An Examination of the Drivers of Resistance to Digital-Only Banking Among Portuguese Mobile Banking Adopters

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Abstract

Digital-only banking, often referred to as neobanking, has grown in popularity in the past years, especially among younger generations. However, its adoption rates are still well below mobile banking adoption rates, as most individuals continue to prefer traditional banks. This dissertation aims to understand the drivers of this resistance among Portuguese mobile banking users. Through a review of the literature on innovation resistance, five resistance constructs - inertia, perceived complexity, perceived risk, trust, and need for human interaction - and two driving demographic factors - age and gender - were identified and used to formulate seven hypotheses. These hypotheses were initially supported through a qualitative study based on eight online interviews, and further validated through a quantitative study based on 219 survey responses from Portuguese mobile banking users. The results of the latter study revealed that only the perceived complexity and perceived risk constructs and the age factor had significantly positive effects on resistance to digital-only banking. Based on these findings, practical recommendations were provided to support neobanks in overcoming these barriers and increasing market share.

Keywords: digital-only banking; neobanking; Portuguese mobile banking users; resistance; barriers to adoption

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Abstrato

Os bancos 100% digitais, frequentemente referidos como *neobanks*, têm se tornado cada vez mais populares nos últimos anos, especialmente entre as gerações mais jovens. No entanto, as suas taxas de adoção continuam a ser muito inferiores às taxas de adoção de serviços bancários mobile, uma vez que a maioria dos indivíduos continua a preferir os bancos tradicionais. Esta dissertação tem como objectivo compreender os factores que fomentam esta resistência entre os utilizadores portugueses de serviços bancários *mobile*. Através de uma revisão da literatura sobre resistência à inovação, cinco conceitos de resistência - inércia, complexidade percecionada, risco percecionado, confiança e necessidade de interação humana - e dois factores demográficos impulsionadores - idade e sexo - foram identificados e utilizados para formular sete hipóteses. Estas hipóteses foram inicialmente suportadas através de um estudo qualitativo baseado em oito entrevistas online, e posteriormente validadas através de um estudo quantitativo baseado em 219 respostas de utilizadores portugueses de serviços bancários mobile a um questionário. Os resultados deste último estudo revelaram que apenas os conceitos de complexidade percecionada e risco percecionado e o factor idade produzem efeitos significativamente positivos na resistência aos bancos 100% digitais. Com base nestes resultados, foram fornecidas recomendações práticas para apoiar bancos 100% digitais na superação destas barreiras e no aumento das suas participações de mercado.

Palavras-chave: bancos 100% digitais; neobanks; utilizadores Portugueses de serviços bancários mobile; resistência; barreiras à adoção

Título: Um Análise dos Impulsionadores da Resistência a Bancos 100% Digitais Entre Utilizadores Portugueses de Serviços Bancários Mobile

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1. Introduction

The rise of digital-only banks, also known as neobanks, has disrupted the traditional banking industry. These banks offer convenient and lower-price banking services through their mobile apps and websites, without relying on physical branches. Over the past years, neobanks have gained increasing popularity among banking consumers, namely in Portugal. However, despite their steady growth, neobanks face several challenges. For instance, most mobile banking users continue to rely on their traditional banks, and even among neobanking adopters, only a small proportion use these accounts for most of their banking transactions. Moreover, neobaking adoption rates significantly decline when it comes to older consumers.

This dissertation aims to understand what factors drive resistance to digital-only banking among Portuguese mobile banking adopters, i.e., individuals who are comfortable engaging with banking services through their phones. To do so, both qualitative and quantitative studies were conducted to validate hypotheses formulated based on a literature review of five identified resistance constructs - inertia, perceived complexity, perceived risk, trust, and need for human interaction -, as well as two demographic factors - age and gender. The findings of this study are highly significant for neobanks, as they can leverage them to develop targeted strategies to overcome the main barriers to the adoption of their services and increase their market share.

This dissertation is structured as follows:

1. This section, "Introduction", provides an overview of the research topic and explains the importance and scope of the study.
2. The "Market Analysis" section delves into the impact of technology disruption on the banking industry, the emergence of FinTechs, and the evolution and current state of the neobanking sector both worldwide and in Portugal.
3. Followed by the "Problem Statement and Research Question" section
4. The "Literature Review" section reviews existing research on innovation resistance, examining various theories that have been proposed to explain different drivers of resistance.
5. The "Qualitative Study" section outlines the methodology used in the online interviews and presents the key findings from this research

6. The "Quantitative Study" section outlines the methodology used to analyze the data collected through the online survey and reports the key findings from this analysis.

7. The "Conclusions" section summarizes the main findings of the study and provides recommendations for neobanks on how to overcome the identified resistance drivers. It also identifies potential directions for further research on this topic.

2. Market analysis

2.1. The rise of FinTech

For the past century, the banking industry has been disrupted by the fast-paced development of information and communication technologies and their impact on consumer behavior.
In the 1970s, the first self-service technologies were installed - the automatic teller machines (ATM) -, followed by the introduction of telephone banking services in the 1980s, and, due to the emergence of the Internet in the 1990s, the expansion of banking distribution channels to the web (Hoehle et al., 2012). By the turn of the century, mobile phone banking was being developed (Jiménez & Díaz, 2019). Over the past two decades, we have experienced the proliferation of mobile technologies (Hoehle et al., 2012), leading us to the mainstream use of mobile banking applications we observe today. However, the banking industry has been historically known for being conservative and resistant to change (Tornjanski et al., 2015). Most retail banks relied on incremental adjustments to their business models to answer to disruptions to the industry, but their competitive advantages started fading as a result of the widespread technology adoption and increasing regulations (Deloitte, 2014).

The U.S. subprime mortgage meltdown, which led to the fall of Lehman Brothers and contributed to the 2008 global financial crisis, radically changed the financial sector, depleting the market advantages of traditional financial services providers (IFC, 2017). The anger towards the financial system and the lack of trust in incumbent banks created a demand for new players to enter the market, in addition, a big amount of talent left their traditional banking jobs to look for opportunities to create alternative financial solutions (Braileanu, 2018). Moreover, the explosion of new regulations, put in place to prevent future catastrophes, shifted the banks' focus and capital towards compliance efforts and away from innovation (Braileanu, 2018). These three by-products from the crisis, together with digital transformations of other industries, which made consumers more comfortable with and trusting of technology-based financial solutions (IFC, 2017), culminated in the rise of technologically enabled innovation in financial services, FinTech, as defined by the FSB (2022).

A wave of technology start-ups and companies penetrated nearly every segment of the financial services industry with innovative products and services, from retail banking to asset management and insurance. These companies could offer cheaper and more efficient services than their incumbent competitors, who were burdened with regulations and legacy infrastructure (IFC, 2017). A study conducted by PwC (2016), predicted consumer banking and fund transfer & payments to be the most disrupted sectors by 2020. Mainly due to the emergence of online platforms that allowed peer-to-peer lending, alternative credit models, faster lending processes, lower operating costs, technology-driven payments, and money transfers through electronic devices (PwC, 2016).

By 2015, more than 2,000 FinTech start-ups had launched, and the majority offered retail banking services, notably 25% of the leading FinTechs provided payment solutions (McKinsey & Company, 2015). Venture capital funding in FinTech companies reached $13.8 billion that year, almost 7 times higher than the value invested in 2011 (KPMG & CB Insights, 2016). According to a consumer survey conducted by EY (2019), 3 out of 4 global consumers were using a money transfer and payments FinTech service.

To answer the threat of the widespread use of FinTech services, incumbent banks had to accelerate the integration of digital technologies (Beranek, 2022). For many retail banks, the online and mobile channels became a point of focus and enhancing their digital capabilities in the front office was a priority (Deloitte, 2018). Some traditional financial institutions have sought digital expertise through collaborative partnerships with FinTechs, while, in return, they provide the skills and resources required to grow quickly (Dietz et al., 2016). For banks, digitalization has become a crucial source of higher profitability and market differentiation, it allows them to reduce costs, improve client satisfaction and develop new financial products (Paulet & Mavoori, 2020).

