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The Democratization of Finance through the Banking Revolution and Financial Technologies in Brazil

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I. Introduction

Every nation requires an adequate financial system to support the flow of funds between savers and borrowers, providing a safe and effective payment system. The Brazilian National Financial System (*Sistema Financeiro Nacional* - SFN) is recognized as one of the backbones of Brazilian development throughout the years, one of the explicit drivers of the ten largest world economies. Interestingly, institutions that established the country's financial system are vulnerable to structural change driven by continuous development created through new ideas, new challenges, and new opportunities. The National Financial System plays an essential part in the entire country, impacting the possibilities and ways we behave and deal with finance. The system is responsible to provide new technological solutions to focus on delivering easy and reliable access to the forty-five million Brazilians that remain unbanked, according to a recent survey from Locomotiva. ("National Financial System (SFN)", "National Financial System", "*Um Em Cada Três Brasileiros Não Tem Conta Em Banco, Mostra Pesquisa Locomotiva.")*.

This study will assess the components that comprise the Brazilian National Financial System. The main goal is to develop a comprehensive analysis of the current conditions of the traditional banking sector in Brazil and the prospects of digital banks. Two successful Brazilian digital banks provide distinct perspectives on how those technologies can serve different target markets in the industry. This author firmly believe that digital banks promote a considerable change in the banking system and providing a unique opportunity to individuals who could not use financial products due to the traditional market's limitations. Fintechs are promoting a positive impact on Brazil's bank revolution, endorsing financial inclusion and education through technological solutions.

II. National Financial System

A. Overview

Creating an organized national financial system[1] requires a vast conglomerate of entities. An efficient and successful system demands policymakers, supervisors, and, of course, financial institutions that drive this economic engine. There are three elements that comprise the Brazilian National Financial System: i. policy boards, ii. supervisory bodies, and iii. operators—the components work to promote currency circulation and serve the money, credit, capital, and foreign exchange markets, the private insurance industry, and closed pension funds industry. ("National Financial System (SFN)", "National Financial System")

The SFN performs an essential role in connecting surplus agents to deficit agents in terms of funds, regulating the intermediary financial tools that consolidate the national economy and target economic growth. In other words, the SFN binds the individual who is borrowing to the one who is lending money, ensuring that all types of trade are efficiently and lawfully working. (Cavalcante, "National Financial System (SFN)," "National Financial System")

Ultimately, financial stability is crucial to providing a reliable environment for those operational agents. The SFN operates to deliver a comprehensive set of laws and regulations to help all parties shape the national economy and look for approaches to balance out economic trends and shifts. The constant drive for efficiency and innovation leads the national financial system to research and link more effective services and economic stability the large insurance companies to the Fintech. ("Financial Stability")

[1] See Appendix 1.1 – Composition of the SFN.

The structure organization is divided into three major divisions under the SFN umbrella. The textbook, *Sistema Financeiro Nacional* by Edgar Gomes de Abreu, provides an excellent perspective on the foundation that makes this system. In the next chapter of this work, the primary purpose is to provide a clear overview of the organs that comprise this system and understand which commissions, entities, and agents create the SFN. Also, the upcoming chapter will explain which institutions are primarily responsible for developing financial technologies tools. Overall, understanding this system's organization supports dynamics for the new technological solutions that promise to boost the best monetary practices and functions of new financial technologies. Furthermore, the backbone of a country's economy hints at the prospective opportunities, and it is a crucial participant in the development of new technologies in Brazil.

B. Policy boards

Policy boards are responsible for determining the rules and guidelines that shape the SFN. Still, policy boards do not have executive roles; those policy boards are mainly responsible for providing the supervisors' technical frameworks. The supervisory entities can then issue their regulations and become accountable for enforcing them after a policy board sets those guidelines. (Abreu and Silva 15, “National Financial System”)

Currently, the SFN consists of three policy boards:

- CMN – *Conselho Monetário Nacional* (National Monetary Council)
- CNSP – *Conselho Nacional de Seguros Privados* (National Private Insurance Council)
- CNPC – *Conselho Nacional de Previdência* (National Complementary Pension Council)

a. National Monetary Council (CMN)

Further study into the influence on and adoption of financial technologies in the banking system is best suited to the National Monetary Council (CMN). The CMN is the highest institution of the SFN, serving as a critical policy board of Brazil's national financial system. This policy board is responsible for national economic strength and financial environment, and innovative approaches and platforms. Moreover, the CMN coordinates the economy by managing monetary and credit policies enforced by supervisory entities that will be discussed below, such as the Brazilian Central Bank (BCB) and the Brazilian Securities and Exchange Commission (CVM). Additionally, the CMN is responsible for authorizing paper currency emissions, setting currency policies, and handling all types of credit operations and forms. The CMN improves and manages regulations, processes, and surveillance of all financial institutions and also managing interest rates. (Abreu and Silva 19, “National Financial System”)

C. Supervisory entities

The supervisory entities' main competencies are to regulate the market according to the policy boards' direction by overseeing, inspecting, and penalizing operator agencies that are not complying with legal requirements. Those entities are most likely to set standards to regulate legal provisions or guidelines set by the policy boards to secure those established regulations. The SFN supervisory entities are (Abreu and Silva, 31):

- *Banco Central do Brasil* (BCB – Brazilian Central Bank)
- *Comissão de Valores Mobiliários* (CVM - Brazilian Securities and Exchange Commission)

- *Superintendência de Seguros Privados* (SUSEP - Private Insurance Regulator)
- *Superintendência Nacional de Previdência* (PREVIC - Complementary Pension Regulator).

a. Central Bank (BCB)

In 1964, the Banking Law (No. 4,595) created the *Banco Central do Brasil* (BCB). Today, the BCB performs its functions as a monetary, regulatory, and supervisory authority under the guidelines issued by the CMN under this institutional framework. The institutional mission of the BCB is to guarantee the stability of the currency's buying power and the solidity and effectiveness of the National Financial System. Also, this supervisory board creates monetary policy's best contribution to sustainable economic development, low unemployment, and improvement in people's living conditions to keep inflation low, stable, and predictable. (Abreu and Silva 32)

Interestingly, the BCB supervises Brazilian securities together with the Brazilian Securities and Exchange Commission (CVM). The BCB also oversees the Brazilian Payment System (SPB), the financial department directly responsible for developing and implementing the new instant payment system. The BCB is now developing the new electronic payment system and open banking regulations that are set to revolutionize the Brazilian banking system. (Abreu and Silva 32)

BC+ Agenda

The BCB also holds a program called *Agenda BC+* to make public the current, mid-term, and long-term commitments towards a better financial system with four main principles to follow: financial inclusion, modern legislation, efficient and sustainable growth, and credit availability. By 2019, the BCB had already taken sixty-eight actions towards those principles, and twenty-five were still developing. The BCB edited thirty-one resolutions, approved six laws and decrees, and designed other thirty-three normative policies. (“Agenda BC+ 2º Ano”, 11-12)

> First, the BCB promotes financial education, expands the population's financial inclusion, provides safer financial products and services, improves communication and transparency between financial institutions and their customers, and measures the impact of the Central Bank's actions from the perspective of economic citizenship. ("BC+")
>
> Second, the BCB promotes modern legislation by establishing technical and operational autonomy; strengthening the institutional environment targeting financial stability; modernizing the laws and regulations that govern the Central Bank's activities; improving the Central Bank's relationship model with the National Treasury; and aligning the regulatory framework with the most prominent international practices to provide better legal security for the Central Bank's attributions. ("BC+")
>
> Third, the BCB seeks to improve efficiency and sustainable growth by: simplify the Central Bank's procedures and rules; adjusting them to the size and profile of the institutions maintain the adequacy, alignment, and convergence to international standards; to analyze new means of payment; monitor the impacts of technological innovations; reduce the cost of compliance; improve the relationship of financial institutions with customers and users. ("BC+")
>
> Lastly, the BCB strategy to lower credit interest rates would lower the credit cost for the final borrower, reduce the default level, increase competitiveness and flexibility in granting credit, and stimulate a more efficient allocation of credit. ("BC+")

b. Brazilian Securities and Exchange Commission (CVM).

