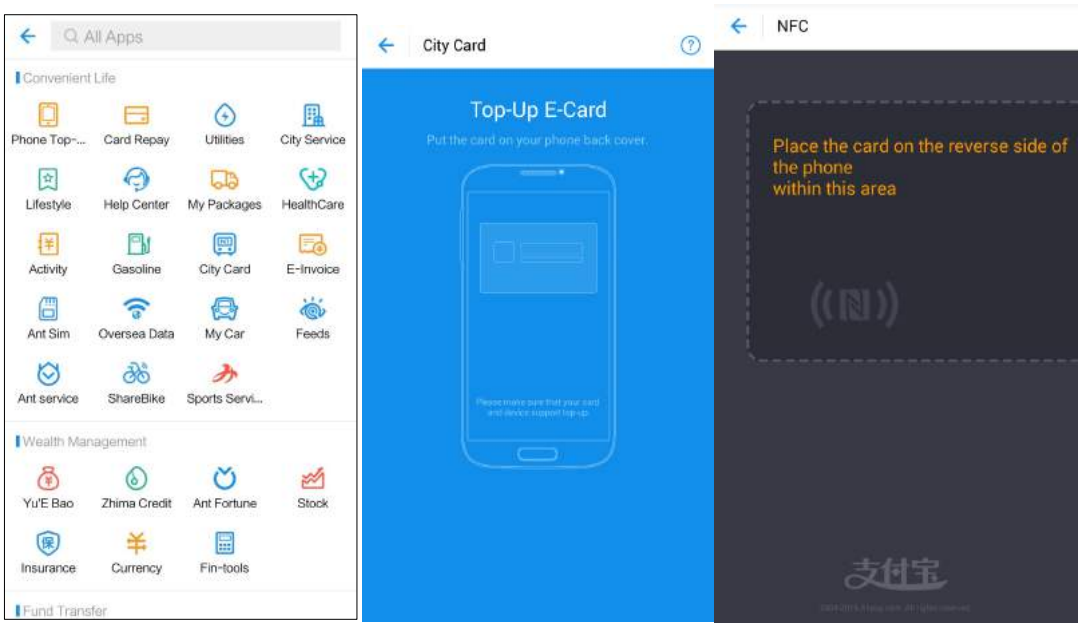

Figure A.3.1 Alipay mobile app display and public transportation card top-up system. Source: author (2017).

In order to top-up his/her public transportation card, the user has to open his/her Alipay mobile app, click on the button named "city card" in the "convenient life" section (figure A.3.1). Then, she/he has to turn on the cellphone's NFC function

and approach the card to the back of the cellphone (figure A.3.2).

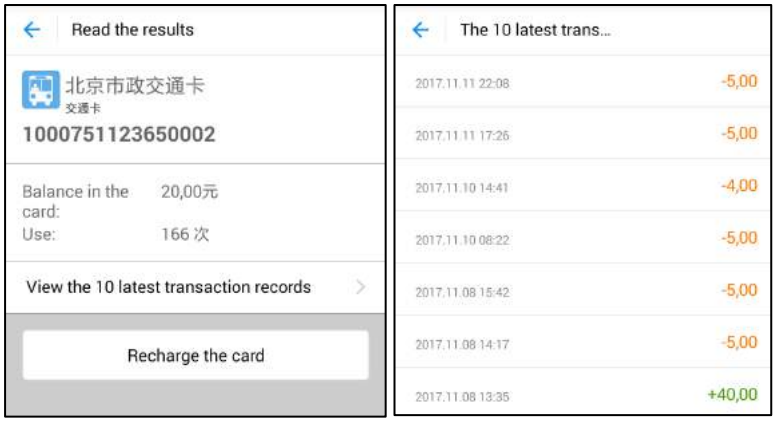

Figure A.3.2 Alipay's public transportation card topping-up system. Source: author (2017).

After this, a pup-up with the car information will appear. It will show how many times the card was used, its serial number and the balance available at the moment (figure A.3.2). The user, then, can choose to recharge it by clicking in the button "recharge the card". Finally, he/she will type the amount to be charged, and confirm it through his/her password or fingerprint.