During the 2010-2015 period, the world witnessed an increase in the share of mobile banking users by 21% and a decrease in the share of branch banking users by 16% (Statista, 2016). In. 2019, 6 out of 7 Europeans used digital banking solutions at least once a month (Schmitz-Engels, 2019).

2.2. Digital-only banks

Within the wide pool of FinTech companies, we can identify a smaller group of challenger banks. These banks primarily operate online, offering real-time services and a better customer experience while saving on operating costs (PwC, 2021). According to PwC (2021), challenger banks can be:

- FinTechs providing digital-only banking services through a virtual banking license or by partnering with a traditional bank, i.e., neobanks
- Digital arms of incumbent banks, having both online and offline presence
- Tech companies, like Alibaba, Apple, and Google, that offer financial services, such as payment platforms, or non-financial services, for example, personal finance management services

The scope of this dissertation will be limited to neobanks, also referred to as digital-only banks. These banks rely solely on internet websites and mobile applications to provide their services, as they have no brick-and-mortar branches (Lee & Kim, 2020). Most neobanks offer a similar bundle of products: a saving and spending account, a mobile application with personal finance management tools and a debit card (CB Insights, 2020).

The popularity of digital-only banks has increased significantly, and so has the number of new entrants. At the end of 2020, there were 319 neobanks worldwide, up from 41 in 2015 (Exton Consulting, 2021). During that same period, the total revenue of these firms grew sixfold, reaching $3.6 billion in 2020 (Statista, 2022a). According to a recent study, which surveyed more than 47,000 global consumers, 23% of the respondents have accounts with a digital-only bank, i.e., almost 1 in every 4 people already use a digital-only bank (N26 & Accenture, 2021). Currently, the neobanking sector registers the highest user penetration rates in Ireland (26.4%), Luxembourg (22.1%), the U.K. (20.8%), Denmark (20.5%), and Brazil (17.8%) (Statista, 2022b).

Revolut is a notable example of this growing breed of financial institutions. A fast-growing fintech start-up, launched in 2015 by former traders from Lehman Brothers with the ambition to develop better technologies which ensure superior financial services (Mohan, 2020). Revolut

owes its fame to its fast and cheap currency exchange (Polasik et al., 2021). Additionally, the company offers payment services, simple international transfers, investment products such as crypto trading, savings products like saving vaults, and much more, all through its mobile app. FinTechs often charge for their services through a monthly subscription (Green & Shevlin, 2022), as does Revolut: consumers can choose between the standard free plan where they just pay a one-time fee for their debit card and the Metal plan which provides more exclusive offers for €13.99/month (Revolut, 2022). This London-based start-up has experienced exponential growth, in 2022 it reached 20 million customers worldwide (Revolut, 2022), a number that was down to 450,000 in 2017 (Storonsky, 2018). By 2021, Revolut was valued as Europe's biggest neobank at $33 billion (O'Neill, 2021).

In Europe, Revolut's main competitors are N26, serving 7 million customers, Monzo (5 million) and Starling Bank (2.5 million) (Statista, 2022c). Many consumers see the benefits of these banks, mainly their competitive pricing and the simple and convenient customer experience (Accenture, 2020). Another study (PYMNTS, 2022), identified lower costs and improved money transfers as the biggest motivators to switch to digital banks.

2.3. Digital-only banking adopters

Instead of targeting the mass market, neobanks focus on multiple niche customer segments, mostly the unbanked or underbanked, namely Millennials, so they can offer hyper-personalized services that provide a superior customer experience (PwC, 2021). Millennials and Gen Zers are the biggest adopters of digital banking, with 3 in every 10 U.S. consumers from these generations using a digital bank as their primary checking account provider (Cornerstone Advisors & StrategyCorps, 2022). These generations represent 54% of the global population (Liversedge & Harrington, 2021), thus posing a significant threat to traditional banking. These consumers demand more convenient and personalized services and do not fully trust traditional banks (KPMG & CB Insights, 2016). They are digital natives (McKinsey & Company, 2015), thus prioritizing online and mobile banking capabilities when choosing their bank, and they are less loyal to their banks than older generations (Zafin, 2020).

According to a 2020 consumer study, neobank usage decreases with consumer age, in fact, 17-18% of the younger respondents, i.e., from 18 to 34 years old, were already using a neobank for most of their transactions, compared to only 4% for individuals over 65 years old (Accenture, 2020). In another study, Accenture defined 4 financial services customer personas, one of those was the Pioneers, i.e., customers that are "Tech-savvy and keen to engage with financial providers using mobile devices, (…) hungry for innovation in services and channels" (Accenture, 2019, p. 7). 50% of respondents belonging to this persona were between the age of 18 and 34, and 55% were men. A contrasting persona was the Traditionalists, i.e., consumers who value the human touch, avoid technology, and are uninterested in new products or services, out of which 65% were 55 or older (Accenture, 2019).

2.4. COVID-19 impact on the banking industry

The pandemic increased the demand for mobile banking. The number of people using their smartphones to interact with their banks increased by almost 20% during the 2018-2020 period (Accenture, 2020). Conversely, a study conducted with 1,000 U.S. consumers determined that 87% of the respondents were visiting their bank's branch less often than they did before the pandemic (MX, 2021). The concern around spreading the virus by using cash led to a 57% fall in cash usage and an increase in electronic payments usage, such as credit cards (7%), debit cards (10%) and online payment tools (14%) (Bellens, 2020). Across all generations, people feel the pandemic has made them value online and mobile banking more than they did previously (Zafin, 2020).

On the supply side, due to the COVID-19-related restrictions, banks had to restrict face-to-face consumer contact and rely on technology to maintain their businesses remotely (Cooke, 2021). 18% launched contactless payment methods, 41% of banks increased the limit of contactless payments, introduced remote identification and verification, and 34% implemented fully digital processes, such as opening an account (Deloitte, 2020).

Previously, the core business of the biggest European neobanks was cheap foreign currency exchange, but the pandemic restrictions plummeted the demand for this service (O'Neill, 2021).

However, the success of other revenue streams, such as subscription fees, other in-app services, and stock and crypto trading made up for the interruption in international travels (O'Neill, 2021). In fact, in Europe, the average annual transaction value per user increased by 58% during the 2018-2022 period (Statista, 2022b). Throughout the same period, 47.83 million European consumers became new neobanking users (Statista, 2022b).

2.5. Digital-only banking sector in Portugal

In line with the rest of the world, neobanks have also experienced increasing popularity in Portugal, reaching over a million users in 2022, a value almost 12 times higher than in 2017 (Statista, 2022d). This value is expected to reach 2.13 million by 2027, the same year the user penetration is projected to hit 21.3% (Statista, 2022d). Currently, user penetration is at 10.2% (Statista, 2022d), a quite low value when compared to the online banking penetration rate of 53% in 2021 (Statista, 2022e).

Neobanks in Portugal face strong competition from traditional, incumbent banks. In 2021, the 5 largest incumbent banks in Portugal reported rapid expansion in their digital client bases, namely mobile banking clients, with a combined total of more than 5.9 million active digital clients (Alves, 2022). According to the same article (2022), the penetration rate of digital customers of these banks is on average 57%. In 2021, the largest Portuguese bank, Caixa Geral de Depósitos (CGD), achieved a significant milestone by reaching a total of 2.07 million digital users. Of these users, 1.32 million were mobile customers, marking an impressive 20% growth in CGD's mobile banking user base compared to 2020 (Alves, 2022).

According to Statista (2021a), as of October 2021, 893,986 Portuguese people had downloaded the Revolut bank app, making it the most popular neobank in the country to date. The second most downloaded neobank app belonged to Monese, with 131,845 users (Statista, 2021b), followed by N26, which reported 85,974 downloads in Portugal (Statista, 2021c).

