UNIVERSITY OF LJUBLJANA
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MASTER'S THESIS

THE INFLUENCE OF OPEN APPLICATION PROGRAMMING INTERFACES ON COMMERCIAL BANKING

Ljubljana, September 2019 UROŠ ŠEPEC

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

AISP – Account information service provider
AML – Anti-money laundering
API – Application programming interface
ATM – Automatic teller machine
BBVA – Banco Bilbao Vizcaya Argentaria
B2B – Business to business
B2C – Business to customer
CEE – Central European
CMA – Competition and markets authority
C2C – Customer to customer
EBIC – Electronic banking internet communication
EEA – European economic area
ERP – Enterprise resource planning
EU – European Union
FINTECH COMPANIES – Fintechs
GDP – Gross domestic product
HKMA – Hong Kong monetary authority
HTTP – Hypertext transfer protocol
HTTPS - Hypertext transfer protocol secure
IT – Information technology
JSON – Javascript object notation
KYC – Know your customer
MAS – Monetary Authority of Singapore
NFC – Near field communication
NPCI – National payment council of Indian Government
PFM – Personal finance management
PISP – Payment initiation service provider
POS – Point of sales
PSD1 – Payment service directive 1
PSD2 – Payment service directive 2
P2P – Peer to peer

QR – Quick response
REST – Representational state transfer
RTS – Regulatory technical standards
SME – Small and medium enterprise
SOAP – Simple object access protocol
SWIFT – Society for worldwide interbank financial telecommunication
TPP – Third-party provider
UK – United Kingdom
US – United States
WE – Western European
XML – Extensible markup language

INTRODUCTION

People consider commercial banks as the center of the financial intermediation universe. They are the center due to their role in administering the community's payments and also because commercial banks are used to transmit monetary policy impulses. The primary assignment of commercial banks is to be a distributor of currency (paper money and coin) and to be a producer and servicer of demand deposits (Greenbaum, Thakor & Boot, 2016).

Bank customers have been generally slow to changes in financial service providers. Such speed to changes is particularly true in developed markets, where customers have chosen the established brands, which were seen stable in times of turbulence. Banks are systematically crucial to the economy and are therefore highly regulated institutions. They primarily hold a monopoly on credit issuance and risk-taking and are a significant repository for deposits. Customers identify deposits as one of their primary financial relationships. Banks continue to be in charge of the world's most extensive payment system (McKinsey & Company, 2015a). However, things have changed recently. Since the financial crisis in 2008, people are having less trust in the banking system. Furthermore, the increasing number of mobile devices has started to decrease the importance of physical distribution. Smartphones enable new and fully personalized user experience.

Rising customer expectations increased interest in internet-only banks and fintechs. However, traditional banks still have most of the customers, but their importance is beginning to erode due to the emergence of credible alternatives (Ernst & Young, 2017b).

The financial services industry's interest in open application programming interface (hereinafter: API) and open banking is gaining momentum and could change the way how banks deliver their products. In general, APIs and digitalization allow the creation of value to be distributed through an ecosystem of partners. Creating value with partners will likely present a significant change and challenge for banks soon. Banks may benefit from open APIs and open banking because they are expected to bring enhanced innovation, customer centricity and industrial partnerships with the broader ecosystem of fintech market participants (European banking association, 2016).

The goal of this master thesis is to figure out how does the emergence of alternative banking solutions and accommodative regulation affect the banking industry.

This thesis will be divided into two major parts. Following the introduction, we will get to know what fintechs are, what open APIs are and how technology is changing the banking environment similarly as it changed other industries. Furthermore, we will get to know regulative initiatives and how are they changing the business models of banks. We will get to know how are European banks prepared for payment service directive 2 (hereinafter: PSD2), which will enable bank customers to use a third-party provider (hereinafter: TPP) to manage their finance and what are the possible strategies for banks to tackle PSD2 challenges. The first part will be

concluded with representation, how will banks interact with customers and what will be the function of a physical branch in the future.

In the second part of this thesis, we will get to know the customers of financial products and what is the rate of adoption of alternative banking solutions. Concerning this, we will find out how customers in the United Kingdom (hereinafter: UK) perceive the PSD2 regulation using data from a previously conducted survey by Accenture. Based on already existing information, I will establish a few hypotheses and test them in the Slovenian market. I am interested in how Slovenians are aware of alternative banking solutions and open banking. Therefore, we will get to know what is the adoption rate of alternative banking solutions in Slovenia with the help of an online survey.

1 RISE OF FINTECHS

In chapter 1, we will get to know what the core business of commercial banks is, who fintechs are and how they drive the digital revolution in commercial banking. Furthermore, we will get to know which banking business they disrupt, how do they focus on customer experience, how much was invested in such companies over the years, in which countries they are adopted the most and which fintechs are the best in the banking business.

