ISCTE Business School
Instituto Universitário de Lisboa

THE EXPECTED IMPACT OF THE PAYMENT SERVICES DIRECTIVE 2 IN PORTUGAL, AT THREE LEVELS: CONSUMERS, TRADITIONAL BANKING AND FINTECHS

Joana Sofia da Silva Ferreira

Dissertation submitted as partial requirement for the conferral of

Master in Finance

Supervisor: Prof. Paulo Viegas de Carvalho, Visiting Assistant Professor, ISCTE Business School, Department of Finance

September 2019

Resumo

A indústria bancária está a mudar significativamente devido a alterações nas expectativas dos clientes, à inovação inerente à tecnologia e a nova legislação, como a Diretiva dos Serviços de Pagamento revista (DSP2). Como resultado desta diretiva e com o objetivo de aumentar a integração, a eficiência e a competição no mercado europeu de pagamentos, os bancos passaram a ter que partilhar informação sobre contas e iniciação de pagamento com terceiros.

Esta dissertação visa avaliar o impacto esperado desta diretiva a três níveis diferentes: consumidores, bancos e fintechs. Devido às suas características distintas, cada nível foi analisado de maneira diferente, nomeadamente: o nível do consumidor através de uma análise quantitativa, com questionários; os outros dois através de uma análise qualitativa, com entrevistas semiestruturadas.

Em relação aos consumidores, ficou claro que existe uma grande confiança nos bancos e que, embora ainda estejam apreensivos em relação aos novos serviços, a recetividade em experimentá-los é consideravelmente maior se estes forem fornecidos por uma instituição financeira.

Os bancos consideram que a confiança dos consumidores é o seu principal ponto forte para lidar com esta mudança e admitem ir além da estratégia de conformidade exigida. Comparativamente a outros países europeus, eles também destacaram que esta conformidade foi garantida de maneira atípica, devido à intervenção da SIBS.

Tanto os bancos como as fintechs confirmaram que, para alcançar as oportunidades de negócios promovidas pela DSP2 e superar fragilidades atuais, estão abertos a estabelecer parcerias. Nesse sentido, é possível afirmar que há um clima de cooperação no mercado português.

Palavras-chave: DPS2, Bancos Portugueses, Fintechs

Classificação JEL: G21; G28

Abstract

The banking industry is significantly changing due to the shifting customers' expectations, technology-driven innovations and crucial regulatory changes such as the revised Payments Services Directive (PSD2). As a result of PSD2, European banks need to share account information and payment initiations information with third-party providers, in order to increase integration, effectivity and competition on the European payment market.

The purpose of this dissertation is to assess the expected impact of this regulatory change, at three different levels: consumers, banks and fintechs. Due to their distinct characteristics, each level was analysed in a different way: the consumers' level through a quantitative analysis, with the use of questionnaires; the other two through a qualitative analysis, by conducting semi-structured interviews.

Regarding consumers, it became clear that banks are highly trusted and that, although they are still unsure about the new services, the willingness to try them is considerably higher if the player is a financial institution.

Banks believe that the trust consumers have in them is their major strength to cope with this change, and they are willing to go beyond the required compliance strategy and head towards an open banking approach. When compared to other European countries, they also highlighted that compliance is assured in an atypical way, due to SIBS' intervention.

Both banks and fintechs confirmed that, in order to achieve new business opportunities and overcome weaknesses, they are open to establish partnerships, reason why it is possible to state that there is a cooperation trend in the Portuguese market.

Keywords: PSD2, Portuguese Banks, Fintechs

JEL Classifications: G21; G28

Acknowledgments

I would like to begin by showing my gratitude to Professor Paulo Viegas de Carvalho, for his availability and guidance throughout these months.

To my parents, the most sincere thank you for the unconditional love, motivation and support. Thank you for allowing me to get this far and believing I could make it, even when I did not. I guess you were right all along. I would also like to thank my brother and Ana for being a huge support. This thesis is also yours.

Then I would like to thank Luís, Pedro, Micaela, Márcia, Margarida and Tiago and my Master' colleagues André and Margarida for keeping up with my stressful moments. You have proved once again what strong friendships are made of.

Finally, I would like to share that doing a master's thesis and working full time at the same time is a tremendous challenge. Luckily, Vodafone made it so much easier. Fátima and Francisco, thank you for being the best colleagues and mentors I could ever have asked for.

Contents

List of figures

List of tables

List of Acronyms

AISP(s) – Account Information Service Provider(s);

APB – Portuguese Banking Association;

API(s) – Application Programming Interface(s);

APP(s) – (Computer or mobile) Application(s);

ASPSP(s) – Account Servicing Payment Service Provider(s);

ATM – Automatic Teller Machine;

DFS – Digital Financial Services;

EU – European Union;

GAFAA – Google, Apple, Facebook, Amazon and Alibaba;

GDPR – General Data Protection Regulation;

GFC – Global Financial Crisis;

GVIF – Generalized Variance Inflation Factor;

IBAN – International Bank Account Number;

IT – Information Technology;

KYC – Know-Your-Costumer;

KYT – Know-Your-Transaction;

MVP – Minimum Viable Product;

NUTS – Nomenclature of Territorial Units for Statistics;

PISP(s) – Payment Initiation Service Provider(s);

PSD1 – First Payment Services Directive;

PSD2 – Second or Revised Payment Services Directive;

RTS – Regulatory Technical Standards;

SCA – Strong Customer Authentication;

SEPA – Single Euro Payments Area;

SWOT – Strengths, Weaknesses, Opportunities and Threats;

TTP(s) – Third Party Provider(s);

1. Introduction

Banks have enjoyed a comfortable position for a long time, mostly due to a steady business development and an almost static competitive environment. However, due to a shifting consumer behaviour, technological-driven transformation and regulatory changes, they are now facing the challenge to adapt themselves in order to sustain competitiveness and reduce the risk of being left behind.

Fintech can be defined as the use of technology to deliver financial solutions (Arner *et al.*, 2015). Nonetheless, the term fintech can also be used to label startups or companies that are leveraging the financial market technological solutions. Even though there is not a unique concept, the increasing relevance of fintechs is undeniable.

Additionally, in terms of regulations, the revised Payment Services (henceforth, known as PSD2) has been introduced as the game changer legislation in the European payments market.

Given the customer consent, PSD2 dictates that banks need to allow access to their customers' accounts to third-parties providers, opening this market to non-bank entities and thus allowing them to offer account information and payments initiation services. It aims at modernising payment services to the benefit of both consumers and businesses, keeping pace with the rapidly evolving market (European Comission, 2018b.). The final compliance due date set for the PSD2 implementation was September 2019. However, the transposition to the Portuguese law suffered a delay of eleven months, that may have conditioned banks' adaptation.

The purpose of this study is to assess the expected impact of this regulatory change, distinguishing between three levels of analysis:

(1) **Consumer level**, by evaluating which consumer profile is the most receptive to change, what is the standard consumer perception and the attitude towards his bank, and in which type of player do consumers trust the most;

(2) **Banking level**, by gauging banks' perception of PSD2, finding to which (Cortet *et al.*) options they are oriented to, and confirm whether Fintechs are seen as enemies or allies;

(3) **Fintech level**, by realizing how will PSD2 boost the competition from their perspective and verify if banks are seen as enemies or allies.

Due to its novelty and given the differences among the European Union member states – in terms of expectations, receptiveness and trust in these type of solutions –, this research pretends to be a complementary source of information regarding the Portuguese market.

2. Banking Industry

2.1 Evolution of the industry

Banks are financial intermediaries whose core activity is to provide loans to borrowers and to collect deposits from savers (Casu *et al.*, 2006). Since they perform a variety of functions, it may seem difficult to provide a unique definition of banking (Mehta, 2000). However, the banking industry plays a significant role in every economy, as it allows the successful development of a country by enabling the efficient delivery of payments, saving, lending and other products (Romānova *et al.*, 2018).

The Global Competitiveness Index (produced by the World Economic Forum) considers the financial market development as one of the twelve pillars that define a country competitiveness.

But it was not always like this. In fact, the importance and functions of banks changed over time (Figure 1).

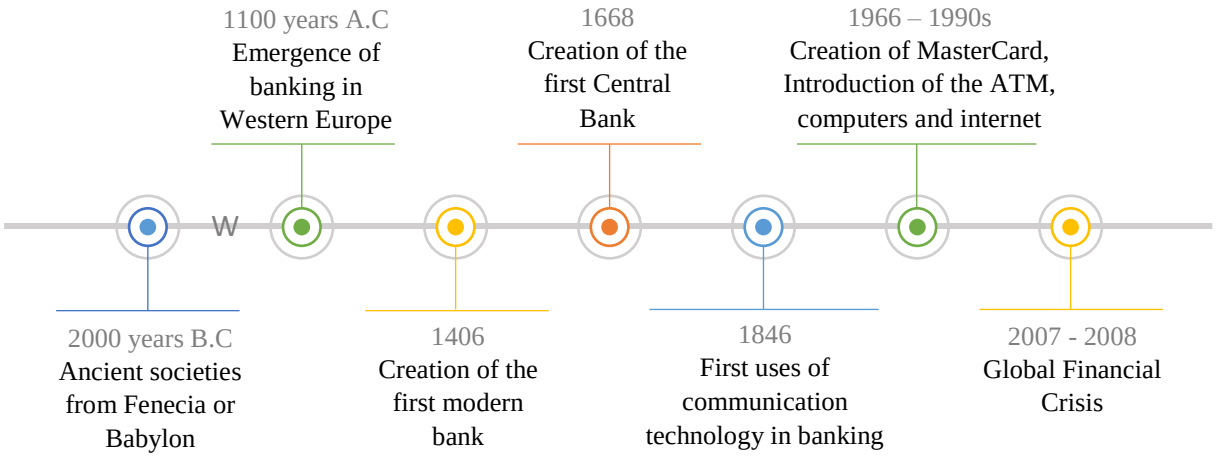

Figure 1 - Evolution of the banking industry

The first evidence of banking can be traced to ancient societies, from Fenecia or Babylon, 2000 years B.C., which used to do loans of grains to the agriculturalists (and register it in boards of clay) and where temples worked as boxes of deposits (Espinoza-Loayza *et al.*, 2019). The French writer Revilpout alleges that there were banks and banknotes in this territory in the year 600 B.C. (Mehta, 2000).

Later, around 1100s A.C., the emergence of banking in Western Europe (in the shape of commercial banks) was stimulated by the need to transfer big quantities of money. Consequently, Italian cities such as Florence or Siena became rudimentary banking centres (Espinoza-Loayza *et al.*, 2019) and double-entry accounting appeared and became a technology fundamental to the modern economy (Arner *et al.*, 2015).

Vélez Núñez and Jaramillo (2017) state that the first modern bank – Bank of Saint Giorgio – was created in 1406, in Genoa, Italy. Then, there was an expansion to northern Italy, Europe and the rest of the world.

According to Pollard (2003), the first Central Bank – called Swedish Riksbank, located in Stockholm – began operations in 1668 and its primary function was to act as the government's banker. From this point onwards, technology produced considerable impacts that shaped this industry.

The first uses of communication technology in banking were recorded in the United States, in 1846, with the use of the telegraph (Garbade & Silber, 1978). The use of railroads, canals and steamships also supported international relations and allowed rapid transmission of financial information and payments around the world, reason why we can call this period the first age of financial globalization (Arner *et al.*, 2015).

After the war, some events marked not only a consumer revolution, but also the beginning of the digitalization of finance. The two most relevant ones are the creation, in 1966 in the United States, of the Interbank Card Association (now called MasterCard), and the introduction of the Automatic Teller Machine (ATM), in the United Kingdom in 1967, provided by Barclays Bank. The commercial introduction of the computer in 1984, by IBM, or the internet revolution in the early 1990s, emphasized the transformation happening worldwide.

In the beginning of the 21st century, the banks' internal processes and interactions with retail customers had become fully digitalized, explaining why the financial services industry became (and still is) the single largest purchaser of IT (Arner *et al.*, 2015).

More recently, around 2008, it is possible to identify another important mark in this industry history: the Global Financial Crisis (GFC). In the first part of this crisis, financial institutions were concerned with the bank solvability, but the authorities and market players were not considering the threat of a systemic collapse. However, this belief changed with the collapse of Lehman Brothers that induced a drop of trust in the system and the panic among investors (Andrieș *et al.*, 2016). For this reason, many governments had to rescue some banks and their banking systems (Claessens and Van Horen, 2014).

According to the World Economic Forum (2017b), even ten years after the crisis, the financial sector remains vulnerable.

2.2 Challenges faced and drivers of change

For many decades, the banking sector resembled an oligopoly due to its small number of players, high barriers to entry and regulation that prevented new players from entering the market. This settled a comfortable position for banks, not only due to the nearly static competitive environment, but also due to the steady business development.

However, the GFC was a turning point for the industry. In terms of regulation, we can identify two different consequences:

- Tougher regulation, that led incumbents to spend more resources to ensure their compliance across all areas of banking activity, thereby reducing their availability to invest in innovation (Teigland *et al.,* 2018);
- A de-regulation that removed barriers to competition in traditional and new product areas (Berger *et al.*, 2012).

Like in many other industries, technology is also contributing to the changes (and consequent challenges) in this industry. According to Ferrari (2016) and Varga (2017), most traditional banks rely on old-fashioned IT systems and architecture, which results in increased costs and complexity and creates legacy. Blakstad and Allen (2018) indorse that most (incumbent) banks are struggling to embrace the new digital economy and add that it has also been difficult to provide an effective response to customer behaviour changes.

Cortet *et al.* (2016) summarize this in three drivers, which are affecting financial services: changing consumer behaviour, technology-driven innovation and regulatory intervention.

2.2.1 Changing consumer behaviour

First, it is important to highlight that one of the biggest drivers for customer behaviour change is the availability of alternative services or products – something that is "new" to this industry (Blakstad and Allen, 2018).

Nevertheless, the digitisation of commerce (as a whole) changed customers. Real-time transacting capability of internet-connected devices led to higher customer expectations in terms of convenience, speed, cost and user-friendliness of services – including the financial ones (Financial Stability Board, 2019).

Additionally to this, a generational shift is taking place. The World Bank (2016) states that millennials (*i.e.* consumers/workers born between 1980 and 1996-2000) will increasingly be assigned with important roles in the society and change not only the demographics but also the consumption habits.

The Millennial Disruption Index (2016) confirms that the banking industry is the one with the highest level of risk, since 53% of the people from this generation does not perceive differentiation between banks and their competition. There is a belief that innovation will come from outside the industry, with 73% of millennials more excited about a new offering in financial services, for example, from Google, Amazon or Apple than from their own nationwide bank.

Driven by the influence of digital technology in everyday life, these "new consumers" want inexpensive services, tailor-made to their needs and accessible anywhere and at real-time (Jakšič and Marinč, 2015). In other words, they want to feel special and empowered. Yet, it is important to understand that there are differences among consumers. The geographical location (and consequent country development) is one of the factors to take into consideration in this analysis.

2.2.2 Technology-driven innovation

Gupta and Tham (2019) defend that technology has had three main impacts on every industry:

- It has allowed the automation of processes, due to the use of machines and algorithms;
- It has lowered the cost of information acquisition and made it more accessible to everyone;
- It has made all manufacturing and distribution processes far more efficient.

Additionally, technology is determining our attitudes, preferences and decisions as a member of a given society and as a person. The financial services industry is not an exception and Fintech and TechFin are the terms used to reflect the compelling connection between finance and technology. For this reason, they will be analysed with more detail in the next chapter.

2.2.3 Regulatory intervention

Firstly, it is important to understand why it is decisive to regulate the financial sector. Joskow and Noll (1981) and Brunnermeier *et al.* (2009) consider that financial regulation seeks to address vulnerabilities and imperfections in financial markets that weaken stability, undermine market efficiency and expose consumers to risks. Due to banks dimension and importance, governments have mandated stringent regulations via Financial Services Authorities, Central Banks and other regulatory bodies (Blakstad and Allen, 2018).

As technology continues to modify this industry, regulation must adapt to remain effective and become a positive influence on the development of new technologies, products or services. Arner *et al.* (2015) agree that the challenge lies in resolving the tension between having a

forward-looking framework that promotes innovation, and the framework being clear enough to maintain market, consumer and investor trust.

Colangelo and Maggiolino (2019) state that there are reforms that will empower individuals, by drawing the profile of a consumer who is aware of the risks and give us two examples:

- By taking into consideration big data exploitation increasing importance, the European Union gave consumers the power to manage their personal data and not be subject to automated decision-making with the new General Data Protection Regulation (GDPR);
- The new or revised Payments Service Directive (PSD2), which is already considered a significant accelerator of the on-going change in the financial industry, will promote competition and innovation by "non-banks" providers and challenge banks' current positions.

Due to its relevance, this second example will be analyzed in detail ahead.

3. FinTech, TechFin & Other players

3.1 Fintech

According to Google Trends, the interest overtime for this word increased exponentially since 2014, turning Fintech into a buzzword, but also into an evolving concept. The World Economic Forum (2017) considers that it changed how financial services are structured, provisioned and consumed. To fully understand why, let us start by analysing the definitions.

3.1.1 Evolution of the concept

Some of the first researchers to study the evolution of this phenomenon were Arner *et al.* (2015), which consider that Fintech refers to the use of technology to deliver financial solutions. However, they do not consider it a unique marriage of financial services and technology. In fact, they highlight three relevant periods:

- **Fintech 1.0** (1866 – 1987) – refers to the period of transition from analogue to digital technology and includes important milestones such as the double-entry accounting or the ATM creation;
- **Fintech 2.0** (1987 – 2008) – also named the "Development of Traditional Digital Financial Services", it begins with the internet revolution and ends with the Global Financial Crisis;
- **FinTech 3.0** (2009 – present) – refers to the "Digital Financial Services Democratization" and means that today's financial, political and public factors are establishing a new generation of market participants and, therefore, a new paradigm.

Varga (2017) states that Fintech are not fully regulated ventures whose sole goal is to develop novel, technology-enabled financial services with a value-added design that will revolutionize our current financial practices.

A broader definition arises from the Financial Stability Board (2017), which considers Fintech as a "technologically enabled financial innovation that could result in new business models, applications, processes or products, with an associated material effect on financial markets and institutions and the provision of financial services".

More recently, Gupta and Tham (2019) consider that Fintech is the term given to companies that leverage technology to provide financial services directly to the consumer or provide solutions to financial services.

Although there are differences, these definitions are not mutually exclusive, but rather complementary, and have the same core – the connection between finance and technology.

3.1.2 Ecosystem

By now, it is possible to understand that the Fintech concept is not limited to banks and startups. Lee and Shin (2018) suggest that the Fintech ecosystem has five elements, which contribute to stimulate and to facilitate the collaboration and competition of this industry (Figure 2):

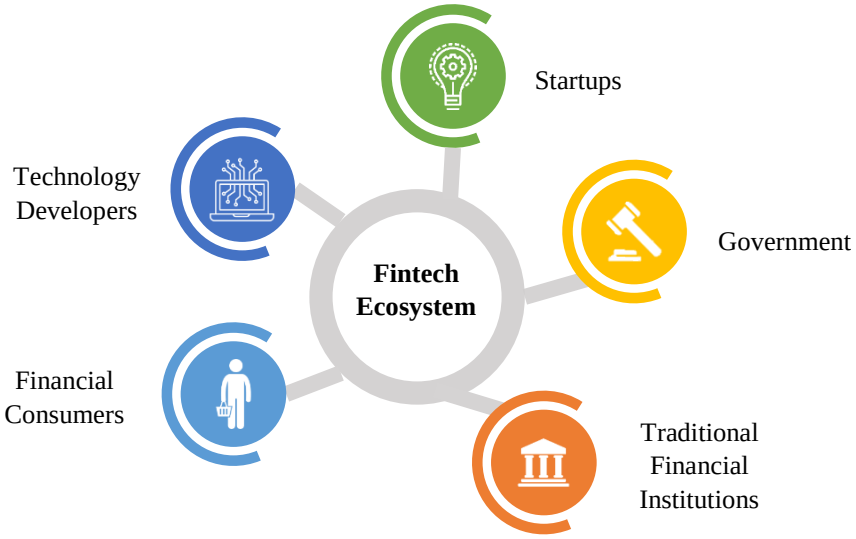

Figure 2 - The five elements of the Fintech ecosystem
Source: Lee and Shin (2018)

1) Fintech Start-ups – *i.e.* entrepreneurial companies that have the ability to unbundle services and have driven major innovations by lowering operational costs, targeting niche markets and providing personalized services;

2) Technology Developers – that provide digital platforms (*e.g.* for big data analysis or artificial intelligence) and create a favourable environment for startups to launch services rapidly;
3) Government – in the form of the regulator or the different legislatures;
4) Financial Customers – that represent the source of revenue for these companies and can be individuals or other organizations;
5) Traditional Financial Institutions – that can be banks, insurance firms, stock brokerage firms or venture capitalists.

This ecosystem definition corroborates with the three drivers presented before, by considering the costumers as the users of innovative solutions, the government as the regulator and the technology developers and the startups as the technology-driven innovators.

When referring to start-ups, Gupta and Tham (2019) distinguish between two types:

i) The ones who provide tech-enabled financial services in which the use of technology allows greater efficiency, scale and speed in existing products or processes;
ii) The ones who provide novel solutions for a specific financial activity and have the power to disrupt business models.

Based on their level of innovation, Varga (2017) distinguishes three types of financial institutions: traditional banks (that have a very limited digital footprint), transformational banks (that have the ability to steer their businesses strategies in a more competitive way) and digital banks (that are not greatly different to fintech companies). This author also enhances that there is space for cooperation between these two actors of the ecosystem.

The Financial Stability Board (2019) concludes that there are three types of possible interactions between Fintechs and financial institutions:

(i) to **become a partner** (or to be taken over), allowing banks to improve their service level or efficiency;
(ii) to **provide a complementary service** to those already provided by existing institutions, in order to improve the attractiveness or facilitate stronger competition between financial institutions;
(iii) to **compete**, reducing margins in the affected segments.

3.1.3 Business Models

Explicitly or implicitly, every company employs a particular business model, which can be defined as the plan that crystallizes customer needs and ability to pay and defines the way the business responds to and delivers value to customers (Teece, 2010). Due to the increasing relevance of Fintech start-ups and other non-bank players, Arner *et al.* (2015) and Lee and Shin (2018) analysed the business models, deepening the ecosystem characterization (Table 1).

Table 1 - Fintech business models

Author(s)	Different Areas
Arner *et al.* (2015)	Finance & investment Operations & risk management Payments & infrastructure Data security & monetization Customer interface
Lee and Shin (2018)	Payments Wealth management Crowdfunding Lending Capital market Insurance

Both authors establish that Fintech players are unbundling services, by focusing on one specific vertical of the financial services. Blakstad and Allen (2018) justify it by stating that tackling one of banking's pain points for customers is far easier than building a new type of bank, due to the time, regulatory support and lots of capital needed. Ferrari (2016) complements that Fintech companies target specific business lines in order to bypass traditional players and create new marketplaces.

From all the above-mentioned areas, the World Economic Forum (2015) considers that the one expected to see major changes is the area of payments – what can be justified by the emerging number of innovations in the past five years that levered mobile devices and connectivity and made payments simpler and more valuable. Gomber *et al.* (2017) confirm that payments have always been at the forefront of technological change and of innovative approaches, what reinforces their importance.

In fact, this business model is becoming attractive to other non-bank players, such as TechFins – *i.e.* technological firms that now offer financial services – or telecommunications companies.

3.2 TechFin & Other players

Big technological companies such as Google, Apple, Facebook or Amazon started in different types of businesses (namely search, computers and phones, social network and retail) and are now converging to a set of activities that mix all the initial areas of specialization (Navaretti, 2017). Besides this, they are some of the new competitors entering the payments market.

Hausladen and Zipf (2018) call them GAFAA companies and consider that the attraction comes from the fact that they already occupy important parts of the digital customer experience. Zetzsche *et al.* (2017) define them as Techfin since they started with technology, data and access to consumers and then moved into the world of finance by leveraging their access to data and seeking to out-compete incumbent financial firms (such as banks) and Fintech startups. The superiority comes from information that provides them a comprehensive database of their customers' preferences and behaviours.

These authors also highlight that, even though there are still considerable differences between traditional financial institutions, Fintech start-ups and Techfins, such differences will diminish over time.

In terms of opportunities or advantages, it is expected that they will help improve business and risk management – due to the quality of data sets –, help reduce costs too – specifically transaction costs –, and promote financial inclusion.

3.2.1 Digital Financial Services

As stated before, the geographical location (and consequently country development) is one of the main factors to take into consideration in the consumer analysis. Nevertheless, this is also true for technology development and impact.

In developing countries, the use of digital financial services (DFS) has been crucial to promote access to financial services. Arner *et al.* (2015) defend that meeting the needs of the local consumers is the key requirement for success in DFS.

Broadband internet and online payment systems are becoming the bridges and roads of the traditional economy and all of this led to the entrance of other players in the market. Mainly in Africa, telecommunications companies rather than banks have taken the lead and provided mobile money.

The most successful case is M-Pesa – launched by Vodafone in 2007 – that offered as its first service money transfers via SMS texting. The actual exchange of money – *i.e.* the deposit and

withdrawal – occurred through a network of agents that essentially acted as ATMs, that could be small shops, gas stations, post offices, or even traditional bank branches. Although Kenya and Tanzania were the first markets with this service, it already expanded to South Africa, Afghanistan, India and even Eastern Europe (Blakstad and Allen, 2018). On its tenth anniversary, M-Pesa was serving 30 million customers across 10 countries (Soyres *et al*., 2018).

4. Regulation and the Payment Services Directives

Hausladen and Zipf (2018) claim that the current wave of technology change (and consequent innovation) is being amplified by regulatory changes, which is a significant difference to prior technology-driven disruptions. Specifically in Europe, the regulators have already identified banks limited action in bringing innovation to the payments arena as a problem (Cortet *et al.*, 2016). To address it, they have introduced some directives such as the first Payment Services Directive (PSD1) and, more recently, the new or revised Payment Services Directive (PSD2).

4.1 First Payment Services Directive (PSD1)

4.1.1 Why did we need it?

In 1992, European countries significantly increased their economic activity with the establishment of the Single Market – which allows people, goods, services and capital to move freely between all Member States. However, it became evident that the different payment systems could not sustain this growth.

In order to continue the process of standardization of the payment methods (Figure 3) and make the single market more efficient, the European Union implemented a single currency – the euro.