A.4 Sharing-economy: the Umbrella's rental machine

Figure A.4.1 Umbrella-lending machine in Hangzhou, China. Source: author (2017).

A.5 Bike-sharing app usage via Alipay mobile app

In Alipay mobile app, there is a button named “Bike Share”. Clicking there, the user is redirected to a window containing all the sharing-bike companies available in the location/city where the Alipay user is. The user, then, can scan the bike’s QR code and log in the sharing-bike company app. In case he/she does not have an account there yet, the company will first confirm the new user’s ID and financial information – it will require information such as where he/she lives, his/her ID card, student card or passport’s number, etc. After confirming these data, the company might require an initial security deposit and, after this money is paid via the new user’s Alipay account, the/she is able to start riding a bike. It means that, after scanning the QR Code in the bicycle, the user will receive a message with the password for unblocking the bike’s locker – sometimes, this unlocking process can even be done remotely via Bluetooth technology. Whenever the person stops riding the bike, he/she just need to lock the bicycle again and the trip’s cost will be deducted either from his/her Alipay account or directly from the bike-sharing app’s account.

It is important to highlight that, in some cases, the initial security deposit’s amount required may be reduced or even not charged by the bike-share company. A couple of companies decided not to have a fixed security deposit rate. Instead, they prefer calculate what amount each of its new customers should pay according with the credit score provided via Zhima Credit. If a person has a good score, this means that the risk associated with the bicycle physical lending might be lower than the risk involved in lending it to a person that has a moderate or bad score rate.

Figure A.5.1 Alipay mobile app display and bike-sharing system. Source: author (2017).

A.6 Example of street food offering the option of online payment via Alipay (QR Code)

Figure A.6.1 Payment via Alipay to Street food vendors, Hangzhou. Source: author (2017).

A.7 Personal QR code that any individual can present in his/her phone or print it out in order to receive payments, donations and other money transfers.

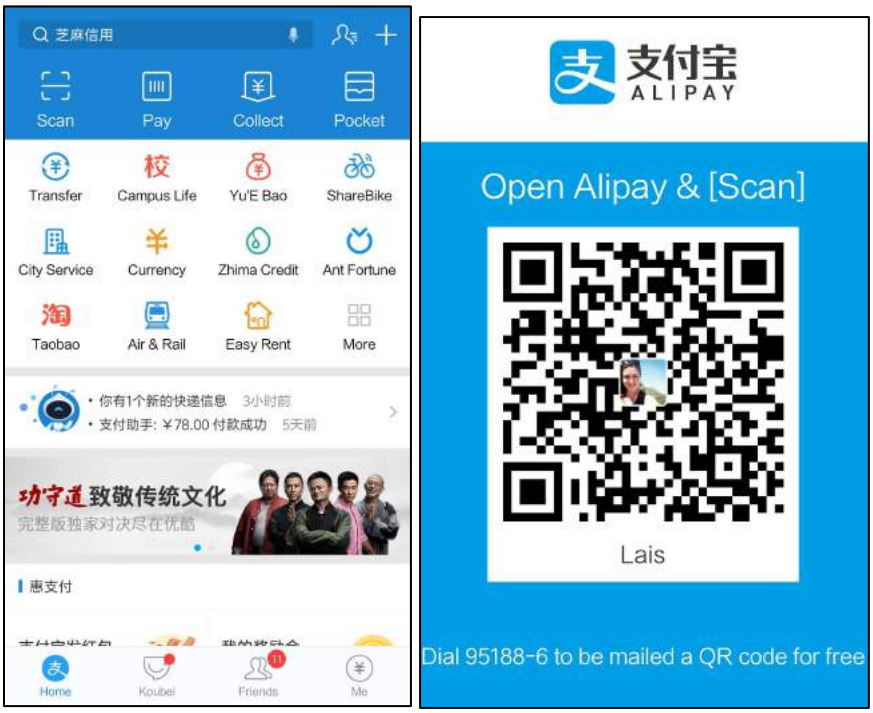

Figure A.7.1 Alipay mobile app display's and QR Code generation. Source: author (2017).