2.6. Challenges faced by digital-only banks

Even though neobaking usage rates continue to grow steadily, and more customers are using them for primary accounts (O'Neill, 2021), primary account switching has slowed down (Accenture, 2020). The number of multi-banked customers is increasing, “a third of Gen Zers and Gen Xers and 40% of Millennials have two or more checking accounts” (Cornerstone Advisors & StrategyCorps, 2022, p. 25). However, when surveyed in 2020, only 3.8% of consumers had switched their primary account in the past year (Accenture, 2020). According to the same study, 23% of surveyed consumers use a neobank account, nonetheless, only 12% use it for most of their banking transactions. The main reason for consumers not to use their neobanking account as a primary account is that they are happy with their existing bank (Accenture, 2020). In the U.S., only 11% of consumers have their primary checking account with a neobank, at the same time, these banks hold a 17% market share of secondary accounts and 30% of third accounts (Shevlin, 2021).

Moreover, some consumers developed a strong aversion towards digital-only banks (Accenture, 2020). This study determined that 57% of surveyed consumers aged over 65 are not willing to open a neobank account, for those aged 55-64 this value remains high, at 40% (Accenture, 2020). Most of these consumers are less comfortable with technology, have limited online presence, and distrust the safety of mobile and online banking (Accenture, 2019). At the same time, currently, only 13.7% of active online banking European users have an account in a digital-only bank (Statista, 2022b), i.e., most individuals who are comfortable using digital banking channels have not adopted neobanking services.

Apart from these adoption challenges, neobanks also face other market pressures such as increasing competition from other digital banks and incumbent banks who are improving their digital offerings, and the tightened regulatory framework (Exton Consulting, 2021). They are undergoing internal challenges as well, the 4 largest challenger banks in the U.K. experienced a 150% increase in total expenses from 2019 to 2020 (CB Insights, 2020). Moreover, the economic turbulence caused by the pandemic has affected the neobaking sector, as many other sectors, for example, in June 2020 Monzo cut 120 jobs in its U.K. headquarters (Exton Consulting, 2021).

Pressure to achieve profitability and identify new revenue streams may impair neobanks' price advantage (Accenture, 2020).

Despite facing challenges of their own, neobanks still have a lot of growth potential. This sector is estimated to grow at an annual average rate (CAGR) of 53.4% during the 2021-2030 period, by 2023 it is expected to reach a $2.05 trillion market size (Statista, 2022f).

3. Problem Statement and Research Questions

Digital-only banks, also referred to as neobanks, have gained widespread popularity in recent years, namely in Portugal. Despite this trend, adoption rates of neobanking and mobile banking services still vary significantly, with mobile banking experiencing much higher rates. Nowadays, most individuals feel comfortable engaging with banking services through their phones and we are observing a reduction in the reliance on physical branches. However, a significant number of mobile banking users continue to prioritize their traditional, incumbent banks. These individuals either do not adopt neobanks or only use them for specific tasks or occasions, while conducting the majority of their banking transactions with their incumbent banks.

In light of this, the research question that arises is:

- What are the main drivers of resistance to digital-only banking among Portuguese mobile banking adopters?

4. Literature Review

4.1. Innovation resistance

Each year, nearly 50% of new products introduced to the market fail (Sivadas & Dwyer, 2000). Discussions around negative responses to technological innovations by the end user recognize that this resistance is to be expected and is a critical source of information for the successful implementation and marketing of innovations (Ellen et al., 1991). As stated by Markus (1983, p. 430) "better theories of resistance will lead to better implementation strategies and, hopefully, to better outcomes". However, innovation diffusion literature mostly focuses on "positive outcomes of the adoption process, such as innovation acceptance, the intention to adopt an innovation, or adoption behavior" (Talke & Heidenreich, 2014, p. 894). According to Sheth (1981), a pro-change bias has led researchers to disregard innovation resistance.

Consumer resistance to innovation is defined as a negative reaction or attitude to new products and services that pose potential changes and disrupt the status quo (Mani & Chouk, 2018). This resistance impacts the timing of the innovation adoption (Ram & Sheth, 1989). Rogers (1962) identified five categories of innovation adopters: innovators, early adopters, early majority, late majority, and laggards. These categories experience resistance at different levels, for example, innovators do not exhibit any resistance, as they are the first to adopt an innovation (Ram & Sheth, 1989). Conversely, laggards, the last to adopt an innovation, experience a very high level of resistance (Ram & Sheth, 1989).

In like manner, innovation resistance also varies in degree, increasing from passive resistance to active resistance (Ram & Sheth, 1989). Passive resistance is driven by a consumer's predisposition to resist change (Talke & Heidenreich, 2014), it "takes place under conditions of low involvement or limited or no cognitive processing" (Nabih et al., 1997, p. 191), with no conscious evaluation of the new product (Talke & Heidenreich, 2014). On the other hand, active resistance takes place after a deliberate evaluation of the new product and it is driven by product-specific barriers (Heidenreich & Handrich, 2015).

4.2. Passive innovation resistance

Passive innovation resistance refers to the "predisposition to resist innovations due to an individual's inclination to resist changes and status quo satisfaction that already forms rather unconsciously prior new product evaluation" (Heidenreich & Handrich, 2015, p. 881).

The status quo bias theory, developed by Samuelson and Zeckhauser (1988), provides a valuable framework to understand consumers' passive resistance to innovation (Kim & Kankanhalli, 2009). Through numerous experiments, the authors of this theory showed that individuals may be biased toward maintaining their current situation because they perceived any novelty as generating more risks than benefits (Mani & Chouk, 2018). Three mechanisms contribute to this behavioral bias: the perception of transaction and uncertainty costs as greater than the benefits of the change, the cognitive misperception of loss aversion, and the psychological commitment to an existing status (Kim & Kankanhalli, 2009), which is driven by the weight given to sunk costs, social norms, and feeling in control (Samuelson & Zeckhauser, 1988).

The status quo bias is often manifested as inertia, defined by Polites and Karahanna (2012) as "attachment to, and persistence of, existing behavioral patterns (some of which are habituated) even if there were better alternatives and incentives to change" (p. 22). They conceptualized inertia as having three different components. Behavior-based inertia refers to the failure of a user to switch from their current system simply because it is what they have always done, thus not implicating much thought (Polites & Karahanna, 2012). This is associated with "habit towards an existing practice" (Sheth, 1981, p. 275), identified by Sheth, as one of the primary psychological drivers of innovation resistance. Cognitive-based inertia takes place when an individual continues to use a system despite being aware that it might not be the best alternative (Polites & Karahanna, 2012). Equally important is affective-based inertia, which implies that an individual continues using a system either because it would be stressful to change, because they enjoy or feel comfortable doing so, or even due to the strong emotional attachment they developed towards the current way of doing things (Polites & Karahanna, 2012).

In the case of information systems, resistance is frequently expressed as a "failure of a user to switch from an incumbent technology to a newly introduced one" (Polites & Karahanna, 2012). Given that, when adhering to a digital-only bank, a consumer is partly or even fully replacing their current incumbent bank, it would be expected that inertia is a source of resistance towards these services.

H1: Inertia has a positive effect on consumer resistance to digital-only banking

4.3. Active innovation resistance

Active innovation resistance refers to "a negative attitude formation driven by functional and psychological barriers that follows deliberate new product evaluation" (Heidenreich & Handrich, 2015, p. 881). Functional barriers arise if consumers' perceived functional attributes of an innovation differ from their optimal expectations (Heidenreich & Handrich, 2015), these attributes are related to product usage patterns, product value and risks linked to the product (Ram & Sheth, 1989). Psychological barriers "mostly arise through conflicts with consumers' prior beliefs" (Antioco & Kleijnen, 2010, p. 1701), namely their traditions and norms, perceived product image (Ram & Sheth, 1989), and trust in the product or service provider (Berraies et al., 2017).