1.1 The core business of the commercial banks

Currency and demand deposits are the primary means of payment and media of exchange, as well as the major components in the supply of money. Lending is the core business of many commercial bankers. Fees on loan commitment, loan interests, other contingent claims and last but not least, fees on cash management and other transaction services represent significant revenues of commercial banks (Greenbaum, Thakor & Boot, 2016).

Banks have historically generated value by serving customers' financial needs over a more extended period with mostly financing, investing and transactions. Essential banking services are provided at a low cost to acquire customers on board. Once this is achieved, for example, by opening a current account, a customer is very likely not to switch a bank or financial provider. A bank becomes a default choice and this is what enables them to retain high margins on products such as foreign transactions or deposits. The customer relationship holds those activities together. Due to the appearance of fintechs, customers are now able to switch a financial provider and it has never been easier to do that until recently. The rise of fintechs and digitalization presents a threat to banks' business models (McKinsey & Company, 2015b).

1.2 Digital revolution

Fintech is a term that describes the junction between technology and finance (Koffi, 2016). It refers to innovative financial service offerings, which disrupts the existing financial services

market. Fintech is defined as a new type of financial service, which is combining information technology (hereinafter: IT) and financial services.

Digitalization is quickly increasing, especially in Asia. For example, in Korea, there were only 33% of respondents in 2007 using online banking, opposite to 96% in 2014. In Taiwan percentage went from 11 to 92, in Singapore from 31 to 94, in China from 4 to 57, in Indonesia from 8 to 36 and in Vietnam from 9 to 44 (McKinsey & Company, 2015b). Digitalization is also driving sales. Between 58% and 75% of customers have bought a banking product online and an increasing number of customers are willing to try digital-only product propositions. More than 50% of the current account holders would change the bank if a digital-only provider made an exciting offer. Rapid digitalization is not just a concern in the retail segment. Small and medium enterprises (hereinafter: SME) are aware of the benefits of an attractive digital proposition. Mckinsey's research in Europe showed that such customers are far more likely to choose a bank with an excellent digital banking proposition, rather than the one with a branch nearby. When customers are not satisfied with the offer, they are searching for better options on the market. Since the emergence of fintechs, it has never been easier to switch a financial provider. Most fintechs are taking customer's business a slice at a time. Some platforms have started with a single product and now they are covering the full financial spectrum, but also extend into energy, telecommunications, travel, etc. These new services offer customers simple account opening and once they have it, customers can easily switch providers. The offers are often more attractive than offers from banks.

New financial organizations, such as fintechs, impel product innovation in the financial system (Chen, Li, Wu & Luo, 2017). Such innovation speeds the evolution of financial products. The integration of fintechs and financial institutions accelerates the overall innovation in the financial world. The purpose of integration is to establish a fair and value sharing digital ecosystem. Technology is presenting a continuous change and it is becoming an increasingly important force, while traditional administrative and social resources will become noncore competitive powers.

1.3 Disruption of commercial banking

Fintechs offer considerable advantages, such as lower prices due to lower operating costs. For example, in wealth management fintechs charge 15 basis points for the advisory fee and on the other hand, banks charge for the same service 100 basis points (McKinsey & Company, 2015b). Fintechs are creating more compelling and intuitive customer experiences. For example, Alipay makes a game out of the savings. They are enabling customers to compete by comparing their returns. Furthermore, Alipay is making peer to peer (hereinafter: P2P) transfers fun, by adding emoticons and voice messages. Additionally, Nutmeg provides a reliable and straightforward service for the customers, which are not served by banks. Nutmeg offers them building and managing their investment portfolio if they tell them about themselves. Fintechs are much smaller than banks and can, therefore, take big chances, experiment and can quickly pivot away

from mistakes. Lots of new companies are emerging which specialize in improving customer experience. Every time one succeeds in attracting a bank customer, the relationship between a customer and a bank weakens. When a customer owns one service to get an online mortgage, another to save for college and third to aggregate information, he is no longer an active bank customer. Banking's main business of lending, deposit-taking and current accounts is protected by a massive regulatory regime. The threat here is that competitors will take over the customer relationship with its opportunities to cross-sell and not the overall business and the associated balances. The acquisition is happening either through an aggregator website or an intuitive application. Competitors now sell customer loans, currency exchange, deposits and other essential banking services, by creating a compelling user interface and by using a bank and its balance sheet for the service. Consequently, margins are expected to decrease and customer relationship is expected to weaken. Therefore, platforms on which banks sell their products will also be reduced or might even disappear.

