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BANKING ON CHANGE – A STUDY ON BANKING BUSINESS MODELS IN PORTUGAL
EVOLUTION AND OVERVIEW OF THE PORTUGUESE BANKING INDUSTRY

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Abstract

This report investigates the banking business models with an in-depth focus on the Portuguese reality. It analysis the historic evolution of the sector and applies a cluster analysis based on several financial and non-financial indicators chosen. Moreover, there is an in-depth analysis of the digital banking business model in Portugal followed by new opportunities that these entities can take for their future competitive landscape.

KEYWORDS: Evolution; Banking Business Models, Digital banking, Portugal banking industry, Historic Evolution, Strategic frameworks, Value Proposition, Financial Services, Innovation Technology, Traditional banking business model, Disruption value, Customers

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Introduction

Banks are essential institutions for the sound functioning of any business environment, regardless of whichever economic context they are inserted in. In fact, the banking industry has experienced considerable changes, such as the Basel III accord and other regulatory modifications that surged in the wake of the Great Financial Crisis (here onwards also denominated as GFC) over the last few years, which were driven by an ever-growing sprout of digital technologies and differences in customer preferences and needs. As such, traditional banking business models are now poised to rethink their respective strategies in order to adapt to an environment that has constantly been under fast development. Nowadays, with the emergence of digital banks and related applied technologies, banks which employ – or used to do it – traditional strategies must forcefully shift towards a more digital model. That is, of course, if they do not wish to become obsolete. As this shift is currently happening in the whole world, the same is happening, although at a unique pace, in Portugal. Previous works have been considerably useful to define the evolving role of banks that operate in Portugal; however, we must also take the emergence of newer digital, virtual banks into account and define where they position themselves with respect to other banks which engage in traditional banking activities.

The purpose of this work is to explore and identify the different types of existing banking business models, their evolution over time, and the factors that have influenced their development, according to different perspectives that have been adopted by various researchers along the years. Additionally, our focus within this Work Project would be to analyse how banking business model structures align with the emergence of digital banks in the specific context of the Portuguese reality. Thus, there comes a point where we must first introduce the concept of business models before delving into the depths and intricacies of banking business models. As such, our work's theoretical

ground is mainly – but not limited to - sustained by Alex Osterwalder and Yves Pigneur's *Business Model Generation: A Handbook for Visionaries, Challengers, and Game Changers*.

Namely, studies of bank business models can be traced to early work by Amel and Rhoades (1988) and Mehra (1996), where bank business models were more simply defined as *bank strategic groups*, and the ongoing debate was on whether these existed or not. In later years, thanks to the works of selected researchers, work on banking business models has been deepened and finetuned, up to the point where we now have several approaches from which to begin when starting a possible definition of current banking business models.

Before getting into detail as to how business models in general and banking business models in particular work and define themselves, there arises a need for defining a timeline of events that preceded the current setting and that may serve as a baseline for current business models that exist nowadays. Thus, we will proceed to build a timeline that includes all relevant events and historical issues that have happened along a certain period – in this case, our period of analysis was chosen to be comprised between the 1970s (for historical context purposes, since from that decade onwards major changes happened in the banking sector) and the year of 2021, which is the last year that contains publicly available financial data that could be used for the purpose of this Work Project. Specifically, this timeline will address developments in the Portuguese banking sector on a number of elements, such as overall size, geographical dimension, workforce size, key activities, profitability, solvency, and an emphasis on events preceding the GFC as well as events that occurred in the aftermath of the GFC (BdP 2020, Ayadi *et al.* 2011).

Important definitions

Throughout this document, several terms will be mentioned, from which some doubts might arise

due to the fact that different authors have different interpretations which can generate unclear consensus. In fact, there will be terms repeated exhaustively and for this reason we will present distinct perspectives of other authors that have already studied and analysed these concepts. First of all, we start with the concept of “Business Model”.

As a matter of fact, Alexander Osterwalder describes it as it follows: *“A business model describes the rationale of how an organization creates, delivers and captures value”* (Osterwalder and Pigneur 2010). In this case, Osterwalder and Pigneur describe a business model as something that not only creates value by turning resources or capabilities of those organizations, but also delivers it by giving something that can satisfy the needs of the market. At the same time, they also mention the nine building blocks of a business model (Customer Segment, Value Proposition, Channels, Customer Relationships, Revenue Streams, Key Resources, Key Activities, Key Partnerships, and Cost Structure) that will be further explained and described in detail in this document. In addition to these two researchers, in one of the very first attempts of defining a business model, Timmers defines it as: *“(a) an architecture for the product, service and information flows, including a description of the various business actors and their roles; and (b) a description of the potential benefits for the various business actors; and (c) a description of the sources of revenues”* (Timmers 1998). In this case, Timmers (1998) is more concerned and focused on the specificities of the product architecture, how information flows in that specific business model and the role of each and every component of the company.

Likewise, in 2001, Afuah and Tucci (2001) define it as *“method by which a firm builds and uses its resources to offer its customers better value than its competitors and make money doing so. It details how a firm makes money now and how it plans to do so in the long-term. The model is what enables a firm to have a sustainable competitive advantage, to perform better than its rivals in the*

long term” (Afuah and Tucci 2001). It is essential to emphasize that they added an important concept to this definition. As Charles Darwin coined *“It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is most adaptable to change”* (Darwin 1859), which means that the company who is more well-prepared is the one who is going to “win” in the future thus the importance of a well-defined and adapted business model. Furthermore, in the same year, Amit and Zott (2001) say that *“A business model depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities”* (Amit and Zott 2001). This concept is similar to the previously mentioned by Afuah and Tucci (2001) regarding on value creation. Moreover, Shafer alongside other authors mentions *“We define a business model as a representation of a firm’s underlying core logic and strategic choices for creating and capturing value within a value network”* (Shafer et al. 2005). Taking this into account, Shafer says that the business model represents the logic behind a company’s strategy for the reason that every company’s strategy is based on the model they operate in.

In order to complement these last attempts of definition, Teece (2010) points out that *“In short, a business model defines how the enterprise creates and delivers value to customers, and then converts payments received to profits.”* In reality, Teece is trying to convey that once the company is able to define all the elements, then can focus its resources and capabilities on the activities that are more plausible to generate revenues. To top it off, Rym Ayadi, one of the most important and dedicated researchers in this area, defines and elaborates that business models are a systematic representation of a firm's logic and value proposition that incorporate the set of activities and resources that enable a company to create, deliver and capture value (Ayadi 2019).

As a final point, every author presents their own definition for this particular term of “Business Model”. However, it should be noted that all these definitions turned out to touch common points given that they all focus on value creation and delivery, underlying companies’ strategies and sustainable competitive advantage which elucidates and suggests common points to better understand what a business model is about and what it stands for.

By the same token, it is important to define the concept of bank. Starting with Freixas and Rochet (2008) “(...) a feature of banking firms is the collection of deposits of the public and granting loans. These are financial contracts (...) are not easily transferrable” and “(...) management of the payment system (...) they are in a better position to alter informational asymmetries between savers and borrowers” (Diamond 1984). At the same time in a first attempt to define banks Gurley describes banks as “(...) *firms that transform size, risk, and maturity of financial claims. Banks transform and manage risk* (Gurley *et al.* 1960). In fact, in the existing literature there are distinct types of business models for banks. During the research, several authors have different business model for banks and in order to do so, they do an analysis of different ratios and indicators to better evaluate banking business models.

Moreover, since now we have defined what a bank is, we can therefore define what a business model in banks is. To identify how it is possible to identify different banking business models it is important to understand that banks have different ownership structures, different funding activities and activities and they all compete in the same and highly competitive market (Ayadi 2019). Starting with the **ownership structure**, banks can have a more direct focused towards their shareholders with a clear focus on their profit maximization and risk taking, which is different from the stakeholder theory (Wicks 2009). The stakeholder-view is concerned about their members concerns and interest of the society as it understands that motivated stakeholders can help the

company to achieve greater goals while obtaining profits (Freeman 1984). Consequently, a bank which has a deep focus on risk maximization, in case the risk is not well managed, can lead to a big exposure of the banking sector and society to a possible collapse (Ayadi 2019). Thus, based on the bank's decision making, this structure indicates if the bank is willing to take more or less risk in its activities in order to achieve their goals.

Secondly, the **organisational structure** defines how a bank is organised in domestic and non-domestic market with subsidiaries or branches which gives a picture of the internationalisation of the bank (Goodhart 2003). However, this has implications at cross-border coordination and information flow dynamics between headquarters and branches given that the more internationalised a bank is, the more difficult is to coordinate different political, social, economic, and environmental changes in every country they operate in and the more prepared they should be to avoid these problems by keeping an effective and continuous flow of communication between them. In addition, in connection with the organisational structure, banks who follow a shareholder perspective are more internationally spread than the ones who follow a stakeholder perspective that focus on the domestic market and this pattern should be constantly monitored to understand possible changes in the internationalisation strategy of business models important to Ayadi (2019). Another key point to consider is the size and it is defined as the total assets, deposits, and credits relative to the GDP (Gross Domestic Product) of a country. It defines that if a bank is systemically important to the world, i.e., if the collapse of the bank can drag other entities and the economy down with it (Ayadi 2019). Therefore, this indicator provides information if the bank is too big to fail or so big that cannot even be harmed and if they are systemic in the economic context.

Timeline

The Portuguese banking sector has suffered various important changes in the last 50 years, especially immediately after the 1974 Revolution, all of the country's institutions underwent a profound transformation, including of course its banking entities. After the revolution, laws were drastically modified, banks were acquired, nationalised and reprivatized (Borges 1994), and even new banks were born. The second major set of alterations verified in the Portuguese banking sector occurred in the context of the Portuguese accession to the European Union, and the third one emerged in the aftermath of the GFC. In the following paragraphs, we will provide a detailed analysis and description of the evolution of the Portuguese banking sector on a macro level, while highlighting its main events across a historical timeline, as well as the evolution of key banking indicators such as branches, employees, and performance indicators.