The Securities and Exchange Commission of Brazil (CVM) is also responsible for managing the financial services industry through policy development and regulations. The CVM constitutes an autonomous entity under a special regime connected to the Ministry of Economics which is also endowed with independent administrative authority and financial and budgetary autonomy. The CVM was created on 7 December 1976 by Law 6,385 / 76 to supervise and strengthen Brazil's securities market. (Abreu and Silva, 45)

Historically, the CVM had established new regulations to new technologies such as robot-advisors, providing proper registration to automated investment advisers and HFTs[2], and forming rules of market manipulation. Like other securities and exchange commissions, the CVM will promote market development through efficient systems and legal stimulation strategies to protect investors, aim for an efficient and well-functioning market, collaborate with transparency and appropriate information, and actively monitors securities market activities and services. The critical legal mandates that govern this supervisory entity are available on the official CVM website, which is run by the Brazilian government ("Legal Mandates of CVM"):

> **Market development:** stimulate the formation of savings and its application in securities; promote the efficient and regular expansion and functioning of the stock market; and stimulate permanent investments in shares of the capital stock of publicly held companies controlled by national private capitals (Law 6.385/76, art. 4, items I and II).
>
> **Efficiency and functioning of the market:** ensure the efficient and regular operation of the stock and OTC markets; ensure the observance of fair-trade practices in the securities market; and ensure compliance, in the market, with the conditions of use of credit laid down by the National Monetary Council (Law 6.385/76, art. 4, items III, VII and VIII).
>
> **Protection of investors:** protect the holders of securities and the investors of the market against irregular issuance of securities; illegal acts of directors and controlling stockholders of publicly held companies, or administrators of securities portfolio; and the use of relevant information not disclosed in the securities market. Prevent or discourage modalities of fraud or manipulation intended to create artificial conditions of demand, supply or price of securities traded on the market (Law 6.385/76, art. 4, items IV and V).
>
> **Access to appropriate information:** ensure public access to information on securities traded and the companies that issued them, regulating the Law and administering the registration system for issuers, distribution and regulated agents (Law 6.385/76, art. 4, item VI, and art. 8, items I and II).
>
> **Supervision and sanction:** continuously monitor the activities and services of the securities market, as well as the disclosure of information related to the market, its participants and securities traded therein, and impose penalties for offenders of Laws 6.404/76 and 6.385/76, CVM rules or special laws whose enforcement is under CVM´s responsibility (Law 6385/76, art. 8, lines III and V, and art. 11).

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[2] High-frequency traders.

D. Operators

Finally, operator agents include institutions, public or private, that are directly or indirectly involved in the acquisition, brokering, or investment of resources within the SFN. The operators of the SFN are the intermediary institutions that provide the public with financial services and auxiliary institutions, offering essential financial assistance for the operations of the SFN. In other words, after the guidelines have been standardized by the regulatory agents and applied by the supervisors, operators are responsible for carrying those transactions between borrowers and lenders and providing safe and legal financial products in performing lawful markets' practice. Operators are early adopters that will be studied in this thesis; operators are the institutions directly connected to make those changes in the system happen of new innovative technologies that propel the Central Bank and the National Monetary Council to regulate and monitor those products. ("National Financial System (SFN)", Abreu and Silva, 11-13)

E. Technological Solutions

The banking revolution started with a wide range of technological innovations that became popular in recent years. This chapter looks at two of those superior technology solutions: the electronic payment system and open banking. Those technologies would not be possible without artificial intelligence, big data, and blockchain technologies. Also, the consumer-centered banking services is opening space for new crowdfunding platforms and peer-to-peer lending. Furthermore, robot-selecting investment volumes and risk levels for personal accounts. Meanwhile, all solutions are still in the early stages of adoption in financial institutions in Brazil.

a. Electronic Payment System – PIX

Instant payments (IP) are electronic money transfers that provide 24/7 real-time activities: payment messaging and the availability of funds for the payee managed by the Brazilian Central Bank. Due to the necessity and desire to organize and regulate a new and effective mechanism, the BCB created PIX, a new system to solve problems regarding disrupted characteristics of e-commerce and the inefficiency of current old payment methods compared to modern technologies. ("PIX: The New Instant Payment System from Central Bank of Brazil," "Brazilian Payments System")

Implemented in November of 2020, the IP platform in Brazil intends to advance the payment message's transmission and the availability of final funds to the payee thereby reducing costs, enhancing safety, and focusing on customer experience. Transfers take place directly from the payer's account to the payee's account, without the need for intermediaries, leading to lower transaction costs. Payees will benefit from a lower fee resulting from an expected reduction in the number of intermediaries in the payment chain. Further, PIX can optimize payees' cash flow management to reduce their credit needs by creating those preferred availabilities of resources. Additionally, enhanced data processing and direct payment ordering will enable the technological solutions handed in to integrate and automate payee systems, creating positive opportunities for the Brazilian economy. ("PIX")

According to the BCB, "the Brazilian IP ecosystem will enable innovation, the emergence of new business models, and the reduction of the social cost related to the use of paper-based instruments. In addition to the potential to leverage market competitiveness and efficiency, full implementation of instant payments will promote financial inclusion and fill several existing gaps in the currently available basket of payment instruments." PIX will let the user set up to five wallets in a multiplatform environment that uses QR codes to connect e-wallets to secure IP transfers, allowing both parties to calculate and accept transfer and fees from one e-wallet to another in real-time. ("PIX")

Started on November 3, 2020, PIX transactions operated in restricted mode. The BCB approved in the homologation[3] stage the allowance to execute PIX functionalities in testing stage. A limited number of users and a differentiated timetable leading to selected customers trying the innovative service. Likewise, the restricted process compiled more than 71 million PIX keys registered, and the execution of more than 1.9 million transactions, representing a monetary amount of over 780 million Brazilians reais (BRL), according to the BCB. The restricted operation phase's success consolidated the path for the Pix's potential impacts, fostering competition and promoting better services for all users, improved economic efficiency, and digital payments (shifting of cash/checks to electronic/digital payment). Plus, the possibility of initiating and receiving Pix through digital payment accounts, the large number of participants, and the low fees (including the gratuity to activate Pix to citizens) will foster the inclusion of millions of Brazilians in the National Financial System in the upcoming years. After a successful restricted operation period, Pix began its full operation with its 734 institutions on November 16, 2020. ("PIX", "Pix Starts Its Full Operation with 734 Institutions on November 16, 2020")

b. Open-Banking

Open banking is a tool that enables customer banking and financial accounts to be accessed and regulated by third-party software. Open banking technologies guarantees the great potential to reshape the banking industry's competitive environment and consumer experience,

[3] to approve or confirm officially.

posing both exciting advantages and some risks to customers as more of their data is exchanged on a wider scale. In essence, it is an accelerator and facilitator for financial operators, centralizing digital ecosystems through exchanging data and business information from Application Programming Interfaces (APIs). In other words, open banking establishes a consumer-centered environment where the individual can select from different products from various institutions and centralize that in a single platform. This system permits the multiple operators of this ecosystem, such as banks, fintech, insurance companies, to interchange knowledge and valuable assets, providing new innovate business applications, emphasizing new and better end-user services, enhancing efficiency, and improving competition. ("Open Banking", "Open Banking (BCB)")