An essential indication is that fintech is expected to lead to the disaggregation of the value chain (Boot, 2017). Interfaces will help to connect the product offerings of specialized providers and will, therefore, become a substitute to banks. Fintechs are offering new opportunities for businesses that have tried to enter banking. There is a high possibility that banks, as traditional financial institutions, will be pushed to serve as the back office to the platform. Fintechs themselves or fintechs in cooperation with other competitors such as telecommunication providers or a supermarket chain could provide banking services under their brand. Furthermore, they could also integrate non-financial offerings with a lifestyle-oriented focus.

Customers have shifted their behavior towards digital solutions. Therefore, banks should rethink their digital strategy and the omnichannel one is the winning solution over the next decade (Citi GPS, 2016). The strategy should be built around a competitive digital offering, a reduced and modernized branch and finally a targetted channel strategy for different segments of customers. Fintech is changing the world of finance. The banks have clients and scale, but fintechs usually know how to innovate better, especially at the customer interface experience. The smartphone revolution and mobile internet have changed the game in retail and SME finance and payments. Not all fintechs offer cheaper services, but some are solving the financial needs differently, which helps them keep their innovation know-how for longer. Business models that are based on lower costs are easier to be replicated by banks. It is harder for banks to compete with companies, which offer their services differently. That does not mean to be technologically different but altered in targeting a specific segment or creating a new business model. According to the North America Bank case study, total digital disruption in 2020 will be 10% of the overall market value and 17% in 2023. Fintechs are growing fast due to a combination of high mobile and internet penetration, an extensive e-commerce system with internet companies focused on payments, accommodative regulations and relatively unsophisticated commercial banking.

Digital financial services, especially ones provided on mobile phones, are promised to deepen financial inclusion to underserved market segments (World Bank Group, 2018). Fintechs are

likely to adjust the provisions of financial services and impact the way how banks compete with each other and with non-bank competitors. Historically, there has been a gap between the financial needs of households and businesses in developing economies and the set of financial products available to them. Mobile phone penetration is usually higher than the banking penetration in emerging markets. The quick advancement of digital technologies holds the potential to overcome the traditional barriers and financially include traditionally excluded segments. For example, mobile money platforms enable unbanked customers to make and receive payments much faster and at a lower cost.

Main drivers, which are causing structural changes in the financial industry, are the following (Capgemini, 2017b):

1. Regulatory initiatives.
2. The emergence of fintechs leading to the disintermediation of banks.
3. Customer expectation for value-added services.
4. The emergence of enabling technologies in payments.
5. An expectation of increased efficiency in transaction handling.
6. Challenged current business models.
7. Adoption of new distribution models from open digital platforms.
8. Fragmentation of the payments value chain.
9. Uncertainty in future business models of banks.

1.4 Fintechs disrupting banking business

Fintechs are not burdened by obsolete, inefficient and costly structures. Therefore they can make the most out of the technology (Gonzalez, 2017). They are offering their customers better experiences in payments, loans, security transactions, deposits, insurance, risk management, cybersecurity and capital markets.

Fintechs prioritize speed, cost and convenience. Pleasant user experience such as fast onboarding process, the convenience of an online platform and quick decision making are the most influential drivers for customer borrowing in P2P lending (Delloite, 2017).

The focus of banks' competitors accounts for approximately 60% of global banking profits. Fintechs are everywhere, especially in payments (McKinsey & Company, 2015b). In 2015, 25% of the activities of 350 most successful fintechs were in retail payments. 14% of activities were in retail lending and financing and 10% in retail account management. Fintech is still mostly concentrated in the retail segment, but already in 2015, there were 12% of activities also in SME payments. Fintech activities in the corporate sector are four times lower than in retail. In 2025 it is expected that banks will lose 40% of revenues in customer finance, 30% in payments, 25% in SME lending, 15% in wealth management and 10% in mortgages. A closer look at customer finance predicts that the main part of the revenue loss will be represented by price erosion and a smaller part by lost volumes.

In 2017 the most enhanced fintech categories were money transfer and payments, with 50% of respondents using fintech solutions for it, followed by insurance with 24% of respondents using fintech solutions for it, savings and investments with 20%, financial planning with 10% and borrowing with 10% (Ernst & Young, 2017c). Anticipated future use of the fintech solutions for the categories mentioned above is the following. Money transfer and payments are expected to rise to 65%, financial planning to 18%, savings and investments to 33%, borrowing to 20% and insurance to 39%.

Banks should focus on protecting the payments businesses not only due to fees. The real value is in the information which payments bring. The information which is obtained by observing transactions helps in reducing loan defaults (Jakšič & Marinč, 2015).

