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Viewpoint

Digital Banks in Brazil: Struggling to Reach the Breakeven Point or a New Evolution Wave?

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Abstract: Digital banks have profoundly changed the financial industry's operations. In this scenario, the study of digital banks has gained increasing attention in the academic community. However, there is still a lot of room to understand how this type of organization functions and impacts different contexts. Considering the information collected, partial findings, and the professional experience of those involved in a larger research project, the main objective of this study is to present the Brazilian scenario related to digital banks from the analytical perspective of the research group. The methodological approach included analysis of partial results of a larger research project, bibliographic research, analysis of public data about digital banks in Brazil, and multidisciplinary discursive approach to conduct debates with the support of academic literature and experience from top managers working in major Brazilian financial institutions. Data on key performance indicators (KPIs), including cost breakdown, net revenue, return on equity (ROE), and cost-to-income ratio, are presented and analyzed for both traditional and digital banks. Furthermore, this study puts forward potential avenues for future research within three main research domains: digital operational efficiency for banks, customer attraction strategies employed by digital banks, and the utilization of digital financial services in the retail industry.

Keywords: digital banking; digitalization; digital service; virtual bank; online bank; brazil; fintech; financial service; digital transformation

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1. Introduction

Digital banks, also known as online or virtual banks, are financial institutions that offer banking services exclusively through digital channels, such as mobile apps and websites, without physical branches [1,2]. The rise of digital banks is driven by the growing adoption of digital technologies and the increasing demand for more convenient, efficient, and accessible banking services [3–5].

From a customer's perspective [6–8], digital banks offer several advantages such as the following:

- Convenience: customers can access banking services anytime and anywhere through their smartphones or computers without having to visit a physical bank branch;
- Lower fees: digital banks often have lower overhead costs compared to traditional banks, allowing them to offer lower fees and better rates on deposits and loans;
- Enhanced security: digital banks often use advanced security measures to protect customer data and prevent fraud, such as two-factor authentication and biometric authentication;
- Personalized services: digital banks can use customer data and artificial intelligence to provide personalized financial advice and tailored banking services.

From a business perspective [9,10], digital banks can offer several advantages such as the following:

- Lower costs: digital banks can operate with lower overhead costs than traditional banks, allowing them to offer competitive pricing on products and services;
- Agile operations: digital banks can quickly adapt to changes in the market and customer needs by leveraging technology and data analytics;
- Scalability: digital banks can expand their customer base quickly and efficiently by leveraging digital channels;
- Enhanced customer experience: digital banks can offer a seamless and personalized customer experience by leveraging technology and data analytics.

Overall, digital banks are disrupting the traditional banking industry by offering more convenient, efficient, and accessible banking services to customers. However, they still face challenges such as regulatory compliance, customer trust, product portfolio completeness, and cybersecurity risks [11,12].

Despite the highly appealing business model, the journey towards maturity remains a significant challenge. To date, many digital banks have struggled to achieve breakeven on their investments. Numerous digital banks in the United States and Japan have faced bankruptcy, while others continue to operate at a loss [13]. This scenario has garnered growing attention in the academic community, as evidenced by the evolution of academic publications (Figure 1).

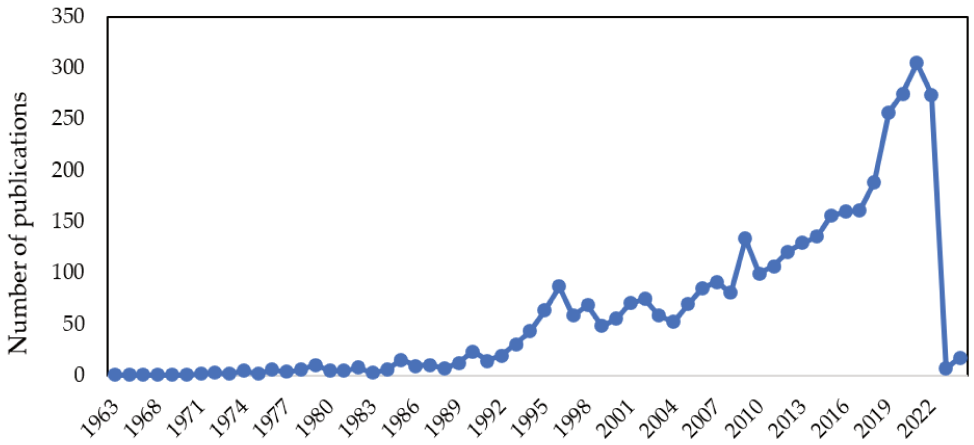

Figure 1. Publications related to digital efficiency in banks from 1963 to 2023.