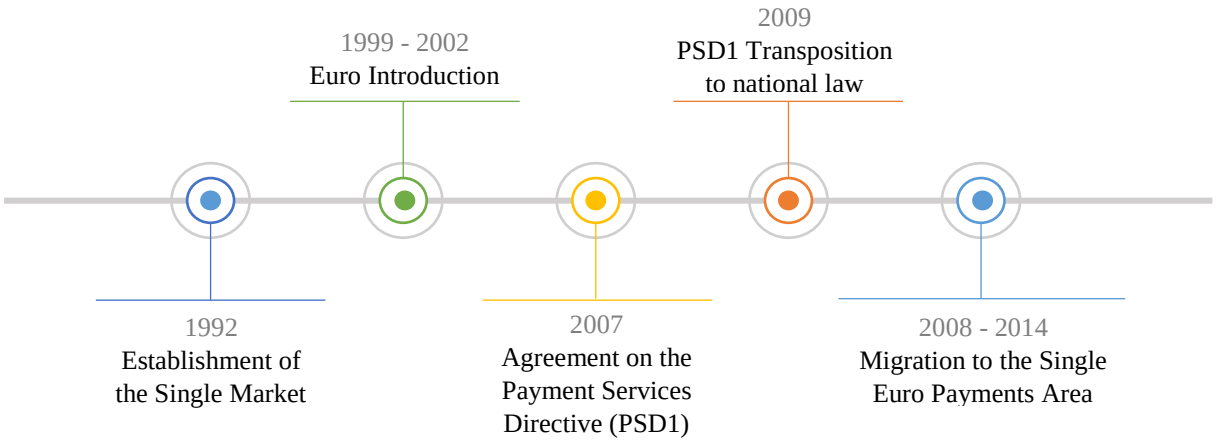

Figure 3 – Milestones of the standardization of the European payment methods

However, up until 2007, each member state still had its own rules regarding payments, making the cost of payments across them very high (European Commission, 2007) and affecting the activity between customers and businesses.

The first payment services directive (PSD1) was the first specifically targeted decision towards creating the same set of rules for payments across the European Economic Area.

4.1.2 Main characteristics

The first Payment Services Directive (PSD1) went into force on December 25th, 2007 and was transposed into national legislation by November 1st, 2009.

According to the European Commission (2007b), this Directive had two main objectives: "(1) to generate more competition in payment markets by removing market entry barriers and guaranteeing fair market access and (2) to provide a simplified and fully harmonized set of rules with regard to the information requirements and the rights and obligations linked to the provision and use of payment services". In short, its main goal was to make cross-border payments as easy, efficient and secure as national payments within a Member State.

Some years later, it was possible to understand some benefits from this directive, such as (European Commission, 2018):

- Turned the access for new market entrants and payment institutions easier, offering more competition and choice to consumers;
- Meant more transparency and information for consumers;
- Laid the groundwork for the Single Euro Payments Area (SEPA) – since SEPA allows European consumers, businesses and public administrations to make and receive credit transfers, direct debit payments and card payments under the same basic conditions.

4.1.3 Why was it not enough?

Donnelly (2016) considers that, although the PSD1 applied too many online payment solutions, it did not address specific issues that arise in online payments. Many of these payments only began to emerge after 2007, reason why they were left out of scope. Nevertheless, they were crucial for the development of e-commerce within the European Union.

Besides this, it had a limited geographical scope, since payments to and from countries outside Europe were processed differently (*i.e.* in a slower and more expensive way).

Lastly, the need for modernization identified by the European Commission also took into consideration that certain rules have been transposed or applied in different ways by the

Member States, thus creating regulatory arbitrage. According to Nouy (2017), this means that banks structured their activities in a way that reduced the impact of regulation, without a corresponding reduction in the underlying risk. In some cases, it also created legal uncertainty, which impaired consumer protection and competitive distortions.

4.2 Revised Payment Services Directive (PSD2)

In 2012, the European Commission reviewed the PSD1 rules and identified the need to update them, in order to fit the digital requirements. One year later, some additions and amendments to the original directive were officially presented, in the form of a new directive – being this the first of five key milestones of the Revised Payment Services Directive (Figure 4).

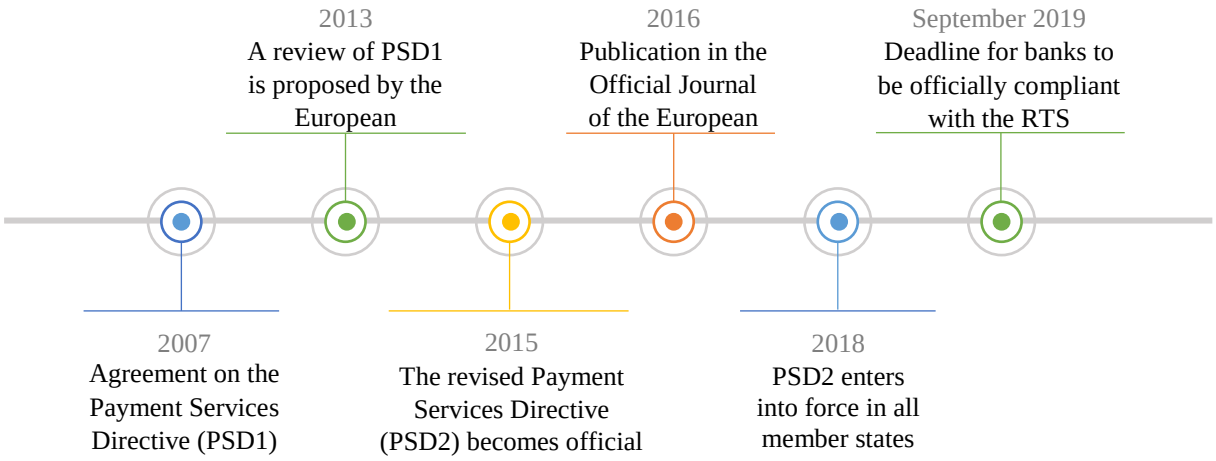

Figure 4 - Milestones of the Revised Payment Services Directive

4.2.1 Main characteristics

As stated by the European Commission (2018), "the revised Payment Services Directive (PSD2) updates and complements the EU rules put in place by the Payment Services Directive (PSD1, 2007/64/EC). Its main objectives are to:

- Contribute to a more integrated and efficient European payments market;
- Improve the level playing field for payment service providers (including new players);
- Make payments safer and more secure;
- Protect consumers."

In other words, this directive will expand the scope of coverage, clarify the range of provider's obligations and customers rights and introduce security and authentication requirements (Donelly, 2016).

The above-mentioned new players can also be called **Third Party Providers (TPPs)** and will now have to follow the same rules as the traditional payment service providers. They can be (European Commission, 2018):

- **Payment Initiation Service Providers (PISPs)** – *i.e.* providers that initiate a payment from the user account to the merchant account by creating a software "bridge" between these accounts, fill in the information necessary for a transfer and inform the merchant once the transaction has been initiated;
- **Account Information Service[1] Providers (AISPs)** – *i.e.* companies that gather and consolidate information on the different bank accounts of a consumer, in a single place;

The ecosystem still counts with one more player, namely **Account Servicing Payment Service Providers (ASPSPs)**, which are the banks or traditional payment service providers. These ones are not new but will be obligated to allow TPPs access to account and transaction information. Precisely because of this obligation, the use of **Application Programming Interfaces (APIs)** – that enable information exchanges between two programs without requiring developers on both sides to share their complete software code (European Payments Council, 2017) – is becoming the new standard.

To better understand the possible interactions between these players, let us assume the following scenario:

- Robin – an entrepreneur that sells sports products online – is a client of three different banks. Since she runs a start-up, she does not have much free time to go to an ATM whenever she wants to check her financial status, reason why she does it on her phone, using MoneyHub – *i.e.* an app that allows users to check all their accounts, investments, assets and borrowing in one place, considered an AISP.
- Ted, on the other hand, is a gym enthusiast who wants to buy a new sports bag and that discovered one he really liked in Robin's website. As it was allowed on that website, he decided to use Trustly – *i.e* a payment method (operating through PayPal and TransferWise) that allows customers to shop and pay from their bank account, considered a PISP.

Even though Robin and Ted did not share the same bank, they both performed their activities using TPPs, which exchanged information with their banks using APIs. Figure 5 illustrates all of these relations.

[1] Also referred as "XS2A".

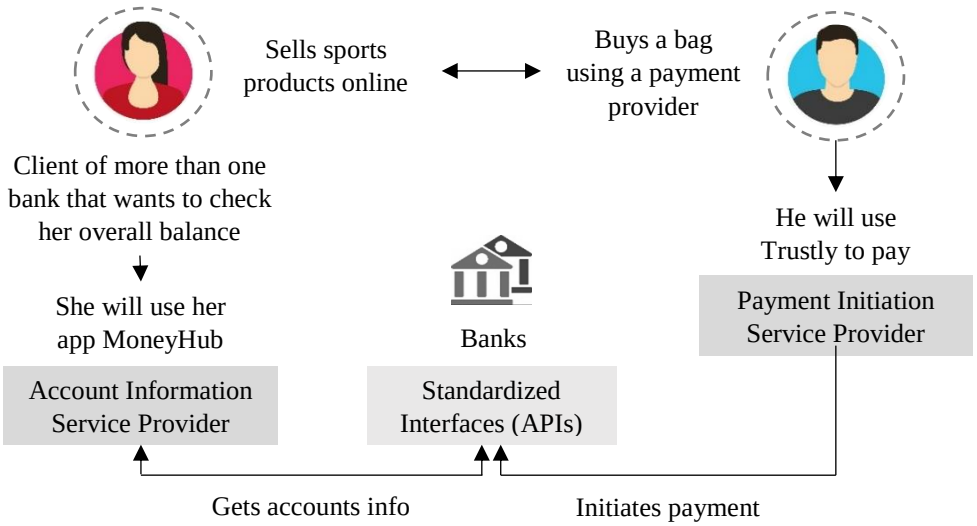

Figure 5 - Third-Party Providers interactions example

It is also important to highlight that, through the **Regulatory Technical Standards (RTS)** this revised directive boosts customer protection and security for online payment services, by defining strong customer authentication (SCA) requirements and technical standards. This not only recognizes the importance of Big Data in digital markets but also the active role that consumers should be entitled to play (Colangelo and Maggiolino, 2019).

Lastly, like exposed above in the PSD2 timeline (*i.e.* figure 4), there is a transition period during which payment service providers can already provide their services under the PSD2, but are not yet legally required to implement the respective security measures. Nonetheless, all banks are strongly encouraged to accomplish the requirements as soon as possible (European Central Bank, 2018).

4.2.2 Additional benefits & PSD1 differences

Additionally to the new services and players scope extension mentioned above, this directive (European Commission, 2018):

- Includes one-leg transactions (*i.e.* with third countries, when only one of the parts is located within the EU);
- Updates the telecom exemption – by restraining it mainly to micro-payments for digital services;
- Enhances information exchange and cooperation between authorities, in terms of authorization and supervision of payment institutions;
- Helps reduce charges for consumers and ban "surcharging" for card payments – a practice that is still common for online payments and in the tourism industry in some member states;

- Obligates to designate capable authorities in each member state, to deal with the complaints of payment service users and other interested parties;

4.2.3 Post-PSD2 Scenarios

4.2.3.1 Banks position

Based on this directive analysis and expected impact, Romānova *et al.* (2018) designed a sort of SWOT analysis, which considers that traditional financial service providers, in comparison to the (new) TPPs:

1) Have some **strengths**, such as… - Experience and trust from consumers. - Wide range of products/services, that enables cross-selling. - Personal contact and consultancy services, through bank branches.	2) Have additional **opportunities**, like: - Possibility to outsource innovative solutions, to improve products/services or expand the current portfolio. - Improved business efficiency and risk assessment approaches – based on standardization and data analysis.
3) Will see some **weaknesses** exposed, as… - High pressure on margins and potential loss of market share - Need for additional IT investment or dependence of outsourcing	4) Have potential **threats**, for instance: - Need to evolve the business models to enable innovations. - Increased operational, security and fraud risk – by sharing data and account info.

Cortet *et al.* (2016), on the other hand, suggest that banks have to address two key questions:

- Their positioning in the payments value chain – *i.e.* if they just want to provide the obligatory account access, becoming "just" an account access provider, or to compete and also offer front-end services to customers, becoming a TPP as well;
- The scope of their transaction services portfolio – *i.e.* if they will limit themselves to services that comply with PSD2, or extend to advanced payment and information services;

By doing this exercise, banks will have four strategic options to cope with it (Figure 6):

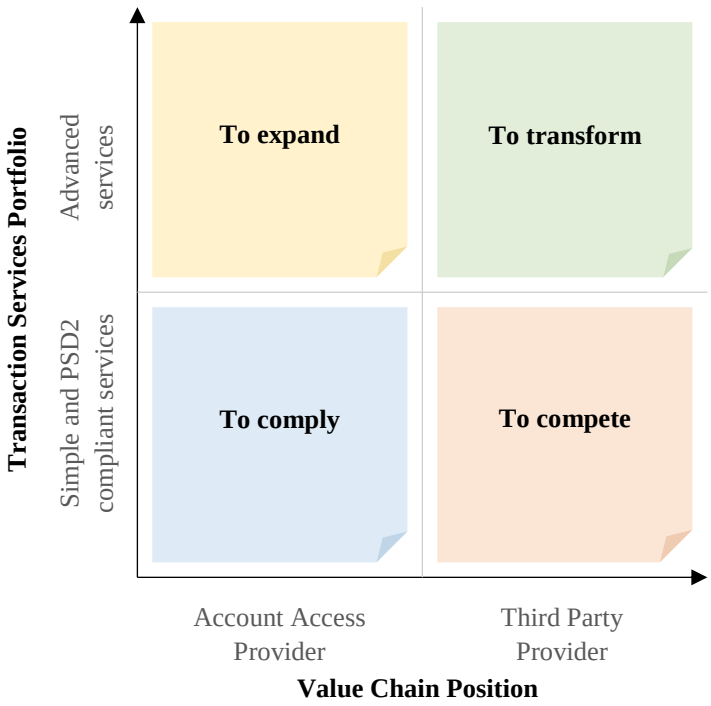

Figure 6 - Four strategic options for banks
Source: Cortet et al. (2016)

- **To comply** – where banks focus will be on PSD2 compliance, by "opening up" to the most limited extent possible – *i.e.* by only enabling the new players to offer and execute "plain" payment and account information services.
- **To compete** – meaning that banks will also add an offensive strategy, offering innovative front-end payment initiation and account information services, in order to dispute customer interest. In other words, the incumbents may develop mobile commerce payments landscapes or personal finance management services in order to challenge the existing and the new TTPs.
- **To expand** – what implies that, additionally to the compliance approach, banks will also focus on developing and exposing services through open APIs that go beyond basic payment and account information services, such as creditworthiness verification, real-time financial advisory services or advanced loan application processes.
- **To transform** – what means that the incumbents' focus will be on pursuing a "bank as a platform" strategy, in order to compete but also collaborate for customer relevance. In addition to business and operation modifications, this option will imply the change of internal behaviours and, therefore, the culture of the institutions.

To successfully go beyond the first one, besides having to improve security and IT systems, banks will have to reconsider partnerships, business and operating models.

4.2.3.2 TechFin

As said before, by combining their significant knowledge about the customers and the highly attractive interfaces, the Techfin or GAFAA companies constitute a serious competitive risk for incumbents. Beyond (European) borders, there is already one important example of this.

Google "took advantage" of an Indian directive similar to the PSD2 and launched TEZ – a mobile payments solution. Now called Google Pay, this app became part of the daily life of more than 22 million people and businesses in just less than a year.

In addition to "the basic" digital payments, Google is looking to empower the 1.2 million Indian local businesses, namely by helping them to be discovered through Google Search and Maps and communicate with their customers through messages and offers (Google India Blog, 2018).

Due to its success, many governments are asking for similar digital payments solutions to their countries – a challenge that Google will accept.

Inside European borders and by the end of 2018, two important things already happened in this context:

1) **Revolut got a European banking licence**, which will help them towards the goal to build an account where customers can manage every aspect of their financial life (West, 2018). Moreover, this London-based Fintech will be able to diminish the Brexit consequences and will join a growing number of firms that have secured permission to offer banking accounts and loans (Kahn, 2018);
2) **Google Payment obtained an e-money license in Lithuania**, which will enable them to process payments, issue e-money and handle electronic money wallets, throughout the EU. This is the opportunity to expand the current storage of card details in a digital wallet and the use of mobile phones as payment devices in a store (Seputyte & Kahn, 2018).

5. Research Methodology

5.1 Research Questions

The main goal of this dissertation is to understand what the expected impact of PSD2 in Portugal will be, at three different levels: consumers, banking industry and Fintech start-ups. Since they have specific characteristics, each level is analysed in a different way.

Due to the generational shift that is taking place (mainly concerning millennials) and the differences between EU consumers – either in terms of expectations, behaviours and trust in these type of new solutions –, we intend to test three questions at the **consumer level**:

RQ1) Which consumer profile is the most receptive to change?
RQ2) What is the standard consumer's perception and attitude towards their bank?
RQ3) In which type of player do consumers trust the most?

Considering that Fintech start-ups and banks will have to interact with each other – either by becoming partners, by providing complementary service or by competing – and that banks will be obliged to comply with PSD2, it is crucial to analyse their perception and reaction to the directive. Therefore, at the **banks level**, we assess three premises:

RQ4) What perception do banks have (and consequent SWOT analysis) of PSD2?
RQ5) To which options (Cortet *et al.*) are banks oriented to, in order to cope with PSD2?
RQ6) Are Fintechs seen as enemies or allies?

At the **Fintechs level**, on the other hand, the goal is to check the following:

RQ7) How will PSD2 boost the competition?
RQ8) Are banks seen as enemies or allies?

5.2 Research Strategy & Data Collection Method

Since Fintech (and its ecosystem) is an evolving concept, researchers tend to rely on sponsored research carried out by big consultancy companies (Varga, 2017). Our goal is to provide complementary information, by producing our own research and compare the results to those previously achieved.

Hennink *et al.* (2010) consider that, in order to gain a detailed understanding of the reasons or motivations behind something, we should do qualitative research; on the contrary, to quantify a problem and answer questions such as how much or at what proportions, we should do

quantitative research. Desai & Potter (2006) add that the first method is adequate for large random samples, and the second for small, purposive ones.

Taking into consideration the different targets and the above-mentioned research questions, we used a mixed methodology (*i.e.* consisting of both quantitative and qualitative analysis). Table 2 specifically presents the research strategy, by target:

Table 2 - Research Strategy, by target

Target	Consumers	Fintechs	Banks
Population dimension	Big (according to Pordata, there are ~ 6 million Portuguese's between 20 and 64 years old – *i.e.* within the age gap in which people tend to have a bank account)	Small (according to the Portugal Fintech Report 2018, there are 25 relevant startups – a number that decreases to less than half by applying the "Personal finance" and "Payments & money transfers" filter)	Small (according to Banco de Portugal, there are 30 different ones in the Portuguese territory)
Sample dimension	723 people	3 startups	5 banks
Type of analysis	Quantitative	Qualitative	
Method	Deductive process, using surveys (performed online)	Inductive approach (*i.e.* with a topic of investigation, narrowed down by research questions), using semi-structured interviews	

Consumers level

As presented by Table 2, at the consumer level we apply one of the oldest and most widely used research methods – surveys by means of questionnaires (Desai & Potter, 2006). These were structured (*i.e.* with closed alternatives), to obtain specific answers, namely of multiple-choice or within a scale. In terms of scales, we used the seven-digit Likert Scale, to reduce the scope and the extreme values limitations due to reluctance (Azzara, 2010).

We made sure that the questions formulation is coherent, taking into consideration that, in addition to answering the research questions, we also intend to measure the differences between our results and the ones from two different studies – namely "Customer experience and payment behaviours in the PSD2 context" (conducted by PWC), and "Consumers' initial reactions to the new services enabled by PSD2" (conducted by Accenture).

The questionnaire (Appendix 1) was originally developed in English and then translated to Portuguese. It was pre-tested with a small group of volunteers, who were explicitly asked to

comment on the clarity of the questions. After the re-formulation of some elements, for enhanced precision and clarity, the dissemination of the survey was processed online, using multiple platforms (such as social networks and email), from June 27 to July 27.

It is important to highlight that the survey experience was different for some respondents, since:

- The question "Do you have a bank account?" was selective and directed respondents to the end of the survey in case they answered negatively;
- The questions about the activities performed through the financial apps (owned by the banks or alternative ones) were shown only to those who mentioned that they use them.

Banks and Fintechs levels

For these two levels the approach is the same: conducting interviews (open-ended and semi-structured), to gain in-depth information and proceed with further exploration of the topic (Henderson & Bialeschki, 2002). At the banks level, we made sure that the questions' formulation is coherent, taking into consideration that our goal is to compare some of the question results with the theoretical frameworks mentioned before. At the Fintechs level, on the other hand, the goal is to compare the results with the one from banks. In both cases, the questions can be found in the Appendix (2 and 3).

To get data as accurate as possible, all the respondents at these levels were selected for belonging to the teams responsible for the strategic decisions regarding PSD2 within each entity. Whenever possible, the interviewee was someone with the higher hierarchical position within these teams.

An interview guide – with a brief theoretical contextualization and the questions – was developed and shared with the respondents before the moment of the interview and anonymity was guaranteed to ensure that they were comfortable to share their company strategic options.

The interviewees were asked to clarify the meaning of an answer, whenever it was considered ambiguous. Also, the interviewees were directly asked about topics that were not mentioned and that were previously included in the theoretical framework

While all the bank's interviews were conducted face-to-face and took place at the interviewee's offices for their convenience, the Fintech's interviews were conducted online, due to geographical limitations. In either case, the interviews were recorded and later transcribed to enhance the accuracy of the data collection process.

6. Data Analysis

6.1. Consumer Level

To be receptive can be defined as being open to new ideas or to change. With regard to the first research question, we consider that the receptiveness to change represents the willingness of respondents to switch banks (*i.e.* to change their current provider) and their willingness to try a new and still unknown type of provider. For this reason, different ordinal regressions were carried out, with the goal of determining which independent variables had a statistically significant effect on the dependent ones (i.e. in the willingness to switch banks or to try a PISP or an AISP).

To ensure the validity of results, three assumptions are checked beforehand: (i) the dependent variables are measured at the ordinal level (which is true, since they are measured with a 7-digit Likert scale); (ii) the independent variables are either continuous, ordinal or categorical (which they are); (iii) there is no multicollinearity. The third assumption verification is supported by the Fox & Monette (1992) Generalized Variance Inflation Factor (GVIF), since most of the variables are categorical. The results (appendix 7) suggest that there is no problem with collinearity in our data set. Besides the assumptions, we also confirm that the models fitted with likelihood-ratio tests (appendix 7).

On the other hand, the second and third research questions, are supported by descriptive measures, such as the Kruskal-Wallis H Tests, Fisher's exact tests and one additional (yet simpler) regression – that also verifies the above-mentioned assumptions.

6.1.2. Sample Characterization

The questionnaire had 1129 respondents. However, 406 did not answer to the total amount of questions and/or exited the browser before conclusion, which is why only 723 responses were considered valid. It is important to remember that the question “Do you have a bank account?” was selective and directed respondents to the end of the survey in case they answered negatively. For this reason, from that point onwards only 704 responses were considered.

Based on a descriptive analysis in SPSS, the sample socio-demographic characterization was analysed (appendix 6) and the following information was drawn:

- 63,80% of the respondents were female and 36,20% were male;
- Only 0,6% were under 18 years old, 27,7% were between 18 and 29 years old (or Millennials), 21,3% were between 30 and 39 years old, 29,5% were between 40 and 49 years old, 19,9% were between 50 and 65 years old and lastly 1,1% were over 65 years old;

- 8,3% had less than a High School diploma, 25,9% finished High School, 4,1% had vocational training, and 61,6% enrolled in college – 44,5% completed a Bachelor degree, 16% completed a Master degree and the final 1,1% had a PhD;
- The 3-person household was the most common one (with 31%), followed by the 4-person and the 2-person (respectively with 25,9% and 22,4%);
- 41,2% of the household has a monthly income under 1500€, 33,7% between 1501€ and 2500€, 17,2% between 2501€ and 3500€, 4,4% between 3501€ and 4500€ and lastly 3,5% over 4500€;
- 74,6% were employed, 6,6% were also studying while working, 11,2% were just students, 2,5% were already retired and 1,5% were domestics. The remaining 3,6% were unemployed at the moment of the study;
- 23,9% lived in the north of Portugal, 14,0% lived in the centre, 34,9% lived in the Lisbon metropolitan area, 23,7% lived in the south and 3,6% in the islands (taking the NUT II Portuguese territory division as criteria and the conditions mentioned in appendix 6).

Additionally, given that PSD2 is a directive that will impact customers financial and online journey, it was important to assess the participants' degree of technological sophistication, level of financial literacy and the degree of risk aversion. It is important to note that, for the second and third characteristic and considering that the 1 to 7 scale varied from no knowledge to specialized knowledge and from no risk aversion to complete risk aversion (respectively), 4 was considered an average knowledge or risk aversion. With this in mind, the following information was drawn:

- More than 50% of the respondents use social media platforms at least once a day and use them substantially more often than other platforms such as Netflix, Spotify or Uber;
- More than half of the respondents consider they can effortlessly browse, search and filter data/information and digital content, interact through digital technologies and use digital tools and technologies for collaborative processes;
- 42,9% of the respondents considered their financial and innovation knowledge was below average and 33,2% considered to have an above average knowledge;
- 15,8% of the respondents are totally risk-averse, another 47,3% are above average, 23,4% are average and only 13,6% consider having a low degree of risk aversion.

6.1.3 Findings

6.1.3.1 Finding #1 – There are seven characteristics that define the consumer profile most receptive to switch banks.

By analysing the significance levels of the estimates in first regression presented in appendix 7, we find that there were seven statistically significant variables to explain the propensity of consumers to switch banks (Table 3):

Table 3 - First regression parameters estimation summary

		Estimate	Std. Error	Wald	Sig.	95% Conf. Interval Lower B.	Upper B.
Location	Gender	**.327**	.150	4.784	**.029**	.034	.621
	Education	**.157**	.060	6.893	**.009**	.040	.275
	North	**-.972**	.382	6.467	**.011**	-1.722	-.223
	Lisbon_MA	**-.893**	.371	5.802	**.016**	-1.620	-.166
	South	**-1.063**	.380	7.807	**.005**	-1.808	-.317
	Dif. Offers Belief	**-.089**	.040	5.052	**.025**	-.167	-.011
	Trust (in own bank)	**-.242**	.052	21.570	**.000**	-.344	-.140

Supported by the estimates for each parameter, we conclude that the profile whose most receptive to switch banks is: a male consumer, with a high education level, that lives in the center or in the islands. This consumer does not consider that his bank offers anything different from what other banks offer and does not trust his bank to protect his data and provide secure online operations.

6.1.3.2 Finding #2 – There are six characteristics that define the consumer profile most open to try a Payment Initiation Service.

By analysing the second regression variables significance levels presented in appendix 7, we conclude that in this case there are only six statistically significant variables (Table 4):

Table 4 - Second regression parameters estimation summary

		Estimate	Std. Error	Wald	Sig.	95% Conf. Interval Lower B.	Upper B.
Location	Education	**0.144**	0.063	5.247	**0.022**	0.021	0.267
	Tech Sophistication 3	**0.236**	0.111	4.529	**0.033**	0.019	0.453
	Risk Aversion	**-0.147**	0.054	7.482	**0.006**	-0.252	-0.042
	Dif. Offers Belief	**0.081**	0.041	3.907	**0.048**	0.001	0.162
	Trust (in own bank)	**0.186**	0.056	10.892	**0.001**	0.075	0.296
	Use of alternative APPs	**0.158**	0.046	12.093	**0.001**	0.069	0.247

Supported by the estimates for each parameter, it is possible to conclude that the profile whose most open to try this new player type is: a risk-seeking female or male with a high education level, who is able to use digital tools and technologies for collaborative processes. This type of consumer does not consider that his bank offers something different from what other banks offer and does not trust his bank to protect his data and provide secure online operations. Additionally, we know that it uses alternative APPs.