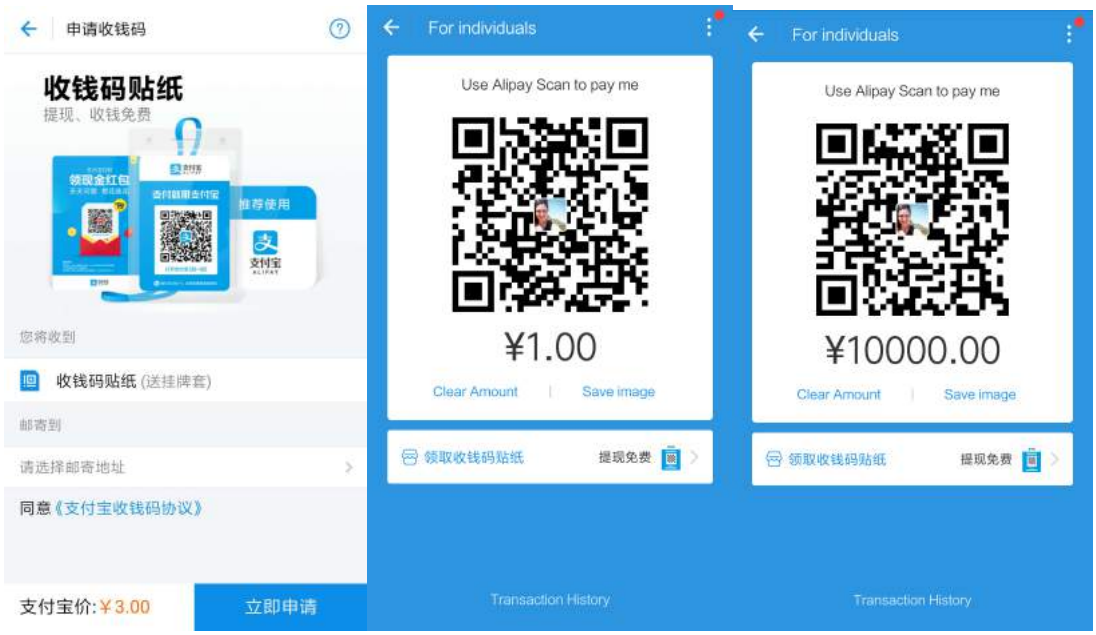

Figure A.7.2 Alipay's QR Codes. Source: author (2017).

Appendix B

This appendix contains figures displaying information such as number, logo and evolution of FinTechs in Brazil from September 2015 to September 2017.