4.3.1. Usage barrier

If the use of a new product or service is not compatible with the consumer's existing workflows, practices, or habits, it will take a long time for them to accept the innovation (Ram & Sheth, 1989). According to Ram and Sheth (1989), this is possibly the most common reason behind innovation resistance. The usage barrier is mostly related to an innovation's complexity and ease of use (Laukkanen et al., 2008), two analogous constructs (Teo & Pok, 2003). According to Rogers (1962), "complexity is the degree to which an innovation is perceived as difficult to understand and use" (p. 15). The Technology Acceptance Model (Davis, 1989) states that perceived ease of use positively correlates with user acceptance of information technology. Early

studies defend that perceived ease of use has a significant effect on consumer adoption of mobile banking (Lee et al., 2012) and internet banking services (Kuisma et al., 2007).

H2: Perceived complexity has a positive effect on consumer resistance to digital-only banking

4.3.2. Risk barrier

According to Sheth (1981), the perception of risks associated with the adoption of an innovation is one of the most useful psychological constructs to understand innovation resistance. Perceived risk is defined as the uncertainty and potential unexpected and undesired side effects associated with innovations, which postpone adoption behavior (Ram & Sheth, 1989). Early studies found privacy and security concerns, and the perceived risk of the internet as a banking channel are major barriers to the adoption of internet banking services (Kuisma et al., 2007). More recent research revealed that perceived risk significantly influences consumers' intention to use mobile banking (Chen C. , 2013).

A Federal Reserve survey determined that "concerns about the security of the technology were the primary reason given for not using mobile payments (42 percent) and the second most common reason given for not using mobile banking (48 percent)" (2012, p. 1). Perceived security risk is associated with the fear of losing control over personal and private information due to the intrusion of malicious entities or individuals or fraudulent behavior by organizations (Mani & Chouk, 2018). Digital-only banks might expose users to security risks such as hacking or divulgence of private information through insufficient security systems (Lee & Kim, 2020). Recent research found that even bank customers who believe digital services are convenient are concerned about how their private financial data can be used (Dimitrova et al., 2021).

In addition, digital-only banking services can be perceived as risky in terms of functionality (Lee & Kim, 2020) and accessibility (Dimitrova et al., 2021). Because these banks don't rely on physical infrastructures, consumers may be concerned about system failures or network problems that cause functional problems to their platforms (Lee & Kim, 2020). Such issues could be

associated with impediments to accessing their money, delayed payments or transfers (Dimitrova et al., 2021), or even monetary damage (Lee & Kim, 2020).

H3: Perceived risk has a positive effect on consumer resistance to digital-only banking

4.3.3. Trust barrier

Trust is defined as an individual's confidence in the intentions and capabilities of an entity and the belief that the entity would behave as desired (Deutsch, 1960). Regarding mobile banking, it can be described as a "client's psychological state that is manifested through a presumption, expectation or belief that the bank online will have a positive behavior" (Berraies et al., 2017, p. 1022). According to Mayer et al.'s (1995) perspective, this positive expectation influences the perceptions of the ability, benevolence, and integrity of an entity. Ability, or its corollary – competence -, relates to possessing the capabilities to fulfil promises communicated to the consumers and to perform as expected (Chen & Dhillon, 2003). Benevolence refers to the likelihood that the company prioritizes consumers' interests over its self-interest, signalling an honest concern for the welfare of its customers (Chen & Dhillon, 2003). Finally, integrity implies that the company will act "in a consistent, reliable, and honest manner when fulfilling its promises" (Chen & Dhillon, 2003, p. 305).

Trust is especially critical when it comes to online services since they offer limited or null personal interactions (Poromatikul et al., 2019). It reduces the uncertainty faced by the consumer (Rehncrona, 2018), potentially contributing to overcoming perceived risk (Windasari et al., 2022).

H4: Lack of trust has a positive effect on consumer resistance to digital-only banking

4.3.4. Tradition barrier

The tradition barrier arises “when an innovation requires a customer to deviate from established traditions” (Ram & Sheth, 1989, p. 9). If the innovation is incompatible with the customer’s existing values, social norms and past experiences it will be resisted (Ram & Sheth, 1989).

For instance, the need for human interaction may influence customers' views towards online banking (Laukkanen T. , 2016). For many services, human interaction is perceived as extremely important, therefore, the loss of social interaction through the dehumanization of these services may offset the benefits of a service innovation (Dabholkar, 1996). There is substantial literature highlighting the need for human interaction as an essential dimension of the service experience (Mani & Chouk, 2018).

According to Marr and Prendergast (1993), in the case of retail banking, the desire for personal contact with a human teller can cause resistance towards self-service technologies. Due to the financial nature of transactions, there is a greater consumer concern over risk when it comes to the banking sector, consequently, consumers experience a predominant need to be in contact with bank staff to solve potential problems as quickly as possible (Mani & Chouk, 2018).

H5: The need for human interaction has a positive effect on consumer resistance to digital-only banking

4.3.5. Demographic variables that drive innovation resistance

Demographic variables are important factors to understand consumers’ attitudes towards innovations (Mani & Chouk, 2018). Concerning electronic services, the most frequently studied demographic variables are age and gender (Laukkanen T. , 2016).

There is considerable literature relating age to consumers' decisions to adopt or reject service innovations (Laukkanen T. , 2016). Early research found that the older the consumer, the more negative their view towards technology, and, therefore, the lower the propensity for adopting new

technology (Gilly & Zeithaml, 1985). A more recent study shows that mature consumers resist mobile banking services more than younger consumers, as they demonstrate significantly higher levels of risk, tradition and image barriers towards the use of these services (Laukkanen T. et al., 2007).

H6: Age has a positive effect on consumer resistance to digital-only banking

Previous findings suggest that "there is a difference between men and women in their perception of technology-based services" (Mani & Chouk, 2018, p. 795). An earlier study found that women perceive online purchases as riskier than men, namely "compared to men, women perceive more severe consequences to loss of privacy" (Garbarino & Strahilevitz, 2004, p. 773). Furthermore, results from Laukkanen's (2016) study, conducted in Finland, show that men are nearly twice as likely as women to adopt mobile banking.

H7: Women are more inclined to resist digital-only banking than men

5. Qualitative study

5.1. Methodology

To evaluate the hypotheses developed through the literature research and, potentially, identify new hypotheses that may emerge, it is imperative to conduct a qualitative study. This study consists of qualitative interviews entailing in-depth, open-ended conversations with relevant consumers, used to explore participants' experiences with traditional and digital-only banks and their perspective on digital-only banking. This will enable a deeper understanding of the drivers of resistance to digital-only banking by Portuguese mobile banking adopters and may reveal further insights than the ones obtained during the literature review. Here, resistance refers to the reluctance of individuals to adopt digital-only banking services or, in the case of adoption, to make their digital-only bank accounts their primary accounts.

Eight participants were selected for the interviews based on their adoption of mobile banking, their Portuguese nationality, and their willingness to participate. The interviews were conducted through video calls and were structured in two sets of open-ended questions (see Appendix A). The first set of questions was designed to explore participants' experiences with the banking sector, including the banks they use and the factors that influenced their choice. The second set of questions focused on participants' opinions and experiences with digital-only banks.

The collected data was analyzed with the five resistance constructs identified during the literature review - inertia, perceived complexity, perceived risk, trust, and need for human interaction – in mind. Upon re-examination of the summarized interviews, it was determined that most of the responses could be matched with these constructs.

5.2. Findings

All interview participants were Portuguese mobile banking users with higher education and different professional backgrounds, ranging in age from 25 to 63 years. Out of the eight

participants, five were female and three were male. Furthermore, six resided in Portugal, one in The Netherlands and another in Spain. All of them were aware of the existence of digital-only banks, but only six used such services. Among the digital-only banking adopters, all used Revolut, but none of them used it as their primary bank. All eight participants held their primary bank accounts in large incumbent national banks.