6.1.3.3 Finding #3 – There are also seven characteristics that define the consumer profile most willing to try an Account Information Service.

Lastly, by analysing the third regression variables significance levels presented in appendix 7, we detect that in this case there are seven statistically significant variables (Table 5):

Table 5 - Third regression parameters estimation summary

		Estimate	Std. Error	Wald	Sig.	95% Conf. Interval Lower B.	Upper B.
Location	Gender	**0.420**	0.157	7.121	**0.008**	0.112	0.729
	Age	**-0.370**	0.085	18.831	**0.000**	-0.537	-0.203
	Education	**0.240**	0.064	14.032	**0.000**	0.114	0.365
	South	**-0.876**	0.392	4.994	**0.025**	-1.645	-0.108
	Risk Aversion	**-0.113**	0.055	4.294	**0.038**	-0.220	-0.006
	Dif. Offers Belief	**0.090**	0.041	4.754	**0.029**	0.009	0.172
	Trust (in own bank)	**0.265**	0.058	20.819	**0.000**	0.151	0.378

Supported by the estimates for each parameter, it was possible to conclude that the profile who is most willing to try this type of new player is: a risk-seeking younger male consumer, with a high education level, that does not live in the Southern region of Portugal. Additionally, this consumer trusts his bank and considers that it offers something different from what other banks offer.

6.1.3.4 Finding #4 – Nearly half of the sample consisted of multi-banking customers.

After asking consumers if they owned none, one or more bank accounts, we are able to draw the following conclusions (figure 7):

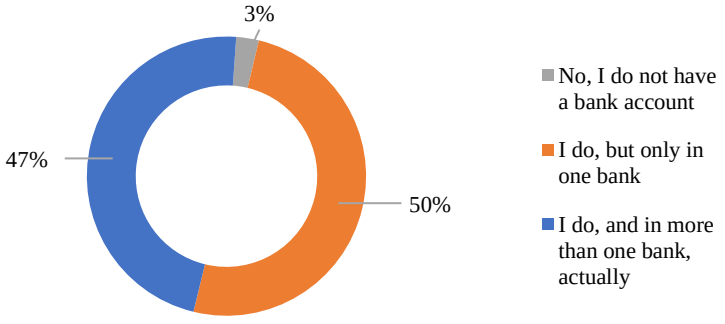

Figure 7 - Bank account ownership analysis

Even though there are still consumers that do not possess a bank account, they represent a residual percentage. Regarding the ones with an account, 50% opted to have the account in only one bank, while 47% opted to have accounts in more than one bank – reason why they can be considered multi-banking customers.

6.1.3.5 Finding #5 – The belief that their bank offers something different from what other banks offer is not consensual among consumers.

By asking consumers if they consider that their bank offers anything different than what other banks do, we find the following (figure 8):

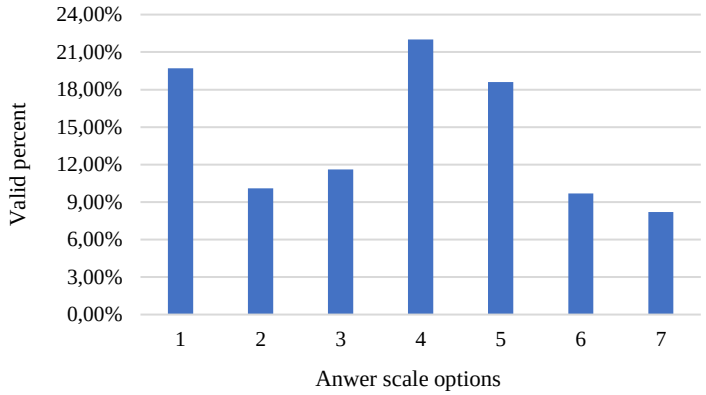

Figure 8 – Survey question 14 frequency analysis

By only considering frequencies, the three most frequent answers are (respectively): 4 – which can be considered "indifference", given the range –, 1 – which can be interpreted as "Not at all" – and 5 – which can considered the first level of agreement.

By analysing the descriptive statistics (present in appendix 7, "Statistics (4)" table), we find that the average answer is 3.72 – which can be translated as a low level of disagreement, almost indifference – and that the standard deviation is 1.88. Given that this standard deviation represents approximately half of the average value and one-third of the total answer scale, we conclude that there is no consensus among the answers.

Lastly, we perform a Kruskal-Wallis H Test to confirm if there are differences in this belief between the different age groups (appendix 7). Since the decision outcome is to retain the null hypothesis, we conclude that there are no differences.

6.1.3.6 Finding #6 – Consumers tend to trust their banks. However, millennials tend to trust more than people from 50 to 65 years old.

After directly asking consumers to what extent they trust their bank to protect their data and provide secure online operations, we are able to draw the following results (figure 9):

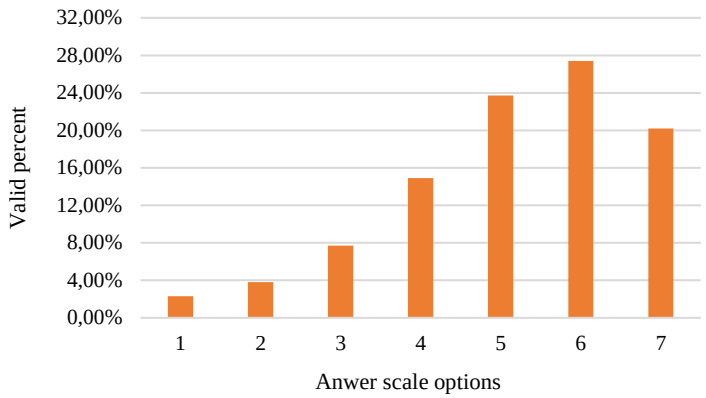

Figure 9 - Survey question 15 frequency analysis

This question gathered more than 70% of the answers above the "indifference" or intermediate level – i.e. above level 4 – which implies that these consumers trust their banks. Regarding the descriptive statistics (present in appendix 7, "Statistics (4)" table), there is an average answer of 5.17 – that also implies trust – and a standard deviation of 1.49 – that only represents approximately one-third of the mean and one-fifth of the whole scale.

As previously done, we perform a Kruskal-Wallis H Test to confirm if there are differences between the different age groups (appendix 7). This time, however, the decision outcome was to reject the null, reason why pairwise comparisons are then performed using Dunn's (1964) procedure with a Bonferroni correction for multiple comparisons (tables 6 and 7).

Table 6 - Pairwise comparisons of Age

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
Under 18 – 50-65	-193.785	141.452	-1.370	.171	1.000
Under 18 – 40-49	-238.537	141.130	-1.690	.091	1.000
Under 18 – 30-39	-249.326	141.380	-1.764	.078	1.000
Under 18 – 18-29	-276.036	141.189	-1.955	.051	.759
Under 18 – Over 65	-308.688	157.038	-1.966	.049	.740
50-65 – 40-49	44.752	21.648	2.067	.039	.581
50-65 – 30-39	55.540	23.226	2.391	.017	.252
50-65 – 18-29	82.251	22.031	3.733	.000	.003
50-65 – Over 65	-114.902	72.195	-1.592	.111	1.000
40-49 – 30-39	10.789	21.175	.509	.610	1.000
40-49 – 18-29	37.499	19.857	1.888	.059	.884
40-49 – Over 65	-70.150	71.561	-.980	.327	1.000
30-39 – 18-29	26.711	21.566	1.239	.216	1.000
30-39 – Over 65	-59.362	72.054	-.824	.410	1.000
18-29 – Over 65	-32.651	71.678	-.456	.649	1.000

Each row tests the null hypothesis that Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.
Significance values have been adjusted by the Bonferroni correction for multiple tests.

Table 7 - Question 15 Descriptive statistics, by age group

Age?	Mean	N	Std. Deviation	Median
Under 18	3.50	2	.707	3.50
18-29	5.46	192	1.265	6.00
30-39	5.22	152	1.488	5.00
40-49	5.16	209	1.434	5.00
50-65	4.73	141	1.748	5.00
Over 65	5.63	8	1.408	6.00
Total	5.17	704	1.490	5.00

This post hoc analysis reveals a statistically significant difference between two age groups, confirming that millennials trust more in banks than 50 to 65 years old consumers do.

6.1.3.7 Finding #7 – Most consumers do not want to switch banks for now.

As a result of asking consumers if they would be open to switch banks in the next 90 days, we achieve the following results (figure 10):

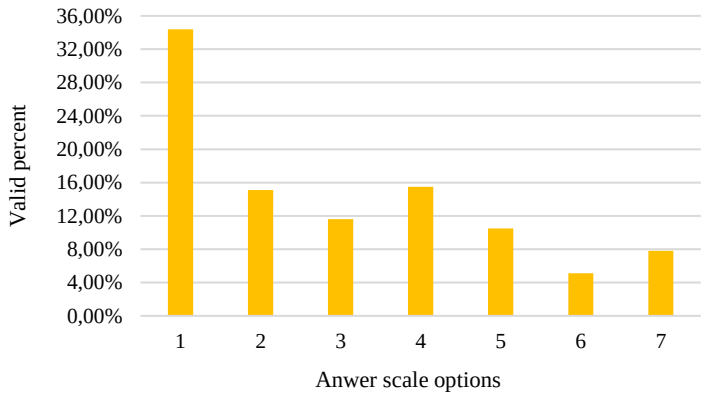

Figure 10 - Survey question 16 frequency analysis

Opposed to the previous question, this one assembled more than 60% of the answers bellow the "indifference" level – i.e. above the level 4 – and the most frequent answer was 1 – which represents "Not at all".

The descriptive statistics (present in appendix 7, "Statistics (4)" table) show an average answer of 2.99 – which still implies not changing banks – and a standard deviation of 1.95. Even though this S.D. may seem high (since it represents approximately two-thirds of the mean), the value is deemed reasonable, considering that the most frequent answer is an "extreme" one.

Once again, we perform a Kruskal-Wallis H Test to confirm if there are differences between the different age groups (appendix 7). Since its decision outcome is to retain the null hypothesis, we conclude that there are no differences

6.1.3.8 Finding #8 – Only 68% of consumers use their banks' app, mainly to view transactions, do online purchases and perform bank transfers.

To further analyze the Portuguese consumers' relationship with banks, we asked them if they use the financial apps provided by these institutions and, if so, which are the activities they perform. This allowed us to assess the following (figure 11 and 12):

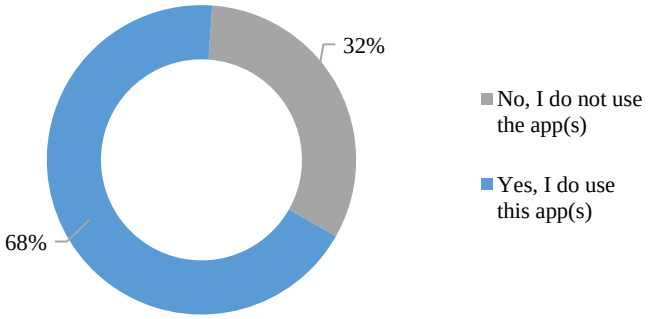

Figure 11 - Own bank financial app usage analysis

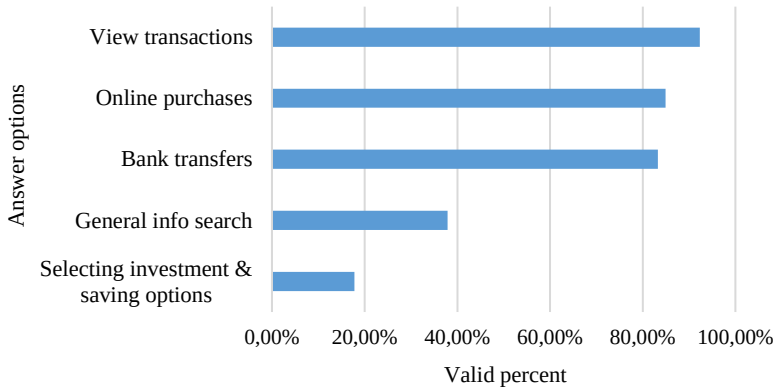

Figure 12 - Activities performed through own bank's app analysis

Only (approximately) two-thirds of consumers use these kind of apps and, in terms of activities performed, "View transactions" is the main one, followed by "Online purchases" and "Bank transfers" (respectively). It is important to highlight that these two last activities' percentages are almost matched and that the other two under study have less than half of it.

6.1.3.9 Finding #9 – 50-65 years old consumers differ in terms of banks app usage.

To understand if there is a difference between the binomial proportions of the age groups, we perform a Chi-Square Test of Homogeneity. However, since we have three expected cell counts of less than five, we conduct the Fisher's exact test (2 x c) instead (appendix 7).

As the p-value is less than 0.05, we confirm statistically significant differences in proportions and use a post hoc test to determine where the differences lie. To do so, we use pairwise comparisons using multiple Fisher's exact tests (2 x 2) with a Bonferroni correction (table 8). It should be noticed that, due to the Bonferroni correction, the alpha considered for this second analysis changed to an adjusted value of 0.0033.

Table 8 - Fisher's exact test (2 x 2) for each possible pairwise comparison summary

	Exact Sig. (2-sided)	Exact Sig. (1-sided)
40-49 - 50-65	0.000	0.000
30-39 - 50-65	0.000	0.000
18-29 - 50-65	0.000	0.000

Like highlighted in the table, it was possible to verify that 50-65 years old consumers differed from three of the other age groups in terms of app usage.

6.1.3.10 Finding #10 – Only half of the consumers use alternative apps, mainly to perform bank transfers, do online purchases and view transactions. The main perceived benefit is the user-friendly experience.

Given the wide range of financial apps in the app market – even at a pre-PSD2 scenario – we analysed how frequently these alternative apps were used (figure 13).

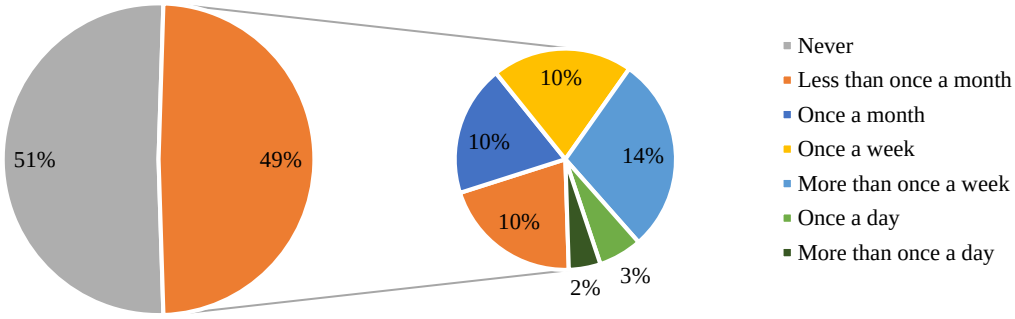

Figure 13 - Alternative financial app usage analysis

In terms of app usage, it was possible to assess that half of consumers do not use this type of solution and that only approximately 20% do it at least once a week.

For those who used this kind of apps, we asked which activities were performed, allowing us to assess the following (figure 14):

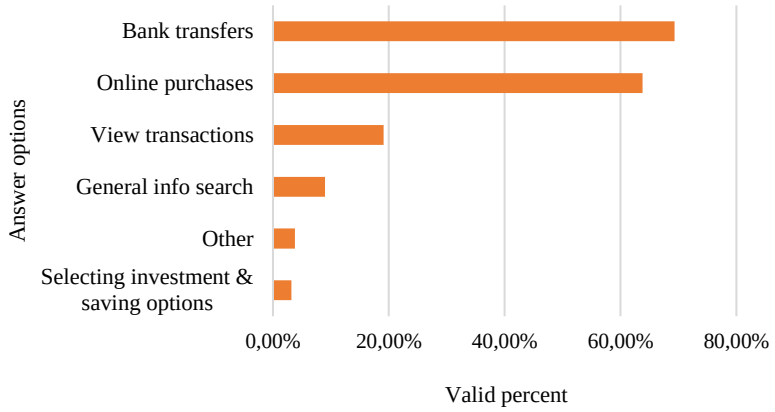

Figure 14 - Activities performed through alternative apps analysis

Even though the three most frequent answers are the same as the ones provided for the bank apps, the order changed: “Bank transfers” is now the main one, followed by “Online purchases” and “View transactions” (respectively).

Regarding the major benefits that these consumers perceived whilst using these kind of apps, we conclude the following (figure 15):

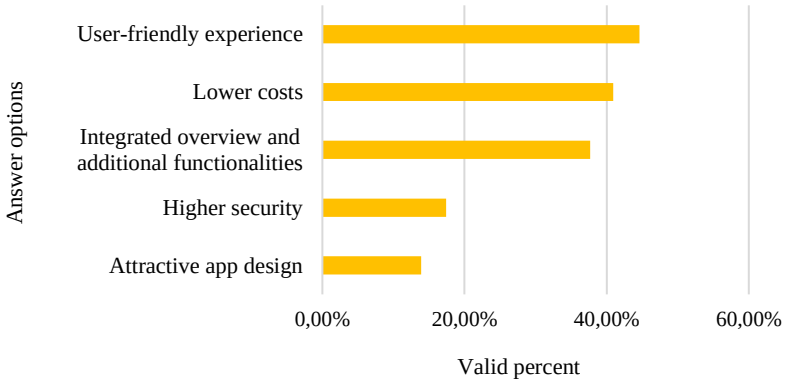

Figure 15 - Benefits of using alternative financial apps analysis

The three most mentioned benefits were “User-friendly experience”, “Lower costs” and “[Allowing an] Integrated overview and additional functionalities” (respectively).

6.1.3.11 Finding #11 – Consumers use bank apps more than alternative apps. However, if they do not use bank apps at all, they still tend to use alternative apps.

By comparing the usage of bank’s own app and of alternative apps, we conclude that:

- There is a higher number of consumers using bank apps;
- The top three activities performed through those apps are the same, but with a different order (as implied by the last finding).

Additionally, to clarify if not using bank apps meant using alternative apps, we perform another ordinal regression (appendix 7), achieving the following results (table 9):

Table 9 - Forth regression parameters estimation summary

		Estimate	Std. Error	Wald	Sig.	95% Confidence Interval Lower B.	Upper B.
Location	No use of bank apps	-1.566	.177	78.641	.000	-1.912	-1.220

In fact, these two variables have a negative relationship, which is why we can state that consumers that do not use their own bank's financial app tend to use alternative ones.

6.1.3.12 Finding #12 – In a macro perspective, there is not much willingness to try both PISPs and AISPs.

The first three findings were concerned with the consumer characteristics that define the most receptive profiles to change. Here, the goal is to compare the willingness to try the two new types of providers (figures 16).

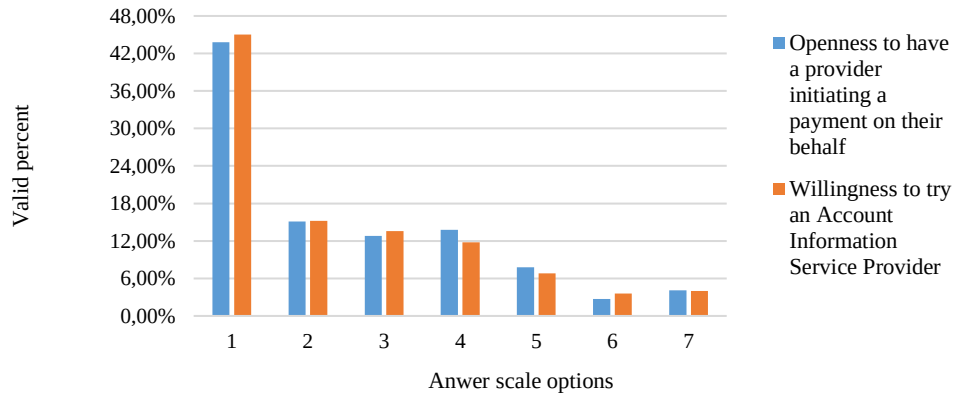

Figure 16 - Willingness to try a new type of provider analysis

As the figure reveals, there are not significant differences in the answers given to the questions in it. The descriptive statistics (presented in appendix 7, "Statistics (6)" table) confirm this assessment, with the two means close to each other (i.e. approximately 2.50) and with the same standard deviation. Given the range of the scale of the answer, these values show that consumers are not yet open to try out the new type of players entering the market.

6.1.3.13 Finding #13 – In a micro perspective, there are differences in terms of willingness to try PISPs and AISPs between different age groups.

To confirm if there are differences in terms of willingness to try new types of providers between the different age groups, we perform two other Kruskal-Wallis H Tests (appendix 7). As before, since the decision outcome is to reject the null, we perform pairwise comparisons (tables 10 to 13).

Table 10 - PISPs Pairwise Comparisons

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
Under 18 – Over 65	-89.875	153.169	-.587	.557	1.000
Under 18 – 50-65	-136.500	137.967	-.989	.322	1.000
Under 18 – 40-49	-193.699	137.653	-1.407	.159	1.000
Under 18 – 30-39	-219.076	137.897	-1.589	.112	1.000
Under 18 – 18-29	-237.729	137.711	-1.726	.084	1.000
Over 65 – 50-65	46.625	70.416	.662	.508	1.000
Over 65 – 40-49	103.824	69.798	1.487	.137	1.000
Over 65 – 30-39	129.201	70.279	1.838	.066	.990
Over 65 – 18-29	147.854	69.912	2.115	.034	.517
50-65 – 40-49	57.199	21.115	2.709	.007	.101
50-65 – 30-39	82.576	22.653	3.645	.000	.004
50-65 – 18-29	101.229	21.488	4.711	.000	.000
40-49 – 30-39	25.377	20.653	1.229	.219	1.000
40-49 – 18-29	44.031	19.368	2.273	.023	0.345
30-39 – 18-29	18.654	21.035	.887	.375	1.000

Table 11 - AISPs Pairwise Comparisons

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj. Sig.
Over 65 – Under 18	106.000	152.579	.695	.487	1.000
Over 65 – 50-65	117.241	70.144	1.671	.095	1.000
Over 65 – 40-49	177.526	69.529	2.553	.011	.160
Over 65 – 30-39	195.444	70.008	2.792	.005	.079
Over 65 – 18-29	274.326	69.642	3.939	.000	.001
Under 18 – 50-65	-11.241	137.435	-.082	.935	1.000
Under 18 – 40-49	-71.526	137.122	-.522	.602	1.000
Under 18 – 30-39	-89.444	137.366	-.651	.515	1.000
Under 18 – 18-29	-168.326	137.180	-1.227	.220	1.000
50-65 – 40-49	60.285	21.033	2.866	.004	.062
50-65 – 30-39	78.203	22.566	3.465	.001	.008
50-65 – 18-29	157.084	21.405	7.339	.000	.000
40-49 – 30-39	17.918	20.574	.871	.384	1.000
40-49 – 18-29	96.799	19.293	5.017	.000	.000
30-39 – 18-29	78.881	20.954	3.765	.000	.003

Each row tests the null hypothesis that Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.
Significance values have been adjusted by the Bonferroni correction for multiple tests.

Table 12 - Question 22 Descriptive statistics, by age group

Age?	Mean	N	Std. Deviation	Median
Under 18	1.00	2	.000	1.00
18-29	2.85	192	1.825	3.00
30-39	2.72	152	1.818	2.00
40-49	2.45	209	1.667	2.00
50-65	2.00	141	1.531	1.00
Over 65	1.50	8	.756	1.00
Total	2.51	704	1.738	2.00

Table 13 - Question 24 Descriptive statistics, by age group

Age?	Mean	N	Std. Deviation	Median
Under 18	1.50	2	.707	1.50
18-29	3.19	192	1.877	3.00
30-39	2.49	152	1.768	2.00
40-49	2.29	209	1.597	2.00
50-65	1.82	141	1.369	1.00
Over 65	1.00	8	.000	1.00
Total	2.47	704	1.738	2.00

This post hoc analysis revealed statistically significant differences, namely:

- In terms of PISPs, 50 to 65 years old consumers differ from two younger groups – revealing lower openness to try this type of player;
- In terms of AISPs, 18 to 29 years old consumers differ from four older age groups – revealing higher willingness to try this type of new player – and 50 to 65 years old consumers differ from the age group between 30 and 39 – again revealing lower willingness.

It is also important to highlight that, in both cases, the age group from 18 to 29 years old has the highest mean and that it was higher than the "general" one presented in the previous finding.

6.1.3.14 Finding #14 – For both PISP and AISP, consumers prefer Traditional Banks over other providers.

In addition to the "general" analysis of consumers' willingness to try the new type of players, we asked about specific providers that could perform these functions, in order to assess their trust (figure 17).

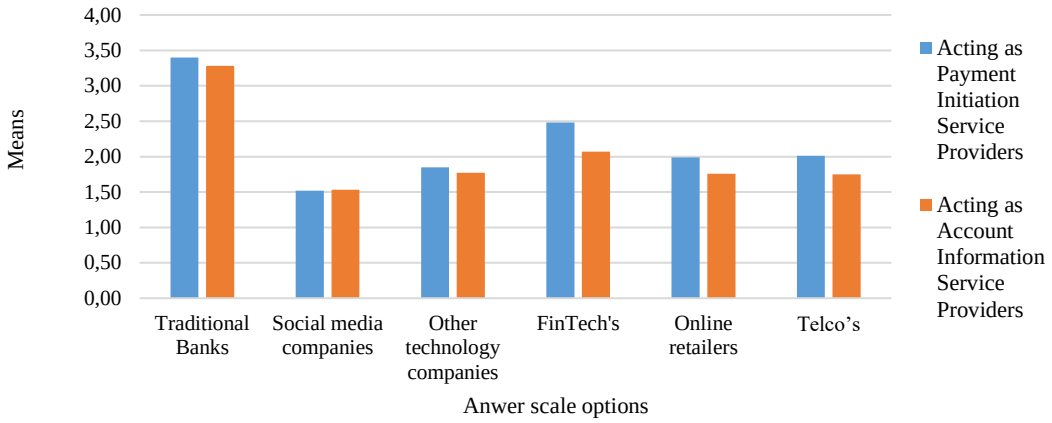

Figure 17 - PISP and AISP possible providers analysis

We conclude, in both cases, that consumer's trust the most in "Traditional Banks", followed by "Fintech's", and that "Social media companies" are the providers with a lower mean, thus, a lower level of trust.

It is important to add that the low level of trust in "Social media companies" does not match the level of usage of their core services revealed at the beginning of the survey (namely by question eight, which presents a mean varying from 4.52 to 6.32).

It is also possible to verify that PISPs values tend to be higher than those from AISPs, i.e. that, when presented with possible players, consumers are more comfortable with these entities initiating payments on their behalf rather than providing information services.

