IMPULSIONANDO A INOVAÇÃO NA INDÚSTRIA FINANCEIRA: EXAMINANDO ESTRATÉGIAS DE DIFERENCIAÇÃO DE PRODUTOS BASEADAS EM BLOCKCHAIN

DRIVING INNOVATION IN FINANCIAL INDUSTRY: EXAMINING BLOCKCHAIN-BASED PRODUCT DIFFERENTIATION STRATEGIES

ÁREA TEMÁTICA: ESTRATÉGIA EM ORGANIZAÇÕES

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Resumo

O presente estudo tem como objetivo abordar as diferentes estratégias que as instituições financeiras brasileiras estão adotando para inovar seus produtos por meio da tecnologia blockchain. Serão discutidos os desafios enfrentados por essas instituições na adoção do blockchain em seus produtos financeiros, bem como os benefícios que a tecnologia pode proporcionar. Além disso, por meio de métodos mistos, serão analisados casos de sucesso de instituições financeiras brasileiras que já adotaram estratégias de diferenciação de produtos utilizando o blockchain, a fim de compreender melhor como essa tecnologia pode ser aplicada para aprimorar a experiência do cliente e aumentar a performance no setor financeiro, fortalecendo suas capacidades dinâmicas.

Palavras-chave: Estratégia; Capacidades Dinâmicas; Blockchain; Inovação; Instituições Financeiras.

Abstract

The present study aims to address the different strategies that Brazilian financial institutions are adopting to innovate their products through blockchain technology. The challenges faced by these institutions in adopting blockchain in their financial products will be discussed, as well as the benefits that the technology can provide. Furthermore, through mixed methods, successful case studies of Brazilian financial institutions that have already adopted product differentiation strategies using blockchain will be analyzed to better understand how this technology can be applied to enhance the customer experience and improve performance in the financial sector, strengthening their dynamic capabilities.

Keywords: *Strategy; Dynamic Capabilities; Blockchain; Innovation; Financial Institutions.*

1. INTRODUCTION

Brazil is rapidly emerging as a prominent player in the global innovation landscape through technological advancements, creating opportunities for domestic financial institutions to keep pace with ongoing advancements. This is evident in various aspects, including the pilot program for the "Real Digital" initiated by the Central Bank of Brazil in early 2023. This initiative aligns Brazil with over 114 central banks worldwide that are exploring the issuance of digital currencies on blockchain technology, also known as CBDCs. These central banks represent approximately 95% of global GDP, with 20 of them already in the planning stages of their own currency pilots, Brazil included. Additionally, the recent approval of Law Nº14.478/2022, known as the Virtual Assets Law, further solidifies Brazil's regulatory framework for the market of blockchain based products, fostering a conducive environment for innovation in the financial industry and promoting trust among stakeholders. Moreover, the digital market in Brazil is growing because the country have a majority of digitalized population: with over 75% of the Brazilian population having internet access (according to the Brazilian Institute of Geography and Statistics, IBGE, in 2019), the country exhibits significant digital connectivity. On the other hand, Brazilian fintech companies - as exemplified by Nubank - have become global benchmarks for disrupting the financial market. This combination of a tech-savvy population and a dynamic fintech landscape positions Brazil as an ideal setting for exploring innovative financial solutions. This will provide end customers with enhanced convenience, efficiency in transactions, and simplified access to banking services and digital platforms.

However, the application of blockchain in financial institutions may face challenges in terms of measuring the resources and capabilities necessary for the success of the technological transformation and requiring significant business changes (Teece, 1997). As a result, financial institutions - including banking institutions, credit unions and non-banking institutions - are allocating resources towards blockchain solutions, despite its inherent hazards and possible advantages (Hassani, Huang, & Silva, 2018; Higginson, Hilal, & Yoguc, 2019). The use of blockchain in financial services is expected to grow in the coming years as more companies realize its potential to transform the industry (Guo and Liang, 2016).

Deepen the perspective of dynamic capabilities, blockchain can be seen as a strategic resource for institutions that seek to obtain sustainable competitive advantage (Nandi et al., 2020; Madhani, 2021). This leads us to reflect on the key question: **How are financial institutions adopting product differentiation strategies with the implementation of blockchain?**

Possible contributions of the study include the development of a theoretical-practical framework that helps identify critical factors that influence the success of technology adoption, and the construction of a deeper understanding of the adoption of disruptive technologies by financial institutions according to Brazilian particularities. However, there are also potential risks associated with conducting this study, such as the possibility of limited access to sensitive data or encountering challenges in data analysis due to the complexity of the subject matter. Additionally, there is a risk of overgeneralizing findings or failing to consider unique contextual factors that may affect the adoption of blockchain technology in the Brazilian financial sector.