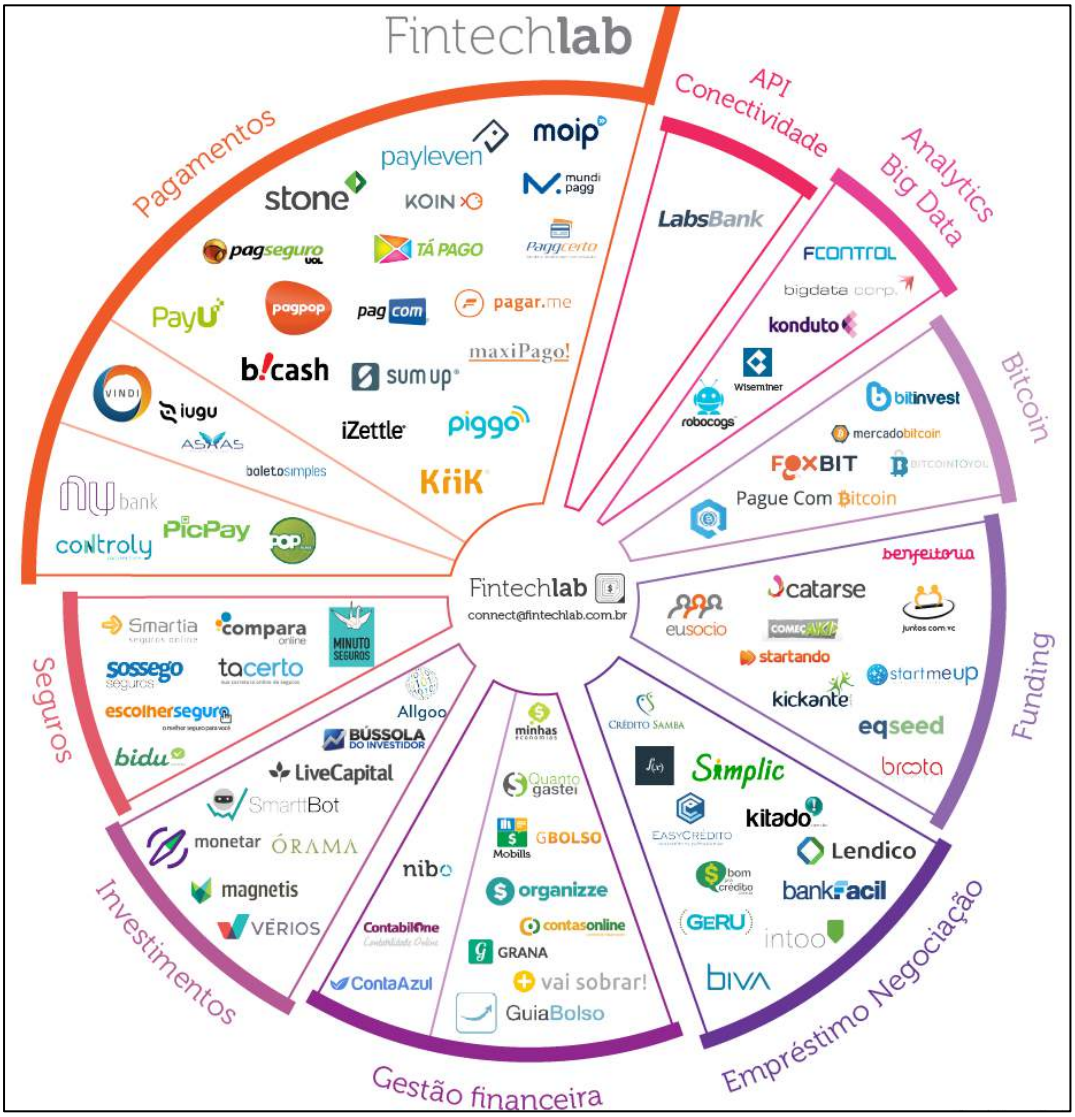

Figure B.1 FinTechs in Brazil (September, 2015). Source: FINTECH LAB (2016:10).

Figure B.2 FinTechs in Brazil (September, 2016). Source: FINTECH LAB (2016:11).

Figure B.3 FinTechs in Brazil (September, 2017). Source: FINTECH LAB (2016:11).