Historical Events – From the 1974 Revolution to the present day

From the beginning of the 1970s onwards, major changes occurred within the general banking industry in Europe and, more particularly, in Portugal. The traditional role of deposit-loan intermediation of banks shifted dramatically towards an integrated solution, where nowadays banks offer a vast array of different products and services (Ayadi 2019). To add up to that, the whole international monetary system changed. The main highlight of this shift can be traced to a change in the fixed exchange rate system towards a floating exchange rate and total cross-currency convertibility system. In the wake of the revolution that took place on April 25th, 1974, the subsequent decolonization process, and the establishment of a new political regime in 1976, economic growth that had occurred during the previous decade experienced some stagnation in Portugal, as was happening in the rest of Europe. However, inflation was found to be considerably higher in Portugal than in the rest of Europe and this can be evidenced by the fact that the

Portuguese currency (*escudo*, at the time) had devalued to a value that was 5 times lower with regards the Euro zone.

Thus, the period of political transition was marked by a few, although crucial, institutional transformations in the banking sector, such as the nationalization of the Bank of Angola, Banco Nacional Ultramarino and Banco de Portugal (1974); as well as the nationalization of all credit institutions that would be headquartered in Portugal, except Portuguese departments of foreign banks, *caixas económicas* and *caixas de crédito agrícola mútuo* (1975).

These institutional transformations would then later be confirmed by the 1976 Constitution, which stated the prohibition of reprivatization of previously nationalized banking institutions and also awarded full exclusivity for the public initiative to lead the domestic banking activity.

The prohibition against private initiative regarding banking activities would provoke a debate a few years down the line when the Portuguese case would start to be considered in the context of the adhesion process to the European Economic Community (EEC) in 1977. Subsequently, further revisions to the Constitution in 1982 and 1989 would then allow private initiatives to delve into the banking sector as well as the reprivatization of previously nationalized banking institutions, respectively (Borges 1994).

Portuguese Banks and the Euro Zone

In January 1986, Portugal completed its formal adhesion to the EEC, which in 1993 would then transition into what is currently known as the European Union (EU).

The conclusion of the process of the economic union among the EU's initial members and the conclusion of the monetary union process among eleven countries that belonged to the EU, prompted the Portuguese economy to ditch certain aspects that would typically characterize a

purely national economy. Jumpstarted by Banco de Portugal's insertion into the European System of Central Banks (ESCB), a series of profound changes were verified within the context of the Portuguese banking sector, in addition to those formerly mentioned above: A significant increase in the activity of foreign banking entities into the Portuguese economy; important foreign direct investment transactions into the Portuguese banking sector. This reopening had first begun by creating a large number of para-banking institutions and was followed by the creation of entirely new private banks, as was the case of Banco Comercial Português (BCP) and Banco Português de Investimento (BPI). As for the reprivatization of previously nationalized banking entities, this happened in the 1990s and led to some important operations, such as the rebuilding of formerly existing large economic and financial groups, such as the Espírito Santo group, which regained control of Banco Espírito Santo (BES); as well as the emergence of novel configurations of economic groups, mainly derived from corporate strategy transactions led by the then only two existing private banks, BCP and BPI (Borges 1994).

These economic and financial groups were the ones responsible for the construction of the main banking groups through a variety of corporate strategy transaction types, which would then allow them to develop activities such as commercial banking, investment banking, real estate banking, e-banking, consumer credit, among others.

Also, there was a noticeable number of foreign banks which opened their respective branches in Portugal, especially in the later years of the 20th century. Notably, however, none of these would amount to gain a significant foothold of the Portuguese sector just yet.

By the turn of the century, two main expansion projects led by Portuguese banks went underway, namely BCP and BES. As for BCP's project, on one hand, its main focus was an extension of its banking operations towards Eastern European countries that were in the process of transitioning

from planned economic systems to market-based systems, as well as countries in the process of joining the EU. On the other hand, the project led by BES rather focused on expanding towards non-financial entities belonging to non-European Portuguese speaking countries.

Nevertheless, both projects would fail to be implemented as well as their respective movements, however, the exact opposite would happen in terms of foreign activity in Portugal. Foreign banks such as Santander, of Spanish origin, were able to take part in and even absorb some Portuguese banks, such as Banco Totta, in this case. It is also worthy of mentioning that foreign direct investment also took large chunks of capital belonging to both BCP and BPI, as both banks saw themselves partly controlled by foreign investors. In truth, only Caixa Geral de Depósitos (CGD) remains as a banking entity whose main capital nucleus is not dependent on foreign entities (Tomás and Valério 2021, 14-17).

GFC Considerations

It is argued that, in the wake of the Portuguese adhesion to the European Union, the resulting consequences for the country and its economy turned out to be positive. This was mainly due to the fact that it stimulated the transition of Portugal into a highly developed economy, as well as a financial and monetary stabilization that mitigated inflation down to similar levels as those of Portugal's EU counterparties. After the currency convergence process was finalized, however, economic growth suffered a gradual halt and the Portuguese economy certainly felt the effects of such stagnation, namely in the 2000s.

In mid 2000s, the world's economy was struck by a phenomenon widely known as the Great Financial Crisis (GFC), which was triggered by the collapse of speculative securitizations of banking credits issued in the United States of America. While this occurrence did not immediately

affect the Portuguese banking sector, two Portuguese banking entities could not resist the crisis' direct outbreak, namely Banco Português de Negócios (BPN) and Banco Privado Português (BPP), which were nationalized and obliged to issue payment suspensions, respectively. In the case of BPP, specifically, in order to assure the payment of loans and deposits of the bank, a special line of government backed credit was given to 6 other financial institutions. Even though BdP considered these institutions to be of a smaller size, BdP simultaneously believed that these rescues would assure the safety of deposits and the stability of the Portuguese financial system, referencing as well that at the time there was a high uncertainty regarding financial activity at a global scale. This then justified the need for "the sale or unwinding of the BPN bank", which until its sale to BIC Bank in 2012 was incorporated into the publicly owned CGD group (Borio *et al.* 2014).

In the sequence of the GFC, another crisis outburst resulting from the collapse of credit rating scores and sudden stock market performance drops within some European countries. This was mainly due to negative account balances resulting from the attempt made by some countries, namely Greece and Portugal, to stimulate economic activity, among other reasons. The sovereign debt crisis, as it was named, forced Portugal to utter a desperate cry for help and support from the ECB and the International Monetary Fund (IMF), in order to finance itself and avoid default. This procedure affected the Portuguese treasury bond market and led some Portuguese banks, which not surprisingly held considerable amounts of Portuguese public debt, to in turn require a bailout from the Portuguese state. The state of the Portuguese banking sector continued to worsen, as 2014 came with the news of the collapse of BES, one Portugal's systemic banks at the time. BES would later be succeeded by Novo Banco via a mixed ownership in between Banco de Portugal and a resolution fund. Later, Novo Banco would be acquired by American-based Lone Star fund (Tomás and Valério 2021, 17-18).

From 2014 onwards, the Portuguese banking sector experienced some level of consolidation, with its main banks establishing a stronger foothold in the market and focusing their activities on the customer side, all the while diversifying their offerings and product portfolios. In fact, it was predicted that, by 2022, retail banking trends would include integration within social media channels, threats from online players in the payments and transfers business, a growing demand for advisory services that denoted an increasing need for personalized experiences when it comes to banking via various channels, a revolution in branch formats and, last but not least, an emerging competition between banking sector incumbents and new players that would penetrate the market via an internet business. Furthermore, it was also predicted that, by 2020, consumer banking and fund transfers and payments were likely to be the most disrupted sectors within the financial services and banking industries (PwC 2016). While most, if not all, predictions about this have turned out to be true, there still lies the question on whether these main retail banks will be able to keep up with the novel digital banking trend that has surged in the latest years. Large, hard to pivot banks like CGD, BCP, BPI, Novo Banco and Montepio nowadays face the threat of nimble, streamlined, and emerging customer-focused digital banks such as Revolut, N26, and Monese. Fundamentally, they are tasked with both adapting their business models accordingly and the development of new digitalized customer-centric banking solutions for their target markets. Exceptional examples of successful execution in this regard are BCP and Crédito Agrícola's ActivoBank and Moey! respectively, which were able to capitalize on the digital trend early on in the Portuguese market, and thus gain a significant advantage towards its competitors.

This leads us to the next and final chapter of this timeline, which describes latest and current trends regarding the banking sector in Portugal and its adaptation to newly emerging digital banking entities and Fintech companies, as well as other similar evolutions within this context.

From 2014 to today: The emergence of digital banking trends

As the digital revolution has now definitely come to stay, the banking sector is no different. With the emergence of Fintech trends on the banking radar, there are a number of them which are relevant for the purpose of this Work Project and that will be described in detail within the following paragraphs. Firstly, banks have started to gradually move away from physical interactions when dealing with their customers. As the digital spree has come to dominate in the recent years, businesses and individuals have increased demand for online and digital services, especially younger consumers. For Portugal's case, this is absolutely no different, as digital banking entities have come to take the banking sector by storm, with international start-ups such as Revolut and N26 taking the majority of the sector's market share, all the while some Portuguese solutions have also come into the fray in the form of ActivoBank, Banco BEST or Moey!. Increased distrust of retail banks and other large banks which employ traditional banking activities, provoked by the collapse of Banco Espírito Santo (BES, later succeeded by Novo Banco), has prompted the Portuguese consumers to increase the need for leaner, more agile and free of intermediation services that are also secure and reliable, providing the flexibility and comfort that especially newer and younger market segments are currently demanding (PwC 2016).

Following our historical overview of the Portuguese banking industry, in the following paragraphs and for the purposes of a complete overview, a detailed description of the banking sector's evolution across a period extending from the 1990s until current times will ensue, all the while analysing changes in the sector's size, workforce, concentration, and reach, as well as key indicators from its players (BdP 2020).