The BCB planned to begin the regulatory process of open banking in Brazil on November 30, 2020. After essential pressure from financial institutions, the supervisory entity postponed its plans on November 27. Due to the effects of the COVID-19 pandemic and the attention devoted to the new instant payment system, the BCB postponed the latest date to start the regulatory process as February 1, 2021. ("Open Banking (BCB)")

F. Traditional Banking Sector

a. Sector Conditions

As we learn more about the financial operators, this chapter will examine the traditional banking sector. The current conditions and digital trends are core subjects to study the importance for Brazil's financial technologies and their implications in the prolonged restricted banking environment in the country. A 2017 research report from Goldman Sachs develops a case for Brazil's fintech companies' still on-going potential; the report defines low-market concentration because of its oligopolistic market structure, limited penetration of low-income individuals compared to a global scale, and high-interest rates on loans because of the limited popular financial education and slow competition. Five major banks still hold a large piece of the banking sector market share, making it a historically challenging new entrants' environment. According to the *Brazil Digital Report – 1ª Edição* from McKinsey & Company, the banking sector also presented a significant increase in its compound annual growth rate (around 8% annually from 2010 to 2018), according to the Brazil Report from McKinsey & Company. These trends also helped the financial sector become highly profitable, with a return on capital of 11% to 17%. According to the World Bank, Brazil is still facing challenges in its robust regulatory environment that have promoted traditional banking practices promoted by high-interest record rate spreads, setting as the second most significant interest rate spread in the world. (G. Macedo et al. Fintech's Brazil Moment 3, Calicchio 111-112)

b. Banking Digital Trends

Digital transformation is not a recent trend for many operators. Even with a close and traditional banking environment, traditional banking institutions have been working on and implementing new technologies developed by the Brazilian Central Bank, technologies such as mobile banking and open-banking platforms. Digital trends also lead those institutions to increase banking products through digital means, such as providing investment tools, insurance, and deposits. The increasing adoption of mobile banking leads institutions to start developing their open banking APIs[4] to follow those innovative and disruptive trends to provide more efficient, trustworthy, and convenient products. A recent study from the Bank Federation of Brazil (*Federação Brasileira de Bancos* - FEBRABAN) found Brazilian banks increased

[4] application programming interface (API)

technology-related investments by around 48% in 2019. The research also indicates the enhanced relationship of consumers in mobile banking, showing that clients are accessing their banking information like never before, averaging twenty-three times per month, potentially leading to access accounts at least forty times per month to heavy-user accounts. For the banking sector, the goal is to continue to provide the most reliable, convenient, and personalized experience to clients. Because of that, artificial intelligence (72%) focused on the client experience continues to be the leading technology investment strategy, followed by blockchain, robot-advisors, and Internet-of-things[5]. (Rep. *Pesquisa FEBRABAN De Tecnologia Bancária 2020* 3)

The FEBRABAN study also presents the impact of COVID-19 on banking services, concluding that chatbots and webchats became a vital means of communication between clients and banks. There was also a sharp increase in the transaction through digital channels (Internet banking and mobile banking), representing 74% of all transactions. (Rep. *Pesquisa FEBRABAN De Tecnologia Bancária 2020* 3)

[5] "The Internet of Things (IoT) describes the network of physical objects— "things"—that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the internet." ("What Is the Internet of Things (IoT)?")

III. Fintech

Mário Henrique Simonsen, former Brazilian finance minister, defending the constant realignment of regulatory procedures to new products, once asked: "What would happen to mankind if the governments of the 19th century had decided to protect candle makers against competition from the electric lamp?". Technology has always enabled and boosted innovation. Recent technological trends help us discuss and improve well-established systems in every aspect of our lives, leading to five common and desirable elements:

- Efficiency
- Quality
- Security
- Inclusion
- Diversification

Fintech represents those modern technologies —new business models, applications, processes, and products— technologies that enhance and automate financial services delivery and use. A global trend surrounding those technologies has caught the awareness of many new businesses and traditional companies in markets throughout the financial sector. Most importantly, these financial-technology startups are the principal drivers of promoting financial innovation through modern tools and reinventing financial markets and institutions by providing a new perspective on financial provision services. Likewise, fintech tends to enhance and automate financial services delivery and use. It is fundamental to mention that fintech drives cross-competition and asymmetric competition, which allow the latest startup to compete with the most influential market players. Fintech also serves to challenge global corporations, business owners, and consumers to change their banking and financial services, appropriating new specialized software and algorithms used on a technological device. ("Fintech Ecosystem")

This chapter will develop further the story of three fintech companies that became very successful in Brazil. Those stories also build on the importance of competition to enhance regulation and boost new technological processes and solutions. Undoubtedly, certain fintech products are convenient, and they reduce many costs due to the digital-centered environment.

Fintech companies may still face some significant risks including cybersecurity, privacy, consumer education, and regulation, since no clear view on regulation over products exists. Consumers tend not to be entirely familiar with the technology due to the lack of accessibility and proper education, topics that will develop later in this paper. The digital revolution caused by fintech is increasingly disrupting and reshaping financial markets, officials, and traditional competitors, to meet the need to respond to their clients' evolving expectations. (G. Macedo et al. Fintech's Brazil Moment 11, "Fintech Ecosystem")

A. Global FINDEX

After analyzing the regulatory setting that encompasses the Brazilian national financial system and looking at technology-enabled solutions to maximize efficiency in its financial system, it is crucial to understand concepts of the financial technologies from a broader perspective. This paper will develop a global outlook on the importance of the opportunities financial technologies have contributed for the future of finance.

The Global Findex database is a data set that looks at how individuals manage financial products and participate in banking systems in 140 economies worldwide. The Global Findex was launched by the World Bank with funding from the Bill & Melinda Gates Foundation, and has been published every three years since 2011. The extensive and promising set of data from

Findex 2020, is set to be released sometime in 2021, showing the current achievements from, showing the current achievements from the innovative breakthroughs of the global perspective on financial services. For reference, this paper will analyze Brazil's available data compared to Latin America and the world in the years 2011, 2014, and 2017. The data will serve as a good starting point to continue discussing Brazil's financial technologies' implications since they prove to be connected to many aspects of the country's development opportunities. The Global Findex reports that investment on financial inclusion solutions can lower the cost of installing payments, boost people's financial assistance access, and help governments improve efficiency by reducing corruption as they implement digital payments operations. The report also emphasizes the importance of account accessibility and ownership since 1.7 billion adults remain unbanked worldwide. (Demirgüç-Kunt, 4)

The main reasons why people are unbanked, according to the Findex report, are: (Demirgüç-Kunt, 39-41)[6]

- Insufficient financial assets (not enough money) to open an account.
- Low educational attainment.
- Lack of proper documentation to open an account.
- Distrust of the financial system and discouragement due to high fees and inaccessibility.
- Lack of government regulations to promote financial inclusion.
- Need of technological devices, such as mobile phones.

The data shows the importance of mobile phone ownership and access to the Internet access, revealing unique possibilities for boosting account ownership in developing nations and to

[6] See Appendix 1.2 – Account Ownership (Global FINDEX)

educating those who have been excluded of financial services for so long.[7] Ultimately, an entire system needs to be remodeled within its financial system to encompass and achieve financial inclusion; according to the report, "a digital and efficient payments system, good physical infrastructure, appropriate regulations, and vigorous consumer protection safeguards." (Global Findex, 10) It is also essential to design financial platforms that are more inclusive of social groups and minorities, such as women, underprivileged individuals, and first-time financial services users, who might to be overrepresented as unbanked and present lower educations experiences linked to the possibility of actively embrace those groups into the system. (Demirgüç-Kunt 36-37) The report provides an in-depth perspective on the availability of financial services, consumer behavior, and accessibility to financial services from various social and demographic aspects. The following list[8] offers some pivotal pieces of data on account ownership, which this author believes is the starting point for financial development and inclusion:

- 70% of individuals (15+[9]) hold a personal account in a financial institution.
- 74% of individuals in the labor force (15+) have a financial institution account.
- 77% of older adults (25+[10]) have a financial institution account.
- 61% of individuals out of the labor force (15+) have a financial institution account.
- 62% of individuals with primary education or less (15+) have a financial institution account
- 70% of individuals that live in rural areas (15+) have a financial institution account.