Over the past five years (2018 to 2022), more than 1000 documents using the keywords "Bank", "Fintech", "Digital", "Efficiency", and "Performance" were published considering the Scopus and Web of Science. Despite this sharp growth, there is still a lot of room to understand the functioning and impact of this type of organization in different contexts. Among these, Brazil, a country with more than 214 million inhabitants, the 5th largest in terms of territory, and a country with a GDP of 1.6 trillion USD, has been minorly studied in relation to digital banks. In fact, a search in the Scopus database using the keywords "digital bank*" and "brazil*" results in only three documents, and these focus on very specific aspects such as digital credit [14], functional, psychological and emotional barriers to the use of digital banking services [15], and financial crimes in the context of digitalization [16].

The lack of studies on digital banks in developing countries like Brazil is a concerning gap that needs to be addressed. Conducting comprehensive research in these regions is important due to the potential of digital banks to drive economic and financial development [17], overcome barriers to financial access, and promote financial inclusion [18]. Without adequate studies, there is a risk of outdated policies and regulations [19]. Additionally, it is important to measure and compare the efficiency of digital banks against traditional banks to identify best practices and foster the adoption of more efficient models in the financial sector [20–22], ultimately enhancing economic development and improving people's quality of life [23].

These factors led to the development of this study, generated from a larger research project that involves both academics (researchers and university professors) and top management professionals from fintechs and financial institutions in Brazil. Considering the information collected, partial findings, and the professional experience of those involved in this larger project, the main objective of this study is to present the Brazilian scenario related to digital banks from the analytical perspective of the research group. Particularly, we aim to provide a broad portrait of digital banks in Brazil and instigate researchers interested in the subject to carry out future work in this rich context for research.

The methodological approach was based on other studies in the viewpoint style produced by the research group, including analysis of partial results of the mentioned larger research project, bibliographic research [24], analysis of public data about digital banks in Brazil, and multidisciplinary discursive approach to conduct debate among members of the research group [25,26]. In the following sections, we present the methodological procedures used to conduct this research and an overview of research involving digital banks, highlighting the lack of studies in Brazil. Then, we present key information and critical reflections about these organizations in this country.

2. Methodological Approach

This research was conducted in five steps, as depicted in Figure 2:

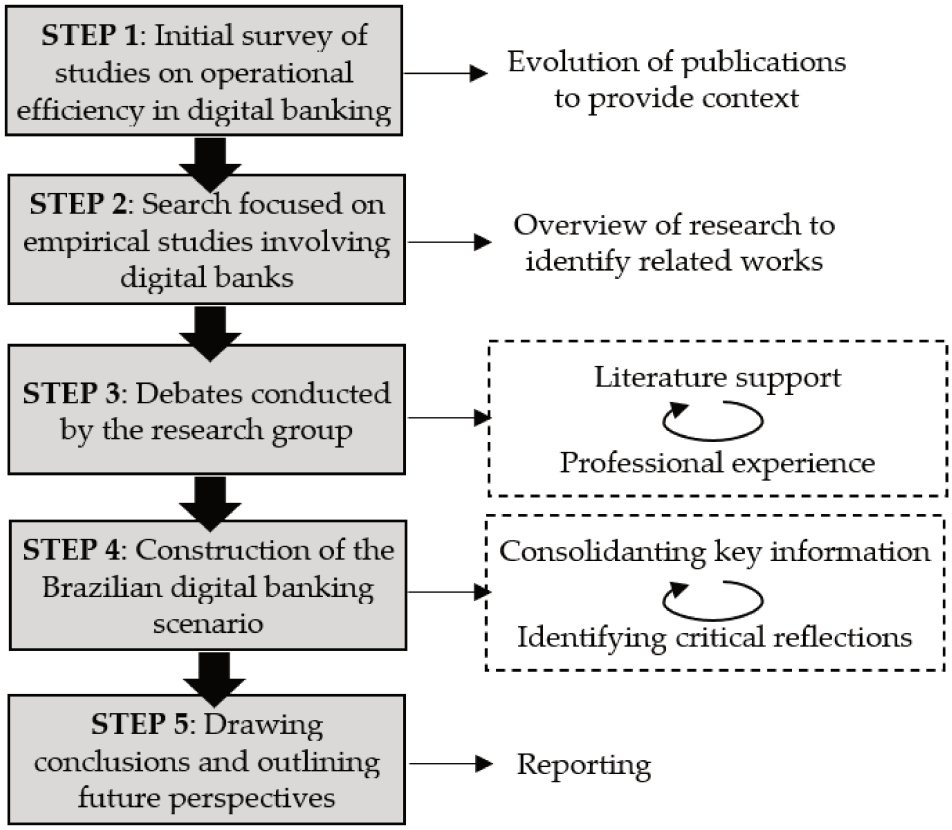

Figure 2. Methodological steps conducted in this research. Source: Developed by the authors based on Anholon et al. [24], Cazeri et al. [25], and Sigahi et al. [26].