General Considerations – Portuguese Banking Sector

When it comes to the overall size and weight on the economy, the Portuguese Banking sector “has never been among the euro area countries where the banking sector weighs heavier on the economy.” (BdP 2020), in 2018 the sector’s assets represented around 190% of GDP, whilst in the Euro Area the average was 260%. Additionally, when considering the relative size of the Portuguese Banking sector, its branch network far surpasses the Euro Area average, as the Portuguese sector remains at or above the 80th percentile in Branches/per asset from 2008 to 2018, and furthermore, it has the 6th highest branch per capita in the Euro Area. These observations could reflect a possible greater share of retail banks in Portugal when compared to the Euro area, given that traditional retail banks require a larger network of branches. Geographically, the distribution of branches was dispersed and therefore not dense, which reveals a strategy of geographical diversification in the Portuguese banking sector. During the period in which similar information can be found, the Portuguese economy had higher concentration levels than those of the euro area, which could be inferred when considering that larger countries have a tendency for lower concentration levels relative to smaller countries. Besides domestic activity, the Portuguese banking industry managed to expand beyond the country’s geographical limits. However, this particular trend has actually been overturned by the emergence of the GFC’s effects. As of 2012, a considerable decrease in the Portuguese banking sector’s international activity has been verified regarding both the number of branches as well as the workforce size. Up to 2012, much like domestic activity, a strong uptick in international activity has been recorded regarding both the number of branches as well as the workforce size. This increase was vastly bolder than that of domestic activity, as per the following metrics: From 10% to approximately 22% between 1990 and 2013 when it comes to branches, and from 5% to more than 30% regarding the sector’s workforce. After 2013, in the midst of the GFC and when banks had to focus their resources “towards core domestic activities”, there was a strong reduction in international activity. Besides

the number of branches, it is also relevant to mention as well as analyse the number of employees that banks have under their respective payrolls. These, alongside branches, can help define a greater landscape when it comes to the level of digitalization of banks in Portugal. Accompanying these observations, moreover, is the fact that from 2008 to 2018 the ratio of employees per asset is above the median value in the Euro Area, however, when considering the employees per capita the trend inverses as the Portuguese Banking sector's ratio stands below the Euro Area median, possibly highlighting inefficiencies regarding human resources management in the sector. Further analysis into the topic reveals that in spite of a "remarkable reduction in the number of employees in recent years" (BdP 2020) the sector's employee turnover has significantly reduced. In 1990, employees with 15 or more years of seniority represented around 22% of the sector's workforce, while in 2018 that had greatly increased to 57%. Finally, as for payment systems and consumer payment habits, over the last few years there has been an observable change in the way payments are processed in Portugal, as there has been a consistent move into cards over cash, with home banking also noticeably increasing as of late. As a reflection of these changes (or perhaps cause), after peaking in 2010, the number of ATMs in Portugal declined over 20% in just 8 years, and the share of withdrawals as a share of card-based activities has also declined in the same period. According to BdP, "Available statistics also suggest the Portuguese have a greater appetite for the use of payment cards. Among euro area countries, Portugal ranks first with regard to share of card payments". Moreover, regarding the evolution of profitability and solvency across the Portuguese banking sector, the following events occurred within the period in question: Overall, net incomes in the Portuguese financial sector were relatively stable from the 1990s up until 2007, varying between 0.5% and 1% of assets and "showing only a procyclical development, but without any trend or structural change." according to BdP. In the years immediately after the GFC net incomes in the sector would generally fall, but as is noted in the Portuguese Economic Adjustment Program (EAP)

report of June 2011, “On the positive side, Portugal did not witness a property boom and bust, nor were banks exposed to toxic assets. Therefore, the financial sector has weathered the first phase of the financial crisis relatively well.”, additionally stating “Adhering to traditional business models, not holding significant amounts of toxic assets and being spared from a housing bubble, the banks remained overall profitable”. With these statements being Corroborated by the fact that the Portuguese financial sector’s net income was above the Euro Area’s median from 2008 to 2010. However, in the early 2010s the situation would continue to worsen for the Portuguese Financial Sector as net incomes would sharply decline towards negative values and remaining so from 2011 up until 2016, with net incomes being at their lowest level in 2015 of around -1.3% of assets. Breaking down the evolution of revenues and costs from the 1990s up until 2018 the banking system had many significant changes: Firstly, net interest income decreased considerably due to a “significant reduction in interest rates and financial intermediation margins, as well as a strong deceleration in credit”. In the early 90s, net interest income as a % of assets was slightly above 4%, by the early 2000s it had reduced to 2%, and in the wake of the GFC it kept decreasing up until 2013. From its bottom of 1.2% it then rose to around 1.5% in 2018. These proceedings revealed both “a reduction in the margins between lending and deposit rates, as well as a slowdown in activity”. Considering this decline in net interest income during the period in question, the sector was affected by “differentiated developments in other profitability components”, thus upbringing certain implications regarding the sector’s performance across the past thirty years. On the revenues side, fees consistently grew as % of assets, from the early 90s up until 2005 its growth was more notable, as in 1995 they represented approximately 0.4%, but by 2005 they nearly doubled to 0.7%, from 2005 to 2018 the growth was similarly consistent, yet much slower, as fees as a % of assets were around 0.78% in 2018. On the costs side, reflecting among other reasons, the various technological improvements and innovations which allowed banks to provide financial services for

an ever-shrinking unit cost, operating costs notably decreased from a high of 2.5% of assets in 1998 to around 1.8% in 2001, where they remained until 2005, they would then steadily decrease to 1.5% in 2010, remaining at that level until 2018. Finally, the key contributing factor for the Portuguese banking industry's poor performance in the early 2010s were the problematic assets, categorized as provisions/impairments. Provisions were at their lowest level of the past 30 years in 2006, representing 0.4% of assets, and reached their highest level in 2013, accounting for 2.3% of assets. Notably however, provisions as a % of assets was only 0.7% in 2010, so in comparison with 2013's values it becomes clear that there was a sharp increase in impairments in the early 2010s, to which Banco de Portugal attributes to a period of sharp fall in economic activity, and importantly as well, the special credit portfolio inspections that came as a result of the Economic and Financial adjustment programs, or the EFAP/EAP, that were put in place for Greece, Portugal, Ireland, and Cyprus. The Portuguese EAP report of 2011 also warned of potential weaknesses in the Portuguese financial sector, mentioning that it was "highly leveraged and exposed to a highly indebted economy with weak growth prospects.", and in fact, in the years post GFC, the Portuguese economy contracted significantly. In real terms it shrunk -3.12% in 2009, grew 1.74% in 2010, decreased - 1.7% in 2011, sharply fell -4.06% in 2012, and declined -0.92% in 2013 (INE, Pordata), additionally private indebtedness in 2009 was close to 250% of GDP, whilst simultaneously non-performing loans had grown from 1.5% in 2007, to 4.1% in 2010. Furthermore, as a consequence of the economic and credit slowdown in the 2010s, Portuguese banks' liquidity grew significantly. However, the sector's solvency was far below the Euro Area's levels, as even though Tier 1 capital ratios doubled from 2006 to 2016 in Portugal, they were below the 20th Percentile of the Euro Area's average from 2008 up until 2018.

Significant Banking institutions that operate in Portugal

For the purpose of defining a database of banks that might later serve as a baseline for our further analysis, as of the date of publication of this Work Project, the current image pertaining to some banks belonging to the Portuguese banking sector – and that are present in our clustering analysis - is the following:

Banks

Banco Atlântico Europa: Began operating in 2009 and headquartered in Lisbon. Currently, the bank is in the imminence of being acquired by Well Link Group, a banking conglomerate coming from Hong Kong (Jornal Económico 2022).

Banco BAI Europa: Established in 2002 after transitioning from Banco Africano de Investimento (BAI) and headquartered in Lisbon. It is also part of a larger Angolan banking group.

Banco Comercial Português: Began operating in 1986 and headquartered in Porto. Until 1995, its commercial name was NovaRede, and it is currently the parent company of ActivoBank. Also, the bank absorbed several formerly important banking entities, such as Banco Mello (2000), Banco Pinto & Sotto Mayor and Banco Português do Atlântico (2004). From 2004 onwards, it began using the commercial name Millennium BCP. Recently, in 2018, BCP also absorbed Banco de Investimento Imobiliário. ActivoBank, one of BCP's subsidiaries, was created in 2010 after transitioning from its former version, ActivoBank7.

Banco Credibom: Began operations in 1996 and headquartered in Lisbon, it is a part of French banking group Crédit Agricole.

Banco CTT: Began operating in 2015 and headquartered in Lisbon.

Banco EuroBic: Having transitioned from its previous denomination as Banco BIC since 2017, it began operations in 2008 and headquartered in Lisbon, it is also a part of a larger Angolan banking group. In 2013, it absorbed Banco Português de Negócios (BPN).

Banco Finantia: Established in 1993 and headquartered in Lisbon.

Banco Invest: Established in 2005 by transformation of Banco Alves Ribeiro and headquartered in Lisbon.

Banco de Investimento Global (BIG): Began its operations in 1999 and is headquartered in Lisbon.

Banco L.J. Carregosa: Founded in 1833 and is headquartered in Porto.

Banco de Negócios Internacional (BNI Europa): Initiated its operations in 2014 and headquartered in Lisbon, it is a part of a larger Angolan banking group.

Banco de Portugal: Established in 1846 and headquartered in Lisbon, it has served as Portuguese Central Bank since 1931 and was nationalized in 1974. Since 1999, it is a part of the ESCB.

Banco Português de Gestão: Began its operations in 2000 and is headquartered in Lisbon. Currently, it is under the process of being sold after successive mismanagement practices which have led the bank to report non-performing loans at a proportion of 65%.