[7] See Appendix 1.3 – Reasons to not hold an account (Global FINDEX)
[8] See Appendix 1.2
[9] 15 years old or older.
[10] 21 years old or older.

- 74% of individuals that live in rural areas (15+) have a financial institution account.
- 67% of females (15+) have a financial institution account.
- 56% of the poorest 40% (15+) have a financial institution account.
- 78% of the richest 60% (15+) have a financial institution account.
- 72% of males (15+) hold a financial institution account.
- 46% of young adults (15-24[11]) hold a financial institution account.

B. Brazilian Fintech Environment

Fintech has played an important role worldwide, but what is different in the Brazilian economic environment? The 2017 report from Goldman Sachs identifies the three fundamental market dynamics that differentiate this emerging market: market concentration, limited penetration, and pricing. Thus, the right conditions exist in Brazil for technology drive disruption to have a more considerable impact than in more developed markets. According to Goldman Sachs, the top five banks in Brazil, excluding the national development banks, hold 84% of the system's total loans in an oligarchical structure. The Herfindahl-Hirschman market concentration index, a standard measure of market concentration to determine market competitiveness, places Brazil in the top half of the range of various countries. This concentration becomes more evident because of in-branch banking, where those top five banks still operate 90% of the branches. With new technologies actively disrupting the traditional operators, easing entry barriers, promoting new electronic payment systems, and setting the environment for an open banking environment, large banks in Brazil would seem to be more vulnerable to new entrants than other nations' main competitors. (G. Macedo et al. Fintech's Brazil Moment, 3-7)

[11] Between 15 and 24 years old.

Recently, WhatsApp, the largest instant messaging apps in Brazil with an impressive user base, introduced its in-app electronic money platform between bank accounts enabled by Facebook Pay and processed by Cielo in Brazil. As WhatsApp introduced the new tool, Facebook temporarily suspended the device since the Central Bank questioned concerns over consumers' privacy and security and the unjust competition environment that could emerge with traditional financial institutions. Brazil's central bank issued a statement stressing the importance of preserving "an adequate competitive environment," for mobile payments and ensuring payment systems remain "interchangeable, fast, secure, transparent, open and cheap." On the other side, central Brazilian commercial banks requested Mastercard and Visa, some payment partners for WhatsApp in Brazil, to halt money transfer on the application because it failed to comply with national regulatory and administrative sanctions, according to an article at TechCrunch. (Singh, Mari)

As the WhatsApp scenario demonstrates, new technologies still face legal scrutiny from the supervisory entities, which look for ways to regulate these new platforms. Interestingly, the weak penetration of banking services in mobile platforms in Brazil compared to global peers relates to current levels of new technology adoption and other limitations of every different emerging market; still, due to culture, regulation, and market structure, all of which could be significantly overcome by the problems of technology penetration. Expensive pricing for loans, unequal access to banking services, and other financial services are still on-going challenges. Of course, implementing a new electronic payment system, developing an upcoming open banking environment, and currently changing consumer behavior provoked by Brazil's current political. Also, the current state of the economy leads to a promising setting for new fintech product development and adoption that ultimately will lead to financial inclusion. In the 2019 EY Fintech

Adoption Index, Brazil appeared as the fifteenth largest adopter of the twenty-seven markets studied. The research suggests that 63% of Brazil's digitally active consumers use two or more Fintech services, demonstrating the market's eagerness to embrace digital banking, lending, payments, and other services across multiple platforms. The experiences of fintech investors and startups in Brazil offer insight into the conditions that make the emerging market ripe for Fintech adoption, as well as into the challenges that new entrants face. (Hatch, 7)

Interestingly, according to the 2019 EY Fintech Adoption Index, the fintech industry has grown from its early stages to meet on customer expectations. Fintech companies are beginning to look like more professionally run firms with comprehensive organizational skills, a complete product suite, and a broad global scope. These corporations have already gone through many fund-raising rounds increased their employee base, formed corporate departments such as human resources, accounting, and legal, and expanded into their home markets. In other words, the Fintech market has matured. It has accelerated in Brazil, aligning ideas to generate a potential increase in the availability of alternative products and financing sources led by more consumer-oriented services. The Brazilian fintech ecosystem has not been any different. The environment is well-diversified and has set new opportunities in several market segments. The next chapter of this thesis will study some successful firms in the Brazilian Fintech industry segments. (Hatch, 8)

The Brazilian financial environment needs work on more accessible the interest rates on Brazil's loans, which are still among the highest globally. The Brazilian population still encounters difficulties in understanding the weight of high-interest rates and the importance and advantages that financial services can offer. Unfortunately, this limited understanding enhances the default risk and reduces the incentives for new competition. However, fintech is all about heavily investing in education and fighting social misconceptions of personal finance, putting the consumer in the center and understanding those concepts and the importance of taking an active role in their finances. In other words, with new technology, significant fintech uses its platforms to make information more widely available for bank clients and potential entrants, ultimately driving prices downwards using a consumer-centered strategy.

C. Market Segments

Modern changes in the financial services system have reached every part of the globe, and Brazil has not been resistant to this development, as we have seen in past chapters. Brazil is leveraging innovations to exponentially boost people's access to financial services in a conglomerate of market segments that combines common characteristics, grouped for marketing purposes towards the convenience that technology can create. Each fintech market segment provides unique opportunities, yet marketers use multiple models to develop a target market for their products or services. All financial technology solutions start from similar principles. Understanding market segments and well-established players in the financial technology ecosystem binds together those distinctive components and helps us set current setbacks and future opportunities. This chapter covers the leading market segments that establish the ability of the Brazilian fintech environment to grasp the target consumer's needs and prospects fully, combining different stories of success, which pinpoint the power of these newly developed tools.

Fintech Lab, founded by Clay Innovation, is a platform that aims to be a connection hub for the fintech ecosystem in Brazil. Fintech Lab is responsible for an annual report that track fintech companies in Brazil. According to the latest Radar Fintech lab report released in August of 2020, there were approximately 680 Fintechs in the national ecosystem representing twelve main sectors, the three most prevalent markets being Payments (28%), Financial Management

(18%), Credit and Loans (17%). (“*Edição 2020 Do Radar FintechLab Detecta 270 Novas Fintechs Em Um Ano”)*

Brazil's financial services sector continues to be in an attractive position to the lower entry barriers and Brazil's current macroeconomic environment; presenting assets growing more than GDP, poor debt under control, reduced cost/revenue ratio, steady profit growth, and return on equity. The market, however, is highly concentrated, with plenty of space for financial inclusion to grow. The penetration of almost all Brazil products - including current bank accounts, credit (particularly long-term credit), investments, and insurance - is relatively low compared to that of developed countries. However, Brazilians tend to be more accepting of change and new technologies. (“*Edição 2020 Do Radar FintechLab Detecta 270 Novas Fintechs Em Um Ano”)*