Regarding their choice of primary bank, most participants were influenced by third parties, such as their parents who opened an account in that bank when they were younger, their university's partnership with a particular bank that offered discounts, or their employer's guidelines. The latter option was only mentioned once, by a participant who worked for a Portuguese bank. Six interviewees reported still using their first bank account, opened by their parents, as their primary account. The ones who changed were motivated by one of the other external parties, such as their university or employer. When questioned about the reasons for maintaining these primary accounts, several participants responded with "it is the bank I have always had". These results appear to be consistent with the inertia construct (H1).

When asked about what they appreciated about their primary banks, several participants cited factors such as efficient customer service, easy access to on-site customer services, a well-functioning mobile application, an easy-to-use website, low fees, and reliability.

The two interviewees who reported not using digital-only banking services mentioned the inexistence of physical branches (H5), lack of confidence (H4) and confusing application and card set-up process (H2) as barriers to the adoption of these services. These participants also reported being satisfied with the bank they have always used and therefore not seeking out other services (H1).

The digital-only banking adopters reported using their Revolut accounts mainly for fast and cheap currency exchanges while travelling. Some also mentioned using it for international transfers and online purchases. When asked about the reasons for not using their Revolut account as their primary account, the lack of physical branches was the most cited barrier (H5), followed by reduced trust compared to incumbent banks that are regulated and perceived as providing

more guarantees (H4). One interviewee stated that there was no specific reason for not using his Revolut account as his primary account, but he had never done so because it would require closing his current primary account and transferring all his bills and paychecks to a new account, a time-consuming process (H1). Another mentioned feeling insecure about Revolut's digital-only presence, fearing power failures, network breakdowns, and digital hacking (H3).

Two additional barriers were mentioned by digital-only banking adopters. One participant mentioned that Revolut's inability to accept cash or check deposits was limiting and another noted that the foreign IBAN associated with her Revolut account could potentially incur additional fees for Portuguese bank clients transferring her money and be perceived as less trustworthy compared to a Portuguese IBAN. No further hypotheses were formulated based on these barriers, as they were only mentioned once.

In conclusion, this qualitative study supported all hypotheses related to the identified resistance constructs. However, due to the small sample size, it is not possible to determine whether these hypotheses are rejected or not. To address this, a quantitative study was conducted.

6. Quantitative study

6.1. Methodology and Data

This study was based on a survey conducted with Portuguese citizens (see Appendix B) and it aims to empirically test the drivers of mobile banking adopters' resistance to digital-only banking within this region. Here, resistance refers to the reluctance of individuals to adopt digital-only banking services and mobile banking adopters are defined as individuals who use their phones to make payments, transfer money and/or check their bank account balance. This study analyses the five identified resistance constructs - inertia, perceived complexity, perceived risk, trust, and need for human interaction – and two demographic variables - age and gender. As shown in Table 1, the measurement items for the five resistance constructs are adapted from previous literature and apply the five-point Likert scale introduced by Rensis Likert (1931) as a reliable scale to measure

consumers' attitudes and preferences. For the data analysis, the Likert scale items were converted to numeric values from 1 to 5, where 1 always represents the lowest level of resistance and 5 the highest (see Table 1).

Table 1: Model constructs and measures

Resistance construct	**Measurement item**	**Source**	**Likert scale**
Perceived complexity	Q8.1. Learning to use digital-only banking services would be easy for me	Adapted from Davis et al. (1989)	Strongly disagree (5) - Strongly agree (1)
	Q8.2. Digital-only banking services are very simple and convenient	Adapted from Laukkanen T. (2016)	Strongly disagree (5) - Strongly agree (1)
	Q8.3. Digital-only banking services are very easy to use	Adapted from Davis (1989)	Strongly disagree (5) - Strongly agree (1)
Perceived risk	Q9.1. The risk of my bank account being hacked is high when using digital-only banking services	Adapted from Dimitrova et al. (2021)	Strongly disagree (1) - Strongly agree (5)
	Q9.2. The risk of third parties (other entities or individuals) having access to my account information is high when using digital-only banking services	Adapted from Mani and Chouk (2018)	Strongly disagree (1) - Strongly agree (5)
	Q10. What would be the likelihood of losing access to a digital-only bank's platform, or of it not working properly?	Adapted from Heidenreich and Kraemer (2016)	Extremely unlikely (1) - Extremely likely (5)
Trust	Q11.1. I believe digital-only banks will reimburse its users for monetary losses due to security reasons	Adapted from Poon (2008)	Strongly disagree (5) - Strongly agree (1)
	Q11.2. I believe digital-only banks will protect the privacy of their users' data	Adapted from Poon (2008)	Strongly disagree (5) - Strongly agree (1)
	Q11.3. Digital-only banks are not as reliable as traditional banks	Adapted from Prakash and Das (2022)	Strongly disagree (1) - Strongly agree (5)
Need for human interaction	Q12.1. I prefer to have access to in-person customer service when it comes to bank-related issues	Adapted from Mani and Chouk (2018)	Strongly disagree (1) - Strongly agree (5)
	Q12.2. I find it difficult to get my bank-related issues resolved remotely	Adapted from Kaur et al. (2020)	Strongly disagree (1) - Strongly agree (5)
	Q13. When you have a bank-related issue, how often do you go to your bank's physical branches?		Never (1) - Always (5)

Inertia	Q14.1. I will continue using my existing bank account in a traditional bank because it would be stressful to change	Adapted from Polites and Karahanna (2012)	Strongly disagree (1) - Strongly agree (5)
	Q14.2. I will continue using my existing bank account in a traditional bank because it is the one I have always had	Adapted from Polites and Karahanna (2012)	Strongly disagree (1) - Strongly agree (5)
	Q14.3. I will continue using my existing bank account in a traditional bank even though digital-only banks offer more advantages	Adapted from Polites and Karahanna (2012)	Strongly disagree (1) - Strongly agree (5)

The survey was spread through several social media platforms and generated 388 responses, of which 65 were found incomplete, resulting in 323 usable responses. Out of this subset, 40 responses were from non-Portuguese citizens and 66 from mobile banking non-users. These were disregarded due to the scope of this study, resulting in a final sample of 219 responses. This sample is divided into 83 (38%) digital-only banking users (i.e., *adopters*) and 136 (62%) digital-only banking non-users (i.e., *non-adopters*). The adopters' group can be further divided into 8 (4%) individuals who have their primary account in a digital-only bank (i.e., *fully adopters*), and 75 (34%) individuals who own an account in a digital-only bank but have their primary account in a traditional bank (i.e., *adopters-resisters*). Within the non-adopters, there are 94 (43%) *informed non-adopters*, i.e., non-users who are aware of the existence of digital-only banks, and 42 (19%) *uninformed non-adopters*, who have never heard of digital-only banks. When answering the survey, the latter group was presented with the following digital-only banking definition:

> Unlike traditional banks, digital-only banks don’t have any brick-and-mortar branches, they rely only on mobile apps and internet websites (Lee & Kim, 2020). Usually, these banks are fintech (financial technology) startups providing services in partnerships with a licensed bank or having their own banking licenses (PwC, 2021).

The respondents’ age ranges from 17 to 74 years, and the average age of the final sample (219 respondents) is 48 years. The adopters were predominantly men (54%) and skewed towards younger age, with 54% in the 17-35 years age group. On the other hand, among non-adopters, the

majority were women (66%) and the most predominant age group was 56-74 years (61%). Table 2 illustrates further demographic information on the respondents.