Banco Português de Investimento (BPI): Created in 1984, after the transformation of the Sociedade Portuguesa de Investimento, a Portuguese investment firm. Headquartered in Porto, it serves as the nucleus of a banking group that absorbed Banco Borges & Irmão and Banco de Fomento e Exterior (both in 1997), among others.

Banco Primus: Began its activity in 2005 and is headquartered in Lisbon. It belongs to French banking group Crédit Foncier.

Banco Santander: Created in 2004 by merging Banco Santander Portugal, Banco Totta & Açores and Companhia Geral de Crédito Predial Português. Headquartered in Lisbon, it serves as the main nucleus of a banking group that encompasses entities such as Banco Madesant and Banco Santander Consumer Portugal. In 2015, the bank absorbed Banco Internacional do Funchal (BANIF) and Banco Popular Portugal in 2017. From 2018 onwards, the bank ditched its former name of Banco Santander-Totta and adopted the commercial name of Banco Santander.

Bison Bank: Began its activity in 2001 and is headquartered in Lisbon. Formerly a part of the BANIF group.

Caixa Geral de Depósitos (CGD): Began its activity in 1876 and headquartered in Lisbon, it is wholly owned by the Portuguese state. Serving as the main nucleus of a banking group that includes Caixa BI, the bank also acquired Banco Nacional Ultramarino in 2001. Caixa BI, CGD's investment bank subsidiary, was established in 2000 after transitioning from Chemical Bank.

Haitong Bank: Rebranded in 2015 and headquartered in Lisbon, it formerly belonged to the BES group and is now a part of a Chinese banking group.

Itaú BBA Europe: Established in 2019 after its transformation from Banco Itaú. It is a part of a larger Brazilian banking group.

Novo Banco: Established in 2014 following the collapse of Banco Espírito Santo (BES). Headquartered in Lisbon, it maintained control of Banco BEST. Similarly, Novo Banco dos Açores was also established in 2014 after the collapse of Banco Espírito Santo dos Açores and is headquartered in Ponta Delgada (Azores islands). As for Banco Eletrónico de Serviço Total (BEST), it began operations in 2001 and is headquartered in Lisbon.

Monese: Established in 2015 in the United Kingdom and expanded its presence to Portugal in 2020.

N26: Established in 2013 in Germany and entered the Portuguese sector in 2016.

Revolut: Established in 2015 and headquartered in London, it entered the Portuguese market in 2017. In 2020, Revolut launched itself as a bank in Lithuania by acquiring a banking license to operate in the EU.

Caixas económicas

Caixa Económica Montepio Geral: Created in 1989 by transforming from Caixa Económica de Lisboa and absorbed a few *caixas económicas* along the years. It currently serves as the main nucleus of a banking group that encompasses Finibanco and Banco Montepio Investimento. From 2019 onwards, it began to adopt Banco Montepio as its commercial name.

Caixas de crédito agrícola mútuo

Caixa Central de Crédito Agrícola Mútuo: Began its activity in 1984 and is headquartered in Lisbon. It is the parent company of Moey!, which was established in 2019.

Subsidiaries belonging to credit and financial institutions

Abanca Corporación Bancaria – Sucursal de instituição de crédito: Began its activity in 2011 and is headquartered in Spain.

Banco Bilbao Vizcaya Argentaria (BBVA) – Sucursal de instituição de crédito: Created in 1999 after the merger between Banco Argentaria and Banco Bilbao Vizcaya. Headquartered in Spain, it acquired Crédit Lyonnais Portugal in 2001.

Bankinter – Sucursal de instituição de crédito: Began its activity in 2016 and holds its headquarters in Spain.

As per Tomás and Valério (2021), this non-extensive list of banking entities represents significantly important banking and credit institutions that currently operate in Portugal, as such the focus of our analysis will logically substantially discuss the activities, services and strategic positionings of key industry players present in this list.

Methodology – Data collection methods and Posterior analysis

The methodology steps and data collection methods were respectively planned and ultimately executed to achieve conclusions that could possibly answer our research question and help us understand the potential outcomes of our analysis. As a consequence, the data collection methods employed in the making of this Work Project can be divided into three main segments: Which data is to be collected, its relevant underlying sources and the method by which said data is to be collected. In fact, these three steps were determined so as to define a blueprint for collecting, processing, and analysing data in an effective and significant manner.

As such, regarding the issue revolving around which data is to be collected, we have identified three main data points: data on the theoretical principles and general definitions of Business Models (from here onwards also mentioned as BM), historical data on the Portuguese banking sector, and finally key indicators of current players that are active within the industry of analysis. As for the data on Business Models in general, the main reason for its recurrence is for it to provide a theoretical basis for this Work Project. Moreover, regarding historical data on the Portuguese banking sector, its motive lies within the need for constructing a timeline of events that can put the concept of the evolution of BM in the Portuguese banking sector into an understandable perspective. Also, by displaying such a timeline, the idea is that the reader is given a certain context as to how BM evolution within Portuguese banks came across a certain number of years, the relevance of the period of analysis in question, as well as possible inferences that might be made

in the conclusion of said timeline. Finally, when it comes to identifying key indicators of currently active players within the industry, the end goal would be to conduct a clustering analysis, which will afterwards be used to make an attempt at defining possible boundaries and distinctions in between each different existing BM which might be present in the Portuguese banking sector.

After defining which data is to be collected, an immediately posterior step would be to iterate characterization and definition of BM in the Portuguese banking sector, based on theoretical principles collected and previously analysed changes that might have occurred within the sector in question. Subsequently, it is relevant to identify, highlight, and determine possible data collection sources that might have been employed in the making of this Work Project. We have identified seven main data collection sources for the purpose of this Field Lab, and those are the following:

The main foundational sources for theoretical principles of BMs in general and BBMs in particular are, namely, Osterwalder and Pigneur's book *Business Model Generation: A Handbook for Visionaries, Challengers and Game Changers* (2010), as well as Rym Ayadi's *Banking Business Models*. As for the main sources utilized in the making of a timeline that describes the Portuguese banking industry's evolution over time are, specifically, *Banco de Portugal*, the Portuguese Central Bank, which notably produced the *Historical Series of the Portuguese Banking Sector* (2018); as well as Tomás and Valério's *Estudos de História Empresarial de Portugal – Banca* (2021). Furthermore, the main sources employed in developing our clustering analysis include Ayadi's aforementioned publications, Earnings reports pertaining to banks, EBA, ECB and financial database BankFocus. Furthermore, it is significant to acknowledge that, in addition to these data sources, we have recently conducted an interview with researcher and industry expert Bernardo P. Marques, who gave us valuable insights and provided us with useful knowledge for the purpose of our Work Project.

Clustering Specific Literature Review

Regarding the topic of bank business models (BBM), a multivariate amount of research, analyses, and studies have been made, and different authors and institutions use different approaches and moreover, come to different conclusions regarding the amount, distinctions, characteristics, and classifications of bank's business models (Demsetz and Strahan 1997; Stiroh 2004, 2006, 2010; Baele et al. 2007; Laeven and Levine 2007; Valverde and Fernández 2007; Demirgüç-Kunt and Huizinga 2010; Altunbas et al. 2011; Ayadi et al. 2012, 2015, 2017, 2019; Ayadi & De Groen 2014; Roengpitya et al. 2014, 2017; Köhler 2015; Mergaerts and Vennet 2016; Farnè and Vouldis 2017). This is part of the reason for which we opted to conduct our own analysis, as given that there is no universal consensus on the matter, we established that our own efforts could perhaps shed a clearer, more concise, and decisive light into the issue.

Our decision was additionally influenced by the fact that even though there are plentiful of studies and analysis on the subject, we found limited efforts for a specific focus on the Portuguese banking sector, as these analyses typically have greater or different scopes than ours. They are generally focused on the international stage, encompassing whole regions such as the Euro Area, North America, Asia, or even a mix of these and other regions.

To conduct our analysis in a fruitful and proper manner, we thoroughly examined and sought to understand studies that have already been published. The first key idea that effectively unfolds this literature review is the different set of approaches that are commonly used for these studies. Each approach is typically reliant on how the author(s) judges what best defines or distinguishes one business model from another, which furthermore relies on how an author envisions and defines a business model or more specifically a bank business model. Not only are there distinctions regarding the use of quantitative, qualitative, or both types of methods, but within each method

there are contrasting approaches regarding variable choice and evaluation, all with their own accompanying reasonings.

Authors that opted for quantitative methods diverge with regards to the type of variables to include, with the main division being the choice between including income base indicators or to restrict the analysis to balance sheet indicators only.

Ayadi (2012) argues that if “banks consciously choose their business models, any (...) analysis should be based on instruments over which the banks can have a direct influence.”, further claiming that performance indicators are “instruments that are beyond the bank’s control”, naming macroeconomic factors as the main reason. Additionally, Roengpitya (2014) simply claims that balance sheet ratios are interpreted as “reflecting strategic management *choices*”, further expanding in his 2017 paper that “In implementing a strategy, a bank’s management has close control over the types of exposures and thus the balance sheet of the institution. Income, on the other hand, tends to vary over time due to conjunctural drivers even if the strategy of the bank has not changed.”. Both authors would use different balance sheet indicators but perform a similar clustering analysis, additionally both authors analyse how banks change their business models over time, and how each business model performs. Income based indicators are used solely as outcome variables for these papers.

In contrast, other authors viewed a bank’s revenue mix and income streams as indicators that can (aid) define a bank’s business model and strategic choices, such as Köhler (2015) or Stiroh and Rumble (2006) who examined banks’ revenue mixes and their respective links with profitability, additionally, Baele et al. (2007) demonstrated in their paper that there is a positive relation between non-interest income share and systematic risk, signalling that income diversification into non-interest income sources tends to be more volatile.

Yet another important paper to discuss is Mergaerts and Vennet's (2016), as in contrast to other authors, they hypothesised the idea of static bank business models invariant over time, as well as conducted a factor analysis as opposed to a clustering analysis. Their factor analysis differed from their peers' clustering analysis as the outcomes of each different variation of business model are their selected indicators.