Step 1 involved conducting a comprehensive survey of studies that explored topics related to operational efficiency in the context of bank digitization. As previously mentioned, this study is part of a larger project, and one of its outcomes is a systematic literature review on the subject, with the results derived from Step 1 intended for publication in an international journal.

In Step 2, a search was performed in the Scopus database to provide an overview of studies focusing on digital banking. The PRISMA protocol [27] was employed for document

analysis and selection, with inclusion criteria requiring the presentation of empirical results on the topic. Step 2 played a crucial role in confirming the lack of studies addressing digital efficiency in digital banks.

Step 3 marked the initiation of an iterative process wherein the research group organized debates supported by relevant literature and the professional experience of those involved in the project. It is noteworthy to mention the valuable contributions and insights provided by professionals holding top management positions in major financial institutions in Brazil.

In Step 4, the research group conducted another iterative process aimed at connecting the key information gathered in the previous steps and generating highly relevant topics for reflecting on the Brazilian digital banking landscape.

Finally, in Step 5, the main conclusions were drawn, and potential future research directions were established to advance the understanding of the subject matter both theoretically and practically.

3. Overview of Research on Digital Banks

Aiming to provide a comprehensive overview of studies focusing on digital banking, the following search string was used in the Scopus database: TITLE ("digital bank*") AND (LIMIT-TO (DOCTYPE, "article") OR LIMIT-TO (DOCTYPE, "review")) AND (LIMIT-TO (LANGUAGE, "English")). No temporal restrictions were imposed. Table 1 displays the criteria and filters used to select the studies.

Table 1. Selection process and filters to define the sample of studies on digital banks.

Selection Process	Action	Documents
Initial search	Search for documents with "digital bank*" in the title	171
Filter 1	Applying databases filter (document type): only articles and reviews	95
Filter 2	Applying databases filter (language): only English	95
Filter 3	Reading title, abstracts, and keywords to assess suitability for the study's scope	88
Filter 4	Reading methods and results section to search for empirical evidence	66
Final sample	Reading full text to map the research topic, sampla, and context	46

Source: Authors.

The search and selection process was conducted in May 2023 and resulted in 46 studies that presented empirical evidence, as summarized in Table 2. It is important to emphasize that our intention was not to conduct a comprehensive and in-depth literature review, but rather to present an overview, highlight key aspects discussed in the literature, and establish the broad context in which this study takes place.

Table 2. Summary of research on digital banks.

Research Topic	Sample/Data	Context	Reference
Impact of financial inclusion and fintechs on income inequality	Data from 39 African countries	Africa	[28]
Gender perspective of cybersecurity in the digital banking sector	50 participants from cybersecurity, engineering, and top management in banks	Bahrain	[12]
Resistance to the use of digital banking services	202 customers	Brazil	[15]
Impact of fintechs on banks' profitability	Industrial and Commercial Bank of China (the most representative bank in China, according to the authors)	China	[10]
Exclusion of people with visual disabilities from digital banking services	Not informed	Egypt	[29]