2. THEORETICAL FOUNDATIONS

2.1. DIGITAL TRANSFORMATION IN FINANCIAL INSTITUTIONS

This section will firstly provide an overview of the digital transformation in the financial market over the decades. Next, we discuss the evolution of digitalization in financial institutions in Brazil focusing on blockchain technology. Then, we provide an overview of the dynamic capabilities theory which we used as a lens to investigate our research question.

2.1.1. From Physical to Digital: The Evolution of Money from the Perspective of the Central Bank of Brazil

In recent years, the rise of fintech and the increasing importance of digital transactions has led to the evolution of payment systems. One such system is PIX, a Brazilian instant payment system that allows for almost immediate transfer of funds between individuals and businesses (Duarte et al., 2022). As new technologies continue to emerge, the future of money is being discussed more than ever. Cryptocurrencies such as Bitcoin and Ethereum have gained significant attention and are being used by more and more people around the world. The use of blockchain technology in finance is also becoming more widespread, offering secure and transparent transactions.

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In the context of businesses, money remains a crucial aspect to consider in the company's strategy, such as in financial planning, resource allocation, and tracking key performance indicators (KPIs), maintaining their sustainable development. With the evolution of money and payment systems, companies must continue to adapt and utilize the latest technologies to stay competitive and efficient (Monrat et al., 2019).

The Open Finance (OPF) is a service proposed by the Central Bank of Brazil at the end of 2019, as part of a modernization initiative of the financial system that includes PIX and Real Digital (Brazilian CBDC), encouraging innovation in the financial sector and allowing new services and products to be offered to users. With OPF, financial institutions can share data, services and information with each other. With this service, the Brazilian financial system can generate greater financial inclusion by allowing more people to have access to financial services, such as creating customized offers in loans, insurance and investments.

The Central Bank of Brazil introduced in 2020 the novel Payment System (SPI), which engendered a new modality of transactions in the country, the “PIX” (Duarte et al., 2022). Among its noteworthy advantages, Central Bank of Brazil highlights the facilitation of transactions for both payers and receivers, the promotion of innovative business models, the reduction of costs, and the contribution to the digitization of payments and, concomitantly, the inclusion of the underbanked population (Central Bank of Brazil, 2021).

A digital transformation of the centuries-old technology of paper currency can be enabled by a universally accessible Central Bank Digital Currency (CBDC). Upon its introduction, the new monetary form aims to coexist and complement physical currency until its voluntary and gradual obsolescence. The CBDC would enable the maintenance of sovereign presence in the payments market, alongside other digital means issued and held by private entities. Public and private issuers are expected to continue coexisting and coordinating, leveraging their own competencies and competitive advantages. The issuing central bank engages with diverse economic agents, ranging from the real and financial sectors to cross-border jurisdictions, whose autonomy and credibility may be positively or negatively impacted by the manner in which it manages and improves liquidity provision through its innovative creation. (Aragão, 2021).

2.1.2. Evolution of Brazil's Banking Institutions

It is well known that the Brazilian banking system is largely dominated by large multinational banks, with little participation from smaller and local banks. This may have implications for

competition and diversification in the Brazilian banking sector compared to other countries. In fact, the top five banks in Brazil hold more than 80% of the banking market, and concentration has been increasing in recent years. This concentration may have negative implications for competition in the banking sector, limiting the diversity of products offered, the efficiency of the banking sector as a whole and, also, increasing banking fees for customers (Staub et al., 2010).

Gomber et al. (2018) highlight that the financial industry is undergoing significant changes due to the growing importance of data and technology, the shift to cloud-based services, and the adoption of disruptive technologies, such as blockchain. With the increasing digitalization of financial services, data and technology have become increasingly important for sector companies: companies are using data analysis to better understand customer behavior and offer more personalized services, as well as automating processes and increasing operational efficiency (Furr et al., 2022).