D. Mapping and Concentration

According to the nineth edition Radar Fintechlab report, the total number of fintech grew 28% in 2020 compared to the previous year, from 604 fintech companies in June 2019 to 771 in August of 2020. The report presents the most reliable and comprehensive view of developing the fintech ecosystem in Brazil, mapping all fintech through different market segments and hubs. Fintech Lab co-founder, Fábio Gonsalez, comments on the high growth of new companies saying that the current position of this ecosystem "is a strong indication that there are many startups that are less than a year old, proving once again that the ecosystem continues to find opportunities to improve services and create new solutions very strongly influenced by regulatory advances such as Open Banking and PIX, for example." The other Fintech Lab co-founder, Marcelo Bradaschia, notes that the impressive volume of new technologies precedes the second wave of new financial startup development. It looks for the new opportunities created by the new regulatory environment that is still in development. According to Bradaschia: ("*Edição 2020 Do Radar FintechLab Detecta 270 Novas Fintechs Em Um Ano*")

> *By establishing Open Banking, regulatory authorities further empower consumers who become the absolute owners of their data. On the other hand, opportunities lead to expanding collaboration between traditional financial institutions and fintech, while instant payments further popularize technological solutions as facilitators of people's lives. This whole environment allows us to build models that are never used and represents opportunities that will undoubtedly produce more and more fintech to take advantage of them* - Bradaschia[12]

Also, Radar Fintechlab mapping[13] shows the fintech ecosystem is present in Brazil's twelve areas, and 90% of those companies are settled in the Southwest region. Sao Paulo is the largest hub in Brazil, already housing the South American headquarters of Google, Uber, and Airbnb besides venture capital firms' offices. ("*Edição 2020 Do Radar FintechLab Detecta 270 Novas Fintechs Em Um Ano*")

Of the five Brazilian unicorns[14], a privately owned startup with a valuation exceeding $1 billion, Nubank is the leading financial technology company in Latin America and the largest independent neobank worldwide, reaching more than twenty million clients. Nubank has its headquarters in São Paulo. Brazil's largest city has also made changes in the regulatory processes of starting a new business, enhancing the most encouraging entrepreneurial environment in Brazil most of the essential incubators and accelerators for startups are found in the city of Sao Paulo. For example, Google has its only Latin-American incubator in São Paulo, one of the six worldwide. Itaú and Bradesco, in partnership with famous venture capital funds, also have cooperative incubators in São Paulo. (Bakker, 3)

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[12] ("*Edição 2020 Do Radar FintechLab Detecta 270 Novas Fintechs Em Um Ano")*
[13] See Appendix 1.4 – Radar Fintechlab
[14] ""Unicorn" is a term used in the venture capital industry to describe a privately held startup company with a value of over $1 billion." (Chen)

Rio de Janeiro and Belo Horizonte have also developed some local initiatives for new fintech startups and enterprises. They are a part of the large conglomerate of fintech in the Southeast region of Brazil. Even though São Paulo is the center of most fintech activity, Rio de Janeiro and Belo Horizonte developed a unique fintech climate. Belo Horizonte is known for delivering IT graduates, and in 2016, Google opened its first engineering center in the area. Additionally, through its Startups and Entrepreneurship Ecosystem Growth (SEED) program, Minas Gerais aims to draw prospective international investors. San Pedro Valley is a private hub with over three hundred startups, including several fintech businesses in Belo Horizonte. In Rio, many fintech have focused on the unbanked to fight social inequality in the finance market, since many companies focus on the citizens who have been segregated from traditional financial services. (Bakker, 3)

E. Financing

Brazilian Fintech startups gathered more than US$ 1.9 billion in a total of 115 investment rounds throughout last year, leading up to a 73% increase compared to 2019 and a total record number of 897 Fintech startups in the country. Wall Street banks and private equity firms were the investors that provided the most attention and financially funded these Brazilian startups. It happened due to the growing market share and prospective growth opportunities of those new companies that are challenging the traditional operators on the national financial system, even in the midst of the COVID-19 pandemic. (Bloomberg "*Fintechs têm aporte recorde de US$ 1,9 bilhão em 2020 no Brazil*")

Venture capital firms also have been the driving financing resource for Fintech startups. 72% of Brazil's Fintechs have capital from investment partners, and 14% of the country's

Fintechs have raised more than BRL20m (US$ 6m) in investment rounds.[15] Goldman Sachs also estimates that Brazil's Fintech companies will generate revenues of around US$24 billions over the next ten years leading to a possible revenue pool of R$ 75 billion[16] over ten years for the more than two hundred significant Fintech currently operating in Brazil back in 2017.[17]

Also, Goldman Sachs invested US$ 120 million in lugu Servicos da Internet SA, a digital platform of financial management and automation dedicated to enterprises, JPMorgan Chase brought a minority share portion of FitBank Pagamentos Eletronicos. According to Distrito, the two largest investment rounds were to Nubank and Neon Payments capitalizing US$ 300 million. The most cases of Merge and Acquisitions also occurred in 2020. (Bloomberg "*Fintechs têm aporte recorde de US$ 1,9 bilhão em 2020 no Brazil*")

F. Regulatory Progress

Even though Latin America still does not have a General Data Protection Regulation (GDPR)*, Brazil's regulator acknowledges the necessity for a modernized licensing regime. Brazil often has been known for its demanding regulatory environment, which provides difficulties to new entrants in the market for financial institutions. The Brazilian Central Bank is responsible for issuing licenses for any new entrant to operate in the market for financial institutions. If the business offers securities, an additional authorization from the Brazilian Security Exchange Commission (CVM) is necessary. Moreover, if the company is owned by or has partial ownership in foreign shareholders, the presidential approval by decree is required. A transfer of funds in Brazil is also required to be backed up by the Central Bank's authorization,

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[15] EY Global Financial Service, 2019, pp. 1–44, Global Fintech Adoption Index 2019.
[16] 75 billions Brazilian reais.
[17] G. Macedo, Carlos, et al. The Goldman Sachs Group, Inc., 2017, pp. 1–45, Fintech's Brazil Moment.

an important issue that was explicitly noticed in the WhatsApp Pay case. Still, regulations can also protect users while lowering entry barriers, providing a more competitive space to all players, including traditional operators looking to strengthen their financial products.

The CVM and the BCB have previously established internal groups to produce a method that fosters innovation and inclusion of several Fintech market segments, such as the credit and payment segments integrated into *Banco Central do Brasil* (BCB). This power helps the BCB monitor technological developments. It also analyzes their potential impacts on operations carried out within the SFN system and the SPB, keeping it consistent with other regulatory bodies and executive orders.

The rise of fintech companies has inevitable regulatory consequences for the entire market, providing the opportunity for traditional companies to join the innovation trend. Similar to the example cited above concerning WhatsApp Pay by conventional commercial banks, companies are willing to assess concerns and disruptions to the policy boards that coordinate financial stability. Indeed, every market has to address its banking and privacy laws as new entrants take on a role that belongs exclusively to banks. To successfully assess those unknown issues, BCB introduced the Financial and Technological Innovations Lab (Lift). This virtual environment supports the collaboration between academia, the market, technology enterprises, and startups, aiming to generate technological innovation, share knowledge, obstacles, and evaluate the projects' results ("Lift Learning").

Regulations are often analyzed and incorporated quickly, enabling fintech companies to enter the payments market and offer digital bank accounts for individuals. However, a new law was still needed to address some of those new corporate accounts. BCB implemented a framework for partnerships between banks and fintech companies to provide securitized loans and peer-to-peer lending that connects borrowers directly with individual investors. Therefore, the BCB licenses two credit fintech: the Direct Credit Society (*Sociedade de Credito Direto* - SCD) and the Peer-to-Peer Loan Company (SEP). Those new licensees facilitate a low-cost operational structure to credit fintech companies specializing in providing financial services to economic segments with poor credit ratings — such as small and medium-sized enterprises (SMEs). According to the BCB, "The CMN Resolution 4,656/2018 provides for the direct credit company and the peer-to-peer loan company, regulates the peer-to-peer loan and financing operations, and establishes requirements and procedures for license approval, transfer of corporate control, restructuring, and license revocation of the institutions mentioned therein." (“Fintech Ecosystem”)

A presidential decree established that foreign capital participation of up to 100 percent in credit Fintech boosting competition and innovation in the market. ("Fintech ecosystem")

The National Financial System has shifted to include those new startups to the system to provide “… more access to banking and financial services without putting the financial system at risk, while at the same time, paving the way for development within the secure judicial framework. In 2017, Brazil saw a regulatory overhaul by the Central Bank in an attempt to bring the Fintechs into the traditional financial system by requiring them to obtain proper approvals with authorities, but under a lighter type of regulation" according to Co-Pierre Georg, an Associate Professor at University of Cape Town.[18] (Georg, Co-Pierre. “Fintech Regulation in Brazil - Fintech Regulation in Emerging Markets.”)