Table 2. *Cont.*

Research Topic	Sample/Data	Context	Reference
Influence of economic policy uncertainty, institutional quality, and corruption level on the growth of digital financial services	N/A	General	[19]
Impact of quality digital banking services delivered during the COVID-19 pandemic on customers' satisfaction and retention intentions	395 responses	Ghana	[30]
Central bank digital currency	CBDC design documents	Ghana and Nigeria	[31]
Impact of digital banking usage on women's economic empowerment	286 women	India	[32]
Impact of digital bank transactions on the performance of banks	32 public and private banks	India	[22]
Impact of customer's training of digital banking services on its acceptability by customers	402 training schedules	India	[33]
Intensity of the risk factors that influence customer satisfaction for digitalized banking services and products	222 customers	India	[34]
Financial inclusion in the digital banking age	3159 participants from rural villages	India	[17]
Impact of digital banking on the growth of micro, small, and medium enterprises	454 companies	India	[9]
Payment system indicators of digital banking ecosystem	N/A	India	[35]
Gamification implementation for digital banks	158 users	Indonesia	[36]
Factors influencing customer satisfaction in digital banks	408 respondents	Indonesia	[7]
Personal data protection in the context of digital banks	N/A	Indonesia	[11]
Predictors of usage attitudes related to digital bank channel distribution	616 university students	Indonesia	[37]
Sentiment analysis on customer satisfaction of digital banking	34,605 tweets related to three digital banks	Indonesia	[38]
Relationship between digital banking and intention to produce sustainability report	155 observations	Indonesia	[39]
Factors influencing customers to use digital banking application	300 respondents	Indonesia	[40]
Intensity of sales through digital banking	78 banks	Indonesia	[41]
Technology readiness and technology acceptance in digital banking	422 respondents from the millenial generation	Indonesia/ Malaysia	[21]
Banks' digitalization, blockchain, and crypto assets	100 articles	Islamic banks	[42]
Customer emotional experience generated during digital banking service delivery	502 participants	Israel	[43]
Customer experience of digital banking	247 digital bank users	Korea	[44]
Effect of perceived usefulness, banking system reliability, and COVID-19 pandemic on the digital banking effectiveness	228 clients	Malaysia	[45]
Sustainable human resource management change in the context of digital banking	4 business leaders, 7 human resources professionals, and 3 high potential talents	Malaysia	[46]
Integrating Total Quality Management practices and knowledge management in digital banks	100 employees the executive management team level	Malaysia	[20]
Financial inclusion through digital banking	12,446 households	Mexico	[18]
Legal issues concerning digital banking	306 respondents	Nigeria	[47]
Factors influencing the adoption of digital banking by retail banking customers	200 customers	Omani	[48]
Factors that drive non-users of digital banking services	208 customers	Pakistan	[49]
Impact of privacy, ease of use, and trust in digital banking	320 participants	Portugal and Spain	[50]
Customer loyalty in digital banking	10 bank managers	Sweden	[51]
Impact of digital banking on greenhouse gas emissions	36 banks	Turkey	[52]

Table 2. *Cont.*

Research Topic	Sample/Data	Context	Reference
Impacts of COVID-19 on the progression of digitalization of banks	4 vice presidents and 3 digital bank managers	Turkey	[53]
Improvement in the relations with clients in the banking sector	50 respondents from Ukraine and 50 respondents from Poland	Ukraine and Poland	[54]
Digital banks' adoption of a regulatory sandbox to foster innovation in financial sectors	24 challenger banks	United Kingdom	[55]
Effect of digital banking-related customer experience on banks' financial performance during COVID-19	456 customers of 20 Vietnamese commercial banks	Vietnam	[56]
Determinants of consumers' behavioral intention to adopt or use digital banking	241 participants	Vietnam	[57]
Factors affecting the intention to use digital banking	201 customers	Vietnam	[58]
Information safety and factors affecting the intention to use digital banking	329 customers	Vietnam	[59]
Effect of digital banking on financial performance of commercial banks	Not informed	Zimbabwe	[60]

Source: Authors.

This mapping of the literature indicates that research on digital banks is highly concentrated in Asia, with 25 of the 46 studies identified. In particular, two countries alone, India and Indonesia, account for approximately 34% of the total sample. The lack of studies on digital banks is a concerning gap that needs to be addressed, especially in developing countries like Brazil [15].

There are several reasons why conducting comprehensive studies on this topic in these regions is crucial. Firstly, digital banks have the potential to play a fundamental role in the economic and financial development of developing countries [17]. They can overcome physical and geographical barriers, allowing for access to financial services in remote and underserved areas. This can drive financial inclusion, reduce poverty, and promote economic growth [18]. Furthermore, the lack of studies can result in inadequate or outdated policies and regulations [19].

Another important aspect is the need to measure and compare the efficiency of digital banks compared to traditional banks [22]. This comparative analysis can help identify best practices and promote the adoption of more efficient models across the financial sector [20,21]. This is especially relevant in developing countries, where access to efficient financial services can drive economic development and improve people's quality of life.

Although it is not the focus of the study, it is interesting to observe emerging themes gaining traction, such as financial inclusion [17,18,28,61]; sustainability aspects, such as greenhouse emissions [52], sustainability reporting [39], and sustainable human resource management [46]; cybersecurity [11,12,50]; and how COVID-19 impacted digital banking services [30,45,53].