With regards to qualitative methods of identification of bank business models, the most significant European focused analyses were performed by the European Banking Authority (EBA) (2014b; 2015; 2016). In contrast to quantitative methods, the EBA's analyses were more granular and expansive in the identification of business models, for instance, in their June 2015 paper they identified 12 BBMs, which significantly contrasts with other analyses that are exclusively reliant on quantitative methods, as they only produce 3 to 5 clusters of BBMs.

Furthermore, the EBA justifies their more expansive set of BBMs by stating that simply using balance sheet indicators, key information that pertains to the identification of a BBM is lost, additionally, certain institutions "do not clearly fall under a single business model category but rather combine various types of business lines of activities and funding strategies, among other elements, which makes the institutions fit into several business models." (Cernov and Urbano, 2018). As to the methodology of the EBA's papers, they clarify that "Based on activities, funding and legal structure of banks" their analysts define a set of different business models, wherein afterwards, "the banks are allocated to each of these categories based on expert judgement.", crucially, they performed these evaluations with the help of local supervisory authorities, but even so, the EBA recognizes that "This type of approach, however, suffers from the drawback that it may be prone to errors and subject to human bias."

Cernov and Urbano's (2018) EBA paper, further expands on the EBA's previous papers by mixing qualitative and quantitative methods in their analysis. Due to the completeness of this paper's description and analysis of BBMs, along with its association with a European banking regulator, led us to, throughout our overview of the Portuguese banking industry, predominantly rely on its insights and observations.

Clustering Specific Methodology

Following a careful review of the available literature on the subject, our efforts converged into conducting a clustering analysis akin to that of Ayadi (2016; 2019) or Roengpitya's (2014; 2017). A hierarchical method based on Ward (1963) was used to identify groups of banks with similar balance sheet characteristics, yet distinctly from the aforementioned authors we also included the income-based variable of trading revenues as a percentage of operating revenues to measure exposure to more volatile streams of revenue.

When possible, in an effort to soften outlier data in the data set, we averaged our variable data for the 5 years that spanned our analysis (2017 to 2021), so in our case, a particular Bank-5-year observation is assigned to a business model by the clustering algorithm. Furthermore, all data used in our clustering analysis was collected from the BankFocus database, which is maintained by Bureau van Dijk, a Moody's Analytics company.

Our final model narrowed to a final set of 7 variables that we believe best defines a bank's funding, activities, and Retail-Facing strategic choices (table A1 provides further information).

- Funding and Capital Structure
 - Wholesale Funding – Share of funding that comes from wholesale sources, with the remainder being funded by customer deposits

- Equity¹
- Activities
 - Customer Loans¹ – This indicator is meant to signal the bank’s reliance on more traditional banking activities, it is defined by the amount of customer loans to non-bank customers, additionally these loans are not held for sale
 - TFA – Total Financial Assets: Securities¹
 - Trading Revenues as a % of operating revenues – Trading revenues are calculated using the P&L line, “*Net Trading income (losses) on Securities and Derivatives*”.
- Retail-Facing Strategic Choices
 - Thousands of assets per employee
 - Branches per Billion Assets

Crucially, as other authors note as well, clustering is an inexact science that depends on several distinct factors, and even though the literature on the technical aspects of cluster analysis is extensive, there is lacking evidence as to why certain procedures work better than others² (Everitt et. al. 2001). Considering this, we conducted several “trials” with different configurations and indicators, and the final 7 indicators mentioned above presented the most congruous, consistent, and complete set of clusters.

Following, our initial trials we were also able to observe that both Banco BAI and Itaú’s Portuguese subsidiaries were inconsistent with (1) their data, and (2) assigned cluster, which lead to the swift

¹ Customer Loans, Securities and Equity are calculated as a % of total Assets

² Graph D1 aids in the visualization of the different types of clustering methods, and their respective effectiveness

removal of both banks from the final clustering, however they will be carefully and individually examined further in our analysis.

Finally, a significant drawback of performing a clustering analysis following our configuration is that in case a certain bank has missing data for one or more variables it is immediately excluded from the statistical process, and so the proximity of that given bank-5-year observation to other observations cannot be determined.

Our dataset included many such cases of missing data, as not every bank that operates in Portugal reports its financial data separately to their parent company. This is the leading cause as to why our clustering analysis was only conducted on approximately 75%³ of the most significant banks that operate in Portugal, however it additionally compelled us to collect qualitative data for the most significant banks that operate in Portugal. Employing the use of both types of variables, along with the clustering analysis, our goal is to accurately assign banks to their respective business models, reducing the risks of human error and bias.

Broad Identification of Bank Business Models in Portugal

Firstly, a dendrogram is a tree-like diagram that conceptualizes the hierarchical relationship between observations, and figure A1 represents the dendrogram resulting of our clustering analysis. In our case, it demonstrates the hierarchical relationship between Portuguese banks and their business models⁴. In our dendrogram, the height at which 2 banks are joined together represents how similar their business models are to one another, so for example, Credibom is most similar to

³ Excluding the 3 international digital banks of Revolut, N26, and Monese

⁴ Assuming that our final 7 variables accurately represent differences in choices of banks' business models

Montepio Crédito and Banco Primus, additionally, it is closest in similarity to the retail-oriented cluster than to the Corporate, Private, and Investment cluster.

Continuing with our explanation of the results produced, Figure A4 details the 3 main clusters that our analysis identified, with the values in the radar graph representing the number of standard deviations that each cluster's data lies from the total sample mean, figure A4 initially details 3 clearly distinct set of choices made by the banks in our data set.

Figure A2 outlines the Radar maps of Banco BAI, and ITAÚ which were selectively removed by us during the clustering process for having data that generally had null or near null commonality with other clusters, and in fact a quick comparison with Figure A4 confirms our choice. In later sections of our work, we will further examine these 2 banks.

Figure A3 on the other hand outlines the radar maps of Banco CTT and the Retail oriented cluster (the latter removed of CTT), given their similarities, and given that Banco CTT's product and service offering is exclusively retail focused, it is henceforth included in the cluster.

Credit Cluster

To start, the simplest model of the 3 is the *Credit* model (Descriptive statistics available in Table B1). In terms of funding, it is entirely wholesale funded, which means it relies on other banking institutions, market sources, and/or public funds instead of customer deposits for its funding, to corroborate this data, none of the credit institutions that we analysed offer any sort of bank account.

Funding through customer deposits is a more traditional and less risky manner of obtaining funds, conversely, wholesale funding typically carries some form of liquidity risk for banks, with some academic papers even suggest it as a major determinant of banking vulnerabilities during the Global Financial Crisis (Huang, et al. 2011), (Ayadi 2011).

Activities wise, accessing these institutions websites provides clear evidence of how credit focused they are, and analysing the data, these institutions are heavily involved in customer loans, with the average share of customer loans to assets being close to double that of the Retail-Oriented group (85% vs 49%), figure C4 clearly demonstrates this contrast.

Fundamentally, since these institutions do not take deposits, they can be classified as non-depository lenders. In addition to lending, this type of financial institution may also provide financial services such as credit counselling, debt management, and financial planning, they may also offer more flexible lending policies when compared to other types of financial institutions.

Further, when analysing securities and trading revenues, for both Primus and Montepio Crédito neither of these institutions had any significant trading revenues, and moreover, Primus has an approximate null share of securities whilst Montepio Crédito nears 10%. Credibom however, had a share of securities as a % of assets of 20% and its trading revenues had an impact of 0.9% on operating revenues (stemming from an abnormal value of -4.4% in 2021). Overall, these institutions have a significantly reduced footprint in these types of activities.

Finally, with regards to branches and employees, Cofidis has the highest number of both indicators at 12 branches and over 700 employees ([Cofidis 2023](#)), but nevertheless we were unsuccessful in determining their value of assets, so a size relative comparative analysis to other institutions in the cluster cannot be performed. Notably, however, Cofidis' values are significantly larger than any of the other institutions.

Of the 3 Credit institutions in our clustering analysis, Credibom is the largest asset wise at over 5x the size of either Montepio Crédito or Banco Primus. Despite this, Credibom has the same number of branches as Montepio Crédito, of 2, whilst Banco Primus has 5. This difference in approaches

to branches explains the large disparity between the minimum and the maximum values in the Branches indicator visible in table B1.

Furthermore, the contrast between Credibom's relatively large size (12th biggest out of 30 banks⁵) and its extremely reduced number of branches gives it the second smallest number of Branches per billion assets of 0.74, far below that of Montepio Crédito's 3.64 or even the Retail-Oriented's cluster smallest value of 6.7. Given the nature of Credibom's activities and customer type, the dichotomy of large asset size despite a lack of branches led us to conclude that their non-physical direct channels (online, and mobile) are most likely a crucial part of Credibom's business model, furthermore, a look at their employee count relative to its assets points in the same direction⁶.

With regards to employees, this cluster has the smallest value of thousands of assets per employee at a mean value of 4811, but as figure A4 demonstrates it is merely -0.5 standard deviations from the full data set's mean. Within the cluster, Banco Primus has a slightly greater number of employees than Montepio Crédito (137 vs 127) and slightly smaller asset size (470M€ vs 550M€), which results in a somewhat smaller number of assets per employee for Banco Primus, in all likelihood related to it having more branches than Montepio Crédito.

Credibom however, has ~3x the number of employees (407) as Banco Primus, but its asset size of 2.7B€ is 5x that of Primus', logically then, Credibom has a significantly greater amount of assets per employee when compared to Banco Primus, which signifies that even though it has a larger size, Credibom's number of employees did not increase proportionally to its size comparatively with Banco Primus or Montepio Crédito.