6.1.3.15 Finding #15 – Portuguese consumers tend to behave differently than other European consumers.

As revealed in the methodology, one of our goals is to compare our results to those in the studies of two different consultancy firms. To contextualize these sources of information:

1. Customer experience and payment behaviours in the PSD2 context, conducted by PWC, has a sample composed by 1.700 consumers, mostly between 26 and 35 years old, from European countries (from Northern, Western, Southern and Eastern Europe).
2. Consumers' initial reactions to the new services enabled by PSD2, conducted by Accenture, is a study from the UK, composed by 800 consumers, aged 18 – 64, who have conducted an online payment or used online banking facilities;

Table 14 includes the three study results, in order to summarily present the main differences:

Table 14 - Consultancy firms and own research main results

	Consultancy firm results	This study results
1	60% of respondents confirm they have current accounts in more than one bank	47% of respondents opted to have accounts in more than one bank
	94% of customers trust their bank to protect their data and are confident in using the bank's online services	71% of consumers explicitly told that they trust their banks (i.e. given the 7 digits Likert scale, they answered at least 5)
	92% of respondents use financial apps provided by banks	Only 68% of respondents use financial apps provided by banks
	24% of customers are using financial apps offered by third party providers	49% of consumers use financial apps that are not provided by their banks
	Banking apps are used mainly to display the list of transactions and to initiate payments, while non-banking apps are primarily used for online shopping and to search for general information.	Consumers use their banks' app, mainly to view transactions and do online purchases. Alternative apps, however, are mainly used to do bank transfers and online purchases.
	40% of customers prefer using non banking financial apps as they provide a better user-friendly experience	45% of consumers identified the "Better user-friendly experience" as a benefit of using alternative apps
2	Just over half of consumers (53%) would be comfortable with a TTP initiating a payment on their behalf	71% of consumers revealed they would not be comfortable with a TTP initiating a payment on their behalf
	Although half of consumers are comfortable with the PISP concept, it is clear that at this initial stage they only trust providers that they currently associate with payments. They rank traditional banks as their first preference (76%), with online retailers in clear second place (40%),	In both cases (PISPs and AISPs), the players consumer's trust the most are "Traditional Banks", followed by "Fintech's". The third place of this rank, however, differs: it is Telco's for PISPs and Other technology companies for AISPs.
	Consumers rank traditional banks as their first choice for the AISP role (65%), and then online retailers (40%).	

It is possible to conclude that Portuguese consumers, when compared to European consumers, present lower trust in their banks and tend to use these players' financial apps less. Nonetheless, they tend to use alternative apps more frequently.

On the other hand, when compared with English consumers, Portuguese consumers revealed to be less receptive to the new type of players.

6.2. Banks Level

According to Leung (2015), in qualitative research the choice of methodology must enable the detection of findings/phenomena in the appropriate context to be considered valid. Additionally, to enhance validity, the procedures and methods must be appropriate for the research paradigm. As such, triangulation of researches can be used in terms of data extraction and analysis.

In terms of data collection, it is important to highlight that (1) by interviewing people with leading positions when it comes to the PSD2 strategy, the possibility of gathering individual opinions was significantly lowered, enabling us to get the company perspective and (2) by recording the interviews, we increased the attention to details and assure transcription accuracy.

To facilitate the process of displaying and comparing the answers, all transcripts are included in a table, where the columns reflect each question. Then, an identification of words and expressions frequently used or with a close meaning is made, in order to identify patterns, what can be considered a data-driven coding approach, since the codes were developed upon reading the answers (Brinkmann, 2013). Lastly, the patterns are linked to specific colours and categorized.

Since PSD2 is still in an implementation phase for most European countries – considering the RTS compliance September 2019 due date – and since there was a time gap between the creation, publication and implementation of this directive, the existing literature mainly forecasts the impacts of its implementation. For this reason, it can be considered that it holds a margin for error. However, in order to increase reliability, the interviews data is triangulated with the literature and consulting firm reports – that still are the biggest source of information.

6.2.1 Portuguese Banking Industry Contextualization

According to Banco de Portugal, there are 30 different financial institutions that are currently operating in Portugal under the category of "Banks".

Supported by the Herfindahl-Hirschman index – a measure of market concentration, that takes into account the relative size distribution of the firms in a market –, the Portuguese Banking Association (APB, 2017) states that this is a moderately concentrated market.

Also according to this entity, the challenges currently faced by banks are:

- Restructuring and resizing of the operating structures of the sector (directly reflected in a reduction in the number of bank branches);

- Processes of consolidation;
- Stringent regulatory requirements;
- Business model adjustment due to the challenges posed by digitization, technological innovation and new competitors.

6.2.2 Sample Characterization

Five different banks, with different dimensions, establish this study sample. Due to the confidentiality agreement made with the entities, it is not possible to describe their characteristics individually. However, on the overall, it is possible to state that:

- Three of the five main banks operating in Portugal (according to the 2017 net interest income data from APB) were interviewed;
- One of the banks considered is recent (i.e. with a beginning date of activity within a five years range);
- Two of the banks can be considered smaller actors when compared to the others;
- Only one of the considered banks has a foreign origin. However, it is well recognized by Portuguese consumers for decades now.

The interviewees, as mentioned before, had a high or the higher hierarchical position within the team responsible for PSD2. Table 15 summarizes their different positions:

Table 15 - Bank interviewees hierarchical positions

Bank	Position of the interviewee
Bank 1	Chief Information Officer (CIO)
Bank 2	Channels Director
Bank 3	Head of Digital Bank Department
Bank 4	Chief Digital Officer
Bank 5	Member of the PSD2 development and compliance team and Product Owner of the Open Banking project

6.2.3 Findings

6.2.3.1 Finding #1 – Most banks consider PSD2 as both an opportunity and a threat.

When faced with the first question of the interview, four out of five banks answered that they see it simultaneously as an opportunity and a threat or a challenge (Table 16).

Table 16 – Banks Interview 1st Question Summary

Question	Bank	Answers Highlights
What is your bank's opinion regarding PSD2?	1	"A huge opportunity and a challenge"
	2	"PSD2 is a developing challenge for banks"
	3	"As an incumbent bank, it is threatening (…). But at the same time, it is an opportunity"
	4	"We see PSD2, as many banks, as both a threat and an opportunity"
	5	"We still believe that it can be seen as a threat, but if we do the right things and leverage the right characteristics to our clients (…) then we can take it as an opportunity"

The other respondent considered that "PSD2 is [only] a developing challenge for banks". However, he mentioned that open banking – which can be considered a "broader PSD2", since it also relies on concepts like TTPs or APIs, but widens the type of players considered TPPs – "is much more than that". Later on the interviews – specifically in questions 7 and 8 – the other interviewees also showed interest in an open banking strategy.

Without getting into much detail, since this is an introductory question, the respondents argued that the main reasons why they see it as a challenge is the exposure of one of their main business lines to other providers, instead of other banks and the need for "structural changes (…) due to the variety of systems, which are heavy and uneasily operated".

In terms of opportunities, they underline the possibility of positioning themselves in this new environment and "get more market share".

It also became clear that banks consider that there is a lot of value at risk and that, besides disrupting the retail banking, the fact that PSD2 is also going to affect the small and medium enterprises that "have not had customized or tailored solutions so far" is a concern.

6.2.3.2 Finding #2 – PSD2 affects banks transversally.

To understand if the different parts of each bank were involved in the strategy set to deal with PSD2, the interviewees were asked: "Which organizational unit in your business and how many people are primarily responsible for addressing PSD2?" (Table 17).

Table 17- Banks Interview 2nd Question Summary

Question	Bank	Answers Highlights
Which organizational unit in your business and how many people are primarily responsible for addressing PSD2?	1	"We do not quite see this as only one perspective of PSD2, because there are two or three different ones. There is compliance (…). Then, there is innovation (…)"
	2	"It is something that is transverse to the entire bank"
	3	"We look to PSD2 in two ways: (1) regulatory, with a team (…) that has persons from several departments from the organization; (2) how to take advantage of it, with a smaller team (…) but also multidisciplinary"
	4	"We have within the digital group (…) probably 15 people. In addition to this group we have 3 other units that are particularly relevant"
	5	"We developed with a squad, three years ago, all the compliance to whichever channel and whichever process of security and we were at least 10 people – from API developers or cybersecurity to law"

In a more or less direct way, all of the banks replied that it is something transversal to the entire bank or that involves "several departments from the organization".

Regarding the most affected departments, the emphasis goes to IT – also referred as technology, the digital group or developers –, then to compliance – also mentioned as legal or law – and finally the business – also known as marketing areas. It should be noted that, as one of the interviewees stated, when PSD2 was transposed into Portuguese law "it took a while and [then] it changed a little bit", creating the need for adaptations in terms of strategy.

It was also possible to understand two important facts:

- Three out of five banks soon revealed that there were teams with different perspectives – one regarding compliance and other concerned with "leverage PSD2 to go a little bit further" or "how to take advantage" or "attacking the opportunities";
- Two out of five banks explained that their actions had started 3 years ago – around the time of the publication of the directive in the Official Journal of the European Union.

6.2.3.3. Finding #3 – Trust and experience are banks' main strengths.

When asked about the strengths possessed to deal with this regulatory change, literally or implicitly (by using equivalent expressions such as goodwill) the interviewed banks emphasize "trustworthiness in the market", when compared to other players (Table 18).

Table 18 - Banks Interview 3rd Question Summary

Question	Bank	Answers Highlights
Which strengths does your bank possess to deal with this regulatory change?	1	"If you think of money you have three things that can be translated as a strength: KYC/KIT framework (that includes components of fraud or money laundry), then we have sophisticated risk management system (because banks know how to manage money and how to pay securely) and then there is trust"
	2	"(…) all the main banks are in advantage due to their experience and to the fact that they already possess a variety of services and a close relationship with the clients"
	3	"We are an old and a big player, what is a strength because we have size, knowledge and the know-how of this business and this specific part of the business"
	4	"(…) Our trustworthiness in the market. Even though banks are not seen as the best brands in the world, they still carry trust equity, that is difficult to beat"
	5	"The goodwill" and "the knowledge – of risk assessment, products and from the existing relationship with the clients"

The explanations varied from "a strong KYC (Know-Your-Costumer) and KYT (Know-Your-Transaction)" – which are related with identity verification procedures and analysis of suspicious behaviours – to "brand equity" or the bank's age.

Along with this factor, experience – about "risk assessment, products and the relationship with the clients" or associated with the "size, knowledge and know-how of the business" – was highlighted.

In order to compare the results with Romānova *et al.* (2018) SWOT's analysis presented in the literature review, our initial question is complemented whenever the respondents did not mentioned a "wide range of products" and/or "personal contact, through bank branches".

Only one of the respondents identified the range of products, autonomously. When asked, other three agreed but complemented that:

- "Although it makes it easier to monetize the relationship banks have with clients, tech companies and Fintech's can also do that if they play well the platform model and capture the value creation around the relation with the customers";
- "Having the portfolio brings convenience because it is all in one place and brings knowledge about the consumers that can be used in their advantage, but not necessarily in terms of cross-selling".

Similarly, only one of the banks identified the existence of a physical point of contact autonomously. However, one of the interviewees referred the "close relationship with the clients", which can be related to this matter. When directly asked, other two agreed with it and complemented that:

- Having a physical presence can be associated with being reliable;
- The importance of having physical points of contact can depend on the type of products that is being considered (*i.e.* it is still valued in complex products, but it is losing importance in simple services such as making transfers or even when asking for cards).

6.2.3.4. Finding #4 – Slowness in terms of adaptation is the bank's main weakness.

When asked about the weaknesses that will be exposed by PSD2, all interviewed banks identified slowness as the main one – either by stating that they do not work at the same pace as other companies, by mentioning the reasons why the bank has to take it slower or by considering that it is a cultural fact (Table 19).

Table 19 - Banks Interview 4th Question Summary

Question	Bank	Answers Highlights
Do you believe that this regulatory change will expose any of your bank's weaknesses? Which ones?	1	"The legacy of technology, because we do not have the same pace as, for example, Revolut"
	2	"System and regulatory demands force the bank to take it slower"
	3	"(…) When something changes or a need is identified, we have a slow reaction, in order to make sure that we measure all the impacts that it will cause"
	4	"(…) Some slowness and rigidity in adapting and changing (…), at the speed that it is required in this market. In other words, it is an organizational inertia"
	5	"As banks were protected in the past, it created this inefficient culture – that is very vertical and heavy. (…) When it comes to be flexible, (…) to change or innovate, we are much slower than any Fintech or even Bigtech"

In terms of their reasons, it is important to highlight that:

- Two banks identified the legacy of technology and another two agreed when directly asked about the need for additional IT investment, due to legacy. However, the remaining bank stated that "banking has had more IT investment in the last 10 years than probably any other industry. (…) it is not about the value of the IT investment, but it is about how it is invested (…) [it] has been misguided and too internal".

- Three banks acknowledged culture as being another reason, but within different perspectives: (1) in "the point of view of bundling", i.e. the belief that "this form of relationship could [ever] be changed"; (2) in terms of rigidness, since banks "do not have the culture of experimentation, (…) of validation, (…) of MVP (*i.e.* minimum viable product) developments" and also due to "organizational inertia".
- Three banks mentioned risk aversion – directly or by stating they have high costs with risk control or that they measure all the impacts a given action can cause.

6.2.3.5. Finding #5 – The possibility of cooperation with the new players represents an opportunity but their presence is also a threat.

When asked about the business opportunities, four interviewees mentioned (directly or implicitly) that the entrance of new players into the market will open the possibility of collaboration. However, one of the respondents alerted that it implies having to "find new and right governance schemes and decision making processes" (Table 20).

Table 20 - Banks Interview 5th Question Summary

Question	Bank	Answers Highlights
Do you identify business opportunities with PSD2?	1	"(…) New players that will come up to talk with the clients will be a reality. We were used to think in terms of industry value chain, and this will change it to customer value chain"
	2	"A company with good capacity that does not have costs with compliance, risk control and regulatory pressure has a huge advantage in this business"
	3	"When a client wakes up in the morning, he does not think right away that he needs (…) to have a mortgage. In fact, he thinks that he wants a new house (…). For this reason, banks are not an end destination, but a mean to an end. With PSD2 we can position ourselves in the journey along with the providers that have this final destination"
	4	"The ability to integrate other services and through that solving problems of our customers and capturing bigger revenue pools. In other words, creating networks for solving bigger problems"
	5	"(…) Getting more players to come in, that have distinct and complementary business models"

Two banks have also stated that it will change the customer value chain – reason why providers (not only banks) should be present in "more parts of the [customer] journey" or "think how to become their clients' babysitter".

In terms of benefits, two respondents mentioned the possibility of capturing "bigger revenue pools" and the increase of the value delivered by banks, which allows them to "grow in market share".

Oppositely, when asked about the biggest threats regarding PSD2, all of the interviewees talked about how (directly or implicitly) the entrance of new players, other than banks, makes them uncomfortable (Table 21).

Table 21 - Banks Interview 6th Question Summary

Question	Bank	Answers Highlights
Do you identify business opportunities with PSD2?	1	"PSD2 will open up banks and create a sort of layer between us and the clients. (…) Basically, it will open up the game to new kind of players, that will be aggregator[s]"
	2	"Banks are exposed to "whoever" wishes to use their clients data with their consent and follows certain proceedings"
	3	"With PSD2 we are now open to any kind of business to become and account aggregator or a payment initiator (…). The "field" it is now open and we will have more competitors from other industries that can be better than us"
	4	"If others start aggregating and capturing the value of customers by bringing more value to certain services, we can see our relationship "eroding""
	5	"(…) The threat is the imminent change or disruption of business model that comes from the entrance of new players."

The main reasons – identified by at least two of the interviewed banks – were:

- The aggregation of services, that enhances transparency in the market and "makes it easy to compare prices and find new solutions"; as a consequence, this can deteriorate the clients' relationship have with banks;
- "A lot of products that used to be profitable will no longer be", which leads to a market share loss or a margin compression;
- "The imminent change or disruption of [the] business model", where banks can "choose to become dump pipes (i.e. only channeling without any intelligence and using third parties that excel on maintaining relationships with front ends and other interesting functionalities, outside the banks' scope)" or to change and become better "in terms of pricing and specially in terms of building and communicating products";

When directly asked about the increased security and fraud risk, two of the banks agreed that there is "some apprehension because banks are not used to feel that their systems are open to

the outside". On the other hand, another bank considers that security and fraud risk is not necessarily linked with PSD2, since "financial data is always going to be valuable regardless of how many players there are".

6.2.3.6. Finding #6 – For now, banks are just implementing a compliance strategy.

All interviewees were asked about their banks' position in terms of the value chain (i.e. if they are an account access provider or a third-party provider) and in terms of transaction services (which can be related with the type of APIs they use).

By stating that they are "already" compliant or that this strategy "will come first", all banks agreed that this is their starting point. However, all are ambitioning to go beyond the compliance strategy and, in fact, achieve an open banking strategy.

6.2.3.7. Finding #7 – PSD2 implementation in Portugal will be atypical, due to SIBS.

SIBS is a Portuguese company created in 1983. It is now considered a large-scale "specialist in complex interbank payment environments", that "supports several Central Banks, interbank processors and individual public & private bank initiatives in launching and reforming payment systems" (SIBS, 2019).

Historically, SIBS had a crucial role in the Portuguese ATMs network development. More recently, in 2015, they expanded their services in an innovative way, with the launch of MB Way – the first national interbank solution that allows shopping, "remote" cash withdrawals and immediate transfers via smartphone or tablet possible in a very simple way (SIBS, 2019b.).

In terms of PSD2, and without a specific question addressed about it, two interviewees emphasized this entity's importance (Table 22).

Table 22 – SIBS mentions during the interview highlights

Bank	Answers Highlights
2	"Portugal's case is quite specific, because banks, through SIBS, have created a place where information can be retrieved. It is not mandatory, but all major banks have joined it and made an agreement with SIBS that guarantees a platform that has all the regulatory standards"
5	"In Portugal we have the solution technically centralized in SIBS and so we have been able to do that [i.e. PSD2 Compliance] with a relatively small amount of people"

The above-mentioned "place" is called SIBS API Market and it "provides both market-shared and provider-specific Payments, Information and Analytics APIs". Through this platform, SIBS provides "all PSD2-compliant APIs (Account Information, Payment Initiation and Availability

of Funds) as well as the MB Way API" not only to banks but also to third parties such as startups or retail stores (SIBS, 2019 c.).

For this reason, the different players can centralize this "part of the equation" within SIBS, thereby reducing the number of people involved and efforts employed.

Considering that in other countries, the APIs creation process has to be ensured by the players themselves, SIBS allows Portuguese players to be in an atypical position.

6.2.3.8. Finding #8 – In terms of competitors, Banks are the closest threat but Bigtechs are the biggest challenge.

When asked about the biggest threats specifically in terms of players, banks expressed two major concerns (Table 23).

Table 23 - Banks Interview 9th Question Summary

Question	Bank	Answers Highlights
Who are the biggest threats regarding PSD2? Banks, Fintechs or big Technological companies?	1	"Not banks because we compete with each others for centuries. The biggest threat for us are the Big Techs"
	2	"Big techs (…) already possess the consumer's trust, excel in front end construction and are the "place" where the consumer already spends 90% of their online time. But only time will tell if they will take particular interest in this industry"
	3	"On the overall vision Big Techs, for sure. As Portugal is a small market (…), maybe we still have some time"
	4	"The threat in front of our eyes are other banks, because it is with them we compete right now. Big tech companies are a looming threat, from whom we do not know what to expect."
	5	"Banks represent the traditional competition. Big Techs are the big question mark. (…) In the near future the main competition will still be banks and then depends on how regulation evolve."

Regarding other banks, we confirm that, although they are not the hardest competitor, they will still be seen as the main one "in the near future".

As for big techs, all banks have the same feeling: although they are not sure about the timeline, companies such as Apple, Facebook or Google represent the biggest threat. In terms of justifications, the banks stated that these companies:

- "Excel in front-end construction";

- "Dominate the customer journey (…) and have the knowledge to capture info about customers and use it in a way that makes customers feel compensated";
- "Have a lot of money and (…) are better equipped".

6.2.3.9. Finding #9 – In Portugal, Fintechs are considered allies.

Beforehand, when asked about the biggest threats specifically in terms of players, two of the respondents made clear that Fintechs are not seen as enemies. They are, in fact, perceived as a mean to "expand bank services", since they are willing to work with banks, "to share their knowledge and to combine value propositions". The fact that the other three interviewees did not even mention this type of companies raised the suspicion that they were considered allies. The last question of the interview regarding the banks' position in terms of cooperation with Fintechs left no room for any doubt (Table 24).

Table 24 - Banks Interview 10th Question Summary

Question	Bank	Answers Highlights
What is your bank's position in terms of cooperating with Fintechs?	1	"We are open up to cooperate. We are trying to figure out which ones to work with, but nevertheless this is Portugal and there are not too many Fintechs in Portugal"
	2	"Our bank already works with many fintechs, and seeks to work with even more"
	3	"Completely open to cooperate. We are not and do not intend to be experts in everything"
	4	"Fintechs have been definitely a partner"
	5	"It is not possible to have more advantages in terms of product or price, so it will come from the ability to being constantly revising the value proposition and revamping it. For that you need speed and speed comes from Fintechs"

Besides all banks confirming that they are open to collaborate with Fintechs, two of them revealed they are already doing it.

6.3. Fintechs Level

As revealed in the methodology, this level of analysis followed the same approach as the bank's level. Therefore, all of the considerations regarding the data collection process and consequent displaying and comparison process are adequate as well.

6.3.1 Portuguese Fintech Industry Contextualization

Portugal Fintech is the first non-profit FinTech community in Portugal, founded in 2016, with the goal of creating "an ecosystem where every FinTech, RegTech, InsureTech and

Cybersecurity company in Portugal can easily interact with regulators, legislators, consultants, banks, investors and other relevant entities" (Portugal Fintech, 2019). Now, it evolved into a well-developed network, which counts with the support of central entities such as the Portuguese national bank (Banco de Portugal), the Portuguese Securities Market Commission or the Portuguese Insurance and Pension Funds Supervisory Authority.

According to this entity, there are 25 main startups in Portugal, divided across different areas (figure 19):

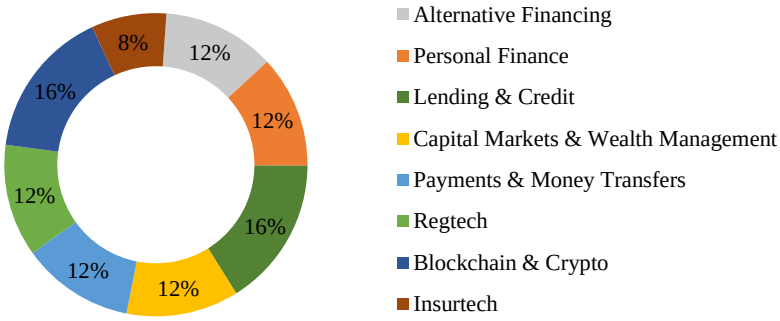

Figure 18 – Fintech Ecosystem Maping
Source: Portugal Fintech Report 2018

Due to the specificities of PSD2, the main areas in which the startups will be affected are "Personal Finance" and "Payments & Money Transfers" – ergo, six startups from this top 25.

Regarding the startups hardships when growing, this report assessed regulation and access to market are the main ones.

6.3.2 Sample Characterization

Three different entities establish this study's sample. Once more, due to the confidentiality agreement that was made with the entities, it is not possible to describe their characteristics individually. However, it is possible to state that they belong to the six above-mentioned startups and that:

- Two of the startups have more than 5 years of existence;
- The three companies have different office locations, in different parts of the country.

6.3.3 Findings

6.3.3.1 Finding #1 – Fintech's perceive PSD2 mainly as an opportunity.

When faced with the first question of the interview, all the startups shared that PSD2 is seen as a big opportunity. Yet, in one case, it is possible to understand that there is also a concern, namely regarding big techs (Table 25).

Table 25 – Fintechs Interview 1st Question Summary

Question	Fintech	Answers Highlights
What is your opinion regarding PSD2?	1	"On the one hand, it is true that it offers new business opportunities in various areas and that new products and services will appear and benefit from this easy integration. On the other hand, this opening also poses some risks. (…) Banks and Fintechs risk to be doing no more than doing the heavily regulated bureaucratic part of the service (…), leaving innovation and customer contact platforms to the big-techs"
	2	"We believe the API driven future that PSD2 implies - and applies - offers significant potential for both old and new players in the payments industry. (…) We understand that opportunities for partnerships and innovation will arise to both traditional banks and to their Fintech challengers"
	3	"The new payments directive will bring huge opportunities to the financial system in Europe, by creating a path for new businesses to rise, and by strengthening the bonds between technology and finance"

When comparing these answers with the ones from the banks, we conclude that fintechs do not tend to perceive PSD2 as a threat, but only as an opportunity, which is reasonable since the main challenges will rely on the banking industry side.

6.3.3.2 Finding #2 – The main business opportunities arise both from new and integrated services.

When asked about the business opportunities, two out of the three interviewees mentioned the creation of new services and the possibility to integrate existing ones, namely from the incumbent banks (Table 26).

Table 26 - Fintechs Interview 2nd Question Summary

Question	Fintech	Answers Highlights
Do you identify any business opportunities with PSD2?	1	"Openness always brings opportunities for new services and new integrations within existing services. (…) Banks (and Fintechs) themselves may also offer more integrated services, and even for them, PSD2 is also an open door to evolution and an opportunity to grow"
	2	"Globally, PSD2 will enable 3rd Party organizations (…) to build financial services on top of banks' data and infrastructure. They will enter the market with new ideas about how to shape the banking experience by adding modern tech infrastructure and a flexible iterative approach, without

		the heavy compliance and infrastructure which banks are required to maintain.
	3	The new directive basically allows the creation of two new services. (…) In any of them you can see new services and companies being created. In Portugal we have MB Way that already lives within this reality in the payment initiation services, but we will see apps with the ability to gather the financial information from different banks, allowing the end consumer to have a complete overview of their finances.

Additionally, and even though it was implicit, all the startups mentioned the entrance of new players into the market as banks did.

It is important to highlight that one of the interviewees mentioned MB Way – the SIBS solution that was previously mentioned – as a solution that already prepared the Portuguese consumer for the changes that this regulation will bring.

6.3.3.3 Finding #3 – The main threat arises from supervision or regulatory challenges.

There was not a unanimous answer among the interviewees when asked about the biggest threats regarding PSD2. However, if we consider that the "challenges to supervision" are equivalent to the regulatory demands, we can consider this as the main threat (Table 27).

Table 27 - Fintechs Interview 3rd Question Summary

Question	Fintech	Answers Highlights
Which are PSD2's biggest threats?	1	"The area of payments, (…) has all the characteristics to quickly be dominated by the world giants of technology and payments. (…) Big-techs are the ones who have the most to gain from this opportunity, because they have unbeatable technological know-how, virtually unlimited funds and infrastructures and, most importantly, a constant and daily connection with billions of users. (…) Global payment solutions and global digital currencies can appear and can radically change our payment habits and those involved in the process. This also brings new challenges to supervision, which may not be prepared for these global services and multinational players. In terms of security, it will also pose enormous challenges"
	2	"Fintechs and other Payment Providers will face regulatory scrutiny - for some maybe for the 1st time. Upon PSD2 implementation, banks' monopoly on their customer's account information and payment services will dissipate. Banks will no longer compete against each other but with

		everyone offering financial services. PSD2 may impose economic challenges too"
	3	We have always used API's since day one. Banks are learning about the existence of this type of technology now. This can only be resolved by a collaborative environment. (…) Portugal delegated this in SIBS that created all on its own and now invites all players to be a part of it. This a big threat because we have in Portugal a solution created by one company which gives us a single viewed option.