Given this broad and diverse scenario, this paper seeks to position Brazil in the debate about digital banks and operational efficiency.

4. Portrait and Reflections on Digital Banks in the Brazilian Scenario

In Brazil, the digitalization process of banks begins in the 2010s, with Banco Original, Neon, and Inter focusing on the customer experience (App) while being supported internally by traditional or manual processes, a service model known as traditional inside-digital outside. This was a common approach at the time to accelerate the bank's launch in order to capture new customers with a digital proposal for the main daily needs, utilizing new technologies that are easier and faster to implement (App, Website, etc.). To run the business, core banking systems are more complex, and full integration between them and the customer journeys necessitates more effort, investments, and time. As a result, while the operation grows and system enhancements are implemented, such banks use a Software as a Service (SaaS) approach focused on core banking systems in conjunction with traditional

labor to run other processes, as traditional banks do. This leads to a partially digitalized operation and a business process that incurs high costs. For example, C6 has 67% of its costs attributed to operational expenses [62]. Figure 3 shows a comparison between traditional (Itaú, Bradesco, Banco do Brasil, and Santander) and digital banks' (BV, Nubank, and C6) operational cost breakdown.

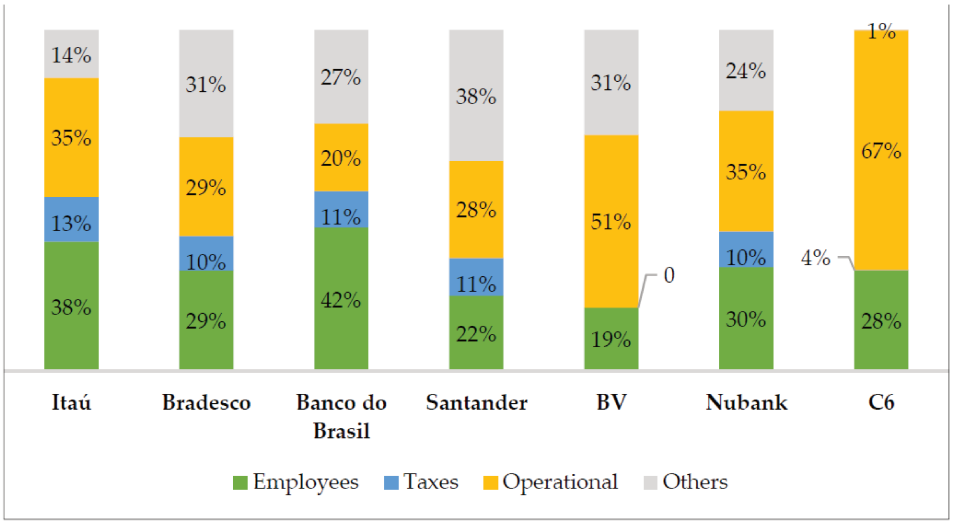

Figure 3. Cost breakdown on traditional and digital banks. Source: Developed by the authors based on the most recent official reports published by Itaú [63], Bradesco [64], Banco do Brasil [65], Santander [66], BV [67], Nubank [68], and C6 [62].

Typically, the banks in question provided digital accounts, credit cards, and a few credit products to meet the most common customer needs on a daily basis, but did not provide long-term products, such as mortgages. As a secondary business operation, those products were capable of capturing younger customers who were used to dealing with new technologies, as well as a larger number of clients who were interested in a better banking user experience and lower costs. As the digital banking competition matures and grows, some of them expanded their product portfolio. For example, Banco Original now offers, in addition to digital accounts, credit cards, and loans, other services such as basic digital products, investments, insurance, cashback programs, and corporate services. Inter has added FX transactions, a global digital account, and a loyalty program; C6, in addition to the previously mentioned features, offers partnership programs with telecom companies and odontological plans. Others, such as Nubank, continue to focus on credit cards and digital accounts.

As a result, the current state of the business model for digital banks falls short of achieving breakeven, particularly when considering financial key performance indicators (KPI) such as net profit and return on equity (ROE). A comparison between traditional banks (Itaú, Bradesco, and Banco do Brasil) and digital banks (BV, Nubank, and C6) reveals the disparities in net revenue (Figure 4) and ROE (Figure 5). The compiled information presents the results in billions of the Brazilian currency (reais or R$).