Ecommerce and the growth of smartphone users are the driving changes for retail payments (Creehan & Borst, 2017). Online transactions continue to grow quickly. By applying quick response (hereinafter: QR) codes, near field communication (hereinafter: NFC) and other methods, smartphones materialized as an all-around payment tool for online and in-person transactions. Fintechs and large technology companies have seized the trend and are creating innovative payment services, which enable customers to manage and track their expenses and transfer funds between accounts. Many fintechs offer payment services connected to their mobile phones, which enable customers to tap their phones or scan a QR code to pay for goods at the checkout. Consequently, customers are attracted to mobile payments since they offer highly convenient features and additional security measures. Furthermore, many fintechs are offering digital wallets, which enable customers to hold the funds and pay for goods and services in person and online. Most known digital wallet applications are connected to popular messaging applications, such as China's WeChat. It is widely used in China and it has an embedded digital wallet that facilitates the purchase of products or services without the need to leave the application. Furthermore, such digital wallets allow customers to transfer funds to each other within the digital wallet network. Banks are only involved when a user wants to withdraw funds from the wallet back to his bank account. Therefore, they lack the profits from transactions within the digital wallet network.

Remittance is the transfer of money overseas. Typically, overseas workers are sending money back to their home country. Fintechs are exploiting technological developments and are dramatically reducing crossborder transaction costs (Creehan & Borst, 2017). The remittance market exceeded $ 600 billion worldwide in 2015. Remittances support low-income families and are often more significant than the value of foreign aid contributions or a domestic social safety net payments. Lending to households or SMEs is many times found underserved by large commercial banks and therefore, fintechs are exploiting the situation and growing their market share. Fintech lending consists mostly of balance sheet lending and P2P lending. The latter is the most outstanding in Asia and involves online platforms that connect companies and individuals with lenders. Balance sheet lenders, on the other hand, also build online platforms but invest with their capital. It is most common in the United States (hereinafter: US). SME

finance is the most promising for fintech lending. For example, e-commerce companies from Asia leverage payment activities to assess customer's ability to repay the loan.

Fintechs are improving credit scoring and are expanding access to credit to those with fewer chances of getting one by employing machine learning techniques and alternative data in their underwriting methods. And some of those companies are helping customers understand their credit score and history. Fintechs are developing products that are encouraging customers' savings, by including tools for helping them to determine how much do they want to save and how much can they afford to save. These products include features such as automatical transfer of funds to savings account (Brody and others, 2017).

Many of fintechs are enabling customers to aggregate data and link their various accounts or cards in one place (SWIFT Institute, 2015). Such a product enables a customer to analyze past transactions, spending habits and gives the customer a consolidated view of his finances. An excellent example of such a fintech is Money Dashboard from the UK.

Fintech platforms could easily be used for non-financial services as well. Customers want lifestyle-oriented solutions and subsequently integrated non-financial solutions (Boot, 2017). For example, a financial services platform could act as a place where people would interact with financial institutions and get financial advice. We may see an evolution of more community-oriented arrangements where people organize their financial affairs directly among themselves. Many of fintech related innovations put customers in charge. Platforms are giving them easier access to a variety of providers and are therefore customer-centric in offering propositions that are beyond what customers could previously obtain.

1.5 Improving customer experience

The main competitive power today is customer experience. A good one combines classic elements with attention on the convenience of interactions across a variety of channels, simplicity, responsiveness to customer requests and engagement with customers (Ernst & Young, 2017b). Such an approach aims to help customers lift their financial knowledge and status. The way how banks sell and deliver their products and services is critical for a pleasant experience. Customer experience is, therefore, every step along the individual customer journey. Changes in customer experiences that are likely to prevail in the future are purchase simplification, few click processing for transactions in digital channels and advanced self-service based on artificial intelligence. Additional customer experience changes which are likely to prevail in the future are smart automatic teller machines (hereinafter: ATMs) and kiosks, which will do more as withdraw cash, expanded hours for branches and weekend openings, simple and easy to understand products and services, digital personal assistants and niche banks serving more narrow segments such as seniors or frequent travelers. Better user experience is not always better technology. Cultural and human factors are essential, as well. Therefore banks need to attract different skills and talents. Furthermore, they need to implement new organizational structures and foster innovation and customer-centricity culture.

Subsequently, the staff is incentivized and allowed to innovate. Customer experience is closely interlaced with branding. An intense experience leads to greater efficiency in gaining and later on, retaining customers. In banking, the idea is to offer customers what they need, starting with fast and effective transaction processing, easy access to relevant information and personalized service. Offering a great customer experience reflects the new world in which banks operate. Efficient digital transactions are the new benchmark for convenience. Confidence and trust in digital banks also eroded due to poorly designed digital channels. Meanwhile, fintechs are building trust and new customers by providing the convenience of use.

Customers are changing and want cheap financial services that are accessible anywhere, 24/7 and customized to their needs (Jakšič & Marinč, 2015). Gaming and omnichannel experience are mixed with decision making and empowerment. Therefore banks should improve their IT systems to enhance the customer experience.