⁵ Also accounting for banks that were not included in our quantitative analysis due to a lack of data, but for which asset size data was available, such as Bankinter, Abanca, BBVA

⁶ Credibom's "[About us](#)" page additionally states "(...) having later extended its area of activities towards Direct Channels, specialized in solutions for final customers, where it has since reenforced its presence."

In-Depth Analysis of Digital Banks' Business Model

In the following analysis, we will base ourselves on the 9 building blocks framework theorized by Osterwalder and Pigneur (2010). This conception of what a business model is composed of and what each of its elements signify serves as a suitable blueprint for a general definition of any business model and as such, for this specific purpose, it serves as a suitable form of mapping digital banks' business models. Thus, in the following paragraphs, we will analyse how business models of digital banks typically go on about their business, namely which customer segments they will target; which specific value proposition they will adopt to serve these customers; by which channels will digital banks reach and deliver value to their customers; what kind of relationships will these banks build with their customers; from which sources will digital banks generate revenue; what key resources, activities and partnerships will these banks be required to possess, execute and develop, respectively, in order to generate revenues; and on which cost structure will all these activities be based on. By following this approach, we will analyse with extensive detail every single one of these nine building blocks in order to better understand the intricacies and the inner functioning of digital bank business models, as well as to put them in the context of an in-depth analysis within the ambit of this Work Project. Subsequently, digital bank business models are typically characterized by the following elements:

Channels

By belonging in Osterwalder and Pigneur's framework, channels allow companies to deliver value propositions through communication, distribution, and sales channels which can be owned by the bank or outsourced (Osterwalder and Pigneur 2010, 28). All in all, it comes down to how companies communicate and reach their customer segments. In the case of digital banks, the most identifiable characteristic of digital bank business models is that their channels are fully digital. The ways in which channels are divided can be described across five identifiable phases: Awareness, Evaluation, Purchase, Delivery and lastly After-sales (Osterwalder and Pigneur 2010). To begin with, awareness endeavours to provide an answer on how to raise buzz about the company. To do so, digital banks typically use digital channels such as their social media platforms like Instagram, Facebook, and others (Forbes 2021) who provide a seamless experience (King 2019). At the same time, referral programs help the brand with word-of-mouth advertising since customers get money from bringing new people into the platform. The second phase, **evaluation**, focuses on helping customers assess the organization's value proposition. Thus, in this case, digital banks clearly communicate the benefits of their products in a way that is convincing and more appealing than that of its competition, as well as by highlighting differentiating points and provide proof points that demonstrate the effectiveness of offers (Osterwalder and Pigneur 2010). This can be evidenced by the fact that most digital banks externalize their offerings by leveraging their digital marketing resources and by utilizing digital channels as a mean of reaching out to customers. When it comes to the third phase, **purchase**, it shares the same infrastructure as the **delivery** phase since these two activities are done via their digital resources, especially mobile banking. Via these means, banks are thus faithful to their value propositions by promising new services that meet unmet needs and that are more agile on whichever channel is chosen (Kellum *et al.* 2021). The purchase process can

be executed and upgraded at any time, which does not happen in the case of traditional banks, as these have physical branches that work on a short regular schedule during the week and do not operate on weekends. Digital banks do not have branches, meaning the marginal cost of a new client is more efficient since it does not upbring rent or other unnecessary overhead expenses (King 2019). In addition, the launch of new products or services such as cryptocurrency or precious metals and commodities creates more attention and distinctiveness to the brand (Revolut 2023), as traditional banks do not currently offer most of the aforementioned. Consequently, there is a main focus on the mobile app where customers can perform all their activities, purchase new services and get them instantly in the same platform. Furthermore, **after-sales** are crucial to all businesses. Notably, they generate customer satisfaction and better retention by generating loyal customers and increasing brand value, given that customers will gain the perception that the organisation is also focused on solving any problems that might arise and they will want to stay with the bank longer (Kotler and Kevin 2006). For instance, time-to-time calls to verify if the customer is satisfied with the offered services, constant customer support services and surveys to understand customer happiness are some ways of establishing sound and efficient after-sales channels. Moreover, the 24/7 customer support proofs that these entities are concerned about the well-being of their customers and their satisfaction.

Customer relationships

The Customer relationships building block describes the types of relationships a company undertakes within the different customer segments it aims to serve. As customer relationships may be of a distinct nature, a company should set its foot on what kind of relationship it wishes to build and maintain with each and every existing customer segment (Osterwalder and Pigneur 2010, 28).

In what regards customer acquisition and retention, digital banks often opt for offering online and personal customer assistance, accompanied by a user-friendly digital platform where customers can easily navigate through its interface and explore the different options that constitute the bank's offering through its digital application. Also, digital banks bet on constant and regular communication with clients and updates on their platforms, whether to improve its performance, user experience or accessibility. The preferred means of communication of digital banks is usually either via their digital platforms or applications or via email marketing content. Finally, digital banks strive to offer secure and reliable banking services, which can be considered a trust-building factor. By ensuring that their clients' money is safe and sound, digital banks are then able to guarantee the establishment of long-term relationships with their customers, who in return will feel safety and will remain loyal to these banks (Forbes 2023).

Revolut, for instance, has adopted a customer-centric approach where its aim is to provide its customers with a top-flight experience by initiating the Deliver WOW project, whose objective is to keep customers as close as possible by taking in their feedback and redirecting it to its Products and Services team in order to envisage and work out potential improvements to be implemented into the platform (Revolut 2021). Considering that it comes from the fastest growing player in the digital banking sector, it can be said that these kinds of projects may soon become the norm for other players in the market, should these wish to keep up with the incumbent in question.

However, digital banks still struggle to gain trust from society and to be the primary bank of customers (FintechTimes 2020) because the relationship is purely digital and impedes other market segments from being attracted. In case of any problem, everything needs to be sorted out with the specific channels and not face to face like in every traditional bank. Moreover, older segments – which are also segments that trust digital banks less - are thus less familiar with IT solutions

(Ekberg 2015). Indeed, it is mentioned that people tend to stick with the banks that they grew up with, which represents a major obstacle for neobanks given that it is deeply rooted within in their culture (FintechTimes 2020) as well as key events in life such as buying a house, saving for university tuitions and retirement planning, all of which are part of what legacy traditional banks usually offer (EY 2021). To create brand awareness and attract customers, digital banks tend to offer lower prices and new products as well as vow to move beyond financial literacy-related content via the introduction of new topics (McKinsey 2022) that are advertised through their channels.

Revenue Streams

The revenue streams represent the cash a company generates from each customer segment (Osterwalder and Pigneur 2010, 29) and in this specific business model they can generate different streams. Firstly, there are usage and subscription fees that clients pay to have access to different services and advantages that the bank offers with different types of accounts (Menegon 2020). All these banks have different plans and, if we take the example of Revolut, they start with a standard account plan with the minimum of specifications where the customer has a limited number of ATM withdrawals, no cashback on card payments, no priority customer support and higher fees on investments. As the **subscription plans**' price level increases, their underlying benefits also increase. Plus, accounts also come with insurance coverage, protection against thefts and refund protection that costs 2.99€/month, as well as the premium plan with a cost of 6.99€/month which offers larger ATM withdrawal limits, cashback on payments and travel protection (flights, baggage loss and airport lounge access). Lastly, Metal – an upgrade on premium - accounts come with a cost of 12.99€/month and with access to all features, higher insurance, travel and theft protections and also lower fees on crypto and stock operations (Revolut 2023). **Interchange fees**, another type

of revenue stream, are fees that neobanks get when customers make payments with their cards in which the bank typically collects a small percentage of sales coming from the associated seller (Finance Magnates 2022).

Additionally, **brokerage fees** can also be a source of revenue for banks that act as intermediaries between the customer and the broker company, allowing trading of stocks and cryptocurrency services (Revolut 2023). Moreover, in the case of Monzo, there is a revenue type that comes from provisions of overdraft (Menegon 2020). In this case, banks set aside a determined amount of funds to cover overdrafts and charge smaller fees than other overdraft protections. As a result, this is useful for customers who need extra-money since they allow customers to withdraw more money than what they have available, thus charging smaller fees for the final user (Menegon 2020). Also, **API connection fees** generate revenues for neobanks by allowing third parties to access their APIs to create apps that use their information and create future partnerships or products (Sullivan 2022).

Key Resources

Every firm requires key resources in order to perform and develop their business, and by saying this, it is specifically important to say that these are considered the most important assets to make a business model flow (Osterwalder and Pigneur 2010, 40). Without these key resources it is not possible for firms to deliver their promised value propositions, to reach specific market segments that they could possibly want to target, maintain, and establish relationships with their target segment and lastly earn their revenues (Osterwalder and Pigneur 2010, 40).

Moreover, regardless of the fact that this concept might suggest about the kind of physical resources that companies have, it extends beyond the simple definition of the word. These resources can be thus categorized into four major categories: Physical, Intellectual, Human and Financial

(Osterwalder and Pigneur 2010). First, the physical dimension englobes all the physical assets possessed by the company, such as buildings and other infrastructure that allow the bank to perform its activities. Since technology is the key pillar of this business model, it “obliges” neobanks to purchase and have in their possession data centres, computers and physical drivers which are of extreme importance for them. Secondly, all the intellectual aspects like patents, copyrights, partnerships and software that whose absence hinders fintech banks’ operations, since they rely on their technology and software to run their apps, customer support and eligibility of information (Osterwalder and Pigneur 2010). Branding also applies in this segment and it is very important for the business model since clients create associations with the brand itself that lead to better results in the future by developing a strong bond (Ashurst 2016).