Thus, blockchain technology has become a promise in various economic sectors, particularly in the financial market, as the technology enables the management of asset transactions in an agile, efficient, and secure way (Higginson, Hilal, & Yoguc, 2019). Using advanced payment technology and cryptographic identification techniques, blockchain has demonstrated its capacity as a new form of private currency to transfer value between network addresses while avoiding the possibility of double spending, allowing the creation of different types of use cases. The blockchain technology is imbued with a number of key features, including cryptographic security (Tapscott, Tapscott and Kirkland, 2016), decentralization (Fengi et al., 2018), and consensus (Bailis et al., 2017), all of which combine to create a highly secure and transparent underlying software system that is almost impervious to tampering (Hawlitschek et al., 2018). In essence, the design of the blockchain is such that no single user or group of users can alter transacted records, providing a truly trustworthy system for all parties involved.

Many initiatives in Brazil rely on partnerships with blockchain startups, which can lead to challenges in process alignment and system interoperability. There is also a need for more specific and clear regulations around technology application to mitigate potential regulatory risks (Rietveld & Schilling, 2021; Stonig et al., 2022).

2.2. Dynamic Capabilities: Concepts from Different Perspectives

This study intends to focus on understanding the phenomenon from the concepts of the dynamic capabilities perspective (Teece, Pisano and Shuen, 1997; Eisenhardt & Martin, 2000; Teece, 2007), derived from the Resource-Based View (Barney, 1991).

Barney (1986, 1991) argues that RBV is an important theory because it emphasizes that competitive advantage cannot be explained solely by external factors such as the economic environment or competition, but also by internal factors of the firm. The internal resources and capabilities of a company, such as its expertise in a particular area, patented technologies or strong brand, can be sources of sustainable competitive advantage.

Barney's (1991) also establishes that companies can achieve competitive advantages through valuable, rare, difficult-to-imitate, and non-substitutable resources. Dynamic capabilities are an extension of this theory, which states that companies must be able to enhance their internal technological, organizational, and managerial processes to achieve and maintain competitive advantages in rapidly changing environments. While some authors claim that dynamic capabilities are difficult to replicate, others argue that competitive advantages do not directly stem from dynamic capabilities, but from the different possible resource configurations that are realized by using these capabilities.

Dynamic capabilities are defined as a company's ability to integrate, build, and reconfigure internal and external competencies in rapidly changing environments. Companies with strong dynamic capabilities are highly entrepreneurial, shaping the environment through innovation and collaboration with diverse actors in the business ecosystem (Teece & Pisano, 1994; Winter, 2003). Operational capabilities, which are routine company activities, are not considered dynamic capabilities. Dynamic capabilities allow organizations to adapt to changes in the external environment and maintain their competitive advantage for a longer time (Eisenhardt and Martin, 2000). These capabilities involve quickly learning and adapting to changes in the operating environment, especially in the context of digital transformation. Companies with dynamic capabilities can adapt to new technologies such as blockchain and changes in consumer behavior, creating new business opportunities and maintaining a competitive edge in the market.

According to Winter (2003), dynamic capabilities are classified into different orders according to their potential for change, with high-order capabilities being the most advantageous, but also the most difficult to develop and replicate. It is important to consider that investing in dynamic capabilities is not always advantageous and that they depend on the paths already taken by companies and the choices they make (Teece, 2007).

In addition, dynamic capabilities are different from best practices and require a learning process, knowledge, and organizational evolution. They can be developed by both individuals and organizations but involve long-term commitments and significant costs (Augier and Teece, 2009; Helfat et al., 2007; Helfat & Martin, 2015). It is important to note that individuals' cognitive ability is linked to their ability to understand the environment and make strategic decisions that can improve the organization's competitive position (Eisenhardt & Martin, 2000).

Based on Ambrosini & Bowman (2009), dynamic capabilities do not automatically result in performance improvements because, although they are valuable and important resources for organizations, their proper implementation and utilization are necessary for them to truly generate competitive advantages and positive outcomes. This implies that merely possessing dynamic capabilities does not guarantee automatic success, but rather, it is the effective harnessing of these capabilities, considering internal and external conditions, that leads to performance enhancements.

Skills are necessary requirements for performing activities and are acquired over time through routines and processes that ensure reliable task execution (Helfat et al., 2007; Helfat & Raubitschek, 2018). Dynamic capabilities are a subset of skills and enable organizations to adapt to rapid changes in the external environment, focusing on strategic changes rather than operational skills (Teece, 2007). They are critical to understanding the sources of value creation and capture of companies in rapidly changing and uncertain environments (Eisenhardt & Martin, 2000), contributing to obtaining competitive advantages that depend on how combinations of resources and competencies are developed, implemented, and protected (Teece, Pisano & Shuen, 1997).