Larger new business models are also supported by digital banks. Some companies have identified the benefits of incorporating a banking unit into their structure in order to increase business profitability and leverage their current customer base. In Brazil, C6 and Tim formed a partnership with the basic strategy of offering financial products to Tim's clients in order to expand C6's customer base by offering rewards to them and vice versa. This collaboration was made possible by the lower entry barriers to establishing a digital bank. The retail industry is rapidly developing its own banking structure, such as Casas Bahia, which has assembled a proprietary bank (banQi, which is a digital bank) to assist their clients with payments and credit needs, as well as a loyalty program (cashback); Americanas with Ame (super App with digital wallet), etc.

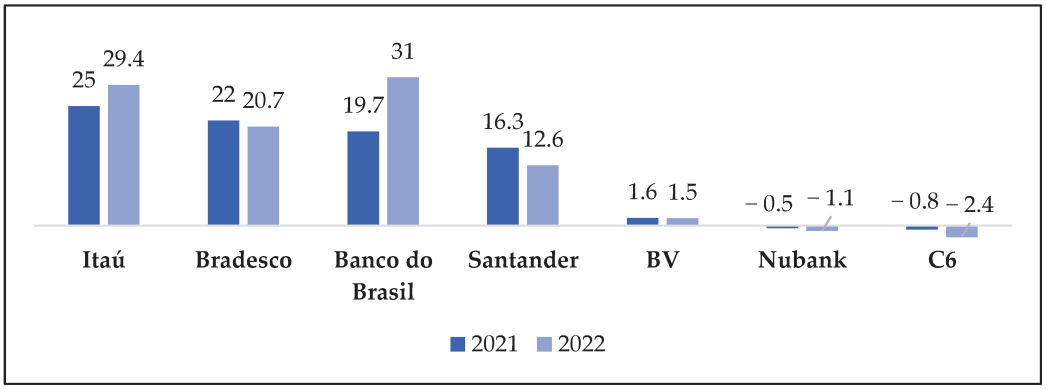

Figure 4. Net revenue (billions of R$) for traditional and digital banks. Source: Developed by the authors based on the most recent official reports published by Itaú [63], Bradesco [64], Banco do Brasil [65], Santander [66], BV [67], Nubank [68], and C6 [62].

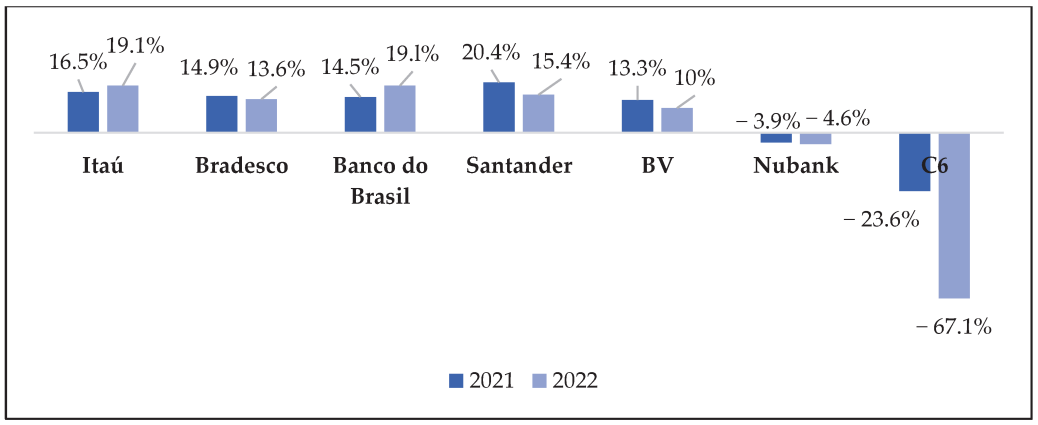

Figure 5. ROE (billions of R$) for traditional and digital banks. Source: Developed by the authors based on the most recent official reports published by Itaú [63], Bradesco [64], Banco do Brasil [65], Santander [66], BV [67], Nubank [68], and C6 [62].

Aside from financial services and retail, other industries have seen significant digital transformations, such as mobility with Uber, food delivery with iFood, and so on. As an outcome, customer behavior shifted from traditional/physical to digital and/or phygital [69,70]. This implies that customers have become accustomed to handling basic daily needs in entirely new ways, forcing traditional business models to reshape themselves.

In this scenario, traditional banks started reflections to determine the impact of those new competitors on the current business model and how they might respond to it. Many of these large banks embark on a digital transformation, aided by FinTechs, in order to improve and/or complete their customer experience, product, and service portfolio. Another strategy was to launch a new digital business. For example, Bradesco launched Next (digital account, credit card, investments, insurance, loyalty programs, etc.), and Ita launched iti (digital account and credit card), both aimed at younger customers. Even the wealth management industry has undergone a digitalization process, owing to XP Investments' value proposition: an easy and fast digital way to invest and track the results of your investments. In this specific sector, BTG Pactual has developed a digital strategy to compete, and Itaú has created a new business unit called Ion.