When analyzing the answers in an isolated way it was possible to understand that:

- Fintech 1 expressed a deep concern regarding big techs and Fintech 2 underlined the economic challenges that may arise – both in line with the banks' worries;
- Fintech 3 mentioned SIBS as a potential threat, due to the API "market" centralization – which contrasts with the banks' opinion.

6.3.3.4 Finding #4 – Fintechs do believe that PSD2 will boost competition.

Oppositely to the previous question, there is a unanimous and positive answer among the interviewees when asked if they believe that PSD2 will boost competition (Table 28).

Table 28 - Fintechs Interview 4th Question Summary

Question	Fintech	Answers Highlights
Do you believe that this regulatory change will boost competition? How?	1	"(…) it will increase competition and innovation because we are opening up a new world of opportunities to thousands of companies who will be very creative in developing new products and services at user convenience"
	2	"Yes, it will. Competition within the financial sector will definitely increase. PSD2 will provide the legal foundation for the further development of a better integrated internal market for electronic payments within the EU. (…) Furthermore, customers can easily choose new financial service providers with the introduction to PSD2. This means that customers will be enabled to create their own collection of payment service providers instead of choosing one specific bank for all financial needs"
	3	"Without a doubt. This will boost competition in a good way, in which banks and fintechs will collaborate to better serve the end consumer, with simple, safe and flexible technological solutions in a way that the consumers will be closer to banks"

It should also be noted that two of the fintechs complemented their answer by mentioning the difference within the consumer experience, which, once again, is in line with the banks' opinion.

6.3.3.5 Finding #5 – For Fintechs, banks are also considered allies.

The last question of the interview concerns their position in terms of cooperation with banks and it confirmed the hints from the other answers: they are all willing to cooperate with banks. In fact, for two of them, it is a priority (Table 29).

Table 29 - Fintechs Interview 5th Question Summary

Question	Fintech	Answers Highlights
What is your position on cooperating with banks?	1	"The smaller Fintechs, as in our case, have always sought cooperation with banks. It is inevitable, because a good part of the basic infrastructure is still exclusively in the hands of banks, and we need their support to have access"
	2	"We can collaborate with banks at the technology level by providing them with a strong and innovative API"
	3	"The market is moving in a way that each player will be specialized in a specific solution. We will see fintechs specialized in payments, for example, and banks specialized in loans, so cooperation is a priority. Banks and fintechs will have to work hand-in-hand."

By matching both banks and fintech's answers, it is possible to conclude that there is a cooperation trend in the Portuguese financial market.

7. Results Discussion

7.1 RQ1) Which consumer profile is the most receptive to change?

As previously mentioned, we analysed the receptiveness to change in three different perspectives: as the willingness of the respondents to switch banks or as the willingness to try a new type of provider, whilst distinguishing between a PISP and an AISP. Table 30 summarizes the different profiles, based on the first three findings from the consumer level:

Table 30 - Different consumer profiles (regarding receptiveness to change)

Switching banks	Payment Initiation Service	Account Information Service
Male, with a high education level, that lives in the center of Portugal or in the islands. This consumer does not consider that his bank offers anything different from what other banks offer and does not trust his bank.	Risk-seeking consumer with a high education level, who is able to use digital tools and technologies for collaborative processes. This consumer does not consider that his bank offers something different from what other banks offer and does not trust his bank. Additionally, he uses alternative APPs.	Risk-seeking younger male, with a high education level, that does not live in the Southern region of Portugal. This consumer trusts his bank and considers that it offers something different from what other banks offer.

Although some characteristics are shared, the profile most receptive to change differs across the three perspectives. In regard to the shared characteristics, we conclude that there is only one that it is transversal to the three profiles – namely the high education level – and that the willingness to try the new type of providers implies a low level of risk aversion.

It is also important to underline that the use of alternative APPs (that is significant in the second profile) can be justified by the popularity of MB WAY among Portuguese consumers (as it features resemble the PISP concept).

7.2 RQ2) What is the standard consumer perception and attitude towards their bank?

In terms of perception, we find that most consumers do not see significant differences between the different incumbents and that they trust their current providers. Additionally, although nearly half of the inquired consumers are clients of two or more institutions, there is no impetus to switch banks in the near future – which indicates that consumers tend to be satisfied.

When it comes to the consumer's attitude towards the bank's digital solutions, we conclude that only 68% of consumers use their banks' app and that the ones that do not use them, tend to use alternative solutions. Despite the different order, the activities performed through the two kind of apps reach the same top 3 (Table 31).

Table 31 – Top 3 activities performed through financial apps

Own banks' apps	Alternative apps
View transactions	Perform bank transfers
Do online purchases	Do online purchases
Perform bank transfers	View transactions

The main alternative apps' activity can be once more related to the MB Way app – which allows consumers to perform bank transfers using their cell-phone number instead of the IBAN (i.e. the International Bank Account Number), simplifying the process when compared with the usual bank apps (thus allowing a user-friendlier experience).

Lastly, it is important to highlight that, at this level of analysis, age has proved to be a significant feature. However, contrary to the expected, it was the 50 to 65 years old age group that behaved differently – namely in terms of bank trust and apps usage.

7.3 RQ3) In which type of player do consumers trust the most?

Traditional banks continue to be regarded as the most trusted players. Nevertheless, it should be noted that the levels of trust diverge across the type of service under analysis – being considerably higher for current services and different between the two new types of services.

The fact that Fintech's placed second and that PISPs values tended to be higher than the ones from AISPs – may emphasize MB Way's importance among consumers.

7.4. RQ4) What perception do banks have (and consequent SWOT analysis) of PSD2?

After deepening the analysis of which key bank's strengths and weaknesses this regulatory change may highlight and which business opportunities and threats it might create, we built the following SWOT analysis (table 32):

Table 32 - PSD2 Banks' SWOT Analysis

Strengths	- Experience and trust from consumers; - Having a portfolio with a wide range of products/services, which brings convenience and facilitates monetizing the clients' relationship; - Physical presence, through bank branches;
Weaknesses	- Slowness in terms of adaptation, associated with legacy or with a risk conservative and bundling culture; - Dependence of outsourcing;
Opportunities	- Possibility to outsource innovative solutions, to improve products/services; - Possibility to re-position along the customer value chain;
Threats	- Additional pressure on margins and potential loss of market share; - Need to evolve the business models; - Increased operational, security and fraud risk – by sharing data and account info;

Regarding the strengths, it is worth noting that all banks agreed that experience and trust from consumers is the most distinctive one, and that the other two, on the opposite, may be "endangered" since they can be replicated by the new players entering the market.

In terms of weaknesses, banks considered outsourcing dependence as one, as Romānova et al. (2018) have also stated. However, they consider that it is caused by slowness or rigidity in terms of adaptation, inherent to the existing legacy and culture of traditional banking.

Regarding the opportunities, we find that the "Improved business efficiency and risk assessment approaches" mentioned by Romānova *et al.* (2018) were not considered crucial by the interviewees. However, the possibility for banks to change their current position in the consumer value chain has proved to be quite important.

Lastly, it should be noted that the interviewees considered the additional pressure on margins as a threat and not a weakness, since it will affect all the players in the market – including the new ones. On the other two topics, they tend to agree with Romānova *et al.* (2018).

7.5 RQ5) To which options (Cortet *et al.*) are banks oriented to, in order to cope with PSD2?

As stated in the sixth finding from the banks' level, all of the interviewed banks ambition to go beyond the compliance strategy and to, in fact, achieve an open banking strategy. After analyzing their arguments and validating this interpretation during the interview, it was possible to draw their expected course (figure 19):

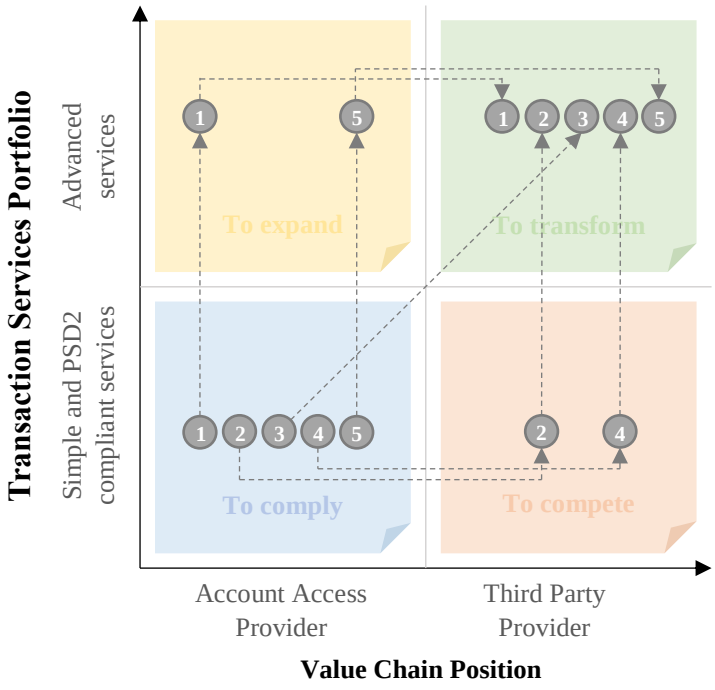

Figure 19 - Interviewees expected strategic course
Source: Adapted from Cortet et al. (2016)

Bank 1 and 5 stated that they are planning to evolve from a compliance strategy to an expansion one before achieving the open banking strategy. Bank 2 and 4, on the other hand, want to develop a competition strategy in the intermediate state. Bank 3 is the only one aiming to make a direct transition into an open banking strategy.

It should be noted that bank 3 is the only one that is assertive regarding the plans for a 2-months timeline; all other banks are uncertain about the intermediate steps and even if they need to analyze other markets strategies (and outcomes) in order to confirm their own.

7.6 RQ6) Are Fintechs seen as enemies or allies?

Until now, financial institutions only competed with each other. For that reason, the interviewees considered that this regulatory change does not create further pressure.

Regarding the additional competitors that PSD2 enables:

- Fintech's – such as startups or even small and medium companies – are definitely perceived as allies by Portuguese banks. In fact, the incumbents' goal is to establish partnerships or even to create networks to overcome their rigidity towards adaptation.
- Due to their popularity among consumers, consequent knowledge about their users and their high financial capacity, big techs are the entities that are currently being considered as the enemies.

7.7 RQ7) How will PSD2 boost competition?

It is undeniable that PSD2 will boost competition, since it will add more players into a very restrictive market. For the interviewed fintechs, this will imply the creation of new products and services, but mostly, it will be an opportunity to create more partnerships and to help changing the relationship that consumers have with the banking industry.

7.8 RQ8) Are banks seen as enemies or allies?

Banks still play the major role in this industry. Taking into consideration the results from the consumer level, it is unlikely that PSD2 will change that, at first. However, the new players entering this market will apply further pressure on banks to do more than merely comply to PSD2 and the interviewed fintechs know that. Given their infrastructures, trust and the knowledge they have from consumers, banks are definitely perceived as ideal partners by fintechs.

In other countries, support in the API infrastructure may be the main reason to cooperate but Portugal is atypical due to SIBS, as one of the interviewees highlighted. Nevertheless, these types of companies seek to help banks reshaping themselves.

8. Conclusion

8.1 Main conclusions

The purpose of this study is the assessment of the expected impact of the revised Payments Service Directive in Portugal, in order to gain a deeper understanding of the future development of the market.

PSD2 established common rules regarding certain types of electronic payments and allowed new players to enter in the European Payments market – namely Third-Party providers. As a consequence, this regulation stimulated integration, efficiency, and provided consumers with secure and innovative services. Therefore, our analysis is carried at three different levels: consumers, banks and fintechs (specifically startups).

Portuguese consumers tend to have a good relationship with their banks, which is indicated by a high level of trust and a low willingness to switch providers. However, there is still much room for improvement regarding the usage of financial digital solutions.

With regard to the new types of providers, although there is a higher receptiveness to try Payment Initiation Services (when compared with Account Information Services), it is clear that still are some hesitations among consumers. Despite being risk-seeking consumers with a high education level, the consumers who are most receptive to these changes have very different profiles.

It is also possible to conclude that Portuguese consumers behave differently than other European consumers – not only regarding the changes promoted by the PSD2, but also with respect to the current relationship with traditional banks.

PSD2 and the inherent option of cooperation with the new players is perceived as both an opportunity and a threat by Portuguese banks and it is being addressed simultaneously by different parts of their structure. Although they identify slowness or rigidity in terms of adaptation as their main weakness, they believe the trust and experience they have, along with the support from partners such as fintechs, are the key to overcome it.

In fact, regarding the competition that PSD2 enables, our study concludes that banks see fintechs as allies and that they do not see each other as a bigger threat than they used to. Much

on the contrary, they perceive big techs as a looming threat due to their large consumer base and their high level of resources and innovation capacity. However, for now they are unsure of the timeline or even of these companies' interest in the Payments market.

As for the strategies that Portuguese banks are implementing, it is clear that they consider that compliance is not enough and that additional strategic actions are needed to handle the intensified competition. All of the interviewees shared that they pretend to have an open banking approach in the future. Yet, the path through this long-run strategy will be taken differently between banks.

It also becomes evident that, in order to achieve compliance, Portuguese banks had the support of SIBS – a national large-scale specialist in complex interbank payment environments –, thus reducing the complexity on the API infrastructure implementation and the need to do it internally or to outsource help.

Lastly, it is possible to verify that Portuguese fintechs perceive PSD2 as a great opportunity to establish partnerships with banks – confirming that there is a cooperation trend in this market – and that, unlike banks, these entities may recognise SIBS as a threat.

8.2 Limitations

At the consumer level, we verified a high rate (36%) of incomplete (and thus invalid) answers to the questionnaire. Although our sample is not very small, the demographics were not evenly distributed in terms of age groups or geographical location – which may have conditioned some of the statistical tests' performance. In addition, the data retrieving process was conducted through an online survey tool, which created room for misinterpretation of questions.

In the qualitative analysis, the lack of a larger control group was our biggest limitation. Regarding the banks level, ten different banks were contacted. However, due to the need of interviewing someone from a high hierarchical position and due to the banks' concern to maintain their strategies confidential, we could not schedule more interviews. Similarly, at the fintechs level, twelve different startups were contacted but, due to the reduced dimension of the teams, they revealed a low response capability.

For these two levels, the low number of interviews created constrains on the use qualitative analysis softwares such as NVivo that were initially considered. Moreover, the lack of additional interviewees within the same entities or the provision of internal documents did not allow triangulating information, which would improve the validity and reliability of the answers.

8.3 Recommendations for future research

Studying a new regulation's real impact implies waiting for it to be completely implemented and understood. PSD2 should have been transposed to the Portuguese legislation in January 2018, but it was only done in November 2018. Additionally, due to the RTS due date, PSD2 was not yet fully implemented at the moment this study was performed. After its complete implementation, further confirmatory and comparative research would be interesting.

Furthermore, this thesis presented results that were obtained from five banks, who did not represent all the different types of banks operating in Portugal. The same can be said at the fintechs level. Whereby, it is uncertain if the results should be directly generalized. Future research including diversified banks and fintechs would be interesting to provide understanding of how it can differ depending on size.

9. Bibliography

- Accenture, *Consumers' initial reactions to the new services enabled by PSD2*; https://www.accenture.com/t00010101T000000Z__w__/gb-en/_acnmedia/PDF-29/Accenture-UK-Banking-PSD2-Consumer-Reactions.pdf; 28/11/2018;
- Andrieș, A. & Căpraru, B. & Ieșan-Muntean, F. & Ihnatov, I. 2016. The Impact of International Financial Crisis on Bank Performance in Eastern and Central European Countries. ***EuroEconomica***, 35(1);
- Arner, D. & Barberis, J. & Buckley, R. 2015. ***The Evolution of Fintech: A New Post-Crisis Paradigm?***. Research Paper No. 2015/047. University of Hong Kong Faculty of Law;
- Associação Portuguesa dos Bancos (APB). Boletim Informativo. Available at: http://www.apb.pt/content/files/BIA_2017.pdf, 20/09/2019;
- Azzara, C. 2010. ***Questionnaire Design for Business Research***. Mustang, OK: Tate Publishing;
- Banco de Portugal. (Listagem das) Instituições autorizadas. Available at: https://www.bportugal.pt/entidades-autorizadas/67/all, 13/03/2019;
- Berger, A. &, Molyneux, P. & Wilson, J. 2012. ***The Oxford Handbook of Banking***. Oxford: Oxford University Press;
- Blakstad, S. and Allen, R. 2018. ***FinTech Revolution: Universal Inclusion in the New Financial Ecosystem***. Cham: Palgrave Macmillan;
- Brinkmann, S. 2013. ***Qualitative Interviewing: Understanding qualitative reserach***. New York: Oxford University Press;
- Brunnermeier, M. & Crockett, A. & Goodhart, C. & Persaud, A. & Shin, H. 2009. ***The Fundamental Principles of Financial Regulation.*** Geneva: International Center for Monetary and Banking Studies;
- Casu, B. & Girardone, C. & Molyneux, P. 2006. ***Introduction to banking***. Harlow: Prentice Hall Financial Times;
- Claessens, S. & Van Horen, N. 2014. ***The Impact of the Global Financial Crisis on Banking Globalization***, Working Paper no. 14/197, International Monetary Fund;
- Colangelo, G. & Maggiolino, M. 2018. From Fragile to Smart Consumers: Shifting Paradigm for the Digital Era. ***Computer Law & Security Review: The international Journal of Technology Law and Practice***;
- Cortet, M. & Rijks, T. & Nijland, S. 2016. PSD2: The digital transformation accelerator for banks. ***Journal of Payments Strategy & Systems.*** 10(1): 13-26;

- Deloitte; *European PSD2 Survey Results highlights*; https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/FinancialServices/PSD2%20Deloitte%20EMEA%20Survey.pdf; 28/11/2018;
- Desai, V. & Potter, R. (Eds.). 2006. ***Doing Development Research***. London: SAGE Publications;
- Donnelly, M. (2016). Payments in the Digital Market: Evaluating the Contribution of Payment Services Directive II. ***Computer Law & Security Review: The international Journal of Technology Law and Practice***, 32: 827-839;
- Espinoza-Loayza, V. & Salas-Tenesaca, E. & Samaniego-Namicela, A. 2019. Banking Industry Innovation. In M. Túñez-López *et al.* (Eds.), **Communication: Innovation & Quality**: 463-474. Springer;
- European Central Bank. 2018. The revised Payment Services Directive (PSD2) and the transition to stronger payments security. Available at: https://www.ecb.europa.eu/paym/intro/mip-online/2018/html/1803_revisedpsd.en.html, 13/03/2019;
- European Commission. 2007. Payment Services Directive: Commission encourages swift and coherent implementation at national level. Available at: http://europa.eu/rapid/press-release_IP-07-1914_en.htm, 11/03/2019;
- European Commission. 2007b. Payment Services Directive: Frequently Asked Questions (See also IP/07/550). Available at: http://europa.eu/rapid/press-release_MEMO-07-152_en.htm?locale=en, 11/03/2019;
- European Commission. 2018. Payment Services Directive: frequently asked questions. Available at: http://europa.eu/rapid/press-release_MEMO-15-5793_en.htm, 08/03/2019;
- European Commission. 2018b. Payment services: Consumers to benefit from cheaper, safer and more innovative electronic payments. Available at: http://europa.eu/rapid/press-release_IP-18-141_en.htm, 08/03/2019;
- European Payments Council. 2017. How can Application Programming Interface standardization be achieved in the context of the revised Payment Services Directive? Available at: https://www.europeanpaymentscouncil.eu/news-insights/insight/how-can-application-programming-interface-standardisation-be-achieved-context, 12/03/2019;
- Ferrari, R. 2016. FinTech Impact on Retail Banking - From a Universal Banking Model to Banking Verticalization. In S. Chishti & J. Barberis (Eds.), ***The FinTech Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries***: 248-252. West Sussex: John Wiley & Sons Ltd;

- Financial Stability Board. 2017. Supervisory and Regulatory Issues that Merit Authorities' Attention. Available at: http://www.fsb.org/wp-content/uploads/R270617.pdf, 07/03/2019;
- Financial Stability Board. 2019. FinTech and market structure in financial services: Market developments and potential financial stability implications. Available at: http://www.fsb.org/wp-content/uploads/P140219.pdf, 17/03/2019;
- Fox, J. & Monette, G. 1992. Generalized Collinearity Diagnostics. ***Journal of the American Statistical Association***. 87(417): 178-183;
- Garbade, K. & Silber W. 1978, Technology, Communications and the Performance of Financial Markets: 1840-1975, ***Journal of Finance***, 33(3): 819-832;
- Gomber, P. & Kauffman, R. & Parker, C. & Weber B. 2018. On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption, and Transformation in Financial Services. ***Journal of Management Information Systems***, 35(1) 220-265;
- Google India Blog. 2018. Google Pay — the next step in the Tez journey. Available at: https://india.googleblog.com/2018/08/google-pay-next-step-in-tez-journey.html, 12/03/2019;
- Google Trends. Fintech. Available at: https://trends.google.com/trends/explore?date=2012-07-03%202019-03-07&q=FinTech, 07/03/2019;
- Gupta, P. & Tham, T. 2019. ***Fintech: The New DNA of Financial Services***. Boston/Berlin: Walter de Gruyter Inc.;
- Hausladen, I. & Zipf, T. 2018. Competitive Differentiation versus Commoditisation: The role of Big Data in the European Payments Industry. ***Journal of Payments Strategy & Systems.*** 12(3): 266-282;
- Henderson, K., & Bialeschki, M. 2002. ***Evaluating Leisure Services: Making Enlightened Decisions.*** Pennsylvania: Venture Publishing Inc.;
- Hennink, M. & Hutter, I. & Bailey, A. 2010. ***Qualitative Research Methods.*** London: SAGE Publications;
- Jakšič, M. & Marinč, M. 2015. **The Future of Banking: The Role of Information Technology**. Forthcoming in Bancni Vestnik: Banking Sector at the Crossroads: Challenges For The Future;
- Joskow P. & Noll. R. 1981. Regulation in Theory and Practice: An Overview. In G. Fromm. (Ed.), ***Studies of Public Regulation***. Cambridge, MA: MIT Press;
- Kahn, J. 2018. U.K. Fintech Revolut Gets European Banking License. Available at: https://www.bloomberg.com/news/articles/2018-12-13/u-k-fintech-revolut-gets-european-banking-license-via-lithuania, 15/04/2019;

- Lee, I. & Shin, Y. 2018. Fintech: Ecosystem, business models, investment decisions, and challenges. ***Business Horizons***. 61(1): 35-46;
- Leung, L. 2015. Validity, reliability, and generalizability in qualitative research. ***Journal of Family Medicine and Primary Care***. 4(3): 324-327;
- Mehta, B. K. 2000. ***Principles of Money and Banking***. Delhi: Motilal Banarsidass Publishers;
- Navaretti, G. & Calzolari, G. & Mansilla-Fernández, J. & Pozzolo, A. 2017. FinTech and Banking. Friends or Foes? ***European Economy – Banks, Regulation and the Real Sector***, 2: 9-30;
- Nouy, D. 2017. Gaming the rules or ruling the game? – How to deal with regulatory arbitrage (Speech from the 33rd SUERF Colloquium, Helsinki). Available at: https://www.bankingsupervision.europa.eu/press/speeches/date/2017/html/ssm.sp170915.en.html, 17/03/2019;
- Núñez, V. & Jaramillo, C. 2017. **Análisis de casos bancarios**. Ediloja: Loja;
- Pollard, P. 2003. A Look Inside Two Central Banks: The European Central Bank and the Federal Reserve. ***Federal Reserve Bank of St. Louis Review*** 85:11-30;
- Pordata. População residente, média anual: total e por grupo etário. Available at: https://www.pordata.pt/Portugal/Popula%C3%A7%C3%A3o+residente++m%C3%A9dia+anual+total+e+por+grupo+et%C3%A1rio-10, 13/03/2019;
- Portugal Fintech. Portugal Fintech Report 2018. Available at: https://www.portugalfintech.org/portugalfintechreport2018, 13/03/2019;
- Portugal Fintech. 2019. Portugal Fintech (Description). Available at: https://www.portugalfintech.org, 20/09/2019;
- PWC. Customer experience and payment behaviours in the PSD2 context. Available at: https://www.pwc.com/gx/en/industries/financial-services/publications/customer-experience-payment-behaviours-psd2-context.html, 14/03/2019;
- Ritchie, J. & Lewis, J. & Nicholls, C. & Ormston, R. 2013. ***Qualitative Research Practice: A Guide for Social Science Students and Researchers***. London: SAGE Publications;
- Romānova, I. & Grima, S. & Spiteri, J. & Kudinska, M. 2018. The Payment Services Directive 2 and Competitiveness: The Perspective of European Fintech Companies. ***European Research Studies Journal.*** 21(2): 5-24;
- Seputyte, M. & Kahn, J. 2018. Google Payment Expands With E-Money License From Lithuania. Available at: https://www.bloomberg.com/news/articles/2018-12-21/google-payment-expands-with-e-money-license-from-lithuania, 12/03/2019;

- SIBS. 2019. Company (Description). Available at: https://www.sibs-international.com/company/, 20/09/2019;
- SIBS. 2019b. MB Way (Description). Available at: https://www.sibs.com/marcas/mbway/, 20/09/2019;
- SIBS. 2019c. SIBS API Market. Available at: https://www.sibsapimarket.com/, 20/09/2019;
- Soyres, F. & Jelil, M. & Cerruti, C. & Kiwara, L. 2018. What Kenya's mobile money success could mean for the Arab world. Available at: https://www.worldbank.org/en/news/feature/2018/10/03/what-kenya-s-mobile-money-success-could-mean-for-the-arab-world, 15/04/2019;
- Teece, D. 2010. Business Models, Business Strategy and Innovation. ***Long Range Planning***. 43(2-3): 172-194;
- Teigland, R. & Siri, S. & Larsson, A. & Puertas, A. & Bogusz, C (Eds.). 2018. ***The Rise and Development of FinTech***. London: Routledge
- The Millennial Disruption Index. 2015. Available at: https://www.bbva.com/wp-content/uploads/2015/08/millenials.pdf, 07/03/2019;
- Varga, D. 2017. Fintech, the new era of financial services. ***Vezetéstudomány / Budapest Management Review***, 48 (11) 22-32;
- West, C., 2018. We got a banking licence. Available at: https://blog.revolut.com/we-got-a-banking-licence/, 12/03/2019;
- World Bank. 2016. Open data catalogue, population ages. Available at: http://datacatalog.worldbank.org/, 07/03/2019;
- World Economic Forum. 2015. ***The Future of Financial Services: How disruptive innovations are reshaping the way financial services are structured, provisioned and consumed***. Available at: http://www3.weforum.org/docs/WEF_The_future__of_financial_services.pdf, 07/03/2019;
- World Economic Forum. 2017. ***Beyond Fintech: A Pragmatic Assessment Of Disruptive Potential In Financial Services***. Available at: http://www3.weforum.org/docs/Beyond_Fintech_-_A_Pragmatic_Assessment_of_Disruptive_Potential_in_Financial_Services.pdf, 07/03/2019;
- World Economic Forum. 2017b. ***The Global Competitiveness Report, 2017-2018***. Available at: http://www3.weforum.org/docs/GCR2017-

2018/05FullReport/TheGlobalCompetitivenessReport2017%E2%80%932018.pdf, 07/03/2019;

- Zetzsche, D. & Buckley, R. & Arner, D. & Barberis, J. 2017. From FinTech to TechFin: The Regulatory Challenges of Data-Driven Finance. ***NYU Journal of Law and Business***, 14(2): 393-446;

10. Appendix

Appendix 1 – Consumer Questionnaire

Portuguese Version

Introduction
O presente questionário tem como finalidade a recolha de dados para uma dissertação do Mestrado de Finanças do ISCTE – Instituto Universitário de Lisboa. O principal objetivo passa pela realização de uma análise do impacto que a nova Diretiva Europeia de Serviços de Pagamentos - denominada PSD2 - terá junto do consumidor final. É garantida absoluta confidencialidade e anonimato dos participantes, sendo que os dados serão apenas utilizados para fins académicos. A sua participação neste estudo é muito importante e agradecemos desde já a sua disponibilidade! Caso exista alguma dúvida relativa ao seguinte questionário, não hesite em contactar jssfa@iscte-iul.pt .