[18] See "Fintech Regulation in Brazil" lecture transcript: https://www.coursera.org/lecture/financial-regulation/fintech-regulation-in-brazil-eMFet

IV. Brazil's Digital Banks

A. Sector Conditions

The digital bank sector's continuous growth shows that the Brazilian market is popularizing digital bank accounts in a highly concentrated and oligopolistic environment in the Brazilian banking system. Most fintech companies heavily invest in marketing and sales promotion to educate the population about a simplistic way of dealing with personal finance. Institutions that command a larger portion of the banking market share in Brazil sponsor significant advertising on television and the Internet. Still, the influence of new investment rounds, new market entrants, and a maturing consumer market is creating a highly competitive market-share environment. The injection of capital in advanced investment rounds and the growing number of companies in the segment may mean an opportunity for early exits. Also, as we analyze the maturing market and the current drive of digitalization of traditional players, the digital bank sector can be leading to a potential market consolidation through mergers and acquisitions.

B. Case of Nubank

David Vélez, Cristina Junqueira, and Edward Wible were the founders of Nubank in 2013 after Vélez, a Colombian financial entrepreneur, moved to Brazil to work and encountered an unpleasant banking experience as he tried to open an account in 2011. Vélez found himself stuck in the bulletproof transparent rotating doors, facing long lines, and armed security guards screening customers at the entry. Vélez saw an exciting opportunity. He reached to Sequoia Capital, a California-based venture capital group for which he was also working for at the time, with a concept that would revolutionize Brazil's banking industry. That is when Vélez presented the idea of launching a financial technology enabled company that would create a new way of experiencing banking in Brazil. In an interview with CNN Business Vélez said:

> There was a lot of conventional wisdom around banking...like [it] was almost sacred and that entrepreneurs could not go compete with them . . . . but as I [dug] deeper and talk[ed] to consumers and felt firsthand the pain of being a banking consumer, I realized that people just really needed more alternatives. Technology was going to create a window of opportunity to build a fully digital bank. (CNN Business, 2019).

Vélez collaborated with his peers Junqueira and Wible after and share a proposition to start working on this idea. They ended up opening an office in Sao Paulo's house with a small team of programmers to work on the idea that became the largest independent global neobank and the second Brazilian startup to reach the valuation of US$1 billion with more than 20 million clients with the goal of “giving people back control over their financial lives, eliminating bureaucracy, abusive rates, and traditional banks' poor service.” (“*Sobre Nós*”)

Nubank exemplifies the success of a digital bank, and how the influence of technology makes it possible to democratize and simplify banking operations in Brazil by offering a fully digital service experience and good consumer service experiences. Nubank's goal focuses on battling red tape branch offices, and expensive customer services centers through developing digital solutions for conventional bank operations. The name "Nu" means "fair and transparent” exemplified by Nubank’s corporate culture. (“*Por Que o Nubank Chama Nubank*?”).

Nubank launched its first product in 2014. "Roxinho" is a credit card with no annual fee or maintenance fees and fully controlled by the app has friendly and effective customer service. The no-fee credit card now has more than 12 million customers. (*Cartão* – Nubank, 2020) Nubank kept increasing its financial products line. Today, the company offers a digital account (Nuconta) after receiving a government banking permit in 2018. The digital bank also provides a rewards program with points that do not expire, as well as personal loans, business accounts, and life insurance. ("*Conta*") Nubank has even started new operations in Mexico and Colombia and opened two engineering offices, one in Argentina and another in Germany. Since its first offering was released in 2014, almost 36 million Brazilians have ordered new digital accounts and Nubank is present in more than 5,570 cities in the country. ("Nubank Takes next Step in International Expansion and Launches in Colombia")

On January 28, 2021, the digital bank announced its seventh investment round, also called the G Series, which raised US$ 400 million to focus on its international expansion program and to increase the supply of its current financial products and national's expansion in Brazil, setting the company to become one of the five most valuable financial institutions of Latin America. Over the past seven years, Nubank has successfully helped to change the Brazilian financial market. Nubank claims that they saved clients "more than R$ 15 billion in fees by cutting red tape and abusive charges," and also "helped the financial inclusion of millions of people," about 20% of customers who had never before had a credit card. Nubank's impact on Latin America, where about 50% of the population was unbanked and 70% of the market was controlled by a handful of traditional banks, is remarkable. The Nubank G series announcement noted that more than 1 million people have already applied for the Nubank card - and in Colombia, the Nubank card waiting list has more than 200,000 subscribers a few months after Nubank's arrival in the country. ("*Nubank Atrai US$ 400 Milhões Em Nova Rodada De Investimentos Em 2021")*

It is fair to say that Nubank's success is due to the goal of being a challenger to the discriminatory traditional banking system.

> *"We are tired of the same old solutions to the same old problems if you want to have and try out new ideas, and if you believe that design, technology, and good customer service can solve any problem."* - Nubank

Digital solutions are at the core competencies of the company. Nubank provides those solutions through strategies for challenging bureaucracy, red tape, and expensive, bad, customer service. The company provides better and more efficient experience by cutting the expensive costs that come to banking branches and infrastructure.

Interestedly, Nubank, like other fintech company, gathers a full set of data analytics and algorithms to provide the best experience for consumers due to the lack of credit histories in Brazil. Fintech companies are better positioned to be early adopters of these platforms and precisely adjust their real consumer needs and offer the right products. This is something that traditional commercial banks still lack as they race to provide a more effective digital experience. In an interview with CNN Business, Vélez called this personalized experience “nontraditional information” and affirming that nontraditional information leads to behavioral information creating a “holistic picture of that consumer." (Pepitone) Vélez declared:

> Nubank look at where you live, how you move, who your friends are, who invited you to Nubank, and the people that you're sending money to [...] We look at whether you read the contract of the creditor whether you don't — it turns out that people [who "read" the contract] fast tend to be fraudsters. We look at the type of transactions that you're doing, if you're buying groceries or if you are in a bar. (Pepitone

Certainly, Nubank's success draws the chance of creating disruption in one of the most challenging banking sector environments on the globe. The constant drive to develop a simplistic tool and a great user experience led Nubank to its place as a prominent fintech startup that became the most extensive digital bank globally. The company is widely known in Brazil as it serves as a significant challenger to the traditional banks that still have a massive influence in the banking sector. In November 2020, Nubank provided the new electronic payment system, PIX, on its digital account platform, developing new ways of making electronic payments, and creating customers retention to register their digital keys under Nubank's digital accounts.