In addition, for an organization to be able to adapt and reconfigure its resources effectively, it needs to be able to absorb external knowledge and continuously adapt to new circumstances. Therefore, theoretical lenses of absorptive capacity can help better understand the dynamic capabilities of institutions because through absorptive capacity, the ability to recognize relevant information is developed, assimilate it into existing knowledge, apply that knowledge to solve problems, and adapt organizational practices in response to changes in the external environment (Cohen & Levinthal, 1990, Zahra & George, 2002). The connection between absorptive capacity and dynamic capability lies in the fact that absorptive capacity is a fundamental part of dynamic capability, allowing the organization to identify and integrate new relevant information, assimilate it into its internal knowledge and then, use it to guide actions of adaptation and resource reconfiguration.

3. RESEARCH ASSUMPTIONS

Given the foregoing, we have the following research assumptions (R.A.):

R.A.1. The adoption of blockchain technology requires financial institutions to develop dynamic capabilities that enable them to adapt and integrate the technology effectively.

R.A.2. The implementation of blockchain technology in financial institutions is influenced by both internal factors (e.g., organizational resources and capabilities) and external factors (e.g., regulatory environment and competitive pressure).

To deepen the research question, it is of interest to the study to cluster financial institutions for empirical observation of common aspects in the dynamic capabilities of these groups that may influence their strategies in digital assets. For this, two variables will be considered for clustering: the stage of maturity in projects using blockchain (institutions with a larger quantity of projects and others with a smaller quantity) and the profile of the financial institution (incumbents or digital native).

3.1 METHODOLOGY

As previously mentioned, the aim is to answer the following research question: How are financial institutions adopting product differentiation strategies with the implementation of blockchain technology?

The study is developed from a pragmatist perspective to substantiate the rationality of financial institutions and, thus, enhance the understanding of their strategy. The construct of digital assets strategy will be better understood using mixed methods to bring benefits from data triangulation. Firstly, data collection will be conducted through document analysis of annual reports and published news related to these institutions. Data analysis can be done through content analysis techniques and descriptive statistical analysis. Data collection will be performed by the researcher.

The selection criteria for the object of study will be based on the nature of the activity (financial institutions) and publicly disclosed projects that use blockchain technology. This methodology will allow for a deeper understanding of the blockchain adoption process by financial institutions in the Brazilian context, enabling the identification of critical success factors and contributing to the development of a theoretical-practical framework applicable to other organizations interested in adopting the technology.

For the criteria of the objects to be analyzed, the definition of Financial Institution as supervised by the Central Bank of Brazil is applied, including Commercial banks, multiple banks, development banks, investment banks, and exchange banks; Credit cooperatives and cooperative banks; Brokerage and distribution companies; Payment institutions; and Other non-banking institutions.

Data collection was mainly done through literature from secondary sources, and structured data was generated from this. Public information was obtained from websites of the financial institutions themselves (Investor Relations websites or pages of financial institutions for the general public), when applicable, or from news clippings in relevant journalistic sources in the market (Valor Econômico, Exame, Veja, O Globo, among others).

Among the data present in the databases, the following were considered relevant for analysis: the description of public projects; the date they were released (year); possible restrictions

observed in public projects; the financial institution's strategy in launching the project (when applicable), and the source presented.

It is worth highlighting that the strategies raised in the data analysis are not exhaustive since only public information was used, therefore, limited. In addition, the strategies considered in the sources had to necessarily belong to the citation of an executive or specialist from the analyzed institution, or a company partner of the institution in that specific thesis, and not from the author of the secondary source.

After selecting the sources of consultation, the following steps were taken to implement the research. The first step was to define the search terms that delimit the subject of interest. Thus, the selected terms were used in portuguese language: "financial institution", "digital assets", "launch", "tokenization", and "blockchain". The terms were searched in the title and body of the text.

At the end of the survey, 33 public projects were obtained from the year January of 2018 to December of 2022. Table 1 presents the distribution of these projects with the longitudinal view according to the launch years.