	Survey Questions	Answers Options
1	Género?	Feminino Masculino
2	Idade?	Inferior a 18 18 – 29 30 – 39 40 – 49 50 – 65 Superior a 65
3	Habilitações literárias?	Inferior ao 12ºano 12ºano Ensino Profissional Licenciatura Mestrado Doutoramento
4	Rendimento mensal (do agregado familiar)?	Inferior a 1500€ 1501€ – 2500€ 2501€ – 3500€ 3501€ – 4500€ Superior a 4500€
5	Composição do agregado familiar?	1 2 3 4 5+
6	Ocupação profissional?	Estudante Estudante-trabalhador Empregado Desempregado Reformado Doméstico

7	Região onde habita?	Viana do Castelo Braga Vila Real Bragança Porto Aveiro Viseu Guarda Coimbra Castelo Branco Leiria Santarém Portalegre Lisboa Setúbal Évora Beja Faro R. A. Madeira R. A. Açores
8	Relativamente às plataformas e aplicações abaixo listadas, indique por favor a frequência com que as utiliza: Facebook; WhatsApp; Instagram; Netflix; Spotify; Uber;	Nunca Inferior a uma vez por mês Uma vez por mês Uma vez por semana Superior a uma vez por semana Uma vez por dia Superior a uma vez por dia
9	Indique, por favor, o seu grau de concordância com cada uma das seguintes afirmações: Sou capaz de navegar, procurar e filtrar dados/informação e conteúdo digital Sou capaz de interagir através de tecnologias digitais Sou capaz de utilizar ferramentas e tecnologias digitais para processos colaborativos	Escala 1-7 1 = Discordo totalmente; 7 = Concordo totalmente;
10	Como classifica os seus conhecimentos sobre produtos e inovações financeiras?	Escala 1-7 1 = Não possuo conhecimentos; 7 = Conhecimentos especializados;
11	(Enquadramento: a existência de aversão ao risco significa que, numa situação de incerteza, o mal-estar associado à perda de um determinado rendimento é superior ao bem-estar proporcionado pelo ganho desse mesmo montante de rendimento. Por outras palavras, a existência de aversão ao risco leva a que a pessoa seja mais cautelosa, preferindo uma situação segura mesmo que o retorno potencial seja menor) Como classifica o seu grau de aversão ao risco?	Escala 1-7 1 = Nada averso ao risco; 7 = Totalmente averso ao risco;

12	Possui, atualmente, uma conta bancária?	Sim/Não
13	Possui, atualmente, uma conta bancária em mais do que um banco?	Sim/Não
14	(Caso tenha respondido afirmativamente à questão anterior, por favor considere apenas o banco que mais utiliza para as próximas questões) Considera que o seu banco oferece algo diferenciador, face aos restantes?	Escala 1-7 1 = Não, de todo; 7 = Sim, totalmente;
15	Confia no seu banco para proteger os seus dados e providenciar operações online seguras?	Escala 1-7 1 = Não, de todo; 7 = Sim, confio totalmente;
16	Estaria recetivo a mudar de banco nos próximos 90 dias?	Escala 1-7 1 = Não, de todo; 7 = Sim, totalmente recetivo;
17	Utiliza APPs (i.e. aplicações para dispositivos móveis) fornecidas pelo seu banco?	Sim/Não
18	Que atividades realiza através das APPs fornecidas pelo seu banco?	Transferências monetárias Procura de informação Pagamentos online Seleção de opções de investimento ou poupança Consulta de movimentos Outras
19	Utiliza APPs **não** fornecidas pelo seu banco? Com que frequência?	Nunca Inferior a uma vez por mês Uma vez por mês Uma vez por semana Superior a uma vez por semana Uma vez por dia Superior a uma vez por dia
20	Que atividades realiza através de APPs alternativas (i.e. não fornecidas pelo seu banco)?	Transferências monetárias Procura de informação Pagamentos online Seleção de opções de investimento ou poupança Consulta de movimentos Outras
21	Quais são os principais benefícios que identifica na utilização de APPs alternativas?	Permite uma análise integrada e funcionalidades adicionais Design mais atrativo Experiência mais "amigável" (i.e. mais fácil compreensão) Segurança mais elevada Custos Inferiores
22	(Enquadramento: Os serviços de iniciação de pagamentos possibilitam aos utilizadores iniciarem operações de pagamento online (e.g. quando efetuam uma compra no website de uma loja), sem que tenham de interagir diretamente com o prestador de serviços de pagamento no qual a sua conta está	Escala 1-7 1 = Nada recetivo; 7 = Totalmente recetivo;

	domiciliada. Será o prestador de serviços de iniciação de pagamentos com quem contratou o serviço a aceder, em seu nome, à conta e a iniciar a operação.) Estaria recetivo a deixar uma entidade iniciar um pagamento em seu nome?	
23	Quão confortável ficaria com as seguintes entidades a iniciarem um pagamento em seu nome? Bancos Empresas de redes sociais (e.g. Facebook) Outras empresas tecnológicas (e.g. Google, Apple) FinTech (e.g. PayPal) Retalhistas online (e.g. Amazon) Empresas de telecomunicações (Altice, Vodafone, NOS)	Escala 1-7 1 = Nada confortável; 7 = Totalmente confortável;
24	(Enquadramento: Os serviços de informação sobre contas permitem que os utilizadores (consumidores e empresas) agreguem, e.g. numa única aplicação ou website, informação sobre as contas detidas junto de um ou mais prestadores de serviços de pagamento (tipicamente bancos), bastando para tal que estas contas sejam acessíveis online. Este serviço permite que o utilizador tenha uma visão global da sua situação financeira, ainda que detenha contas de pagamento em diferentes instituições.) Estaria recetivo a deixar uma entidade desempenhar serviços de informação sobre as suas contas?	Escala 1-7 1 = Nada recetivo; 7 = Totalmente recetivo;
25	Quão confortável ficaria com as seguintes entidades a desempenharem serviços de informação sobre contas? Bancos Empresas de redes sociais (e.g. Facebook) Outras empresas tecnológicas (e.g. Google, Apple) FinTech (e.g. PayPal) Retalhistas online (e.g. Amazon) Empresas de telecomunicações (Altice, Vodafone, NOS)	Escala 1-7 1 = Nada confortável; 7 = Totalmente confortável

English Version

	Survey Questions	Answers Options
1	Gender?	Female Male
2	Age?	Under 18 18 – 29 30 – 39 40 – 49 50 – 65 Over 65
3	Education level?	Less than High School High School Vocational Training Bachelors Masters PhD
4	(Household) Income level?	Under 1500€ 1501€ – 2500€ 2501€ – 3500€ 3501€ – 4500€ Over 4500€
5	Household type?	1 2 3 4 5+
6	Current employment status?	Student Student Worker Employed Unemployed Retired / Pensioner Domestic
7	Residency district?	Viana do Castelo Braga Vila Real Bragança Porto Aveiro Viseu Guarda Coimbra Castelo Branco Leiria Santarém Portalegre Lisboa Setúbal

		Évora Beja Faro R. A. Madeira R. A. Açores
8	Please indicate how often you use the platforms and applications listed below: Facebook; WhatsApp; Instagram; Netflix; Spotify; Uber;	Never Less than once a month Once a month Once a week More than once a week Once a day More than once a day
9	Please indicate your level of agreement with each of the following statements: I can browse, search and filter data/information and digital content; I can interact through digital technologies; I can use digital tools and technologies for collaborative processes;	Scale 1-7 1 = Not at all; 7 = Totally agree;
10	How would you evaluate your product and financial innovation knowledge?	Scale 1-7 1 = I have no knowledge; 7 = Specialized knowledge;
11	(After explaining what risk aversion is) How much averse are you to risk?	Scale 1-7 1 = Not risk-averse at all; 7 = Totally risk-averse;
12	Do you have a bank account?	Yes/No
13	Do you own bank accounts in more than one bank?	Yes/No
14	Do you think your bank offers anything different from what other banks offer?	Scale 1-7 1 = Not at all; 7 = Totally;
15	To what extent do you trust your bank to protect your data and provide secure online operations?	Scale 1-7 1 = Not at all; 7 = Totally trust;
16	Would you be open to switching banks in the next 90 days?	Scale 1-7 1 = Not at all; 7 = Totally;
17	Do you use any financial apps provided by your bank?	Yes/No
18	Which activities do you perform through your bank's financial apps?	Bank transfers General information search Online purchases Selecting investment and saving options View transactions Other

19	How often do you use financial apps that are **not** provided by your bank (i.e. alternative apps)?	Never Less than once a month Once a month Once a week More than once a week Once a day More than once a day
20	Which activities do you perform through alternative financial apps?	Bank transfers General information search Online purchases Selecting investment and saving options View transactions Other
21	What do you perceive as the major benefits of using alternative financial apps?	Allows an integrated overview and additional functionalities Attractive app design Better user-friendly experience Higher security Lower costs
22	(After explaining the concept of PISP and giving one real-life example) Would you be comfortable with a third-party provider initiating a payment on your behalf?	Scale 1-7 1 = Not at all; 7 = Totally comfortable;
23	How comfortable would you be with the following providers initiating a payment on your behalf? Traditional Banks Social media companies (e.g. Facebook) Other technology companies (e.g. Google, Apple) FinTech (e.g. PayPal) Online retailers (e.g. Amazon) Telco's (Altice, Vodafone, NOS)	Scale 1-7 1 = Not at all; 7 = Totally comfortable;
24	(After explaining the concept of AISP and giving one real-life example) Would you be willing to try an Account Information Service Provider?	Scale 1-7 1 = Not at all; 7 = Totally comfortable;
25	How comfortable would you be with the following providers acting as Account Information Service Providers? Traditional Banks Social media companies (e.g. Facebook) Other technology companies (e.g. Google, Apple) FinTech (e.g. PayPal) Online retailers (e.g. Amazon) Telco's (Altice, Vodafone, NOS)	Scale 1-7 1 = Not at all; 7 = Totally comfortable;

Appendix 2 – Banks Interview Questions

1	What is your bank's opinion regarding PSD2?
2	Which organizational unit in your business and how many people are primarily responsible for addressing PSD2?
3	Which strengths does your bank possess to deal with this regulatory change?
4	Do you believe that this regulatory change will expose any of your bank's weaknesses? Which ones?
5	Do you identify business opportunities with PSD2?
6	Which are the biggest threats regarding PSD2?
7	Do you position your bank as an account access provider or as a third-party provider? Why?
8	What is your bank position regarding APIs? PSD2 compliant or advanced ones?
9	Who are the biggest threats regarding PSD2? Banks, Fintechs or big Technological companies?
10	What is your banks' position in terms of cooperating with Fintechs?

Appendix 3 – Fintech Interview Questions

1	What is your opinion regarding PSD2?
2	Do you identify any business opportunities with PSD2?
3	Which are PSD2's biggest threats?
4	Do you believe that this regulatory change will boost competition? How?
5	What is your position on cooperating with banks?

Appendix 4 – Banks Interview Transcription

Entity 1

Date: June 28, 2019

Title of interviewee: Chief Information Officer (CIO)

Question	Answer
1	A huge opportunity and a challenge. First, modernizing technology it is a challenge. Secondly, it is a new ground for us. We are not one of the 4 banks in Portugal so we struggle a little bit in terms of market share, and this might be a very good opportunity for us to get again into the market and do something disruptive.
2	We do not quite see this as only one perspective of PSD2, because there is two or three different ones. There is compliance, that is related to the area that process payments, or operations and that it is a legacy area. This includes technology and business, in order to leverage PSD2 in a compliance perspective. Then, there is innovation that tries to leverage PSD2 to go a little bit further and tries to talk about open banking. In terms of technology we see this as only one and we implemented 3 years ago our API management system – or by other words our technology infrastructure. To contextualize, the ECB tried to leverage this API technology and open up

	banking through this new norm – PSD2. What we did the last 3 years was to try to open up this APIs and try to create services and micro-services that the rest of the bank can use to comply or to go beyond it.
3	One of the strengths that we have is in terms of technology – this is, we are basing already all of our technology to clients (online, mobile, etc.) in open APIs. The second one is that we have a strong KYC (Know-your-Costumer) and KYT (Know-your-Transaction). This is a kind of competitive advantage that banks have over Fintechs for example. Note: When directly asked if this can be translated into experience and trust from customers, the respondent said that this is the trust side. The third one is regarding risk management. If you think of money you have three things that can be translated as a strength: KYC/KIT framework (that includes components of fraud or money laundry), then we have sophisticated risk management system (because banks know how to manage money and how to pay securely) and then there is trust.
4	The legacy of technology, because we do not have the same pace as, for example, Revolut. Another weakness is the culture, and by this I mean the point of view of bundling. We have never thought that this form of relationship could be changed. Figuratively, Revolut is a speed boat and we are a transatlantic vessel moving slow when compared but very securely. And this means we are not so speedy.
5	There is a lot. We are in a new level playing field. I do not quite see what will happen in ten years, but maybe the wearables or the mobile. But new players that will come up to talk with the clients will be a reality. We were used to think in terms of industry value chain, and this will change it to customer value chain – what he does from 7 a.m. to 7 p.m. For this reason, Vodafone or Amazon might be banks, if they want to participate in that part of client's life, besides the part they already do. What I think the mobile or tech disruption will bring is the unbundling and because of that all of the companies need to think how to become the client's companion or babysitter.
6	Of course, because PSD2 will open up banks and create a sort of layer between us and the clients. Our first thoughts were "ok, we are going to lose clients". Clients can now manage their value chain – for instance for saving he will use Bank 1, for lending Bank 2 and for payments he will use Revolut. And all of this might be possible in the same app, if some fintechs or if some banks want to. So this is a threat for sure, because we are used to have a vertical view of the client and this will mean unbundling and it might be possible that some entities have all of the options like an everyday bank in one app, supported by different providers. Basically, it will open up the game to new kind of players, that will be aggregator players. Giving an example, you can have Remax listing all of the available houses and then the different mortgage options, depending on the bank, that allows to do comparisons.
7	Both and both again. We are dealing with the concept of open banking and trying to wear the shoes of the client, in order to think what the client wants and needs. We are already compliant – because of the September 2019 due date.

8	We also have a lot of APIs that the clients can "use" – in terms of payments and information – reason why we can say that we are walking toward "expansion". But you will ear from us in terms of transformation, even though we are not there yet. We are the first Portuguese bank with Apple Pay in Portugal so, we are already taking the first steps. There is also another thing, called "Moey" with rumors online. You should search for it.
9	Not banks because we compete with each others for centuries. The biggest threat for us are the Big Techs e.g. Google and Apple. Maybe not exclusively in terms of mobile, but in terms of wearables.
10	We are open up to cooperate. We are trying to figure out which ones to work with, but nevertheless this is Portugal and there are not too many Fintechs in Portugal. There are not only B2B, but they are still figuring out the gaps. Feedzai is very good in risk and fraud, and we are working with them.

Entity 2

Date: July 2, 2019

Title of interviewee: Channels Director

Note: due to a specific interviewee request, this interview was made in Portuguese and later translated.

Question	Answer
1	Banks are under tremendous regulatory pressure. In addition, the trend is for banks to stop being so reserved regarding information and data, which was not accessible to other partners in the past. The so-called open banking. PSD2 is a legislation that will set minimum regulatory standards and parameters for banks in the Euro Zone. These parameter changes come at great cost for banks – not only in a financial level, but also in terms of structural changes that need to take place due to the variety of systems, which are heavy and uneasily operated. PSD2 is a developing challenge for banks. In other words, it is a legal imposition that forces banks to become exposed without any direct beneficial to do so, even though open banking is much more than that.
2	It is something that is transverse to the entire bank. I would say that we could divide most banks into three major sectors – business development, support and control. Business development areas (channels and marketing) are already exposed due to the nature of their business, specially when it comes to channels. The support areas are also affected due to changes in bank operations (in accordance with the regulation change). The IT area will be the most affected along with the compliance, risk and security areas. As such, I would say that 2/3 bank sectors will be affected.
3	If we picture a small player trying to take a bank's place, it is easy to conclude that all the main banks are in advantage due to their experience and to the fact that they already possess a variety of services and a close relationship with the clients. As an example, some countries that do not have PSD2 regulations already have clustering apps that use screen scrapping methods (i.e, instead of using standard PSD2 APIs, the client provides their credentials and all their bank accounts' information is compiled into one screen). It is a service that

	could be even more complete than PSD2 but its adhesion is poor due to the lack of confidence in the player.
4	People have no idea that the bank's computer systems are extremely heavy due to their inherent reliability. An entity that only needs to build a front end will get the easy part of the job. A company with good capacity that does not have costs with compliance, risk control and regulatory pressure has a huge advantage in this business. System and regulatory demands force the bank to take it slower.
5	The respondent considered that the answer provided in the previous question could be analyzed as either a weakness or an opportunity. We interpreted it as: the possibility of an entity (different from a bank) to build a front-end on top of an already existing service, reducing costs, which is equivalent to the mention a possibility of collaboration.
6	Banks are exposed to "whoever" wishes to use their clients data with their consent and follows certain proceedings, in order to use specific information regarding account balances or transactions. Additionally, if the user wishes to initiate a payment that is provided by the bank's system (e.g. SEPA or normal transfers or service payments), banks are obliged to provide that specific payment service. In this sense, we can conclude that banks are subject to great exposure by having to provide these services outside their scope. One of the risks is that external entities could perform these functions so efficiently that banks choose to become dump pipes (i.e. only channeling without any intelligence and using third parties that excel on maintaining relationships with front ends and other interesting functionalities, outside the banks' scope). It is interesting to look at what is being done internationally, where there is simillar legislation – taking USA and Mint's case, for example, that never went big. In Europe's case, it will depend on the type of players that wish to enter our market. Banks may even create their own front ends that allow users to check other bank account's information – in Portugal, we have the examples of BPI and CTT.
7	At first, we are compliant as demanded. At the moment, we are assessing if we wish to become third party providers. Will it compensate? Will we be able to gain more clients and manage to gain more profit? Should we study and check the current trends to assess if we should expand to other areas (in terms of PSD2 but also open banking)? The bigger pressure will be doing that while competing. But Portugal's case is quite specific, because banks, through SIBS, have created a place where information can be retrieved. It is not mandatory, but all major banks have joined it and made an agreement with SIBS that guarantees a platform that has all the regulatory standards. In other words and taking the example of Google: if Google wants specific information regarding the three banks that are used by a specific client, SIBS is the entity that will communicate with the banks since they possess all the mandatory and exposed APIs. SIBS is currently building SIBS' Open Market, which will favor the creation of advanced APIs (that will go beyond PSD2) and the cooperation between banks. This will be extremely relevant to the public and to other companies. And more, these APIs will not put pressure on the banks, but will

8	contribute to the expansion of the financial system. With this said, it is possible that the cooperation between banks has become a trend, instead of competition. Initially it may seem as a competition, but it usually evolves into cooperation. Note: When asked directly about MBWay, the respondent explained that, technically, it is not a third party provider. SIBS is a society that is held by the majority of the banks within the national bank system. It provides services to all banks (including non-share holders) and by enabling the sharing of infrastructures, it optimizes its investment. Spain, for example, tends to have specific ATM machines for each bank, which are either restricted to their client's own use, or apply high rate fees to the other users. SIBS has created a system that is shared by all and universal in terms of front ends (ATM). This unique standard is not very common in Europe and highlights the cooperation that can exist between banks. For the respondent, MB Way is another way of showing and expanding their value when it comes to cardholders (because unlike PSD2 presupposes, this app simple operates with a debit card and not with a bank account).
9	Small tech companies that wish to compete with banks will only succeed if they offer something very specific, like a niche strategy, but I would say they will not be able to take much out of PSD2. Fintechs will come, not to compete, but to expand bank services. Clients may not take particular interest in bank competition unless other bank's app is so good and inclusive that becomes preferential when comparing it to the remaining offer (which may be supported in these fintechs). Big techs such as Google and Facebook are the third threat, since they already possess the consumer's trust, excel in front end construction and are the "place" where the consumer already spends 90% of their online time. But only time will tell if they will take particular interest in this industry.
10	Our bank already works with many fintechs, and seeks to work with even more. Because we are a new bank, and unlike our competitors, we have a small IT Department. Even though we are part of a trusted institution, we are new in this business so we are still building our offer. As system, processes and back offices development is not part of our expertise, we choose to join people who know how to do it in order to minimize risk. We hold the client and brand base and use specific services, held by other companies we work with.

Entity 3

Date: July 4, 2019

Title of interviewee: Head of Digital Bank Department

Question	Answer
1	PSD2 is an evolution of PSD1 and it tries to promote a more opening environment, by opening what is the payment industry to different kind of providers. As an incumbent bank, it is threatening because it exposes one of our main business lines to other providers, other than banks. But at the same time, it is an opportunity. In fact, every threat as an opportunity inside of it. In this case because we can position ourselves in this new environment. We look at PSD2 this both ways – yes, we will have more competitors that will not be banks and that can integrate different value chains, but we can also do the same, taking advantage of this opportunity.

2	We look to PSD2 in two ways: (1) regulatory, with a team dedicated to make sure that we are compliant, that has persons from several departments from the organization – either operations, marketing, IT or legal. Basically, payments it is something transversal to the bank and we have people from all of the areas trying to accommodate what are the regulations details and trying to set up the bank to be compliant. In this scenario it is hard to say a number, because they are not full-time, but roughly 50 people, besides developers; (2) how to take advantage of it, with a smaller team, with 20 people, but also multidisciplinary.
3	We are an old and a big player, what is a strength because we have size, knowledge and the know-how of this business and this specific part of the business. Note: When directly asked, the respondent also agreed with the wide range of products, that enables cross-selling and the personal contact through bank branches.
4	It is also the fact that we are big, have experience and knowledge, because it creates tendency to not be able to move forward in a fast way. We are "sitting in a pile of costumers" and because of that, when something changes or a need is identified, we have a slow reaction, in order to make sure that we measure all the impacts that it will cause. Note: When directly asked, the respondent also agreed with the need for additional IT investment and the legacy. He exemplified it by saying that when a bank has a portfolio of X debit cards, for example, when he wants to simplify it is hard and legacy it is part of that difficulty.
5	We now can be on more parts of the journey of our customers. When a client wakes up in the morning, he does not think right away that he needs to go to the bank to have a mortgage. In fact, he thinks that he wants a new house or to go on a vacation or to buy something. For this reason, banks are not an end destination, but a mean to an end. With PSD2 we can position ourselves in the journey along with the providers that have this final destination. Note: When directly asked, the respondent also agreed with the possibility to outsource innovative solutions and business efficiency. He complemented by saying that, due to PSD2, the bank is now working with some providers, namely tech companies, that have some specific knowledge that they needed but did not have inside.
6	The main threat it is the passage to an open market, not restrained only to banks. Until PSD2 the payment industry was restrained to banks and some money entities. With PSD2 we are now open to any kind of business to become and account aggregator or a payment initiator – e.g. retailers – and it does not matter if it is a bank or not. The "field" it is now open and we will have more competitors from other industries that can be better than us in some areas. Another threat it is regarding the margins– with more competition, the prices will go down. Note: When directly asked, the respondent also agreed with the possibility to increased security or fraud risk.
7	This is a tricky question. What you know as a client, as an external person to our bank, is that we are just compliant and provide information to third parties. But we are going to work as a TPP in about 2 months. It will be an innovative

8	service in Portugal and means moving to open banking in two ways: we will provide more information to third parties than we are obliged by PSD2 and we will position ourselves as an aggregator of info and a payment initiator for our customers and other banks or entities customers.
9	On the overall vision Big Techs, for sure. As Portugal is still a small market for this companies, maybe we still have some time. Apple Pay is a good example of it: it exists for something like 4 or 5 years, but only entered Portugal this year, provided by Caixa Agricola. But big techs will be the biggest threat, because they dominate the customer journey, they are present on the life of more customers and they have the knowledge to capture info about customers and use it in a way that makes customers feel compensated. Simply because the info is useful – e.g. when Google reminds you where you left your car you like it. In a second level, every industry that has a lot of touching points with the customers are a threat. Note: When directly asked which Big Tech is the biggest threat, the respondent said that Google is a threat because they have the most knowledge about the customer, but Amazon is dangerous as well because they know how to unbundle services. However, in this second case, it is not that relevant in Portugal.
10	Completely open to cooperate. We are not and do not intend to be experts in everything. We are experts e.g. in payments, but even in its value chain we are not experts in themes such as Artificial Intelligence or Machine Learning to score the risk of a client. For this reason, we are open and we are working with techs and fintechs companies, in order to integrate their knowledge in our services. We are working with 2 or 3 Portuguese companies and some "external" ones from the North of Europe.

Entity 4

Date: July 8, 2019

Title of interviewee: Chief Digital Officer

Question	Answer
1	We see PSD2, as many banks, as both a threat and an opportunity. For this reason, we are working on getting the most out of it, knowing that there is value at risk. We have developed an attacker strategy – and by that, I mean that in all the areas of value creation or value destruction we have strategies to face it off.
2	We have within the digital group – that is the main unit addressing PSD2, both compliance issues and attacking the opportunities – probably 15 people. In addition to this group we have 3 other units that are particularly relevant: (1) the compliance department; (2) within the operation, the people that deal with the changes and that deal with SIBS and other payment providers and (3) the retail marketing division.
3	We think the biggest strength is our trustworthiness in the market. Even though banks are not seen as the best brands in the world, they still carry trust equity, that is difficult to beat. According to our studies, if you go to the market with a wallet or an aggregator and do it as a big tech company you get a certain addressable pool. But if you do it as big tech together or with the support of a

	bank, this pool multiplies by 3 or 4 and this is due to the trust that banks have that other companies do not. This has to do not only with brand equity, but also with the fact that we have a physical presence – that points to reliability. Note: When directly asked, the respondent agreed the wide range of products, that enables cross-selling but added that, although it makes it easier to monetize the relationship banks have with clients, tech companies and Fintech's can also do that if they play well the platform model and capture the value creation around the relation with the customers and the leverage that relation.
4	Probably our biggest weakness is some slowness and rigidity in adapting and changing and putting value propositions out there for customers, at the speed that it is required in this market. In other words, it is an organizational inertia. Note: When directly asked, the respondent also agreed with the need for additional IT investment and the legacy but stated that, even though this is another angle of the slowness and rigidity problem, it is probably the easier to solve (when compare to some strategic decisions).
5	We see that the biggest opportunity is the possibility to capture market share. For us it is particularly important in our retail segment, where we have been losing market share slowly. The relation with other players – that is not exclusive to PSD2 – also opens up the ecosystem opportunity – i.e. the ability to integrate other services and through that solving problems of our customers and capturing bigger revenue pools. In other words, creating networks for solving bigger problems – e.g. all the problem of finding and moving into a new a house instead of the financial problem of a home acquisition.
6	In our corporate segment, where we are leaders, the biggest threat relies on the fact that, if others start aggregating and capturing the value of customers by bringing more value to certain services, we can see our relationship "eroding". It is funny the opportunity and threat equation it is different, depending on the segment. Besides the market share loss, it is the margin compression – as part of a broader phenomena of transparency in the market that makes it easy to compare prices and find new solutions. Note: When directly asked about with the possibility to increased security or fraud risk, the respondent agreed. On one hand, he stated that fraud is a constant threat with all the face-to-face interactions and that the less importance the branches network has, the less fraud banks get – e.g. regarding signatures. On the other hand, and specifically regarding the open APIs, even though banks believe they are "bulletproof", there are some apprehension because banks are not used to feel that their systems are open to the outside.
7	The compliance strategy will come first, but we intend to have a competing strategy as soon as possible. We see the importance of coming in early, but we do not see the need to be the first. The experience we are gathering from market that have open first – such as UK and Australia – have shown us that that is quite a lag between the moment you open up and the take up in the market.