Table 2: Sample distribution

Sample	**Variable**	**Frequency**
Full sample (n = 219)	Age	
	17–35 years	62 (28%)
	36–55 years	52 (24%)
	56–74 years	105 (48%)
	Gender	
	Male	91 (42%)
	Female	128 (58%)
	Consumer profile	
	Adopter	83 (38%)
	Non-adopter	136 (62%)
Adopters (n = 83)	Age	
	17–35 years	45 (54%)
	36–55 years	16 (19%)
	56–74 years	22 (27%)
	Gender	
	Male	45 (54%)
	Female	38 (46%)
	Consumer profile	
	Adopters-resister	75 (90%)
	Fully adopter	8 (10%)
Non-adopters (n = 136)	Age	
	17–35 years	17 (13%)
	36–55 years	36 (26%)
	56–74 years	83 (61%)
	Gender	
	Male	46 (34%)
	Female	90 (66%)
	Consumer profile	
	Informed non-adopter	94 (69%)
	Uninformed non-adopter	42 (31%)

Adopters-resisters (n = 75)	Age	
	17–35 years	41 (55%)
	36–55 years	13 (17%)
	56–74 years	21 (28%)
	Gender	
	Male	40 (53%)
	Female	35 (47%)
Fully adopters (n = 8)	Age	
	17–35 years	4 (50%)
	36–55 years	3 (38%)
	56–74 years	1 (13%)
	Gender	
	Male	5 (63%)
	Female	3 (38%)
Informed non-adopters (n = 94)	Age	
	17–35 years	16 (17%)
	36–55 years	25 (27%)
	56–74 years	53 (56%)
	Gender	
	Male	36 (38%)
	Female	58 (62%)
Uninformed non-adopters (n = 42)	Age	
	17–35 years	1 (2%)
	36–55 years	11 (26%)
	56–74 years	30 (71%)
	Gender	
	Male	10 (24%)
	Female	32 (76%)

The data analysis for this study was conducted using R Markdown, an open-source programming language for statistical computing, which allowed me to conduct statistical tests and build regression models.

As previously shown in Table 1, each resistance construct is measured by 3 different items. The objective of this study is to analyze the effects of these constructs on consumer resistance, thus,

for simplicity purposes, if appropriate, a new composite score made of the sum of the respective items was created for each resistance construct. Before creating a single variable for each construct, it is important to consider their inter-item reliability by computing Cronbach's coefficient alpha (1951), a widely used measure of internal consistency of Likert attitude and rating scales (Ponterotto & Ruckdeschel, 2007). A low coefficient alpha suggests that the scale has poor internal consistency, i.e., the 3 items are not closely related to each other (Ponterotto & Ruckdeschel, 2007), and, therefore, it is not appropriate to sum the items' responses to create a composite score. According to Ponterotto and Ruckdeschel (2007), for a test using a sample size between 100 and 300 and less than 7 items per scale, a coefficient alpha above 0.65 is satisfactory. As displayed in Table 3, only the items measuring inertia obtained a coefficient alpha (0.54) below the mentioned threshold. Therefore, for this construct, it is more appropriate to use the responses to the individual items as independent variables.

Table 3: Cronbach's coefficient alpha

Resistance construct	**Variables**	**Cronbach's coefficient alpha**
Perceived complexity	Q8_1, Q8_2, Q8_3	0.80
Perceived risk	Q9_1, Q9_2, Q10	0.87
Trust	Q11_1, Q11_2, Q11_3	0.69
Need for human interaction	Q12_1, Q12_2, Q13	0.75
Inertia	Q14_1, Q14_2, Q14_3	0.54

However, Cronbach's coefficient alpha only provides information on how strongly the items are intercorrelated, it is not a measure of homogeneity or unidimensionality (Ponterotto & Ruckdeschel, 2007), which refers to the extent to which scale items measure a single, distinct construct (Clark & Watson, 1995). Internal consistency, measured by coefficient alpha, "is a necessary but not sufficient condition for unidimensionality" (Ponterotto & Ruckdeschel, 2007, p. 1007). According to Thompson (2004), an exploratory factor analysis (EFA) can identify which sets of observed variables are measuring the same underlying construct. The results of an EFA can be evaluated through a variety of measures, one being the factor loadings, which represent the strength and direction of the relationship between the observed variables and the construct (Thompson, 2004). A pattern of strong factor loadings suggests that the variables are

measuring a single, homogeneous construct (Thompson, 2004), and some researchers consider factor loadings above 0.5 to be strong (Kline, 2015). As shown in Table 4, among the constructs that demonstrate inter-item reliability, only those items related to the trust construct do not meet the criteria for homogeneity. To generate a composite score for each resistance construct, responses from respective variables with factor loadings above 0.5 were aggregated.

Table 4: Results from exploratory factor analysis

Resistance construct	**Variable**	**Factor loading**	**New variable**
Perceived complexity	Q8_1	0.586	complexity_sum
	Q8_2	0.933	
	Q8_3	0.787	
Perceived risk	Q9_1	0.910	risk_sum
	Q9_2	0.949	
	Q10	0.646	
Trust	Q11_1	0.652	trust_sum
	Q11_2	0.907	
	Q11_3	0.435	
Need for human interaction	Q12_1	0.812	human_sum
	Q12_2	0.678	
	Q13	0.638	

After treating the data, some initial statistical tests were conducted to analyze the relationship between the independent variables and the different consumer groups, namely between adopters and non-adopters. The independent variables include the ordinal variables complexity_sum, risk_sum, trust_sum, Q11_3, human_sum, Q14_1, Q14_2, Q14_3, coded as continuous variables, the continuous variable of age, as well as the categorical variable of gender. Several Welch Two Sample t-tests were performed to compare the means between groups and determine if there were significant differences. In addition, Pearson's Chi-squared tests were conducted to assess whether there was a significant relationship between the categorical variable of gender and the

dichotomous dependent variable “Resistance”, which takes the value of zero for adopters and one for non-adopters. These analyses were performed at the 5% significance level.

Furthermore, this study tests the seven identified hypotheses through logistic regression models. The decision to use logistic regression models was based on the binary nature of the dependent variable, i.e., variable that only take the value of zero or one. In such cases, a logit or probit model is a more appropriate method than a linear probability model, as it avoids certain limitations of the latter approach (Wooldridge, 2020). According to Wooldrige (2020), these limitations include the possibility of fitted probabilities falling outside the range of zero to one, as well as the assumption of a constant partial effect of any independent variable. In particular, for the present study, the logit model was utilized, employing a logistic function to model the probability of the dependent variable taking on a value of one, i.e., the consumer being a non-adopter, given the values of the independent variables (Wooldridge, 2020).

The statistical tests and logistic regressions that include the variables Q14_1, Q14_2, and/or Q14_3 do not consider the responses of the entire sample (n = 219) as those respondents who have their primary account with a digital-only bank (i.e., fully adopters) (n = 8) did not answer these questions, since they relate to the continued use of a traditional bank as the primary account holder.

6.2. Findings

Through a preliminary analysis (see Table 5), it can be concluded that at a significance level of 5%, the observed differences between the means of the group of adopters and the group of non-adopters are not statistically significant for the variables related to the need for human interaction (human_sum) and inertia (Q14_1, Q14_2, Q14_3). One the other hand, for the remaining variables, the Welch Two Sample t-tests yielded a p-value lower than 0.05. Specifically, the means in the non-adopters’ group are significantly higher than the means in the adopters’ group for the variables related to the perceived complexity (complexity_sum), perceived risk (risk_sum), and trust (trust_sum, Q11_2) constructs, which may suggest a positive effect of these

constructs on consumer resistance. Moreover, the mean age of individuals in the non-adopters' group is significantly higher than the mean age of individuals in the adopters group.

Table 5: Welch Two Sample t-test results

Variable	**Mean in adopters' group**	**Mean in non-adopters' group**	**p-value**
complexity_sum	4.59	7.24	< 2.2e-16
risk_sum	8.40	10.69	1.309e-07
trust_sum	7.10	9.06	1.565e-07
Q11_3	2.59	3.24	0.0001153
human_sum	7.96	8.68	0.08912
Q14_1	3.21	3.36	0.3983
Q14_2	3.49	3.39	0.5196
Q14_3	3.22	2.97	0.1126
Age	39.81	53.63	8.218e-10

For the variable of gender, a different test was used due to the categorical nature of this variable. As depicted in Table 6, the Pearson's Chi-squared test yielded a p-value higher than 0.05. Therefore, it can be concluded that, regarding gender, the observed differences between the two groups are likely due to random chance, rather than a significant relationship between the variables.