However, with all of this digital capacity to launch new businesses quickly and scale operations, frauds and operational risks became more sophisticated, necessitating an upgrade on the information technology, risks, and compliance teams. Some of those digital banks experienced a data leak in the recent past, exposing a major concern with client data. Especially since the risk of leakage could be in one of their providers, such as the cloud or a

call center. As a result, the providers were forced to improve their security features in order to be considered a valuable partner by those banks.

Like any other business, digital banks must evaluate their performance to determine their success and areas for improvement. In addition to the previous KPIs analyzed (i.e., costs breakdown, net revenue, and ROE), digital banks commonly use the following KPIs to evaluate their performance:

i Customer Acquisition Cost (CAC): Measures how much it costs the digital bank to acquire a new customer. A low CAC indicates that the digital bank is effective at attracting new customers.
ii Customer Retention Rate: Measures the proportion of customers who continue to use the digital bank's services over time. A high retention rate indicates that customers are satisfied with the services provided by the digital bank.
iii Net Promoter Score (NPS): Measures a customer's likelihood of recommending the digital bank's services to others. A high NPS indicates that customers are satisfied with the services provided by the digital bank and are likely to recommend it to others.
iv Average Revenue Per User (ARPU): Measures the average revenue generated by each customer over time. A high ARPU indicates that the digital bank is generating a substantial amount of revenue per customer.
v Cost-to-Income Ratio: Measures the cost efficiency of the digital bank by comparing the operating costs to the revenue generated. A low cost-to-income ratio indicates that the digital bank is effective at generating revenue while incurring few operating expenses.
vi Digital Engagement Metrics: Measures customers' engagement with the digital bank's digital channels, such as the mobile app or website. These metrics may involve logins, transactions, and time spent on digital channels.

Currently, the majority of pure digital banks in Brazil are struggling to reach the investment breakeven point. For example, C6, one of the most well-known digital banks, has yet to breakeven (see Figure 3). One possible explanation is that the profit generated by the customer base is out of balance with the operational costs (possibly because the optimal customer base has not yet been reached and/or the operations are still in the process of development and improvement). Figure 6 illustrates a comparison between traditional banks and digital banks (BV, Nubank, and C6), revealing higher values of this specific KPI for Nubank and C6. This indicates that these operations have achieved a level of efficiency comparable to, if not surpassing, their competitors, at least up until the present moment. For the latter, banks can take more action, such as automating operational processes, reducing labor force, and so on.

In summary, digital banks have become a reality in Brazil, bringing significant enhancements to customer products and services and challenging the traditional banks' existing modus operandi. However, the digital business model needs to be refined and accelerated to achieve profitability. Currently, many digital banks have not yet attained profitability, which could be attributed to factors such as a limited product portfolio, customer trust, and/or operational efficiency.

In addition, new business models for financial services and other industries are being developed. It could also be deduced that those banks could supplement and/or replace a portion of the traditional bank's offerings, but not, until now, the entire portfolio. Analytically, researchers and organizations should consider that digital banks will undergo a new evolution wave, possibly driven by the non-financial services industry, leveraging customer appeal to have relationships with companies that they can feel the benefits and/or the product, such as telecom (e.g., Tim plus C6, Vivo Money, Claro plus Inbursa) or retail (e.g., Casas Bahia plus banQi, Americanas plus Ame).