FINANCIAL INSTITUTION	2018	2019	2020	2021	2022	TOTAL
Itaú Unibanco	Blockchain Platform for Syndicated Loans	-	-	Offer of Structured Investment Note in Blockchain (“COE”)	1. Distribution of Cryptocurrency Fund 2. Credit Token Issuance Test 3. Debenture Token in the Brazilian Securities and Exchange Commission (CVM) sandbox operation 4. Acquisition of Liqi, a cryptocurrency platform startup 5. Custody Offer for Cryptocurrencies	7
BTG Pactual Digital	-	Tokenized shares of a real estate fund	-	1. Bitcoin investment fund 2. Ethereum investment fund	1. Cryptocurrency platform 2. Transfers between digital exchanges or wallets	5
Santander	International transfer	Tokenized title on the blockchain	-	-	1. Simultaneous trading and registration of automobiles in the Central Bank's sandbox pilot operation. 2. Tokenized debentures	4
Mercado Pago	-	-	-	1. Cryptocurrency platform 2. Acquisition of Mercado Bitcoin and Paxos	1.Mercado Coin Token, Mercado Pago's own digital currency 2. Transfers between digital exchanges or wallets	4
Nubank	-	-	-	-	1. Allocating 1% of proprietary treasury cash into Bitcoin cryptocurrency 2. Cryptocurrency platform 3. Nucoin, Nubank's own digital currency	3
Banco do Brasil	-	-	-	-	1. Cryptoassets Fund for qualified investors 2. Acquisition of Bitfy, a Brazilian startup focused on custody services	2
Méliuz	-	-	-	Acquisition of AlterBank, a cryptocurrency platform startup	Cryptocurrency platform	2
Bradesco	-	-	-	Carbon credit tokens	-	1
Banco Inter	-	-	-	Offer of crypto asset funds	-	1
Banco BV	-	-	-	-	Tokenization of a credit receivable	1
XP Investimentos	-	-	-	-	Cryptocurrency platform	1
99Pay	-	-	-	-	Cryptocurrency platform	1
PicPay	-	-	-	-	Cryptocurrency platform	1

Table 1 - Distribution of public theses on digital assets in Brazilian financial institutions January/2018 to December/2022

3.2 RESULTS AND DISCUSSION

To assess the maturity of institutions' blockchain strategies, a comparative framework was developed. It considers factors such as the range of initiatives, integration with existing services, regulatory laboratorial initiatives, partnerships, acquisitions, and customer adoption. Accordingly, it will be possible to obtain more significant conclusions regarding the strategies of certain groups/profiles of financial institutions, taking the study for more in-depth reflections in logical-deductive analysis.

As for Brazilian financial institutions, it was interesting to evaluate that 13 institutions already have some initiative in digital assets, varying between 1 to 7 initiatives. Therefore, the average number of initiatives launched is equivalent to 3 initiatives ($\overline{x} = 3$). Among the pioneering institutions in these initiatives, Itaú Unibanco and Santander stand out, two of the largest traditional Brazilian banks, starting their strategies in digital assets since 2018.

Furthermore, the longitudinal analysis highlights the progression of blockchain adoption in the Brazilian financial sector. It shows that in 2018, Itaú Unibanco and Santander were among the pioneers, initiating their strategies in digital assets. Subsequently, regulatory collaborations through sandboxes facilitated the implementation of blockchain projects. Case studies of specific institutions, such as Itaú Unibanco's debenture token and Santander's car trading system, illustrate the tangible outcomes of these initiatives.

After the collection was done, the data was organized chronologically to observe the evolution of financial institutions over time. In the second instance, it considered reorganizing financial institutions according to two clustering views, as mentioned earlier, as stated in Tables 2 and 3.

- Maturity stage in projects using blockchain (institutions with higher and lower numbers of projects), where "higher" or "lower" number of projects will depend on the average observed in the collected data.

MATURITY STAGE	FINANCIAL INSTITUTION	TOTAL	PERCENTAGE
Higher Maturity	Itaú Unibanco	6	46%
	BTG Pactual Digital		
	Santander		
	Mercado Pago		
	Banco do Brasil		
	Nubank		
Lower Maturity	Bradesco	7	54%
	Méliuz		
	Banco Inter		
	Banco BV		
	XP Investimentos		
	99Pay		
	PicPay		

Table 2 - Maturity stage in projects using blockchain

- Profile of the financial institution (incumbents or fintechs).