Table 6: Pearson's Chi-squared test results

Variable	**X^2**	**p-value**
Gender	3.6742	0.7207

To identify the model that best predicts consumer resistance to digital-only banking while minimizing the number of predictors included, I began by running a logistic regression model that included all independent variables (1). Then, I removed variables whose p-values were higher than 0.1 and that did not show statistical differences between the two groups in the first two statistical tests (2). Finally, the final model (3) only includes variables from model 2 whose p-values are below 0.1, ensuring that no statistically non-significant items are included (see Table 7).

Table 7: Logistic regression results

Dependent variable	Model	Independent variables	β (beta)	Standard Error	Significance level
Digital-only banking non-adopter [1] vs. adopter [0]	1	complexity_sum	0.654	0.127	p<0.01
		risk_sum	0.162	0.085	p<0.1
		trust_sum	0.109	0.115	p>0.1
		Q11_3	0.151	0.247	p>0.1
		human_sum	-0.065	0.082	p>0.1
		Q14_1	-0.307	0.188	p>0.1
		Q14_2	0.129	0.201	p>0.1
		Q14_3	-0.453	0.209	p<0.05
		Age	0.053	0.013	p<0.01
		GenderMale	-0.585	0.404	p>0.1
		Constant	-5.866	1.371	p<0.01
	2	complexity_sum	0.578	0.111	p<0.01
		risk_sum	0.172	0.080	p<0.05
		trust_sum	0.134	0.112	p>0.1
		Q11_3	-0.014	0.231	p>0.1
		Q14_3	-0.530	0.187	p<0.01
		Age	0.055	0.013	p<0.01
		Constant	-6.445	1.219	p<0.01
	3	complexity_sum	0.602	0.110	p<0.01
		risk_sum	0.221	0.071	p<0.01
		Q14_3	-0.498	0.183	p<0.01
		Age	0.054	0.013	p<0.01
		Constant	-6.068	1.156	p<0.01

To test the performance of the final model (3) three different measures were assessed: the area under the curve (AUC), Pearson's Chi-squared test, and the variance inflation factor (VIF). The AUC measures the model's ability to discriminate between positive and negative outcomes (Hosmer et al., 2013). According to Hosmer et al. (2013), an AUC of 0.7 or higher is considered to be an indicator of the model's good performance. The Chi-squared test measures the goodness of fit of the model by comparing the observed data with the expected data, based on the model's predictions (Hosmer et al., 2013). A p-value greater than the predetermined significance level, in this case, 5%, indicates that the model fits the data well (Hosmer et al., 2013). The VIF assesses

multicollinearity in multiple regression models by measuring the degree to which the variance of an estimated regression coefficient is inflated due to multicollinearity among the independent variables (Hair et al., 2010). A VIF value of 1 indicates that there is no multicollinearity, according to Hair et al. (2010), any value equal to or lower than 5 is acceptable.

As demonstrated in Table 8, model 3 satisfies all the criteria to be considered a good-performing model. Therefore, this model will be used to predict the effects of significantly relevant constructs on consumer resistance to digital-only banking.

Table 8: Model 3 performance assessment

Model	Independent variables	VIF	AUC	Chi-squared test (p-value)
3	complexity_sum	1.0613	0.8831	0.4321
	risk_sum	1.0243		
	Q14_3	1.0883		
	Age	1.0424		

According to the results of the computed regression models, there is no statistical evidence to support hypotheses H1, H4, H5, and H7 when comparing digital-only banking adopters with non-adopters (see Table 9). None of the predictor variables related to lack of trust (H4), need for human interaction (H5) and gender (H7) were found to have a statistically significant effect on consumer resistance to digital-only banking. Moreover, for H1, one of its predictor variables (Q14_3) displays a statistically significant negative effect on consumer resistance, which is contrary to the hypothesized positive effect of inertia on consumer resistance to digital-only banking.

The negative effect on consumer resistance by the predictor variable Q14_3, computed from the answers to the question “Do you agree or disagree with the following statement: I will continue using my existing bank account in a traditional bank even though digital-only banks offer more advantages” (see Appendix B) is understandable given that higher answers indicate the respondent perceives digital-only banks as more advantageous compared to traditional banks. In fact, 43% of the adopters-resisters agreed with this statement, compared to 28% in the case of non-adopters. These results suggest that adopters-resisters are more likely to view digital-only

banks as more beneficial than non-adopters, but they still choose to maintain their primary account with traditional banks.

Table 9: Hypothesis testing

Hypothesis	**Predictor variables**	**Lowest p-value obtained in the logistic regressions (respective β)**	**Logistic regression model**	**Conclusion**
H1: Inertia has a positive effect on consumer resistance to digital-only banking	Q14_1	p>0.1 (-0.307)	1	rejected
	Q14_2	p>0.1 (0.129)	1	
	Q14_3	p<0.01 (-0.498)	3	
H2: Perceived complexity has a positive effect on consumer resistance to digital-only banking	complexity_sum	p<0.01 (0.602)	3	accepted
H3: Perceived risk has a positive effect on consumer resistance to digital-only banking	risk_sum	p<0.01 (0.221)	3	accepted
H4: Lack of trust has a positive effect on consumer resistance to digital-only banking	trust_sum	p>0.1 (0.109)	1	rejected
	Q11_3	p>0.1 (0.151)	1	
H5: The need for human interaction has a positive effect on consumer resistance to digital-only banking	human_sum	p>0.1 (-0.065)	1	rejected
H6: Age has a positive effect on consumer resistance to digital-only banking	Age	p<0.01 (0.054)	3	accepted
H7: Women are more inclined to resist digital-only banking than men	Gender	p>0.1 (-0.585)	1	rejected

As shown in Table 9, the logistic regression results support hypotheses H2, H3, and H6. To understand the marginal effects of these statistically significant predictor variables on the dependent variable “Resistance”, the average partial effects (APE) for model 3 were computed. The APE values measure the average change in the probability of the consumer not using digital-only banking services associated with a one-unit change in the predictor variable, holding all other predictor variables constant (Wooldridge, 2020). Table 10 summarizes the APE results of these predictor variables and their interpretations.

Table 10: Average partial effects

Predictor variables	APE value	p-value	Interpretation (holding all other variables constant)
complexity_sum	0.078	0.0001238	1 unit increase in perceived complexity is associated with a 7.8% increase in the probability of the consumer not using digital-only banking services
risk_sum	0.029	0.0073398	1 unit increase in perceived risk is associated with a 2.9% increase in the probability of the consumer not using digital-only banking services
Age	0.007	0.0008175	1 unit increase in age is associated with a 0.7% increase in the probability of the consumer not using digital-only banking services

The APE results provide additional evidence for the statistically significant positive effects of perceived complexity, perceived risk and age on consumer resistance to digital-only banking. Since the variables complexity_sum and risk_sum are measured on the same scale (1 to 15), their APE results can be directly compared. These results indicate that, among the six resistance constructs discussed in this study, perceived complexity has the strongest positive effect on consumer resistance to digital-only banking.

7. Conclusions

7.1. Managerial Conclusions

In conclusion, the results of this dissertation demonstrate that the non-adoption of digital-only banking among Portuguese mobile banking users is influenced by a variety of factors. The most significant driver of resistance among these individuals is perceived complexity, followed by perceived risk. Moreover, it was proved that older individuals are more likely to resist digital-only banking. These findings have important implications for neobanks seeking to increase their market share, as they should address consumer concerns regarding complexity and risk and put in action strategies that attract more consumer segments. Traditional banks may also leverage these insights to inform their strategies in order to maintain their position in the face of increasing competition.