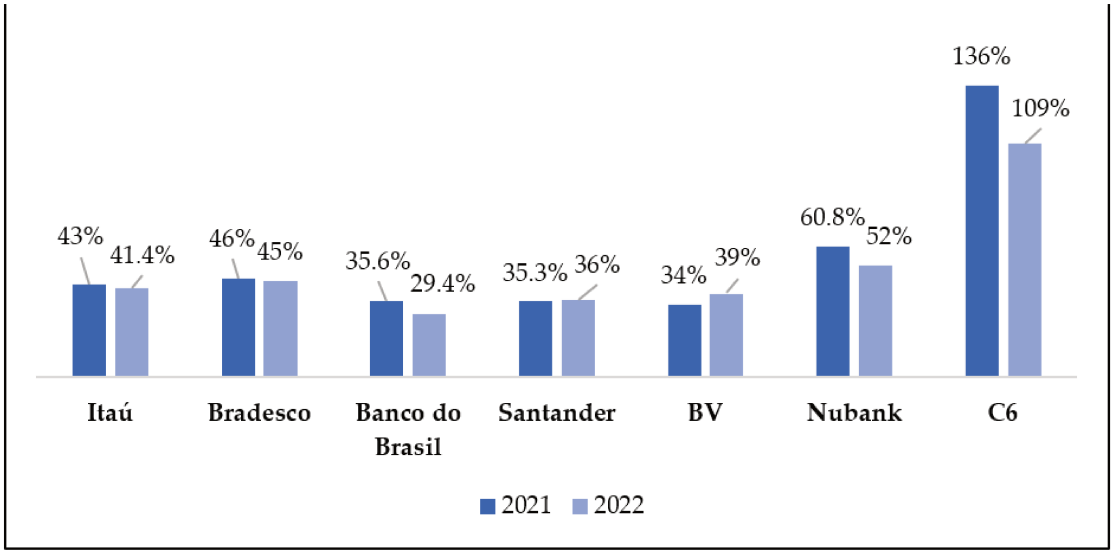

Figure 6. Cost to income for traditional and digital banks. Source: Developed by the authors based on the most recent official reports published by Itaú [63], Bradesco [64], Banco do Brasil [65], Santander [66], BV [67], Nubank [68], and C6 [62].

5. Conclusions and Future Perspectives

The emergence of digital banks has brought about significant transformations in the financial industry, leading to a growing interest in studying these institutions within the academic community. However, there remains ample room for further exploration to fully comprehend the functioning and impact of digital banks across different contexts. This study aimed to shed light on the Brazilian scenario concerning digital banks, employing an analytical perspective based the information collected, partial findings, and the professional experience of those involved in a larger research project.

The analysis of key performance indicators (KPIs), such as cost breakdown, net revenue, return on equity (ROE), and cost-to-income ratio, is of utmost importance in understanding and evaluating the financial performance of banks, both traditional and digital. These KPIs provide valuable insights into the efficiency, profitability, and overall health of banks' operations.

The presented data on KPIs offer a basis for comparative analysis between traditional and digital banks, allowing for a comprehensive assessment of their performance. By examining these metrics, researchers can identify areas of strength and weakness in the operations of different types of banks. This analysis can help in understanding the factors contributing to the success or challenges faced by traditional and digital banks in various market conditions.

The findings from the analysis of KPIs can serve as a valuable resource for future research in several ways. Firstly, researchers can expand upon the existing analysis by incorporating additional variables or considering different time periods to track the performance trends of banks. This can provide a deeper understanding of the dynamics and factors influencing the financial performance of traditional and digital banks. Secondly, the KPIs can be utilized as benchmarks for evaluating the performance of individual banks within the industry. Professionals in the banking sector can use these benchmarks to assess their own bank's performance against industry standards and identify areas for improvement. This can aid in strategic decision making and resource allocation to enhance operational efficiency and profitability. Furthermore, the analysis of KPIs can contribute to the development of best practices and performance metrics specific to digital banks. As the digital banking sector continues to evolve, identifying the key drivers of success and profitability will be crucial for the sustainable growth of these institutions. Professionals

in the digital banking industry can utilize the findings to optimize their operations, refine business strategies, and meet the evolving needs of their customers.

Based on the analyses and discussions presented in this study, three potential avenues for future research are suggested:

- Digital operational efficiency for banks: investigate how operational efficiency can be effectively measured, taking into account the actual impact of digital transformation initiatives and investments on banking operations;
- Digital banks' attraction to customers: analyze the primary factors that influence customers' adoption of digital banks and their continued engagement with these institutions;
- Leveraging digital financial services in the retail industry: evaluate the benefits and challenges associated with implementing the new digital business model that integrates financial services with the retail industry.

By exploring these areas, future research can contribute to a deeper understanding of digital banking operations, customer preferences, and the potential synergies between financial services and the retail sector. This knowledge can inform the development of strategies and best practices that drive operational efficiency, customer satisfaction, and overall success in the evolving digital banking landscape.

In conclusion, the analysis of KPIs provides valuable insights into the performance of traditional and digital banks. It offers a foundation for future research, enabling researchers to delve deeper into the factors influencing bank performance and identify opportunities for improvement. Moreover, professionals in the banking industry can leverage these insights to benchmark their own performance and drive strategic decision making. Ultimately, the analysis of KPIs is instrumental in enhancing the overall understanding and effectiveness of both research and practice in the banking sector.

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