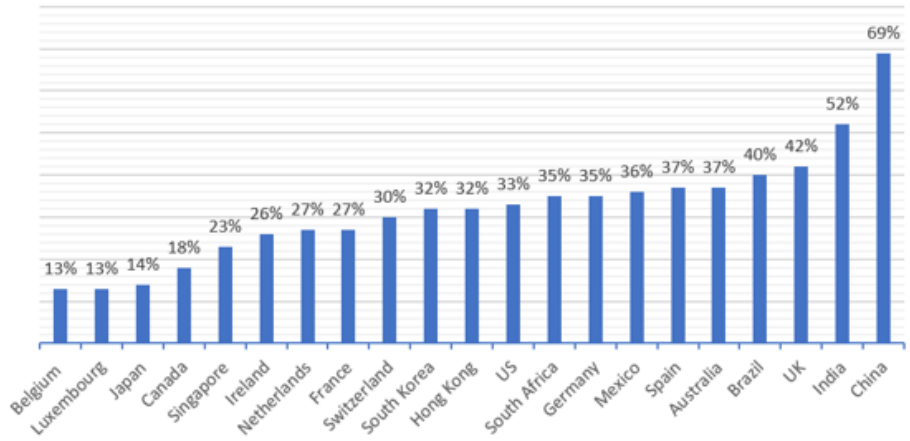
1.6 Investments in fintech

Financing fintechs have grown significantly in the last decade. For example, between 2010 and 2015, it has grown from $1.8 billion to $19 billion (Citi GPS, 2016). Investors are mostly focusing on the applications and the user experience. The majority of these investments have been concentrated on fintechs, which specialize in payments. Payments are the field in which banks are facing the most competition. Even with all of the investments and considerations about banks facing extinction, only about 1% of North American customer banking revenue has been taken by new digital players. Banks still have the upper hand in terms of scale. 73% of fintech capital deployment is in personal and SME banking, 10% in asset management, 10% in insurance, 4% in investment banking and 3% in the corporate segment. On the other hand, global banking profit by segment is the following: 46% is in the personal and SME banking, 35% in corporate banking and 19% in investment banking and markets. There is also a lot of traditional banks investing in fintechs through venture units. For example, Banco Bilbao Vizcaya Argentaria (hereinafter: BBVA) has increased its fintech fund from $100 to $250 million.

1.7 Fintechs around the globe

In Figure 1, we can see the adoption of fintech usage in different countries in 2017. Fintech solutions were mostly adopted in China and India and the least in Belgium and Luxembourg.

Figure 1: Fintech adoption index



Source: Ernst & Young (2017c).

The fintech sector in China grew extraordinarily in recent years. China is the global leader in fintech adoption and innovation (World Bank Group, 2018). Payment platforms dominate the fintech space in China. They are thriving due to their e-commerce user base, social media platforms and the high level of mobile phone penetration. Digital payments have enabled a large part of the cash-based Chinese economy to overcome credit card systems, due to their cost efficiency, reliability and ease of use. Commercial banks had not solved the financial needs of households and SMEs and fintechs have exploited the situation.

Fintechs in China often have more customers than the banks and are also run by well-resourced parent companies in e-commerce and finance. Hence they can sustain more extensive and more balance sheet intensive businesses (Citi GPS, 2016). Fintechs in China are already very well introduced and have grown fast due to high mobile and internet penetration, extensive e-commerce systems, unsophisticated customer banking and accommodative regulations. For example, »know your customer« (hereinafter: KYC) was not introduced until August 2015. China's internet giants have also found success due to early entry, large customer base and their strategic importance of finance to their business models. China's commercial banks were slow in adopting digital offerings. Alibaba is the largest e-commerce company in the world. It is twice as big as Amazon and its revenues are similar to gross domestic product (hereinafter: GDP) of Norway or Austria. It has three brands, Taobao for customer to customer (hereinafter: C2C), Tmall for business to customer (hereinafter: B2C) and Alibaba for business to business (hereinafter: B2B) segment. Each of them has the most significant market share in its segment. Alipay is at the core of the ecosystem and provides a secure and convenient payment system. It is often called the PayPal of China but is around four times bigger than its American peer. Alipay has over 80% market share in third-party mobile payments in China. Similar to Alipay, which is backed by Alibaba's ecosystem, Tenpay is backed by internet giant Tencent, which is known for the most widely used social media WeChat. Tenpay was created to allow Tencent users to pay for online gaming. It has subsequently evolved into a third-party online payment

network. It has an almost 20% market share in online payments but a smaller 10% market share in mobile payments. Similar to Alipay, the success of Tenpay came with a large customer base.