Even though non-adopters who participated in the study are familiar with using their phones for banking activities, such as making payments, transferring money, and checking their bank account balance, they tend to perceive neobanking services as more complex and riskier compared to adopters. To reduce the perceived complexity of neobanking services, neobanks should focus on providing simple and straightforward information about their services and how they work. This can include step-by-step guides or video tutorials and easily accessible FAQ sections that help potential users understand and navigate their features. To alleviate concerns about using a potentially complex service, neobanks should highlight on their website and marketing campaigns their efficient and always available customer support, reassuring potential customers that any issues or questions they may have can be quickly resolved. Leveraging the power of word-of-mouth marketing by encouraging satisfied customers to share their experiences with their friends and family can also be an effective strategy. A more costly strategy could entail offering different user interface (UI) options depending on the user's level of tech savviness. Neobanks could provide a more intuitive and user-friendly experience for those less familiar with technology, while still offering more advanced features for those who are more tech-savvy. Ultimately, it is important for neobanks to create a user experience that is as seamless and intuitive as possible, and continuously iterate their services based on customer feedback.

One strategy to mitigate the effects of perceived risk among potential neobank customers is to increase transparency about the bank's operations by providing detailed information about how it handles security and privacy, protects customer funds, and resolves disputes. Neobanks should emphasize their commitment to security, by stating early on that the bank guarantees users' funds in the event of a security breach or unauthorized transactions. Another approach is to establish trust by highlighting a strong track record of security, customer satisfaction, and reliability through customer reviews and partnerships with reputable brands. Finally, neobanks can provide educational resources to help customers understand how to use their services in the safest and most secure way, including information about best practices for online banking and personal data protection.

Another notable finding from this study was that a significant number of respondents reported having no prior knowledge of digital-only banks, mainly individuals over the age of 56. In order to increase awareness among this demographic, neobanks may consider using both traditional and digital marketing channels. Traditional marketing channels include print and television advertising, while digital marketing channels consist of email marketing and social media platforms such as Facebook, YouTube, and LinkedIn. Additionally, building a robust referral network and partnering with organizations that serve older consumers may constitute effective promotion strategies.

Finally, despite assessing a small sample size, the qualitative analysis provided further insights into the factors influencing the choice of bank provider, including the role of external parties such as parents and universities. These findings suggest that individuals, including digital-only banking adopters, tend to remain with the bank they have always used, which they joined mostly due to either one of the mentioned external parties. Neobanks should consider targeting these influential parties by, for example, focusing their advertising efforts on parents seeking to open savings accounts for their children, as well as partnering with universities and other educational institutions. These strategies may provide opportunities to reach a wider audience of young consumers who, as validated, tend to be more receptive to digital-only banking services than older individuals.

7.2. Limitations and Future Research

One of the main limitations of this study is the fact that the analysis conducted to validate the formulated hypotheses was limited to data on adopters-resisters and non-adopters, as fully adopters did not have data available on the inertia construct. Additionally, due to the statistically insignificant sample size (n=8), it was not possible to evaluate the differences between the fully adopters' group and other groups. Given that adopters-resisters still exhibit some level of resistance to digital-only banking, it would be worthwhile for future research to explore the differences between adopters-resisters and fully adopters in order to investigate the factors that may be inhibiting adopters from using their neobank account for most of their bank transactions.

Moreover, with a sample size of only 219 participants (211 for the logistic regression models), this study may have limited power to detect statistically significant differences between groups. Therefore, it would be valuable for future research to replicate this study using a larger sample size in order to enhance the reliability of the findings.

It is worth noting that 31% of the non-adopters' sample consisted of individuals who had no prior knowledge of digital-only banks and based their responses on the definition provided in the survey. These responses were included in the analysis, as they are representative of an existing consumer segment and their exclusion would have resulted in a reduced sample size of 169. However, it is possible that the responses of uninformed non-adopters may not provide as much insight into the attitudes of non-adopters due to their lack of knowledge of neobanking services. Researchers could consider conducting further analyses between adopters and informed non-adopters using a larger sample size for each group.

Finally, this study only intends to validate the seven formulated hypotheses, however, additional resistance drivers have been identified in the innovation diffusion literature. Further investigation of these drivers within the context of digital-only banking would be quite valuable for the banking sector.

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9. Appendix

A. Online Interview

Current and past banking situation

1. Which bank do you use most?
2. Why did you choose that bank?
3. What do you like about that bank?
4. Have you ever used another bank?
    4.1. (if "yes") Which one? Why?
    4.2. (if "no") Why have you never looked for other services?

Experience with and perception of neobanks

5. Have you ever heard of neobanks?
    5.1. (if "yes") Have you ever used this type of bank? What do you use it for? (if the answer was "no" the interview would terminate here)
        5.1.1. (if "yes") Why don't you use your neobank account as your main account, replacing your current bank? Is there anything you dislike about neobanks?
        5.1.2. (if "no") Why not? What don't you like about neobanks?

B. Online Survey

Introduction

Select the language of the survey on the top right

Hello, I'm a master's student researching the barriers to adopting digital-only banking. Your help is essential, as the results of this questionnaire will allow me to validate the hypotheses of my thesis.
The survey should only take 5 minutes, and your responses are completely anonymous.
Thank you for contributing to this study!

Demographics

Q2.1. What is your year of birth?

Q2.2. Please select your gender:

- Male
- Female
- Other
- Prefer not to say

Q2.3. Please select your country of nationality: (dropdown question with 193 options)

Filtering question

Q3. I use my phone to:

Please select all the options that apply

- Make payments
- Transfer money
- Check my bank account balance
- None of the above

(The participants who answered “None of the above” were not considered for the quantitative study)

Knowledge of the concept

Q4. Have you ever heard of digital-only banks like Revolut, N26 or Chime?

- Yes
- No

Concept explanation

Q5. Unlike traditional banks, digital-only banks don't have any brick-and-mortar branches, they only rely on mobile apps and internet websites. Usually, these banks are fintech (financial technology) startups providing banking services in partnership with a licensed bank or having their own banking licenses.

(This question was only shown if the answer to question Q4.1. was “no”)

Digital-only banking use

Q6. Select the option that applies to your current situation:

- I don’t have an account in a digital-only bank
- I have an account in a digital-only bank, but my main account is in a traditional bank
- My main account is in a digital-only bank

Perceived complexity

Q8. Do you agree or disagree with the following statements?

Q8.1. Learning to use digital-only banking services would be easy for me.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Q8.2. Digital-only banking services are very simple and convenient.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree

- Somewhat agree
- Strongly agree

Q8.3. Digital-only banking services are very easy to use.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Perceived risk

Q9. Do you agree or disagree with the following statements?

Q9.1. The risk of my bank account being hacked is high when using digital-only banking services.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Q9.2. The risk of third parties (other entities or individuals) having access to my account information is high when using digital-only banking services.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Q10. What would be the likelihood of losing access to a digital-only bank's platform, or of it not working properly?

- Extremely unlikely
- Somewhat unlikely
- Neither likely nor unlikely
- Somewhat likely
- Extremely likely

Trust

Q11. Do you agree or disagree with the following statements?

Q11.1. I believe digital-only banks will reimburse its users for monetary losses due to security reasons.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Q11.2. I believe digital-only banks will protect the privacy of their users' data.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Q11.3. Digital-only banks are not as reliable as traditional banks.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree

- Somewhat agree
- Strongly agree

Need for human interaction

Q12. Do you agree or disagree with the following statements?

Q12.1. I prefer to have access to in-person customer service when it comes to bank-related issues.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Q12.2. I find it difficult to get my bank-related issues resolved remotely.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Q13. When you have a bank-related issue, how often do you go to your bank's physical branches?

- Never
- Sometimes
- About half the time
- Most of the time
- Always

Inertia

Q14. Do you agree or disagree with the following statements?

Q14.1. I will continue using my existing bank account in a traditional bank because it would be stressful to change.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Q14.2. I will continue using my existing bank account in a traditional bank because it is the one I have always had.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

Q14.3. I will continue using my existing bank account in a traditional bank even though digital-only banks offer more advantages.

- Strongly disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Strongly agree

(This section Q14 was not shown to individuals who answered “My main account is in a digital-only bank” in Q6)