8	People need to get used to it and people want to try different things. For this reason, we are confident that quality and high standards of the compete proposition will be important. Regarding the APIs, we will start with the compliant services but we want to evolve them. By aggregating more information, we can give more value-added services. We can also allow others to also build on those APIs, but we are not seeing this second perspective in a short term.
9	The threat in front of our eyes are other banks, because it is with them we compete right now. Big tech companies are a looming threat, from whom we do not know what to expect. They are a bigger threat in the sense that they have a lot of money and customers. We want to be in the position that, at some point, we can compete with them, if they decided to come in. But see this as in two horizons: (1) a battle for customers in the traditional banking environment, and we do that trough great customer experience and great digital platforms; (2) where open banking and ecosystem becomes so prevalent that tech companies are better equipped to deal with it. We believe that we cannot be prepared for the second one without winning the first one so we are playing in both.
10	Fintechs have been definitely a partner.

Entity 5

Date: July 10, 2019

Title of interviewee: Member of the PSD2 development and compliance team and Product Owner of the Open Banking project

Question	Answer
1	PSD2 is going to disrupt a lot retail banking obviously and both people and companies – small and medium enterprises specifically, because they have not had customized or tailored solutions so far. And we think that it will disrupt a lot considering that it is opening the idea of competition between banks, by lowering the barriers to entry in the market. You are no longer protected by the fact that you already have the clients. Now you have to give the information of those clients to whoever comes to the banking sector. Regardless, we think that there are a lot of players that have to get all the goodwill banks still have. Even tough banks are "kind of hated" by some customers, we still observe that is still a difference between what are traditional banks and even fintechs or neo banks. Basically, PSD2 is the start of something that can disrupt the market. We still believe that it can be seen as a threat, but if we do the right things and leverage the right characteristics to our clients – as e.g. the financial knowledge –, then we can take it as an opportunity to even get more market share.
2	Specifically, in our case, we are a group with a lot of European banks, so we have been enabled to leverage some developments that have been done centrally. In Portugal we have the solution technically centralized in SIBS and so we have been able to do that with a relatively small amount of people. We developed with a squad, three years ago, all the compliance to whichever channel and whichever process of security and we were at least 10 people – from API developers or cybersecurity to law.

	Law was crucial because PSD2 had to be transposed into Portuguese law and first of all it took a while and secondly it changed a little bit, what created the need to adapt. Even SIBS had to adapt because they had to include some stuff into their roadmap of developments.
3	The goodwill. We are talking about money and most people are willing to share a lot of data about themselves (we see that with Facebook or Google) but when it comes to data about their money they are still reluctant to trust unknown companies such as Fintechs or even Bigtechs. There is no clear evidences of how people would trust Google, Facebook, Amazon or Apple to have their information about their money, so for sure banks still have the goodwill that was built for many decades. Other point that we have is the knowledge – of risk assessment, products and from the existing relationship with the clients. Although is not perfect and it has to change, from a sales to an advisory role or even more, it is a strength we can leverage in the future. Note: When directly asked, the respondent agreed that banks have a wide range of products and that it is important. However, he did not agreed completely with the cross selling, because he thinks the future does not go through bundling products. Having the portfolio brings convenience because it is all in one place and brings knowledge about the consumers that can be use in their advantage, but not necessarily in terms of cross selling. Regarding the existence of a physical point of contact, the respondent stated that the importance depends on who we are talking about. For a significant minority of people, no, it is not important. For the majority of people, that is not possible to define demographically, the physical contact it is still important in specific groups of products. When we are talking about opening accounts, making transfers or even cards it is not important, you are searching for convenience and therefore digital. But if you are talking about buying your first house or investment funds you want to have the security of having the opinion of someone whose role is to advise you. Right now people doubt a lot and they do not see this as helpful because in the past +/- 15 years the "bakers" focus was on sales, what damaged a little the physical interaction, but they still value it in complex products.
4	The main one is cultural. We have been historically protected from competition. We had the data, we had the clients and it was very difficult to someone to come "here" and take the clients away. When you look to AtivoBank or Banco CTT, you understand that they had to do huge sacrifices in terms of profitability to get clients – what is difficult in terms of shareholders acquisition. As banks were protected in the past, it created this inefficient culture – that is very vertical and heavy and makes it hard to move sideways. We usually know where to go, but when it comes to be flexible, when it comes to change or innovate, we are much slower than any Fintech or even Bigtech. We do not have the culture of experimentation, we do not have the culture of validation, we do not have the culture of MVP developments. We are trying to, but it is a big company. The second one is the fact that we are very risk conservative. This is something that on one hand it is positive because we want to be seen as secure and safe. But at the same time, this trend makes it really hard to explore, to fail and to admit that we do not know. This rigidness is a weakness for sure.

	Note: When directly asked about the need for additional IT investment, the respondent stated that banking has had more IT investment in the last 10 years than probably before or in any other industry. IT investment has been insane e.g. in terms of blockchain, cloud computing or Big Data. The rigidness mentioned before was related with the lack of customer development processes and the ability of asking and actually solving the client needs. It is not about the value of the IT investment but it is about how is it invested. We have this syndrome of building everything inside, because of the regulatory risk and the need to control every piece of information, in order not to be hacked, what makes it hard to manage. So, in that sense, IT investment had been misguided and it has been too internal.
5	I think one it is pretty obvious: getting more players to come in, that have distinct and complementary business models. I think that the business model for most Fintechs is not competing with banks, but getting into partnerships with them, because they are the one who have the clients. So, the opportunity is to find new and right governance schemes and decision making processes to collaborate. In very specific markets such as personal finance management, business finance management, invoice management, the Fintech's do not replace what we do, but complement it and they can increase the value of what we do to clients and allow us to grow in market share. Note: When directly asked about the possibility of cooperating with Big techs, beside the already mentioned Fintechs, the respondent stated that it will start in different points with both types of entities or at least for different things. You get to experiment more with Fintechs (e.g. specific target segments with specific value propositions) and to discard them easily if it goes wrong. When it comes e.g. to Google, we would build a stronger product and value proposition because they would bring much more to the "table" than just agility and experimentation. And lastly the business models that would arise from Big techs would be more permanents than the one with Fintechs. They can bring a lot of capital, knowledge and different kind of tools than Fintechs do. Basically, banks will have to cooperate with both. Fintechs will probably start first, by collaborating with innovation or open banking departments and Big techs secondly, at a broader strategy.
6	There is a lot of products that used to be profitable than will not longer be. As more players come in, they will be seen as commodities so the industry business model will change. This is not necessarily a threat, but a realization. If a bank does not realize that the business model will change, then he will probably "die", and other banks or players will be more successful in terms of pricing and specially in terms of building and communicating products. So, the threat is the imminent change or disruption of business model that comes from the entrance of new players. Note: When directly asked about the increased security and fraud risk, the respondent stated that he does not link it necessarily with PSD2, because financial data is always going to be valuable regardless of how many players there are in the process.

7	We do not already have APIs that go beyond PSD2 and compliance, but we will in the near future. We already have advanced services, but we do not have them on the product portfolio. We are validating, we are doing prototypes and pilots. We are trying to understand the direction we should go not to waste resources on our open banking strategy. In fact, this strategy started from PSD2, trying to leverage that services. [In terms of the value chain position] We are going to start by being a PISP specifically for our business clients because they are looking for that. We are also going to use some international project to do an account information project, also related to business. But we have an attack third party strategy to go beyond compliance. Note: When directly asked if there was a difference in the strategy, depending on the client's segment – i.e. B2B or B2C –, the respondent stated that not necessarily, the start will be using mandatory APIs to compete as third-party providers for both.
8	
9	Anyone that says he already knows is lying. We do not see Fintechs as a threat. There are some whose business model is going to threaten banks current business model, but it is defensible. We should look at them as more of an opportunity. They are willing to work with us, to share their knowledge and to combine value propositions. Banks represent the traditional competition. Big Techs are the big question mark. In some scenarios they are going to disrupt the market, definitely, and banks cannot do really anything because they have their data treatment knowledge that is beyond what we can do. In this sense, they are the biggest threat. But they could have done this before. Why have not they done this before? Because they do not like regulated markets. Data is being regulated, what means they have their own market being regulated and that they transition to equally regulated markets. But there is an assumption. Note: When directly asked if the answer depends on the time horizon/frame we are considering, the respondent agreed and stated that in the near future the main competition will still be banks and then depends on how regulation evolve.
10	It is going to be one of the competitive advantages. It is not possible to have more advantages in terms of product or price, so it will come from the ability to being constantly revising the value proposition and revamping it. For that you need speed and speed comes from Fintechs.

Appendix 5 – Fintech Interview Transcription

Entity 1

Date: June 25, 2019

Title of interviewee: Co-CEO

Fintech Dimension: 10 employees

Question	Answer
1	For us, PSD2 is an important step in opening the banking business up to companies in other areas, like technology and e-commerce companies. This openness, which is not very common in a tightly regulated market such as the financial and banking market, brings numerous challenges, risks, and opportunities, which only time can assess in all its dimensions. On the one hand, it is true that it offers new business opportunities in various areas and that new products and services will appear and benefit from this easy integration with payments and banking information. On the other hand, this opening also poses some risks, especially for Europe as a whole and for smaller or less technologically developed countries. The trend towards globalization, which was somehow hampered by the strong regulation that this area had, will make itself feel very quickly and with great force. We are opening an important part of the banking system to latitudes that do not have the same kind of openness than us and are much better prepared to offer global services. Banks and Fintechs risk to be doing no more than doing the heavily regulated bureaucratic part of the service, such as account openings, identity checks, reporting to central banks, and money laundering and terrorist financing prevention procedures locally... leaving innovation and customer contact platforms to the big-techs. And even that scenario will probably be slowly simplified and automated with the increasing use of AI mechanisms, and where big-techs, once again, have all the advantages. This is nothing new and is happening daily in many areas. Simply the strong banking regulation has protected the banks during all these years, which now suddenly see exposed some of their services and their weaknesses.
2	Openness always brings opportunities for new services and new integrations within existing services. Suddenly, thousands of companies around the world will be thinking of new solutions, new products and services that will take advantage of payments initialization or accounts information, areas that were forbidden to them, and will bring much innovation to the sector and also new challenges to supervision. Banks (and Fintechs) themselves may also offer more integrated services, and even for them, PSD2 is also an open door to evolution and an opportunity to grow. The e-commerce platforms have now the opportunity to directly integrate payments into their business – reason why seamless payments become easier, what it is a plus, since users seem to like them.
3	The area of payments, due to its intrinsic dematerialization and with this openness provided by PSD2, has all the characteristics to quickly be dominated by the world giants of technology and payments. The winner-takes-it-all scenario poses a threat to traditional banking, to small Fintechs, to smaller, less technologically-developed countries and even to Europe as a whole because, unfortunately, most big-techs are not European companies. Big-techs are the ones who have the most to gain from this opportunity, because they have unbeatable technological know-how, virtually unlimited funds and infrastructures and, most importantly, a constant and daily connection with billions of users. Thus, big-techs can quickly integrate most European banks into their solutions, quickly obtain the approval and authorization of their users and create global

	payments solutions. No bank or fintech can compete with this. Incidentally, the directive has not yet begun to be implemented and a big tech has already appeared, in this case Facebook, to announce a virtual currency that makes the incumbents tremble. Global payment solutions and global digital currencies can appear and can radically change our payment habits and those involved in the process. This also brings new challenges to supervision, which may not be prepared for these global services and multinational players. In terms of security, it will also pose enormous challenges, not only because of the size of new players and risks of contagion, but also to the users of new payment services themselves. So far, people had usually a single financial entity that they interacted with, within a very traditional way of doing it, but also well-known formalities and processes. And suddenly they "have" to interact with numerous entities in a much more digital way, easier and more informal, who will fight for their authorizations, with not so well-known processes, and that will impact on their day-to-day. This will bring many security problems and many misgivings from all parties involved in the process.
4	On the one hand, it will increase competition and innovation because we are opening up a new world of opportunities to thousands of companies who will be very creative in developing new products and services at user convenience. On the other hand, if there is a trend towards globalization, we can have most of the operation in 3 or 4 global giants, which will not allow big competition in these areas. This has happened in virtually all dematerialized areas, so I think that this is very likely to happen in the area of payments. Of course, regulation may solve some situations, but in other areas, it has been difficult to avoid this concentration.
5	The smaller Fintechs, as in our case, have always sought cooperation with banks. It is inevitable, because a good part of the basic infrastructure is still exclusively in the hands of banks, and we need their support to have access. I think that there will also be a trend towards more specialized banks. It is a way of defending themselves. They specialize in a specific area and develop technologically advanced solutions in this area. With the digitization, the number of physical counters is becoming less relevant. There is also the possibility for these banks to join other banks or Fintechs, in order to have integrated solutions and to make available to these other banks and fintechs the solution in which they have specialized.

Entity 2

Date: July 2, 2019

Title of interviewee: Account Manager

Fintech Dimension: 17 employees

Question	Answer
1	We believe the API driven future that PSD2 implies - and applies - offers significant potential for both old and new players in the payments industry. The potential for disruption of established players will happen, as newcomers gain access to data and payment initiation capabilities. We understand that opportunities for partnerships and innovation will arise to both traditional banks and to their Fintech challengers. The collaboration between Banks and Fintechs will lead to interesting partnership that will leverage the knowledge and expertise of the established financial sector and the agile and innovative capabilities of Fintechs. We sense that the Payments industry will be positively shaken by this directive.
2	Globally, PSD2 will enable 3rd Party organizations - Account-Information Service Providers (AISPs) and Payment-Initiation Service Providers (PISPs) - to build financial services on top of banks' data and infrastructure. They will enter the market with new ideas about how to shape the banking experience by adding modern tech infrastructure and a flexible iterative approach, without the heavy compliance and infrastructure which banks are required to maintain. Take us as an example. We are a technical service provider that has developed a payments platform which can be accessed to initiate payment transactions. The important functionality of such platform is to receive the transaction data collected by or through Merchants and to forward it to a third party who is involved in operating one or more payment methods. Upon the ability to build such powerful infrastructure, we are able to support Banks and Payment Organizations on their transition into becoming compliant with PSD2's technical framework by providing them with the necessary technology and payments knowledge to do it so.
3	There will always be opportunities and threats for all players on this new context. Banks will be required to open their payment account data to third parties through APIs, and securely authenticate all account access and payment authorizations made through them. Fintechs and other Payment Providers will face regulatory scrutiny - for some maybe for the 1st time. Upon PSD2 implementation, banks' monopoly on their customer's account information and payment services will dissipate. Banks will no longer compete against each other but with everyone offering financial services. PSD2 may impose economic challenges too. Banks will lose some of the revenues obtained for payment services and their IT costs will increase due to new security requirements and the introduction of APIs into their infrastructure.
4	Yes, it will. Competition within the financial sector will definitely increase. PSD2 will provide the legal foundation for the further development of a better integrated internal market for electronic payments within the EU. This directive will put in place comprehensive rules for payment services, with the goal of making payments within the EU as easy, efficient and secure as payments occurring in a single country. New entrants in this industry, in a form of non-banks, will get easier access to the market after PSD2. The regulation removes some entry barriers to the financial market therefore, more competitors are likely to emerge. Furthermore, customers can easily choose new financial service providers with the introduction to PSD2. This means that customers will be enabled to create their own collection of payment service providers instead of choosing one specific bank for all financial needs.

5	We can collaborate with banks at the technology level by providing them with a strong and innovative API. Our API can be accessed to initiate payment transactions and/or receive value added transaction data. The fundamental technology requirement for mandatory compliance, introduce by PSD2 is for banks to expose an open API, allowing AISPs and PISPs access to client account and transaction information. We are able to support banks on their transition into becoming complaint with PSD2's technical framework, and banks can capitalize on our certified payments platform to securely expose Banks' core banking applications to those 3rd Party organizations. We can develop a custom flow, that will connect Banks' core banking applications and allow 3rd Party Applications to: a) Authenticate users as Banks' bank account owners; b) Access user's bank account balance; c) Access users' transaction information; and d) Authorize bank transfers on users' behalf.

Entity 3

Date: July 5, 2019

Title of interviewee: Founder & CEO

Fintech Dimension: 20 employees

Question	Answer
1	The new payments directive will bring huge opportunities to the financial system in Europe, by creating a path for new businesses to rise, and by strengthening the bonds between technology and finance. These two phenomenon will improve the relationship between end consumers and companies with their financial services provider.
2	The new directive basically allows the creation of two new services: Account Information Services and Payment Initiation Services. In any of them you can see new services and companies being created. In Portugal we have MB Way that already lives within this reality in the payment initiation services, but we will see apps with the ability to gather the financial information from different banks, allowing the end consumer to have a complete overview of their finances. In Brazil, for instance, there is GuiaBolso, a solution that we will see rising in europe under the PSD2 Directive. Guiabolso allows you to gather all your financial information from several banks and institutions. This gives the end consumer a complete overview of their financial status, where they can easily see their expenses sorted by sector, create notifications for when you reach a spending limit and, with a rating algorithm, it gives you your rating if you want to get a loan. Banks can connect to your Guiabolso account and study your case.
3	In the open market created by PSD2, there are technological aspects, like the obligation to use open API's, that set a gap between fintechs and banks. Fintech company were born in an API context. We have always used API's since day one. Banks are learning about the existence of this type of technology now. This can only be resolved by a collaborative environment. We can see good efforts coming from the UK and Spain, for example, that created a real sandbox environment where every player is participating in the creation of a true open

	API context, and this sandbox is ruled by the competent authority (Competition Authority in the UK and the Banking Regulator in Spain). Portugal delegated this in SIBS that created all on its own and now invites all players to be a part of it. This a big threat because we have in Portugal a solution created by one company which gives us a single viewed option.
4	Without a doubt. This will boost competition in a good way, in which banks and fintech will collaborate to better serve the end consumer, with simple, safe and flexible technological solutions in a way that the consumers will be closer to banks.
5	The market is moving in a way that each player will be specialized in a specific solution. We will see Fintechs specialized in payments, for example, and banks specialized in loans, so cooperation is a priority. Banks and fintechs will have to work hand-in-hand.

Appendix 6 – SPSS outputs – Descriptive statistics

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	461	63,8	63,8	63,8
	Male	262	36,2	36,2	100,0
	Total	723	100,0	100,0	

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under 18	4	,6	,6	,6
	18-29	200	27,7	27,7	28,2
	30-39	154	21,3	21,3	49,5
	40-49	213	29,5	29,5	79,0
	50-65	144	19,9	19,9	98,9
	Over 65	8	1,1	1,1	100,0
	Total	723	100,0	100,0	

Education Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Less than High School	60	8,3	8,3	8,3
	High School	187	25,9	25,9	34,2
	Vocational Training	30	4,1	4,1	38,3
	Bachelors	322	44,5	44,5	82,8
	Masters	116	16,0	16,0	98,9
	PhD	8	1,1	1,1	100,0
	Total	723	100,0	100,0	

Income Level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Under 1500	298	41,2	41,2	41,2
	1501-2500	244	33,7	33,7	75,0
	2501-3500	124	17,2	17,2	92,1
	3501-4500	32	4,4	4,4	96,5
	Over 4500	25	3,5	3,5	100,0
	Total	723	100,0	100,0	

Household Type

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	106	14,7	14,7	14,7
	2	162	22,4	22,4	37,1
	3	224	31,0	31,0	68,0
	4	187	25,9	25,9	93,9
	5	44	6,1	6,1	100,0
	Total	723	100,0	100,0	

Income Level * Household Type Crosstabulation

			Household Type					Total
			1	2	3	4	5	
Income Level	Under 1500	Count	80	66	83	54	15	298
		% within Income Level	26,8%	22,1%	27,9%	18,1%	5,0%	100,0%
		% within Household Type	75,5%	40,7%	37,1%	28,9%	34,1%	41,2%
		% of Total	11,1%	9,1%	11,5%	7,5%	2,1%	41,2%
	1501-2500	Count	21	67	85	59	12	244
		% within Income Level	8,6%	27,5%	34,8%	24,2%	4,9%	100,0%
		% within Household Type	19,8%	41,4%	37,9%	31,6%	27,3%	33,7%
		% of Total	2,9%	9,3%	11,8%	8,2%	1,7%	33,7%
	2501-3500	Count	5	23	42	45	9	124
		% within Income Level	4,0%	18,5%	33,9%	36,3%	7,3%	100,0%
		% within Household Type	4,7%	14,2%	18,8%	24,1%	20,5%	17,2%
		% of Total	0,7%	3,2%	5,8%	6,2%	1,2%	17,2%
	3501-4500	Count	0	3	9	15	5	32
		% within Income Level	0,0%	9,4%	28,1%	46,9%	15,6%	100,0%
		% within Household Type	0,0%	1,9%	4,0%	8,0%	11,4%	4,4%
		% of Total	0,0%	0,4%	1,2%	2,1%	0,7%	4,4%
	Over 4500	Count	0	3	5	14	3	25
		% within Income Level	0,0%	12,0%	20,0%	56,0%	12,0%	100,0%
		% within Household Type	0,0%	1,9%	2,2%	7,5%	6,8%	3,5%
		% of Total	0,0%	0,4%	0,7%	1,9%	0,4%	3,5%
Total		Count	106	162	224	187	44	723
		% within Income Level	14,7%	22,4%	31,0%	25,9%	6,1%	100,0%
		% within Household Type	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	14,7%	22,4%	31,0%	25,9%	6,1%	100,0%

Employment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Student	81	11,2	11,2	11,2
	Student Worker	48	6,6	6,6	17,8
	Employed	539	74,6	74,6	92,4
	Unemployed	26	3,6	3,6	96,0
	Retired/Pensioner	18	2,5	2,5	98,5
	Domestic	11	1,5	1,5	100,0
	Total	723	100,0	100,0	

Residency district

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Viana do Castelo	13	1,8	1,8	1,8
	Braga	19	2,6	2,6	4,4
	Vila Real	28	3,9	3,9	8,3
	Bragança	18	2,5	2,5	10,8
	Porto	95	13,1	13,1	23,9
	Aveiro	17	2,4	2,4	26,3
	Viseu	32	4,4	4,4	30,7
	Guarda	7	1,0	1,0	31,7
	Coimbra	15	2,1	2,1	33,7
	Castelo Branco	14	1,9	1,9	35,7
	Leiria	16	2,2	2,2	37,9
	Santarém	16	2,2	2,2	40,1
	Portalegre	27	3,7	3,7	43,8
	Lisboa	121	16,7	16,7	60,6
	Setúbal	115	15,9	15,9	76,5
	Évora	109	15,1	15,1	91,6
	Beja	20	2,8	2,8	94,3
	Faro	15	2,1	2,1	96,4
	R.A. Madeira	13	1,8	1,8	98,2
	R.A. Açores	13	1,8	1,8	100,0
	Total	723	100,0	100,0	

With the goal of aggregating the districts into larger regions, we considered the Portuguese NUTS II division. However, this type of territorial division does not have a direct “translation” in terms of districts. For simplification, the following division was considered:

North	Center	Lisbon Metropolitan Area	South	Islands
Viana do Castelo	Aveiro	Lisboa	Portalegre	R.A. Madeira
Braga	Viseu	Setúbal	Évora	R.A. Açores
Vila Real	Guarda	Santarém	Beja	
Bragança	Coimbra		Faro	
Porto	Castelo Branco			
	Leiria			

Residency regions (NUT II)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	North	173	23.9	23.9	23.9
	Center	101	14.0	14.0	37.9
	Lisbon Metropolitan Area	252	34.9	34.9	72.8
	South	171	23.7	23.7	96.4
	Islands	26	3.6	3.6	100.0
	Total	723	100.0	100.0	

Please indicate how often you use the platforms and applications listed below:

Facebook

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	26	3,6	3,6	3,6
	Less than once a month	6	,8	,8	4,4
	Once a month	9	1,2	1,2	5,7
	Once a week	23	3,2	3,2	8,9
	More than once a week	43	5,9	5,9	14,8
	Once a day	117	16,2	16,2	31,0
	More than once a day	499	69,0	69,0	100,0
	Total	723	100,0	100,0	

WhatsApp

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	78	10,8	10,8	10,8
	Less than once a month	30	4,1	4,1	14,9
	Once a month	22	3,0	3,0	18,0
	Once a week	43	5,9	5,9	23,9
	More than once a week	74	10,2	10,2	34,2
	Once a day	90	12,4	12,4	46,6
	More than once a day	386	53,4	53,4	100,0
	Total	723	100,0	100,0	

Instagram

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	220	30,4	30,4	30,4
	Less than once a month	20	2,8	2,8	33,2
	Once a month	26	3,6	3,6	36,8
	Once a week	30	4,1	4,1	40,9
	More than once a week	46	6,4	6,4	47,3
	Once a day	90	12,4	12,4	59,8
	More than once a day	291	40,2	40,2	100,0
	Total	723	100,0	100,0	

Netflix

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	451	62,4	62,4	62,4
	Less than once a month	38	5,3	5,3	67,6
	Once a month	17	2,4	2,4	70,0
	Once a week	43	5,9	5,9	75,9
	More than once a week	68	9,4	9,4	85,3
	Once a day	62	8,6	8,6	93,9
	More than once a day	44	6,1	6,1	100,0
	Total	723	100,0	100,0	

Spotify

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	459	63,5	63,5	63,5
	Less than once a month	42	5,8	5,8	69,3
	Once a month	29	4,0	4,0	73,3
	Once a week	27	3,7	3,7	77,0
	More than once a week	54	7,5	7,5	84,5
	Once a day	32	4,4	4,4	88,9
	More than once a day	80	11,1	11,1	100,0
	Total	723	100,0	100,0	

Uber

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	525	72,6	72,6	72,6
	Less than once a month	116	16,0	16,0	88,7
	Once a month	48	6,6	6,6	95,3
	Once a week	19	2,6	2,6	97,9
	More than once a week	6	,8	,8	98,8
	Once a day	4	,6	,6	99,3
	More than once a day	5	,7	,7	100,0
	Total	723	100,0	100,0	

Statistics (1)

		Facebook	WhatsApp	Instagram	Netflix	Spotify	Uber
N	Valid	723	723	723	723	723	723
	Missing	0	0	0	0	0	0
Mean		6,32	5,52	4,52	2,45	2,43	1,47
Median		7,00	7,00	6,00	1,00	1,00	1,00
Std. Deviation		1,387	2,069	2,610	2,105	2,188	,979

I can browse, search and filter data / information and digital content

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	15	2,1	2,1	2,1
	2	10	1,4	1,4	3,5
	3	15	2,1	2,1	5,5
	4	37	5,1	5,1	10,7
	5	63	8,7	8,7	19,4
	6	119	16,5	16,5	35,8
	7	464	64,2	64,2	100,0
	Total	723	100,0	100,0	

I can interact through digital technologies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	10	1,4	1,4	1,4
	2	11	1,5	1,5	2,9
	3	20	2,8	2,8	5,7
	4	48	6,6	6,6	12,3
	5	83	11,5	11,5	23,8
	6	124	17,2	17,2	40,9
	7	427	59,1	59,1	100,0
	Total	723	100,0	100,0	

I can use digital tools and technologies for collaborative processes

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	16	2,2	2,2	2,2
	2	16	2,2	2,2	4,4
	3	24	3,3	3,3	7,7
	4	53	7,3	7,3	15,1
	5	90	12,4	12,4	27,5
	6	140	19,4	19,4	46,9
	7	384	53,1	53,1	100,0
	Total	723	100,0	100,0	

Statistics (2)

		I can browse, search and filter data / information and digital content	I can interact through digital technologies	I can use digital tools and technologies for collaborative processes
N	Valid	723	723	723
	Missing	0	0	0
Mean		6,23	6,13	5,96
Median		7,00	7,00	7,00
Std. Deviation		1,345	1,340	1,468

How would you evaluate your product and financial innovation knowledge?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	92	12,7	12,7	12,7
	2	99	13,7	13,7	26,4
	3	119	16,5	16,5	42,9
	4	173	23,9	23,9	66,8
	5	154	21,3	21,3	88,1
	6	57	7,9	7,9	96,0
	7	29	4,0	4,0	100,0
	Total	723	100,0	100,0	

How much averse are you to risk?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	11	1,5	1,5	1,5
	2	27	3,7	3,7	5,3
	3	60	8,3	8,3	13,6
	4	169	23,4	23,4	36,9
	5	173	23,9	23,9	60,9
	6	169	23,4	23,4	84,2
	7	114	15,8	15,8	100,0
	Total	723	100,0	100,0	

Statistics (3)

		How would you evaluate your product and financial innovation knowledge?	How much averse are you to risk?
N	Valid	723	723
	Missing	0	0
Mean		3,67	4,98
Median		4,00	5,00
Std. Deviation		1,625	1,418

Do you have a bank account?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	704	97,4	97,4	97,4
	No	19	2,6	2,6	100,0
	Total	723	100,0	100,0	

Note: since this was a selective question and directed respondents to the end of the survey in case their answered negatively, from this point on there is always going to be missing (at least) 19 answers.