Finance in Asia and China accordingly has been historically dictated by banks, which have been slow with embracing technological changes. Consequently, a large part of the economy was left underserved (Creehan & Borst, 2017). The growing number of people owning a mobile phone and having an internet connection has enabled digital companies to offer new ways of delivering financial services. The World Bank has identified improved financial inclusion as a significant and positive impact on welfare. Online payments are playing a substantial role within the Chinese economy and they account for 38% of total payments. Alibaba and Tencent are the leading firms within China's online payments industry. Together they account for more than 75% of the entire third-party payments market.

Alipay has signed settlement agreements with over 200 banks and has processed over 80 million transactions per day back in 2013 (Borst, 2015). Furthermore, Alipay is offering SME loans and a money market fund for its users. Also, other internet companies such as Baidu and Tencent, have extended their offerings with other financial products and services.

Building on domestic experience, above mentioned technology companies, are venturing into developing countries such as India, Thailand, Russia and Brazil (World Bank Group, 2018).

Third-party payment services have grown quickly in the US, as well. In 2012, the combined amount of secure online payments, P2P online money transfers and mobile wallet payments exceeded 2 billion transactions (Borst, 2015). Paypal was founded as a startup and was later bought by eBay. It is the largest third-party online payment company in the US. Other companies, such as Dwolla, Square, Apple, Google and Amazon, have begun offering alternative payment services. Third-party payment services in the US, similarly as in China, have the potential to served the needs of the groups, which are underserved by banks. Mostly, they are utilizing technology and customer data to provide financial services. They have offered SMEs, for example, the ability to accept secure payments online, which opened the sales around the world. Furthermore, Paypal, in associations with partner banks, offers working capital loans to small businesses. Lending decisions can be taken quickly and based on the transaction record with Paypal.

In the US, contradictory to China, only a small segment fraction of the current commercial banking business has been taken over by fintechs (Citi GPS, 2016).

African markets are great opportunities for fintechs. More than two-thirds of people own a mobile phone, but only one third has a bank account (Koffi, 2016). Therefore the mobile payments have revolutionized the financial industry in Africa. Over 50% of the population lives in rural areas without, electricity, security and infrastructure. Therefore they are not able to be reached by branch banking. On the other hand, fintech solutions can reach such people and can enhance financial inclusion.

Mobile money usage in Sub Saharan Africa has been the highest despite the lack of wealth in that region. The main reason is that there is a lack of traditional banking (Citi GPS, 2016). Kenya has a single mobile operator and that allows Kenyan mobile users to benefit from positive network effects. Another key reason for the success of mobile payments in Kenya is favorable regulation upon mobile operators handling financial transactions. 58% of the population in Kenya has a mobile money account and 40% made a transaction via mobile phone.

M-PESA was launched commercially in March 2007 by Safaricom, a company that owns a single mobile phone operator in Kenya. It is an electronic payment system and is accessible through mobile phones (Mas & Radcliffe, 2010). Users can have money on their accounts and can use their phones to transfer funds to other M-PESA users, pay bills and purchase mobile airtime credit. The money, which is placed on M-PESA accounts, is secured by deposits at commercial banks. The brand already enables deposits and withdrawals at 28,000 retail stores and half of them are located outside urban centers. The amount of P2P transactions per year is as large as 17% of the whole Kenyan GDP. M-PESA enabled financial inclusion to large segments of unbanked and poor people. Mobile phones became a technology, which is present everywhere. The SIM card inside a GSM phone can be used to authenticate users, thereby avoiding the costly distribution of separate bank cards to low profitable poor customers. A mobile phone can also be used as a point of sale terminal (hereinafter: POS) to initiate financial transactions and securely communicate with the appropriate server to request transaction authorization. Furthermore, M-PESA has demonstrated the importance of designing a product that is solving people's needs rather than copying traditional average financial products. The M-PESA success happened due to Safaricom's vision and execution and favorable market conditions such as intense demands for domestic remittances due to lots of split families, poor quality of available financial services, a convenient banking regulator, a Safaricom's dominant mobile communications market and low commissions on airtime sales.

M-PESA has filled the gap in traditional banking services and it serves as a role model for delivering services to a weak and unbanked population. Analysis by Massachusetts Institute of Technology revealed that M-PESA lifted around 2% of Kenyans out of poverty (The Economist, 2017). Mobile technology is also serving non-financial needs, such as healthcare, humanitarian efforts, female empowerment, water sanitation, energy and transport, which are essential topics in Kenya and Africa in general.