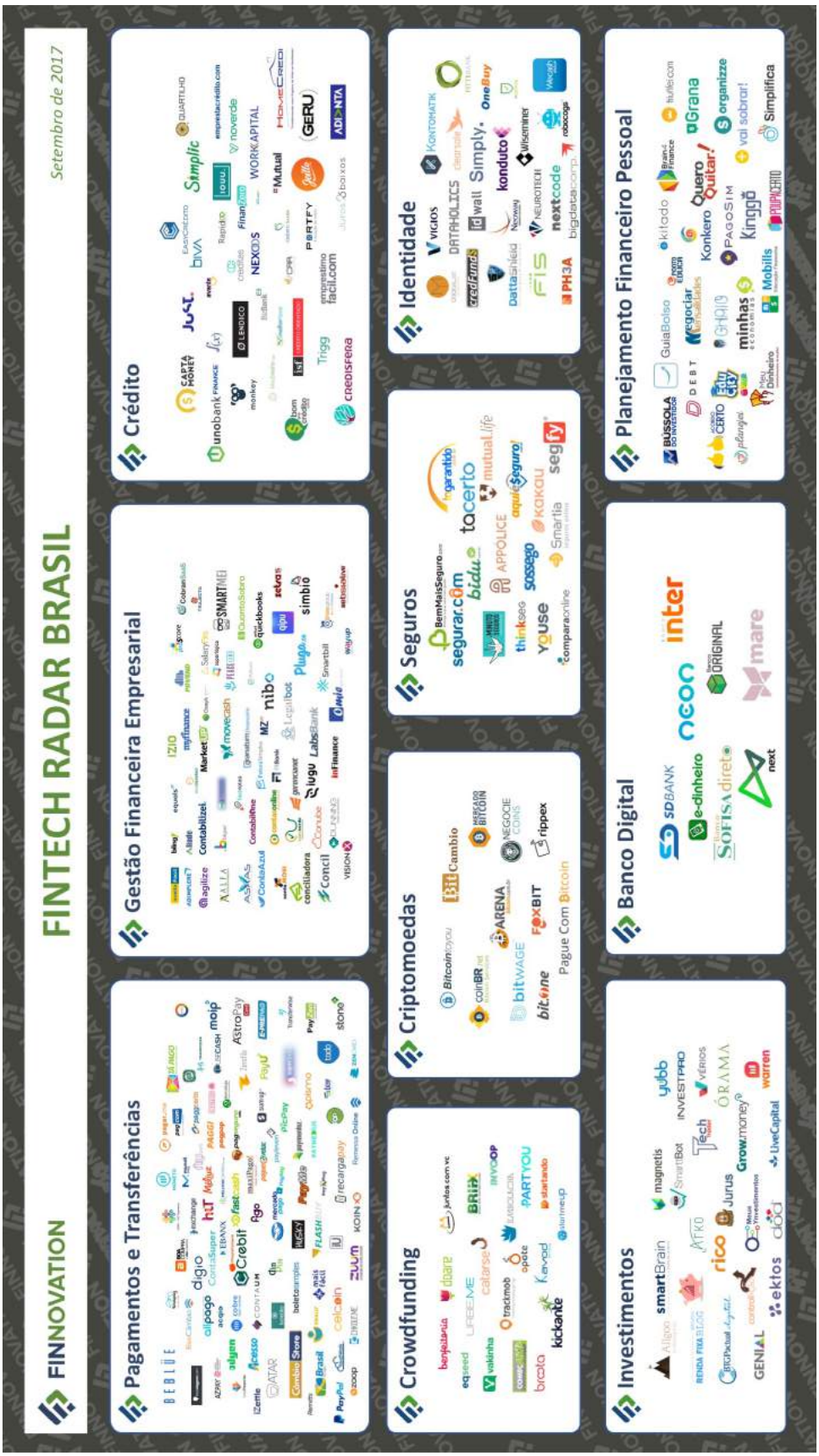

Figure B.4 FinTechs in Brazil (September, 2017). Source: Conexão FinTech (2017).

Appendix C

C.1 Minizinha

This is the entry-level mPOS device of PagSeguro. This device is especially recommended for those micro entrepreneurs, because it is the cheapest POS device and can be taken anywhere once its battery last for several hours. In order to use the minizinha, the seller must be connected with either Wi-Fi or mobile data via the Bluetooth with his/her cellphone or tablet.

Figure C.1 Minizinha - PagSeguro's mPOS device. Sources: Vendedor Informal (2018); Transações Móveis. (2017).

C.2 Minizinha Chip

Is similar to the Minizinha, but is connected to the Internet via a SimCard that provides mobile data to the device – no Bluetooth connection to other mobile devices is required anymore.

Figure C.2 Minizinha Chip. Sources: Vendedor Informal (2018).

C.3 Moderninha Pro

Moderninha pro is the version of PagSeguro's POS devices that has the biggest number of functions/options. It can be connected to the Internet either via Wi-Fi, or via mobile data (it has a SimCard inside). The device can also be connected to the merchant's smartphone via Bluetooth, allowing him/her to connect the POS device with the PagSeguro's app that offers different management tools that might be helpful for the sellers. Additionally, the device has a small printing device inside that allows it to provide printed receipts of each payment made or send them via SMS to the shop's customers.

Figure C.3.1 Moderninha Pro. Source: AutomaSantos (2018).

Figure C.3.2 Moderninha Pro and PagSeguro management app. Source: Transações Móveis (2017).

C.4 Moderninha Wi-Fi

Also very similar to the Minizinha and the Minizinha Chip, the Moderninha Wi-Fi is a mPOS device that connects directly to the Internet either via Wi-Fi or mobile data (it has a SimCard inside). Additionally, this mPOS device allows the merchant to send the purchase's receipt to his/her buyer via SMS messages or email.