Do you own bank accounts in more than one bank?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	342	47,3	48,6	48,6
	No	362	50,1	51,4	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Do you think your bank offers anything different from what other banks offer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	139	19,2	19,7	19,7
	2	71	9,8	10,1	29,8
	3	82	11,3	11,6	41,5
	4	155	21,4	22,0	63,5
	5	131	18,1	18,6	82,1
	6	68	9,4	9,7	91,8
	7	58	8,0	8,2	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

To what extent do you trust your bank to protect your data and provide secure online operations?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	16	2,2	2,3	2,3
	2	27	3,7	3,8	6,1
	3	54	7,5	7,7	13,8
	4	105	14,5	14,9	28,7
	5	167	23,1	23,7	52,4
	6	193	26,7	27,4	79,8
	7	142	19,6	20,2	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Would you be open to switching banks in the next 90 days?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	242	33,5	34,4	34,4
	2	106	14,7	15,1	49,4
	3	82	11,3	11,6	61,1
	4	109	15,1	15,5	76,6
	5	74	10,2	10,5	87,1
	6	36	5,0	5,1	92,2
	7	55	7,6	7,8	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Statistics (4)

		Do you think your bank offers anything different from what other banks offer?	To what extent do you trust your bank to protect your data and provide secure online operations?	Would you be open to switching banks in the next 90 days?
N	Valid	704	704	704
	Missing	19	19	19
Mean		3,72	5,17	2,99
Median		4,00	5,00	3,00
Std. Deviation		1,880	1,490	1,954

Do you use any financial apps provided by your bank?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	478	66,1	67,9	67,9
	No	226	31,3	32,1	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Note: since the next question implies the use of the app, it was only visible to those who answered “Yes” to this question.

Which activities do you perform through your bank's financial apps?

Bank transfers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	398	55,0	83.3	83.3
	No	80	11,1	16.7	100.0
	Total	478	66,1	100.0	
Missing	System	245	33,9		
Total		723	723	100.0	

General information search

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	181	25,0	37,9	37,9
	No	297	41,1	62,1	100,0
	Total	478	66,1	100,0	
Missing	System	245	33,9		
Total		723	100,0		

Online purchases

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	406	56,1	84,9	84,9
	No	72	10,0	15,1	100,0
	Total	478	66,1	100,0	
Missing	System	245	33,9		
Total		723	100,0		

Selecting investment and saving options

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	85	11,8	17,8	17,8
	No	393	54,4	82,2	100,0
	Total	478	66,1	100,0	
Missing	System	245	33,9		
Total		723	100,0		

View transactions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	441	61,0	92,3	92,3
	No	37	5,1	7,7	100,0
	Total	478	66,1	100,0	
Missing	System	245	33,9		
Total		723	100,0		

How often do you use financial apps that are not provided by your bank?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	359	49,7	51,0	51,0
	Less than once a month	71	9,8	10,1	61,1
	Once a month	66	9,1	9,4	70,5
	Once a week	71	9,8	10,1	80,5
	More than once a week	99	13,7	14,1	94,6
	Once a day	22	3,0	3,1	97,7
	More than once a day	16	2,2	2,3	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Statistics (5)

N	Valid	704
	Missing	19
Mean		2,45
Median		1,00
Std. Deviation		1,774

Note: since the next two questions imply the use of these apps, it was only visible to those who answered did not answer “Never” to this question.

Which activities do you perform through alternative financial apps?

Bank transfers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	239	33,1	69,3	69,3
	No	106	14,6	30,7	100,0
	Total	345	47,7		
Missing	System	378	52,3		
Total		723	100,0		

General information search

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	31	4,3	9,0	9,0
	No	314	43,4	91,0	100,0
	Total	345	47,7	100,0	
Missing	System	378	52,3		
Total		723	100,0		

Online purchases

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	220	30,4	63,8	63,8
	No	125	17,3	36,2	100,0
	Total	345	47,7	100,0	
Missing	System	378	52,3		
Total		723	100,0		

Selecting investment and saving options

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	11	1,5	3,2	3,2
	No	334	46,2	96,8	100,0
	Total	345	47,7	100,0	
Missing	System	378	52,3		
Total		723	100,0		

View transactions

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	66	9,1	19,1	19,1
	No	279	38,6	80,9	100,0
	Total	345	47,7	100,0	
Missing	System	378	52,3		
Total		723	100,0		

Other

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(no answer)	332	45,9	96,2	96,2
	Virtual credit card generator	4	,6	1,2	97,4
	Money withdraws	8	1,1	2,3	99,7
	NFC or QR Codes payments	1	,1	0,3	100,0
	Total	345	47,7	100,0	
Missing		378	52,3		
Total		723	100,0		

Note: since the answers were given in Portuguese and in a similar but not exactly the same way (in terms of spelling), we translated and aggregated the answers.

In your opinion, what are the major benefits of using alternative financial apps?

Allows an integrated overview and additional functionalities

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	130	18,0	37,7	37,7
	No	215	29,7	62,3	100,0
	Total	345	47,7	100,0	
Missing	System	378	52,3		
Total		723	100,0		

Attractive app design

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	48	6,6	13,9	13,9
	No	297	41,4	86,1	100,0
	Total	345	47,7	100,0	
Missing	System	378	52,3		
Total		723	100,0		

Better user-friendly experience

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	154	21,3	44,6	44,6
	No	191	26,4	55,4	100,0
	Total	345	47,7	100,0	
Missing	System	378	52,3		
Total		723	100,0		

Higher security

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	60	8,3	17,4	17,4
	No	285	39,4	82,6	100,0
	Total	345	47,7	100,0	
Missing	System	378	52,3		
Total		723	100,0		

Lower costs

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	141	19,5	40,9	40,9
	No	204	28,2	59,1	100,0
	Total	345	47,7	100,0	
Missing	System	378	52,3		
Total		723	100,0		

Would you be open to the idea of a provider initiating a payment on your behalf?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	308	42,6	43,8	43,8
	2	106	14,7	15,1	58,8
	3	90	12,4	12,8	71,6
	4	97	13,4	13,8	85,4
	5	55	7,6	7,8	93,2
	6	19	2,6	2,7	95,9
	7	29	4,0	4,1	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

How comfortable would you be with the idea of the following providers initiating a payment on your behalf?

Traditional Banks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	212	29,3	30,1	30,1
	2	86	11,9	12,2	42,3
	3	72	10,0	10,2	52,6
	4	96	13,3	13,6	66,2
	5	83	11,5	11,8	78,0
	6	93	12,9	13,2	91,2
	7	62	8,6	8,8	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Social media companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	513	71,0	72,9	72,9
	2	100	13,8	14,2	87,1
	3	45	6,2	6,4	93,5
	4	25	3,5	3,6	97,0
	5	9	1,2	1,3	98,3
	6	5	,7	,7	99,0
	7	7	1,0	1,0	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Other technology companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	458	63,3	65,1	65,1
	2	94	13,0	13,4	78,4
	3	57	7,9	8,1	86,5
	4	33	4,6	4,7	91,2
	5	31	4,3	4,4	95,6
	6	18	2,5	2,6	98,2
	7	13	1,8	1,8	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

FinTech's

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	375	51,9	53,3	53,3
	2	75	10,4	10,7	63,9
	3	66	9,1	9,4	73,3
	4	49	6,8	7,0	80,3
	5	49	6,8	7,0	87,2
	6	50	6,9	7,1	94,3
	7	40	5,5	5,7	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Online retailers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	447	61,8	63,5	63,5
	2	79	10,9	11,2	74,7
	3	56	7,7	8,0	82,7
	4	49	6,8	7,0	89,6
	5	27	3,7	3,8	93,5
	6	27	3,7	3,8	97,3
	7	19	2,6	2,7	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Telco's

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	410	56,7	58,2	58,2
	2	107	14,8	15,2	73,4
	3	64	8,9	9,1	82,5
	4	58	8,0	8,2	90,8
	5	36	5,0	5,1	95,9
	6	16	2,2	2,3	98,2
	7	13	1,8	1,8	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Would you be willing to try an Account Information Service Provider?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	317	43,8	45,0	45,0
	2	107	14,8	15,2	60,2
	3	96	13,3	13,6	73,9
	4	83	11,5	11,8	85,7
	5	48	6,6	6,8	92,5
	6	25	3,5	3,6	96,0
	7	28	3,9	4,0	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

How comfortable would you be with the following providers acting as Account Information Service Providers?

Traditional Banks

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	227	31,4	32,2	32,2
	2	88	12,2	12,5	44,7
	3	78	10,8	11,1	55,8
	4	88	12,2	12,5	68,3
	5	86	11,9	12,2	80,5
	6	70	9,7	9,9	90,5
	7	67	9,3	9,5	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Social media companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	519	71,8	73,7	73,7
	2	89	12,3	12,6	86,4
	3	41	5,7	5,8	92,2
	4	33	4,6	4,7	96,9
	5	9	1,2	1,3	98,2
	6	8	1,1	1,1	99,3
	7	5	,7	,7	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Other technology companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	471	65,1	66,9	66,9
	2	95	13,1	13,5	80,4
	3	48	6,6	6,8	87,2
	4	41	5,7	5,8	93,0
	5	26	3,6	3,7	96,7
	6	16	2,2	2,3	99,0
	7	7	1,0	1,0	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

FinTech’s

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	428	59,2	60,8	60,8
	2	85	11,8	12,1	72,9
	3	63	8,7	8,9	81,8
	4	45	6,2	6,4	88,2
	5	31	4,3	4,4	92,6
	6	31	4,3	4,4	97,0
	7	21	2,9	3,0	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Online retailers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	479	66,3	68,0	68,0
	2	76	10,5	10,8	78,8
	3	60	8,3	8,5	87,4
	4	52	7,2	7,4	94,7
	5	16	2,2	2,3	97,0
	6	10	1,4	1,4	98,4
	7	11	1,5	1,6	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Telco's

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	463	64,0	65,8	65,8
	2	105	14,5	14,9	80,7
	3	50	6,9	7,1	87,8
	4	49	6,8	7,0	94,7
	5	18	2,5	2,6	97,3
	6	10	1,4	1,4	98,7
	7	9	1,2	1,3	100,0
	Total	704	97,4	100,0	
Missing	System	19	2,6		
Total		723	100,0		

Statistics (6)

		Would you be open to the idea of a provider initiating a payment on your behalf?	Would you be willing to try an Account Information Service Provider?
N	Valid	704	704
	Missing	19	19
Mean		2,51	2,47
Median		2,00	2,00
Std. Deviation		1,738	1,738

Statistics (7)

[How comfortable would you be with the idea of the following providers initiating a payment on your behalf?]

		Traditional Banks	Social media companies	Other technology companies	FinTech's	Online retailers	Telco's
N	Valid	704	704	704	704	704	704
	Missing	19	19	19	19	19	19
Mean		3,40	1,52	1,85	2,48	1,99	2,01
Median		3,00	1,00	1,00	1,00	1,00	1,00
Std. Deviation		2,093	1,089	1,472	1,966	1,622	1,514

[How comfortable would you be with the following providers acting as Account Information Service Providers?]

		Traditional Banks	Social media companies	Other technology companies	FinTech's	Online retailers	Telco's
N	Valid	704	704	704	704	704	704
	Missing	19	19	19	19	19	19
Mean		3,28	1,53	1,77	2,07	1,76	1,75
Median		3,00	1,00	1,00	1,00	1,00	1,00
Std. Deviation		2,092	1,114	1,365	1,673	1,351	1,313

Appendix 7 – SPSS outputs – Tests

It should be noticed that, even though most of the demographic variables were measured with a 1 to 5 or 1 to 6 scale and can be analysed in the regression context like that, the residency district was decomposed into 5 different dummy variables considering the following setup:

Former scale	Category of Residency regions (NUT II) variable	Dummy **North**	Dummy **Center**	Dummy **Lisbon_MA**	Dummy **South**
1	North	1	0	0	0
2	Center	0	1	0	0
3	Lisbon Metropolitan Area	0	0	1	0
4	South	0	0	0	1
5	Islands	0	0	0	0

Ordinal Regressions

Multicollinearity

	SPSS Output			(Fox & Monette) GVIF		
	Tolerance	VIF	df	GVIF	$GVIF^{\frac{1}{2.df}}$	$\left(GVIF^{\frac{1}{2.df}}\right)^2$
Gender?	0.878	1.139	1	1.067	1.033	**1.067**
Age?	0.57	1.756	5	1.058	1.006	**1.012**
Education level?	0.816	1.225	5	1.021	1.002	**1.004**
(Household) Income level?	0.731	1.369	4	1.04	1.005	**1.01**
Household type?	0.864	1.158	4	1.019	1.002	**1.004**
Current employment status?	0.69	1.449	5	1.038	1.004	**1.008**
North	0.167	5.996	1	2.449	1.565	**2.449**
Center	0.234	4.277	1	2.068	1.438	**2.068**
Lisbon_MA	0.144	6.941	1	2.635	1.623	**2.634**
South	0.17	5.867	1	2.422	1.556	**2.421**
I can browse, search and filter data / information and digital content	0.393	2.546	6	1.081	1.007	**1.014**
I can interact through digital technologies	0.215	4.646	6	1.137	1.011	**1.022**
I can use digital tools and technologies for collaborative processes	0.238	4.196	6	1.127	1.01	**1.02**
How would you evaluate your product and finantial innovation knowledge?	0.811	1.233	6	1.018	1.001	**1.002**
How much averse are you to risk?	0.916	1.092	6	1.007	1.001	**1.002**
Do you own bank accounts in more than one bank?	0.885	1.13	1	1.063	1.031	**1.063**
Do you think your bank offers anything different from what other banks offer?	0.828	1.207	6	1.016	1.001	**1.002**
To what extent do you trust your bank to protect your data and provide secure online operations?	0.773	1.293	6	1.022	1.002	**1.004**
Do you use any financial apps provided by your bank?	0.811	1.234	1	1.111	1.054	**1.111**
How often do you use financial apps that are not provided by your bank?	0.728	1.374	6	1.027	1.002	**1.004**

	Tolerance	VIF	df	GVIF	$\boldsymbol{GVIF^{\frac{1}{2.df}}}$	$\boldsymbol{\left(GVIF^{\frac{1}{2.df}}\right)^2}$
Do you use any financial apps provided by your bank?	0.899	1.112	1	1.055	1.027	**1.055**
How often do you use financial apps that are not provided by your bank?	0.899	1.112	6	1.009	1.001	**1.002**

Variance inflation factors (VIF) are applicable to one-degree-of-freedom effects. As we are dealing with both dichotomous and ordinal variables, reason why the degrees of freedom differ between variables, we computed Fox & Monette (1992) generalized variance-inflation factors (GVIF) and interpreted $\left(GVIF^{\frac{1}{2.df}}\right)^2$ instead, in order to make the GVIFs comparable across dimensions and to apply the usual rule of VIF.

Willingness to switch banks

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Sig.
Intercept Only	2505.412		
Final	2436.478	68.933	.000

Link function: Logit.

Parameter Estimates

			Std.			95% Conf. Interval	
		Estimate	Error	Wald	Sig.	Lower B.	Upper B.
Threshold	1	-2.098	.738	8.075	.004	-3.546	-.651
	2	-1.423	.736	3.733	.053	-2.866	.021
	3	-.919	.735	1.563	.211	-2.361	.522
	4	-.151	.735	.042	.837	-1.591	1.289
	5	.602	.736	.669	.413	-.841	2.045
	6	1.185	.740	2.565	.109	-.265	2.636
Location	Gender	.327	.150	4.784	.029	.034	.621
	Age	-.021	.079	.070	.792	-.177	.135
	Education	.157	.060	6.893	.009	.040	.275
	Income	-.062	.076	.664	.415	-.212	.088
	Household	.017	.064	.070	.792	-.109	.142
	Employment Status	.011	.095	.012	.912	-.176	.197
	North	-.972	.382	6.467	.011	-1.722	-.223
	Center	-.740	.395	3.503	.061	-1.514	.035
	Lisbon_MA	-.893	.371	5.802	.016	-1.620	-.166
	South	-1.063	.380	7.807	.005	-1.808	-.317
	Tech Sophistication 1	.030	.083	.129	.719	-.133	.193
	Tech Sophistication 2	-.026	.111	.056	.813	-.245	.192
	Tech Sophistication 3	.135	.097	1.938	.164	-.055	.325
	Financial Knowledge	-.028	.047	.357	.550	-.119	.063
	Risk Aversion	-.075	.051	2.220	.136	-.174	.024
	Multiple Accounts	.127	.144	.779	.377	-.155	.409
	Dif. Offers Belief	-.089	.040	5.052	.025	-.167	-.011
	Trust (in own bank)	-.242	.052	21.570	.000	-.344	-.140
	Use of Bank APPs	.047	.161	.084	.772	-.269	.363
	Use of alternative APPs	.031	.045	.479	.489	-.057	.119

Willingness to try a PISP

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Sig.
Intercept Only	2268.095		
Final	2124.413	143.682	.000

Link function: Logit.

Parameter Estimates

			Std.			95% Conf. Interval	
		Estimate	Error	Wald	Sig.	Lower B.	Upper B.
Threshold	1	2.176	0.791	7.569	0.006	0.626	3.727
	2	2.892	0.794	13.265	0	1.336	4.449
	3	3.547	0.797	19.789	0	1.984	5.11
	4	4.487	0.803	31.205	0	2.913	6.061
	5	5.407	0.812	44.319	0	3.815	6.998
	6	5.959	0.821	52.663	0	4.35	7.569
Location	Gender	0.265	0.155	2.932	0.087	-0.038	0.568
	Age	-0.076	0.083	0.834	0.361	-0.24	0.087
	Education	0.144	0.063	5.247	0.022	0.021	0.267
	Income	0.002	0.079	0.001	0.980	-0.153	0.157
	Household	-0.04	0.067	0.356	0.551	-0.172	0.092
	Employment Status	0.028	0.1	0.079	0.778	-0.168	0.225
	North	-0.192	0.395	0.238	0.626	-0.966	0.581
	Center	-0.056	0.409	0.019	0.892	-0.856	0.745
	Lisbon_MA	-0.126	0.383	0.108	0.743	-0.876	0.625
	South	-0.412	0.394	1.092	0.296	-1.185	0.361
	Tech Sophistication 1	-0.022	0.09	0.059	0.808	-0.199	0.155
	Tech Sophistication 2	-0.074	0.124	0.363	0.547	-0.317	0.168
	Tech Sophistication 3	0.236	0.111	4.529	0.033	0.019	0.453
	Financial Knowledge	0.084	0.048	3.038	0.081	-0.01	0.179
	Risk Aversion	-0.147	0.054	7.482	0.006	-0.252	-0.042
	Multiple Accounts	0.229	0.15	2.325	0.127	-0.065	0.523
	Dif. Offers Belief	0.081	0.041	3.907	0.048	0.001	0.162
	Trust (in own bank)	0.186	0.056	10.892	0.001	0.075	0.296
	Use of Bank APPs	0.3	0.172	3.052	0.081	-0.037	0.636
	Use of alternative APPs	0.158	0.046	12.093	0.001	0.069	0.247

Link function: Logit.

Willingness to try an AISP

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Sig.
Intercept Only	2251.75		
Final	2079.018	172.732	.000

Link function: Logit.

Parameter Estimates

			Std.			95% Conf. Interval	
		Estimate	Error	Wald	Sig.	Lower B.	Upper B.
Threshold	1	1.380	0.795	3.014	0.083	-0.178	2.938
	2	2.122	0.797	7.085	0.008	0.559	3.684
	3	2.871	0.800	12.888	0.000	1.304	4.439
	4	3.745	0.804	21.676	0.000	2.168	5.321
	5	4.534	0.811	31.250	0.000	2.945	6.124
	6	5.239	0.822	40.606	0.000	3.628	6.851
Location	Gender	0.420	0.157	7.121	0.008	0.112	0.729
	Age	-0.370	0.085	18.831	0.000	-0.537	-0.203
	Education	0.240	0.064	14.032	0.000	0.114	0.365
	Income	0.016	0.079	0.039	0.844	-0.140	0.171
	Household	0.068	0.068	1.009	0.315	-0.065	0.201
	Employment Status	0.076	0.101	0.564	0.453	-0.122	0.273
	North	-0.699	0.392	3.176	0.075	-1.468	0.070
	Center	-0.760	0.408	3.477	0.062	-1.559	0.039
	Lisbon_MA	-0.400	0.379	1.116	0.291	-1.144	0.343
	South	-0.876	0.392	4.994	0.025	-1.645	-0.108
	Tech Sophistication 1	-0.046	0.092	0.251	0.617	-0.227	0.134
	Tech Sophistication 2	-0.040	0.126	0.098	0.754	-0.287	0.208
	Tech Sophistication 3	0.181	0.112	2.638	0.104	-0.038	0.400
	Financial Knowledge	0.001	0.049	0.001	0.980	-0.094	0.097
	Risk Aversion	-0.113	0.055	4.294	0.038	-0.220	-0.006
	Multiple Accounts	0.194	0.152	1.636	0.201	-0.103	0.491
	Dif. Offers Belief	0.090	0.041	4.754	0.029	0.009	0.172
	Trust (in own bank)	0.265	0.058	20.819	0.000	0.151	0.378
	Use of Bank APPs	0.177	0.173	1.039	0.308	-0.163	0.517
	Use of alternative APPs	0.073	0.046	2.532	0.112	-0.017	0.163

Link function: Logit.

Alternative Apps vs Banks Apps

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	Sig.
Intercept Only	151.512		
Final	61.976	89.536	.000

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Threshold	Never	-.426	.092	21.647	1	.000	-.605	-.246
	Less than once a month	.032	.090	.125	1	.724	-.144	.208
	Once a month	.487	.092	27.955	1	.000	.307	.668
	Once a week	1.073	.102	110.860	1	.000	.873	1.273
	More than once a week	2.555	.170	227.140	1	.000	2.222	2.887
	Once a day	3.462	.255	184.879	1	.000	2.963	3.961
Location	No	-1.566	.177	78.641	1	.000	-1.912	-1.220
	Yes	0[a]	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Kruskal-Wallis H Tests

Hypothesis Tests Summary

	Null Hypothesis	Test	Sig.	Decision
1	The distribution of Do you think your bank offers anything different from what other banks offer? is the same across categories of Age?.	Independent-Samples Kruskal-Wallis Test	.603	Retain the null hypothesis
2	The distribution of To what extent do you trust your bank to protect your data and provide secure online operations? is the same across categories of Age?.	Independent-Samples Kruskal-Wallis Test	.003	Reject the null hypothesis
3	The distribution of Would you be open to switching banks in the next 90 days? is the same across categories of Age?.	Independent-Samples Kruskal-Wallis Test	.061	Retain the null hypothesis

4	The distribution of Would you be open to the idea of a provider initiating a payment on your behalf? is the same across categories of Age?.	Independent-Samples Kruskal-Wallis Test		Reject the null hypothesis
5	The distribution of Would you be willing to try an Account Information Service Provider? is the same across categories of Age?.	Independent-Samples Kruskal-Wallis Test		Reject the null hypothesis

Asymptotic significances are displayed. The significance level is .05.

Fisher's exact test (2 x c)

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	44.404[a]	5	.000	.000		
Likelihood Ratio	42.933	5	.000	.000		
Fisher's Exact Test	41.864			.000		
Linear-by-Linear Association	19.934[b]	1	.000	.000	.000	.000
N of Valid Cases	704					

a. 3 cells (25.0%) have expected count less than 5. The minimum expected count is .64.
b. The standardized statistic is -4.465.

Fisher's exact test (2 x 2) for each possible pairwise comparison

	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Under 18 - Over 65	1.000	0.467
Under 18 - 50-65	0.498	0.281
Under 18 - 40-49	0.067	0.067
Under 18 - 30-39	0.092	0.092
Under 18 - 18-29	0.063	0.063
50-65 - Over 65	0.723	0.429
40-49 - Over 65	0.033	0.033
30-39 - Over 65	0.109	0.063
18-29 - Over 65	0.029	0.029
40-49 - 50-65	0.000	0.000
30-39 - 50-65	0.000	0.000
18-29 - 50-65	0.000	0.000
30-39 - 40-49	0.402	0.219
30-39 - 18-29	0.327	0.173
18-29 - 40-49	0.908	0.465