PROFILE	FINANCIAL INSTITUTION	TOTAL	PERCENTAGE
Incumbents	Itaú Unibanco	5	38%
	Santander		
	Banco do Brasil		
	Bradesco		
	Banco BV		
Fintech	BTG Pactual Digital	8	62%
	Mercado Pago		
	Nubank		
	Méliuz		
	Banco Inter		
	XP Investimentos		
	99Pay		
	PicPay		

Table 3 - Profile of the financial institution

Regarding institutions in more mature stages, it is possible to analyze that most of them - except for Nubank and Mercado Pago - started with theses platforms and investment funds, products considered lower risk as they do not involve transactions with crypto assets directly. Only after testing the environment more passively, the more mature institutions advanced into more tangible theses, such as in the case of Banco do Brasil, which acquired Bitfy, a Brazilian startup focused on bitcoin and cryptocurrency custody services.

The framework reveals that more mature institutions have not only diversified their initiatives but also acquired blockchain startups to strengthen their expertise and offerings in this domain: 4 out of the 6 institutions in more mature stages acquired Brazilian startups focused on blockchain services, namely Itaú Unibanco (Liqi, a startup that transforms financial products into tokens through blockchain, received an investment of R$27.5 million in a "Series A" round), BTG Pactual Digital (acquiring 20% of Lumx Studios), Mercado Pago (buying a stake in Mercado Bitcoin and Paxos to advance in the cryptocurrency business), and Banco do Brasil (acquisition of Bitfy, a Brazilian startup focused on bitcoin and cryptocurrency custody services). The acquisition process is frequently related to a subsequent action of a new thesis linked to the acquired company, and the acquisition process can be interesting for the digital assets strategy of financial institutions. For example, Banco do Brasil offered permission to pay taxes with cryptocurrencies through the Bitfy platform shortly after acquiring it. Although more prevalent in more advanced companies on the subject, acquisition is not restricted solely to more mature companies: Méliuz, considered an institution with a lower stage of maturity in this analysis, completed the acquisition of AlterBank (a cryptocurrency investment platform) entirely, and even created a cryptocurrency investment platform shortly after incorporating.

The findings regarding the profile reveal that 62% of the institutions analyzed are fintechs, while incumbents account for the remaining 38%. Fintechs, leveraging their innovative dynamic capabilities, have been more proactive in appropriating blockchain innovation strategies compared to incumbents. A comparative analysis of incumbent banks and fintechs uncovers varying levels of blockchain adoption, with some incumbents demonstrating more advanced initiatives such as tokenization of assets and blockchain-based trading platforms.

Brazilian incumbent institutions - such as Bradesco, Itaú, and Santander - also stand out for blockchain projects carried out in conjunction with regulatory entities through regulatory sandboxes. Itaú Unibanco launched a debenture token approved by the CVM, through a partnership with Vórtx QR Tokenizadora. According to sources from Valor Econômico, the token refers to debentures (shares) issued in a blockchain environment in the total amount of

R$60 million, represented by 60,000 tokens of R$1,000 each. In 2022, Santander created a system for simultaneous trading and ownership registration of cars using blockchain technology, which can facilitate the sales of used cars involving individuals. This initiative was carried out in the laboratory environment of the Central Bank of Brazil so that, in the future, the solution can allow for instantaneous transfer of ownership using smart contracts, which are computer programs that act according to pre-established rules in blockchain. In the same regulatory sandbox of the Central Bank, Bradesco tokenized a R$10 million Bank Credit Bill (CCB).

CONCLUSION

This study showcases the significance of comparative analysis, longitudinal analysis, and a comparative framework in understanding the blockchain adoption strategies of Brazilian financial institutions. The findings emphasize the need for institutions, both incumbents and fintechs, to continuously develop their knowledge and capabilities in blockchain technology. By embracing innovation, collaborating with regulators, and leveraging strategic partnerships, financial institutions can maximize the benefits and navigate the evolving landscape of digital assets effectively. The diversity and prevalence of Brazilian financial institutions with initiatives in digital assets support the first hypothesis, leading to the conclusion that financial institutions see value in applying blockchain technology use cases as dynamic capabilities to differentiate their products in various business areas (Tapscott, Tapscott & Kirkland, 2016; Fengi et al., 2018).