In Emerging Asia it is expected that India is going to be the next China. Due to government initiatives and the National Payments Council of Indian Government (hereinafter: NPCI), non-cash transactions are increasing. The government has a disruptive target to reach 25 billion non-cash transactions for 2017−2018, with mobile phones being a priority (Capgemini, 2017b). The government subsidizes mobile transfers and micropayments. The next item on NPCI's agenda is contactless payments for public transports. The demonetization efforts of the Indian Government that began in November 2016 led to the expansion of the payments infrastructure and increased volumes of digital payments.

India's population of 1.2 billion, its low level of banking and high digital penetration make it one of the significant fintech opportunities (Citi GPS, 2016). The Indian market can be seen as a combination of enormous potential due to economics and demographics, enabling government, more financial players among the traditional banks and new payment systems along with high adoption of mobile phones. Broadband connectivity and the high adoption of mobile phones make the ecosystem a perfect candidate for digital disruption. Furthermore, national identity card, which is run on Aadhar Identity platform, is now covering 900 million people and it provides online identification and KYC. The government has issued the Jan Dhan Initiative, which recommends bank deposit for all. Since releasing, 200 million new accounts have been opened. In general, the Indian market is split into more modern private banks, which posses nearly 70% market share and the larger government banks. Because the landscape is still evolving, banks should not miss any opportunity to capture new customers. Therefore they are giving new payment licenses, for example to telecom operators and mobile wallet players, such as the Pay TM wallet, who could be a disruptive force for banks. Government banks are a bit slower than private banks and are potentially going to be victims of digital disruption. The data have shown that India's mobile banking transaction value increased by four times from December 2014 to December 2015.

Digital banking experience and strengthening of the fintech sector are increasing exponentially in the UK. In 2015, already 22.9 million internet banking applications had been downloaded (Open Banking Working Group, 2015).

A great example of a financial institution, which is operating in a non-traditional way is a UK mobile-only bank Monzo. Its previous name was Mondo and it was founded in 2015 with a purpose to build banking experience around a smartphone. In 2016 Monzo was offering a prepaid card and a mobile application through which the card could be topped up. Now, the application also enables the categorization od spendings. Furthermore, customers can set monthly budget targets for different spending categories and the application is sending push notifications if the customer exceeds the set budget (Delloite, 2017). Monzo cardholders are using their cards more actively when compared to other UK debit cards. Monzo became a fully licensed bank in April 2017 and plans to roll out current accounts with debit cards. In October 2016 Monzo distributed over 50,000 cards, of which 60% were used at least once per week. £560 has been the average spend per active card and active users have made 420 transactions in a year each, which is a lot compared to the UK average of 115. Monzo built its technology platform from scratch, using open source technologies, rather than buying finished products from vendors. Rather than launching a full package of banking products, they are focusing on their core offering, current accounts and debit cards. In the future, they are planning to offer products and services by using open APIs to transform their platform into a marketplace, where customers can use and purchase third-party solutions through their application. Monzo is planning to provide additional value to customers and subsequently convince them to change the financial service provider.

1.8 Top fintechs in the financial service industry in 2017

Top 100 fintechs in 2017 were 32 lending companies, 21 payment companies, 15 transaction and capital markets companies, 12 insurance companies, seven wealth management companies, 6 »regtech« & cybersecurity companies, 4 blockchain and digital currencies companies and 3 data analytics companies (KPMG, 2017). Payment and lending companies are dominating. Interestingly, there is also a rise of data analytics companies, which are the enablers of innovation in the financial services industry. The goal of companies is to serve the needs of the customers and maintain their relevance among the growing competition. To defend and expand their existing revenues, banks and other financial institutions will have to optimize their data assets and improve their capabilities. Open banking emerged from the analysis of the top 100 fintechs. It is bringing new competition, transparency and fosters greater empowerment of customers. Open banking is not only the future in banking but in commerce as well and it will progress in other segments of the financial industry. Leveraging open data and technology will be crucial for a new period of banking. Fintechs, which are leveraging data and technology to develop unique and enhanced products and services, are working with the largest banks and financial services firms in the world and are increasingly adopting plug and play models.

Top 10 fintechs in 2017 are the following (KPMG, 2017):

1. Ant Financial is the world's largest third-party payment platform. It began its domination in the world of payments as Alipay.
2. Zhong An is an online property insurance company, which uses big data to automate underwriting and claims processes. The company is a joint venture between Alibaba Group Holding, Tencent Holdings and Ping An Insurance and is the first fintech in China to receive an insurance license.
3. Qudian is an online electronics retailer and is offering monthly installment payments. They offer smartphones, laptops and other customer electronic devices in China.
4. Oscar is a company, which is transforming health insurance through technology.
5. Avant is the fastest-growing marketplace lending platform for short term customer credit. They are using big data machine learning algorithms to offer highly customized credit.
6. Lufax is an online financial asset trading company, which uses big data and IT technologies to formulate advanced risk assessment models and implement risk of control systems.
7. Kreditech is a money lending technology company. Their business is based on adopting big data, proprietary algorithms and automated workflows.
8. Atom Bank is the first purely digital retail bank in the UK.
9. JD Finance is a lending company, which is also present in e-commerce.
10. Kabbage funds is a company that offers an automated lending platform to small businesses.