Figure C.4.1 Moderninha and PagSeguro pre-paid card. Source: Transações Móveis (2017).

Figure C.4.2 Modrninha WiFi. Source: PagSeguro (2018).

C.5 Prepaid cards – allowing unbanked to pay and receive payments via credit & debit card transactions

PagSeguro implemented a payment system based on prepaid credit card. Those merchants that either do not have a bank account or do not want receive their customers' payments via bank transactions can choose to sign up for the PagSeguro prepaid card. PagSeguro, in this way, can transfer the money paid by the merchants' costumers to the merchants' prepaid card (after discounting the MDF). Then, merchants can use the prepaid card to purchase goods, services and to pay her/his suppliers for example. The PagSeguro prepaid card can be used either within Brazil or abroad and its "card brand" is MasterCard.

With this resource, the merchants have direct access to the payment they received without mandatorily relying on the traditional banking system. As consequence, merchant not previously covered by the traditional banking system can use this prepaid card instead of having to go to a bank agency/office or opening an account. This resource is especially useful for those merchants that live in places where there is no bank agency or for those dissatisfied/underserved by the traditional banking system.

Figure C.5.1 PagSeguro Pre-paid Card and mobile app. Source: Twitter (2018).

Figure C.5.2 Credit & Debit card acceptance device. Source: Marketing de Conteúdo e Venda. (2018)

Appendix D – Interview questionnaires

This appendix contains the research proposed questions (both in Portuguese and in English) used to guide each interview conducted by the author during this research.

D.1 Questionnaire in Portuguese

Perguntas sugeridas:

- O(a) senhor(a) acredita que novas tecnologias financeiras podem ser usadas para gerar um crescimento econômico mais inclusivo? Se sim, como isso pode ou deve ser feito?

- Quais são alguns dos problemas econômicos que, na sua opinião, podem ser resolvidos (ou dirimidos) ao implementarmos novas soluções, serviços e tecnologias financeiras?

- O(a) senhor(a) poderia discorrer sobre alguns (pontenciais) benefícios econômicos advindos da implementação dessas novas tecnologias?

- Na sua opinião, quais são os principais problemas econômicos enfrentados pelo Brasil nos últimos 5 anos? Como o(a) senhor(a) acredita que Fintechs, startups do setor e novos serviços/tecnologias podem ajudar a resolver esses problemas?

- A China é um dos países que mais tem investido no desenvolvimento de tecnologias aplicadas ao setor financeiro. Nos últimos anos, plataformas como Alibaba, Alipay, Wechat entre outras revolucionaram a maneira com as pessoas interagem com o dinheiro e com o sistema bancário tradicional. O(a) senhor(a) acredita que esse tipo de iniciativa poderia ser implantado aqui no Brasil? Se sim,

quais são os obstáculos (legais, econômicos, políticos, sociais) que terão de ser superados para que isso aconteça?

D.1 Questionnaire in English

Suggested questions:

- Do you think that new technologies applied to the financial-related activities can be used to generate a more inclusive economy (and boost economic growth)?

- What are some economic problems that can be (at least partially) solved by the implementation of new financial technologies?

- Could you mention some expected benefits brought by the emergence and expansion of FinTech companies and FinTech-related products and services?

- In your opinion, what are the biggest economic problems faced in China? Do you think FinTechs can help to solve them or, at least, diminish them? (In case of an affirmative answer, please, explain how FinTech-related services and products could address these problems).

- Do you think that the new financial technologies developed in China and Chinese FinTechs' business models could be transferred to other countries? If so, do you believe this could contribute with these countries' economic inclusiveness?

Acknowledgement

"For from Him and through Him and for Him are all things.
To Him be the glory forever! Amen."
Romans 11:36 NIV

This dissertation is my biggest professional accomplishment and a proof of personal resilience. Finishing this master's degree has not been an easy task. Indeed, it would not have been possible if God had not given me serenity, and strength to overcome each and every obstacle I faced during not only the last academic year, but during my entire life. Thank You for Your amazing grace, everlasting love, great mercy, daily presence in my life and sacrifice in the cross for me.

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