Nubank also has earned international prizes for its customer service and personalized financial products platform. In 2018, KPMG[19] listed Nubank among the Top 10 world's leading fintechs, with Nubank being the single Latin American company. In 2020, Nubank was awarded *Best Brazilian Bank* by Forbes, and also earned the *Boldness in Business Award* by the Financial Times, which supports global businesses promoting innovation to change people's lives. ("*Conheça os prêmios internacionais do Nubank*")

C. Case of Banco Maré

Banco Mare, co-founded by Vitor Kneipp and Alexander Albuquerque, is a decentralized network built on blockchain that focuses on creating a unique system for people excluded from the financial system. Albuquerque "brought his laptop into favelas, routed it through his mobile, and started paying people's bills for them," revealed Kneipp to Saïd Business School at the University of Oxford. The fintech startup was awarded a $100K grant from Catalyst Fund, supported by the Bill & Melinda Gates Foundation and JPMorgan Chase & Co, which spurs innovation in financial inclusion in emerging markets. ("Banco Maré Awarded $100K Grant from Global Fintech Accelerator Catalyst Fund")

Banco Maré instituted the cryptocurrency *Palafita* by offering a simple financial operations platform to lower-class individuals without a bank account and who reside in areas and communities at risk. The digital bank also provides a basket of essential services based on the mobile application. Their physical presence in communities supports partnerships with local companies targeting financial exclusion, a common problem that hinders millions of Brazilians

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[19] Klynveld Peat Marwick Goerdeler

daily personal financial transactions. "A Simple Bank for a Simple Life" is the motto of Banco Maré. This blockchain-powered digital bank empowers democratization and financial inclusion by targeting the unbanked in Brazil's lower-class communities offering payment of bills, funds transfers, and purchases through mobile applications, POS machines[20], Pre-paid cards, and a digital community cryptocurrency. Banco Maré was incubated by Facebook and WeWork Brazil and listed as one of the fifteen most disruptive Brazilian fintechs by *Caixa*, the country's largest state bank, in 2017. This social startup provides a convenient digital platform for various financial services through a mobile app, giving full support for the local communities and giving individuals neglected by big institutions for generations the power of utilizing traditional financial instruments. Banco Maré has focused on the regional presence through local stores, called *kioscos*, which offers financial products and customer service. People learn how to use the app and utilize those banking services. ("Banco Maré Awarded $100K Grant from Global Fintech Accelerator Catalyst Fund", "*Serviços*", "*Banco Maré: Um Banco Simples Para Uma Vida Simples")*

Banco Maré also partners with local businesses to present a solution to the financial exclusion that plagues millions of Brazilians, challenging both their daily financial lives and economic growth. Banco Mare does so by not carrying any credit analysis, by providing debt consultations, and not engaging in other forms of financial exclusion. There are some key aspects that Banco Maré have revolutionized and encouraged financial inclusion in those poor communities. The payment of bills and transfer of funds, sometimes to distant locations, the bank's primary services, provides individuals with the ability to stay in their communities to

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[20] "A point-of-sale (POS) terminal is a hardware system for processing card payments at retail locations." (Halton)

perform these tasks. Usually, individuals who move to complex dwellers, also called *favelas*, have come from remote regions of the country to a better quality of living and support for those who stayed behind. POS and pre-paid cards are products recently released to improve the complex's financial inclusion. Community currencies enhance the exchange of money inside the complex, helping to maintain funding inside the community and fostering community's economic and social development, keeping the money flow between local businesses that the community residents. Together with other payment mechanisms, the fintech proposes to boost trade in the area to generate new business opportunities and employment for all. (Ayala, Giarelli 73-79)

V. Conclusion: Future Opportunities

As mentioned before, Brazil is still facing challenges regarding account ownership and promotion of financial technologies due to the robust regulatory environment, and interest rate spreads. In a recent survey from Locomotiva[21], the research institute reported that 45 million Brazilian do not have bank accounts. One in every three citizens 16-year-old or older is unbanked. Nevertheless, the current environment has changed, and the future of banking is most likely to be fintechs. According to the Findexable Report, Brazil is raking at the top of the wager's list, promoting countries where new fintech companies are strong challengers the "old-guard of finance centers" and providing innovation to promote the inclusion and availability of fintech on a larger scale. The Global Fintech Index ranks seven Brazilian cities at the Global Findex Ecosystem, ranking from all twenty-one Latin American and Caribbean cities; and Brazil

[21] The Locomotiva survey was conducted in May 2019 with a pool of 1,500 sixteen years and older in seventy-one Brazilian cities.

displays at 19th on the Global Fintech Index Ecosystem Rankings of Countries as the largest Fintech market in Latin America and the Caribbean. ("*Um Em Cada Três Brasileiros Não Tem Conta Em Banco, Mostra Pesquisa*", Rep. *The Global Fintech Index 2020* 32)

The further inclusion of new artificial intelligence capabilities undoubtedly will dictate the future of banking that may be centralized in one platform through APIs in a society transitioned to an all-digital banking experience. According to the Fintech Deep Dive 2020 report by PwC, the technological bets that will drive the future technical advancements on these segments are artificial intelligence, machine learning, and data analytics "to better understand user behavior and provide bespoke products and services adjusted to specific needs, well before customer demand becomes evident." The report also mentions that nearly two-thirds of the companies interviewed are planning to jump into some of the available sandbox initiatives to develop a "high-level of innovation, in addition to their willingness to meet the regulator's compliance demands, open to transparency and pressure to generate returns." (Schmoller 8)

The current digital trends that surround the banking system are also a vital component of the Fintech revolution. The growing adoption of mobile banking is leading traditional institutions to start developing open banking APIs. The recent study from the Bank Federation of Brazil (FEBRABAN) reflects that Brazilian banks increased technology-related investments by around 48% in 2019. The study also demonstrates the increase in mobile banking awareness and usability where users are averaging access of twenty-three times per month but potentially leading to forty times per month in heavy-user accounts. Moreover, the study concludes that artificial intelligence focused on the client experience continues to lead in technology investments strategy at 72% of the investments, followed by blockchain, robot-advisors, and internet-of-things. This study shows that traditional banks are incorporating digital services to compete against fintech companies. The research concludes that the conventional banking channels such as branches, ATMs, and contact centers are still pretty relevant in the national environment; but acknowledges that financial operations on ATMs are shifting to new mobile platforms. ("*Pesquisa FEBRABAN de Tecnologia Bancária 2020*" 3)

The socio-cultural aspects of how those future opportunities will impact the unbanked in Brazil are also quite important. The Locomotiva survey discovered that most of the unbanked individuals are women (59%), people of color (69%), lower-income individuals (86%), and Northwest citizens (39%). The Global Findex report also confirmed these finding; indicating that a digital revolution and democratization of financial products comes from Internet and technology access and the cooperation of governments and corporations to promote those digital products and electronic payment systems. ("*Um em cada três brasileiros não tem conta em banco, mostra pesquisa Locomotiva*")