To add up, human capital is a key dimension since, without humans, all the knowledge and creative processes are lost, and the app would simply be a set of processes without human interaction. Moreover, the inexistence of human capital would mean that all technological processes and innovations would not exist, since they were created by humans. Specifically, N26 focuses on having a team who has around 1500 people and more than 80 nationalities which contributes not only to the diversity in the workplace, but also to the process of idea generation and a better and more personalized help to the customer in this big group of languages spoken by the employees (N26 2023). These employees also search for the best talent with the goal of continuing to be on the edge of innovation and product offering in the sector. Lastly, regarding the financial dimension, it is important to highlight that not only Revolut but also N26 started as start-ups in the area of banking so the first steps of funding/finding the right partners was extremely relevant for them to succeed. In a similar way, one important key financial indicator that helped in the creation of neobanks was **external funding** since all these banks started as start-ups (Gupta and Tham 2018)

and thus required a certain scale to perform some financial activities like providing loans. While depending on external sources of financing might appear as a potential weakness, it is however critical for early-stage digital banks to achieve scale on their operations. In addition, digital banks also need to achieve and build a strong brand to gain customers by providing satisfactory customer service and brand awareness while being dependent on these VC (RFS 2022). Moreover, since the larger part of the pie of clients' money is in traditional banks, and neobanks are used for daily activities, the money that these banks have in deposits is not enough to provide new loans and results on counting on external funding representing a higher cost comparing with the traditional model (Accenture 2021).

Key Activities

The Key Activities Building Block refers to the most relevant actions/activities that a company must undertake to make its business model work (Osterwalder and Pigneur 2010, 36).

The major and most required activities of digital banks are **software engineering** and **product development**. Since digital banks follow a platform-centric model, they strive to develop a user-friendly mobile application in order to successfully deliver the intended value proposition, thus solving customer problems and satisfy their needs (Finnovate Research 2018). Additionally, through machine learning models, some digital banks are offering customer protection in detecting and preventing fraud (Revolut 2021). Through innovation and product development related capabilities, neobanks are then able to launch and improve customer-focused products, which enable customer retention and attraction (Monzo 2022).

As digital banks follow a customer-centric approach, **data analysis** is a key activity as it enables to gather customer insights and deliver personalized services (Finnovate Research 2018, 27).

Gathering these insights fosters innovation, leading to a more flexible model, which in turn becomes more responsive to customer preferences and needs. Leveraging customer data also has the benefit of enabling cross-selling (Deloitte 2022, 27).

In order to maximize user experience and customer satisfaction, digital banks highly rely on **customer support** as one of their key activities. To ensure customer support, neobanks mainly rely on live chats, email, and automated chats, despite some neobanks still not possessing some method of personalized support (Chong 2020). Artificial Intelligence is widely used by digital banks in chatbots, with the objective of offering a more sophisticated assistance experience (Fintech News 2018). The insights from customer support can present themselves as valuable inputs for digital banks to further optimize their customer journey in the future (Revolut 2021).

Another important aspect of digital banks' main activities is that of **marketing** efforts. By targeting the aforementioned customer segment, digital banks must develop a proper marketing campaign that is able to attract and retain customers. One possible strategy would be to emphasize their superior value relative to that of traditional banks, while educating a sufficiently high number of consumers about services offered by digital banks that traditional banks do not currently offer (Temelkov 2022). This can be achieved through continuous and intensive exposure to social media channels, where the target segment is mostly present, and it would also be coherent with the platform-centric approach adopted by digital banks.

Strategic Advantages of Digital Banking Business Models

By analysing digital banking business models in-depth, several advantages are generated. Firstly, the customer-centric organisational design feature can be considered one of the main advantages of this business model. While the traditional banking model displays a product-centric organisational design, the digital banking model deeply focuses on addressing customer needs, such as speed, transparency, lower costs, user experience, and improved financial wellness (Finnovate Research 2018). By addressing these needs and offering a customized, convenient, and easy-to-use service to its customers, digital banking models create unprecedented value to customers, which translates in their ability to acquire new customers by solving the main customer pains, thus distinguishing itself from the traditional model.

Additionally, a major advantage of digital banking business models is the leveraging of their most important resource, which is that of technology. As digital banking companies adopt Fintech within their business model, digital transformation has a major role in the fast-changing financial industry (Martinčević *et al* 2020). One of the key technological innovations in the banking industry that digital banking models rely on is Application Programming Interface (API), which allows other developers to create functionalities on top of their existing infrastructure. By using APIs, digital banks explore opportunities to expand its customer base, to monetize data, and also creating new financial products (Finnovate Research 2018, 18-19; Martinčević *et al* 2020). Moreover, by using automated robotic processes, digital banks reduce manual processes, assuring that employees focus on decision-making and other important activities. Also, the use of blockchain technology enables banks to massively decrease processing costs (Martinčević *et al* 2020). In addition, Artificial Intelligence enables digital banks to improve its customer support, thus overcoming customer service challenges faced by traditional banking (Fintech News 2018). By leveraging technological

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capabilities, digital banking players also focus on Personal Financial Management, delivering personalized insights and aiming at improving users' financial wellness (Finnovate Research 2018). To add up, a major advantage of digital banks' business models is the inexistence of legacy technology infrastructure unlike traditional banks, in which digitalization initiatives require much larger investments. This leads to another advantage of the business model, which is the agility to respond to market needs that these banks possess (RFS 2022). Instead of relying on existing IT systems as traditional banking does, digital banking business model create their own system, a network with several elements operating together, allowing these banks to implement changes in around 2 weeks, in opposition to 3 to 6 months for traditional banking players (Oliver Wyman 2019). Thus, due to the branchless characteristic of its business model and technology orientation, digital banks can respond to changes faster and implement new features into their service-offering (Hopkinson *et al.* 2019).

Another advantage of digital banking models is the fact that it possesses a higher cost efficiency when compared to the traditional banking model. As digital banks are branchless, fixed costs are lower and so are distribution costs. Additionally, the product set is also simpler, and the operating models are leaner (Finnovate Research 2018). Moreover, both Lifetime Value and Customer Acquisition Cost are more effective in digital banking models. Both metrics are important for digital banking firms as they do not present the long market presence and solid customer base that traditional banking do (Synpulse8).

Moreover, marketing in digital banking business model is a very important activity to reach potential users and expand the current customer base. For a digital bank, marketing is about finding the simplest way of reaching potential customers and transmit and convince them of the value that the bank is creating and delivering (Bulgar 2023). Due to the branchless characteristic of its

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business model, digital banking players almost exclusively rely on digital marketing, unlike traditional banking models, and thus they possess a strategic advantage by relying on marketing channels that traditional banks do not use. For instance, by leveraging referral marketing, affiliate marketing, and influencer marketing, neobanks are able to communicate to potential customers its trustworthiness, which is one of the key aspects that financial institutions should target and how potential users should perceive the business (Bulgar 2023). Also, as a way to address basic human needs of belonging and sharing, many digital banks use community marketing, fostering long-term relationships with customers (Bulgar 2023). For example, Revolut uses digital channels such as social media, tube ads and referral campaigns in order to acquire and retain customers, creating a strong community (Menegon 2020). The focus on digital channels by neobanks is especially relevant and even a stronger advantage in the context of Covid-19 pandemic, as it is expected an increase of 19% in mobile banking and 26% reduction in branch usage after the pandemic (BCG 2021).

Vulnerabilities of Digital Banking Business Models

When taking into account the vulnerabilities present in digital banking business models, there are several which might pose as plausible candidates for this particular business model's case. Thus, six types of vulnerabilities have been identified: Those related with customer acquisition and retention, third parties, profitability, impersonality, venture capital dependence and lastly the branchless characteristic.

Firstly, regarding customer acquisition and retention, while some efforts might have been deployed by digital banking entities towards community building and general marketing objectives, a latent lack of loyalty programs still remains - which incumbent traditional banking entities usually employ - that can be targeted towards customers and their needs, which might even pose as an

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incoherence regarding the fact that digital banking companies utilize the concept of customer centricity as a flagship slogan. Taking the Bank of America as a credible example, its employment of loyalty programs has achieved a 99% retention rate and has even doubled the number of products held per program participant (Accenture 2023, 23). Also, there happens to be a noticeably siloed approach to product development, meaning that banks may actually have products or services that customers demand, but end up not getting due to poor integration within the banks' channels (Accenture 2023, 29). While this is also linked to rewards, a study has found that less than 15% of leading banks provide any sort of reward or loyalty compensation to their customers for increasing the number of products in usage, or even for increasing frequency of transfers and payments through the banks themselves (Accenture 2023, 19).

Regarding third parties, it is verified that digital banking business models boast some degree of dependency on a number of entities, partnerships, suppliers, and activities such as crypto-exchange services, payment processing entities and regulatory compliance entities.

By depending on those, digital banking companies expose themselves to a great deal of risk and uncertainty should any of these services and entities fail, for some reason. Thus, digital banking companies are then stuck in a low bargaining power loop, which could prove to be difficult to steer away from. In addition, challenger banks such as Revolut, N26 and other similar digital banking entities are usually excessively dependent, especially in an early-stage phase, on partnerships of that nature that provide them with resources and capabilities that they cannot replicate or develop internally at a certain level, while their traditional banking counterparts have already managed to establish a years-long positioning strategy and other types of relationships with their customers (Menegon 2020). This is tied to the ever-relevant concept of the "Make vs. Buy" continuum that is stated in vertical diversification theories, where transaction cost economies play a crucial role in

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determining whether a firm must develop its activities based on majorly internal resources or whether it should rely on market factors to execute them (Walker and Weber 1984). In conclusion, digital banking companies lose competitiveness by engaging – or letting themselves be engaged with – entities that provide services or capabilities that could be otherwise developed by challenger banks.

Another case whose relevancy remains urgent is that of profitability. While challenger banks might pose as an attractive, lean, agile and even flashy alternative to traditional banking businesses, its lack of profitability so far has proven to be somewhat alarming. In fact, profitability rates across digital banking companies have shown anything but exciting promises, as only 5% of neobanks have been found to have turned a profit (that is, to have reached operational breakeven) as of 2022 (Simon-Kucher 2022). This can make the case that, for the most impatient shareholders, time might be about to run out regarding the financial backing they might be able to potentially provide, as well as the fact that it does not bode well for a bank that states itself as “secure” and “reliable” to remain unprofitable for relatively long periods of time. In addition, another fact that proves that digital banking companies are still a cash-strapped alternative to their traditional banking counterparts happens to be that, as of current times, the revenue side of digital banks typically does not exceed single digits per client (Simon-Kucher 2022). Given these facts, digital banking companies are thus urged to turn a profit as soon as possible, upon threat of losing their customers, their shareholders and, ultimately, their very own existence.