The dynamic capability of acquisition was relevant to the value capture strategy of new technologies like blockchain for various financial institutions analyzed in the study. One observed strategy is the use of invested startups to promote innovation and technological bases to drive digital asset solutions, as well as knowledge acquisition capability (Zheng, Zheng & Du, 2011).

Additionally, the study confirms that the ability to perceive and track the external environment impacts the creation and capture of value through blockchain application in financial institutions, as seen in initiatives of financial institutions in experimental environments provided by regulators such as Brazilian Securities and Exchange Commission (CVM) and Central Bank of Brazil. Within the regulatory context, the adoption of absorptive capacities is essential for financial institutions to maximize the benefits and minimize the challenges arising from Virtual Assets Law (Nº14.478/2022) and the innovation process of the Central Bank of Brazil, while ensuring their position in the constantly evolving landscape of cryptocurrencies and digital currencies. Both incumbent and fintechs need to develop specialized knowledge about the benefits and challenges of implementing blockchain technology in the financial sector. This involves understanding technical concepts, security protocols, regulations, and best practices related to blockchain usage. It is evident that financial institutions are gradually testing new products in a controlled environment to absorb and create knowledge about blockchain usage. This result aligns with the perspective of the Knowledge-based view (Cohen & Levinthal, 1990, Zahra & George, 2002).

According to Warner & Wäger (2019), dynamic capabilities of innovation play a crucial role in financial institutions' adaptation to the digital era. Digitally native financial institutions have a culture of innovation and are willing to experiment with new ideas, giving them an advantage over traditional models in creating new digital businesses and products, as Carcary, Doherty & Conway (2016) delve deeper. It is worth noting that, in general, the proportion of fintechs versus incumbents reveals the trend of fintechs using dynamic capabilities to execute innovation strategies such as the use of blockchain technology. However, Warner & Wäger (2019) also noted that incumbent financial institutions are also seeking to adapt to digital transformation

and are developing their own dynamic capabilities of innovation to compete with fintechs and digital financial institutions.

Empirical observation of common aspects of dynamic capabilities in financial institution groups showed a correlation between the volume of theses and the time of experience in digital assets, with some institutions operating since 2018 and 2019. This supports the idea that more advanced institutions have a higher risk appetite. The regulatory evolution in Brazil regarding blockchain technology in business operations, such as the Virtual Assets Law in Brazil (Law No. 14.478) approved and sanctioned at the end of 2022, has contributed to this trend. However, no financial institution launched products in 2020, a year marked by the Covid-19 pandemic, indicating that blockchain technology is not yet considered crucial for banks during delicate moments such as economic crises. With the advancement of CBDC in Brazil, it is likely that the risk of adopting blockchain technology will decrease, and financial institutions will need to ensure its application with greater reliability.

In conclusion, this study provides valuable insights into the adoption of disruptive technologies by financial institutions, specifically the use of blockchain in digital assets. The findings indicate that dynamic capabilities play a crucial role in enabling institutions to capture value through innovation, and that more mature institutions are more willing to take risks in this area. Furthermore, the study highlights the trend of fintechs utilizing their dynamic capabilities to innovate and differentiate themselves from incumbents. These findings have significant implications for understanding the competitive landscape of the financial sector and the importance of leveraging innovative technologies to remain relevant and competitive in today's digital economy. As such, this study represents an important contribution to the academic and practical discourse on the adoption of disruptive technologies by financial institutions (Hassani, Huang, & Silva, 2018; Higginson, Hilal, & Yoguc, 2019).

FUTURE RESEARCH PROPOSALS

For future studies, there are potential contributions that can be explored in countries with a similar profile to Brazil, characterized by a homogeneous financial market, the emergence of disruptive digital companies, and a growing regulatory environment in the digital economy. These contributions may include a more in-depth analysis of the impacts of blockchain technology and cryptocurrencies on financial institutions, considering aspects such as digital transformation, the adaptation of traditional business models, and the implications for customers.

As a possibility for future research, it would be interesting to analyze the thematic of this study from the perspective of other theories within the field of business strategy, such as Williamson's transaction cost theory (1979, 1981), which could provide a complementary view on the product differentiation strategies adopted by financial institutions with the implementation of blockchain. Additionally, investigating the impact of the external environment on blockchain adoption, based on Porter's theory (1980), could further deepen the understanding of the opportunities and threats faced by financial institutions in this context. These additional theoretical analyses would broaden the understanding of this phenomenon and provide valuable insights for the formulation of future strategies.

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