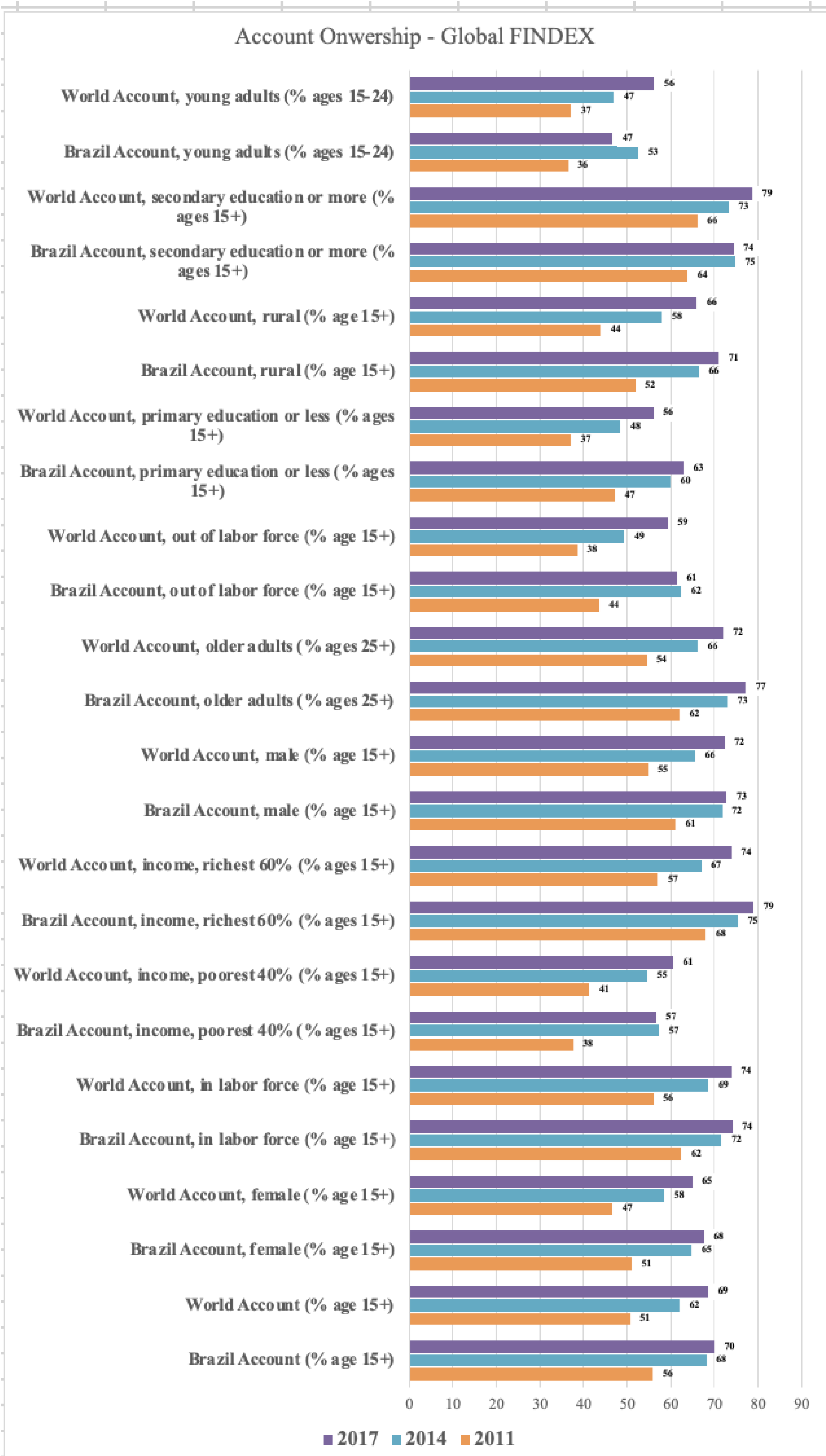
Certainly, financial technologies are changing the global outlook on financial systems and how individuals deal with them. Adopting new alternatives creates safer, more transparent, and accessible financial products with less bureaucracies and more competition. Brazil's current development of its open banking system and implementation of PIX (electronic payment system) sets an encouraging environment for the future of the banking system and financial inclusion development. One can assume that consumers will benefit that consumers will be victorious from his digital revolution; but due to the highly competitive environment, it is unclear which fintech companies and traditional market players will succeed in this transformation.

Still, I this author argues that account owner is still the primary starting point for providing a better financial system to everyone after analyzing the Global Findex Report. Similarly, digital services' availability should start from the government and private institutions that hold the power of making those significant shifts pushed by market challengers. Essentially, the BCB is working to provide the most flexible and open environment for the future of banking services. There is a growing sentiment of good opportunities in the financial technologies market. There is no doubt that the new disruptive setting creates a favorable environment for this unique ecosystem that promises to encompass the traditional and the modern. Traditional banks are becoming more digital than ever before. Fintech startups are essential players in the industry and legally recognized by those supervisory entities that promote the market's financial stability.

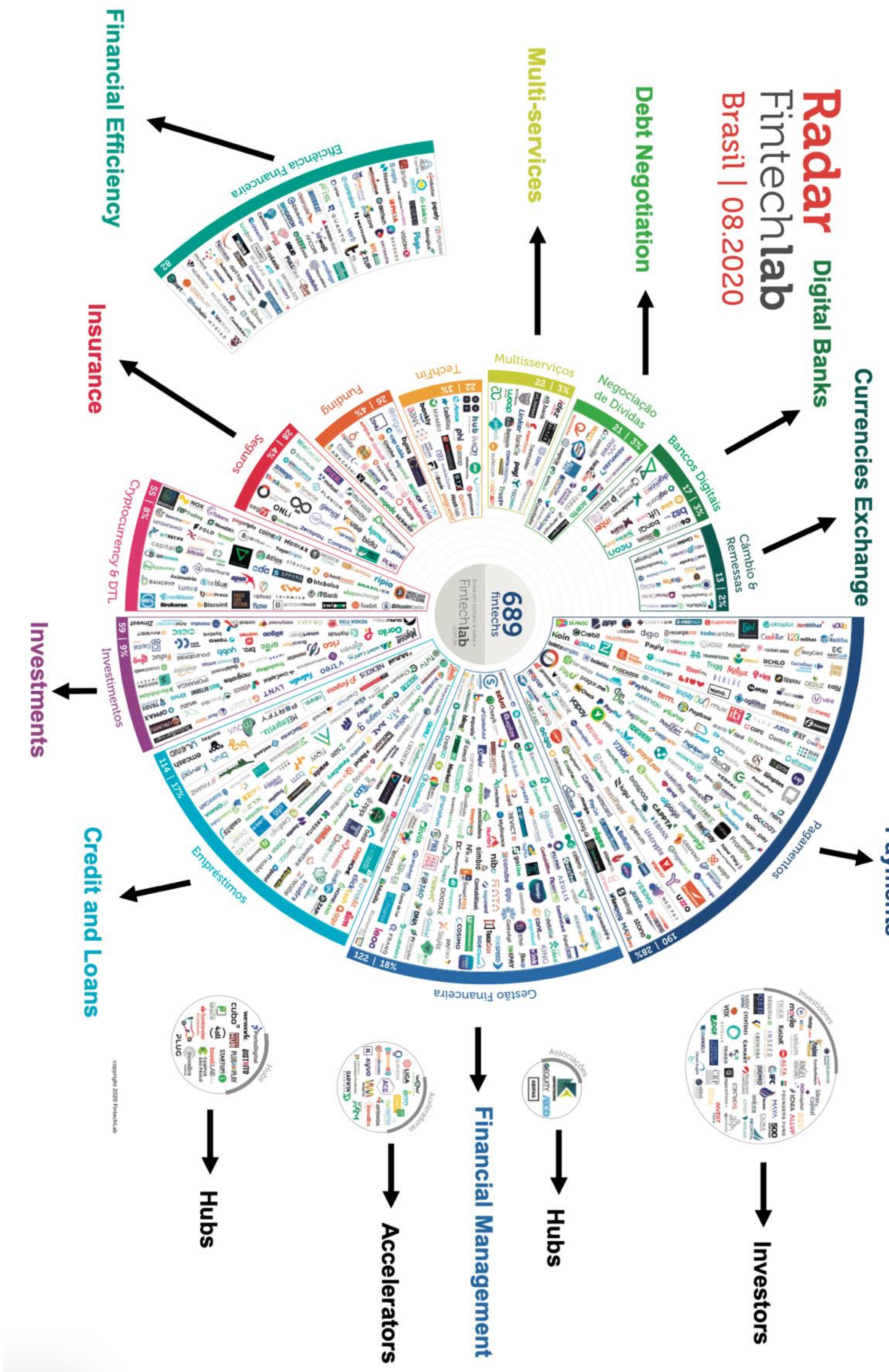
Appendix

Appendix 1.1 – SFN Composition

Appendix 1.2 – Account Ownership (Global FINDEX)



Appendix 1.4 – Radar Fintechlab



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