Moreover, impersonality has been found to act as a potential vulnerability for digital banking companies. The absolute lack of human interaction when engaging in customer support and in-app activities is a characteristic of digital banking business models that could potentially be self-destructive, as for instance 44% of customers aged between 18 and 44 years old have stated to have

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found difficulties when attempting to reach customer support channels (Accenture 2023, 12). This can be particularly worrisome for digital banking entities, given the fact that their target base of customers lies exactly within that specific age range, and very much damaging as well, since this concern can rapidly lead customers to switch banks and perpetually dampen their trust and loyalty towards digital banking companies. This concern is mainly linked to “emotionally devoid primary channels”, which denote a lack of human interaction and consequent dissatisfaction stemming from it, as digital banks cannot sell their products or even provide meaningful advice to their customers without some form of human intervention (Accenture 2023, 12).

Furthermore, the excessive dependence on venture capital by digital banking entities may prove to harm their profitability, their underlying assumptions regarding a going concern, and ultimately their own survival. As VC transactions have been historically common, especially when dealing with promising start-up-style digital companies, it is not exactly surprising that digital banking companies may also engage in these kinds of activities, given their innovative edge (Faria and Barbosa 2014). However, such strategies could pose enormous risks when considering that venture capitalists typically expect a return on their investment in a period comprised of 5 to 7 years. Given that, as previously mentioned, digital banking entities have not proven to be exactly profitable, a growing concern might be on the horizon for VC backed digital banks which have still not been able to turn a profit after the aforementioned period, thus risking default and compounding debt owed to these entities (Simon-Kucher 2022).

Another potential vulnerability that could affect digital banking business models is that of low product variety and diversification when compared to traditional banking entities. As stated above in the Value Propositions section of the digital banking business model in-depth analysis, traditional banking entities have by now caught up with disruptive challenger banks and have

Conclusion

Our thorough analysis of the Portuguese banking industry's complexities and underlying composition, along with our evaluation of the business model of digital banks, and how it exists in the Portuguese market, has shown that the fundamental characteristics of the digital bank business model of possessing a customer centric value proposition that leverages technology and embraces digitalization to create and deliver value to its customers were key to their initial and relevant growth in the Portuguese banking industry. These characteristics of the business model allow digital banks to offer more personalized innovative financial products and services that deeply address changing customer needs and main pain points felt by several of the targeted segments of traditional retail banks.

Also, the need for more personalized, agile, and simultaneously easy to use banking alternatives led customers to seek digital solutions that would save them time and money, which prompted them to quickly adopt novel ways of executing their banking operations, either on a short-term or a long-term basis. Besides the obvious branchless characteristic that majorly defines them along their constant availability via online channels, the ability to maintain a lean operating structure, controlled costs and efficient customer support has allowed digital banks to thrive in an ever-increasing digital world that encompasses individuals with evolving needs and wants. Further expansions of this particular business model are, thus, subject to constant improvements and overhauls. As the online and digital channels will remain relevant for the foreseeable future, digital banks have thus a large potential for growth, only limited by technology advancements themselves.

Crucially however, Portuguese market incumbents have not remained static throughout this period and have focused on adapting and implementing many of the key differentiating valuable attributes of the digital bank business model. Presence in digital channels has become ubiquitous within the

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Portuguese banking industry, and certain banks have additionally increased their product offering to reflect their ever-growing process of digitalization.

One of the threats that digital banks must consider refers to the fact that traditional retail banks are becoming more digitalized by developing or outsourcing technological capabilities. Thus, the benefits created by both digital banks and traditional retail banks can become less perceivable to users. Moreover, retail banks possess a strategic advantage in terms of loyalty and customer retention, as they leverage the proximity to customers created by their physical presence (branches) and their extended breadth of complex services that renew and prolong the vows of trust in their customer relationships. To respond to this threat, it is recommended that digital banks expand its product offering, both in terms of banking and non-banking products and services. By doing so, digital banks can explore additional and profitable revenue streams and customer segments, widen its customer base, deepen the relationships with its customers and explore cross-selling and up-selling opportunities. Also, by taking advantage of its customer-centric value proposition, digital banks should strive to deeply understand the roots of customer needs and solve them, when providing this new set of products. Customer-centricity, as one of the main pillars of the business model of digital banks, continues to play an extremely relevant role and should be a priority when implementing the recommended product portfolio expansion, thus creating additional value for customers when providing products that were only available under retail banks portfolio.

Moreover, other threats that must also be taken into consideration include those posed by conglomerates such as Apple or Starbucks, which have entered the fray of banking services. By providing distinct offerings regarding credit scoring, payment systems automation and loyalty programs within their respective platforms, these MNEs could surely leverage their technological and logistical capabilities in order to compete with all sorts of banks, whether they may be of retail

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or digital nature. To counter this threat, a recommendation regarding the adoption of Banking as a Service practices and the optimization of payment systems is due. As for adopting BaaS practices, digital banks are recommended to outsource their banking infrastructure resources and capabilities as a means of providing non-financial entities with a way to offer financial products to their customers. Since the development of such services in-house would suppose a great amount of capital expenditures, oftentimes the “Buy” option within the “Make vs. Buy” continuum is preferable, especially when considering the vast amount of cash these multinational companies have when compared to, for instance, Portuguese SMEs or smaller online businesses. In addition, when countering payment systems innovations by other giant incumbents and other traditional retail banks, digital banks can profit from one of the most innovative environments when it comes to payments and join SIBS’ MB Way network. This way, digital banks would greatly benefit from network effects stemming from it and serve as a quick, reliable, and valid alternative to their retail counterparts, all the while remaining in a fully digital context. Finally, by partnering with other businesses and specially focusing on Portuguese SMEs, digital banks would then be able to foster their relationships with other businesses and, as such, enhance their footprint among the Portuguese corporate fabric.

In conclusion, digitalization in the Portuguese banking industry along with the assertive entrance of digital banks has disrupted the Portuguese banking industry and is expected to continue doing so. Digital banks have the potential to offer innovative products and services that traditional retail banks cannot, but they also face unique challenges. By following our recommendations to expand into the lending market, and other financial and non-financial services, along with the introduction of BaaS and payment systems, digital banks in Portugal can stay ahead of the curve and continue

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to create and deliver value to their customers, as well as capturing value so that the business model remains sustainable and competitive in the future.

Assumptions and Limitations

In the making of this Work Project, several assumptions and limitations were found that were deemed relevant to be mentioned, in order to shed a clearer light on some topics which might lead to ambiguity and overall doubts regarding its validity, origin, veracity and accuracy of the data presented, as well as some of the information described. As such, the following limitations were defined:

Regarding data and variables, the assumption was made that the final seven variables existent within the underlying clusters accurately represent differences in the respective choices of bank business models. In terms of legal and regulatory, an assumption was made that digital banks either possess a legal banking license or else the capabilities to partner with a bank that has one. Moreover, an assumption was made regarding *Ceteris Paribus*, which states that economic indicators that are relevant to banks in general to remain relatively stable within the period of writing this Work Project, keeping everything else constant.

In addition, regarding technology and innovation, it was assumed that technological resources and their respective availability will remain stable and accessible, as well as the fact that banks, especially the digital ones, are able to gather financial resources to maintain their technological infrastructures and improve upon the stated recommendations.

Regarding the underlying limitations, the following were defined:

When it comes to data and privacy, there is the understanding that all banks must act and perform in compliance with data privacy protection laws and regulations. Moreover, regarding partnerships,

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partnering and collaborating with other banks, whether these are of digital nature or not, may be challenging due to limited transparency and lack of proprietary information. Finally, when talking about long-term survival recommendations made for digital banks to thrive within the Portuguese market were implemented knowing that factors such as profitability, customer acquisition and retention, scalability and competitive intensity are uncertain and thus bound to change.

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APENDIX F

Table F1

Bank	Key activities Performed							Final Business model classification	Initial Cluster allocation					
	Retail activities				Corporate, Private, and Investment									
	Take retail deposits	Personal Lending	Full spectrum retail activities	Basic Business services	Private Banking	Intermediate complexity Business services	Corporate & Investment Banking services							
Credito Agricola					Limited in scope			Cooperative Banking	n.a					
ActivoBank					Recently expanded			Digital Bank						
Banco Best														
BPG (Currently)								Savings Bank						
Banco CTT														
Novo Banco dos Açores													Universal Banking	
Novo Banco														
EuroBic														
Santander														
BPI														
BBVA														
Bankinter														
Abanca														
Atlantico														
BNI Europa		Limited												
BAI	Limited in scope													
Caixa Geral de Depósitos							Through subsidiary	Through Subsidiary						
BCP														
Montepio														
BPG (Before Cutback)	Limited in scope													
Invest														
BIG								Specialized in investments						
L.J. Carregosa										Private Banking	n.a			
ITAU										Private and C&I Banking				
Finantia														
Haitong														
Caixa - BI														
Bison						C&I Banking								
Custodian + C&I Banking														
Montepio Credito									All encompassing personal loans					
Credibom														
Banco Primus														
Cofidis														
Oney	Credit + Complementary specialized service													
Finaceira E.C.I. Portugal														
Sofid														
Unicre														
Finanfarma	Auto-Loans ³⁹													
321 Credito														
FCA Bank														
BMW Financial Services														
Credit Agricole AutoBank														
VW Financial Services														
Mercedes-Benz Financial Services Portugal														

³⁹ BIG' s activities do not adequately fit any of the previously discussed business