In chapter 1, we have firstly reviewed that banking's core business are deposit-taking, lending, managing current accounts and transaction services. Furthermore, we have reviewed that a fintech is a term that describes the junction between technology and finance and it refers to innovative financial service offerings, which disrupts the existing financial services market.

Fintechs are driving the digital revolution by offering advantages such as lower prices due to lower operating costs. They are creating more intuitive and compelling customer experiences and also benefit from experimentation. Banks usually have clients, but fintechs have the innovation edge. Additionally, we have reviewed that fintechs operate primarily in payments, lending and account management. Their activities are concentrated mostly in the retail segment. We have reviewed that an excellent customer experience focuses on the convenience of interactions across a variety of channels, simplicity, responsiveness to customer requests and engagement with customers. Finally, we have reviewed that there is a lot of investments in fintechs. They have grown from $1.8 billion to $19 billion from 2010 to 2015. Fintechs are mostly used in China, India, UK and Brazil and the best fintechs in the banking industry in 2017 were Ant Financial, Zhong An, Qudian, Oscar, Avant, Lufax, Kreditech, Atom Bank, JD Finance and Kabbage funds.

2 APPLICATION PROGRAMMING INTERFACE

In chapter 2 we will get to know what APIs are, what types of APIs exist, how companies create added value with open APIs and how could banks create it, how were other industries disrupted by open APIs, how open APIs lead to open banking and which market participants could leverage in the open banking environment.

2.1 Basics of API

APIs are defined as interfaces, which enable communication between two or more software applications, in which one calls upon the functionality of another. Furthermore, API is a software architectural approach with scalable, reusable and secure interfaces and it offers easy to use self-service (European banking association, 2016). APIs enable faster and cheaper innovation on a larger scale. Moreover, APIs are standardized rules, which govern how one software application can communicate with another. The goal of standardized rules is to increase the ease of use of interfaces and to protect quality aspects. Communities or individuals, who provide these standards as open-source, have developed many of today's API technical standards.

API technical standard consists typically of the following (European banking association, 2016):

1. Data transmission, which takes care that data is securely transmitted. Generally, APIs use HTTP/HTTPS as a transport layer due to the fact it is simple and widely compatible.
2. Data exchange, which takes care of the format of the exchanged data. The most general formats are XML and JSON.
3. Data access, which takes care of who gets permission to view particular data and how it is achieved. The most popular standards for data access are SAML, which is based on XML based network and OAuth 2.0.

4. API design, which takes care of the way how APIs are designed. Standard design principles for APIs are REST (Representational State Transfer) and SOAP (Simple Object Access Protocol).

Most APIs are built based on the above mentioned technical standards.

APIs are also described as electrical sockets, which are designed with predictable patterns of openings into which other applications that match those patterns can plug in and consume them in the same way as electrical devices consume electricity (Zachariadis & Ozcan, 2017). APIs can be used in the companies internally, to integrate diverse systems and allow for the exchange of data across different departments by sending queries to an API server. It makes it easier for internal teams to collaborate and access information when they need it. Subsequently, APIs help to interconnect services and business processes across the organization, improve employee productivity and create better multichannel experiences for customers. APIs can also be used to expose information to an external audience beyond the boundaries of the company. External APIs can provide integration with other companies and allow third-parties to consume organizational data, which potentially leads to cross-selling and up-selling opportunities.

APIs enable the usage of existing capabilities in new ways, quickly and easily. Consequently, they increase innovation and allow for the creation of new value. APIs provide the glue that connects software systems within and between companies and are building blocks of the digital economy (3SCALE, n.d.).

2.2 Types of API

Closed or private APIs can only be accessed within the company. In a case where third-parties outside of the company have access, they are open APIs (European banking association, 2016). The latter is the focus of this master thesis. Open does not mean that every third-party can access, for example, a bank's system. Bank will still hold control to preserve security, contractual conditions and privacy.

In real life, there are different levels of API openness. The level of openness determines the potential number of parties with access and therefore, the potential reach of the functionality offered via API. These levels are (European banking association, 2016):

1. Private APIs, which are accessible only within the organization.
2. Partner APIs, which are opened to a particular partner based on an agreement. Partner APIs are exclusively accessible at the discretion of the provider. An example of a partner API agreement is between a bank and an enterprise resource planning (hereinafter: ERP) software provider.
3. Member APIs, which are open to members of a community with well-defined membership rules. API provider allows access to the community members who comply with community membership rules and regulations.

4. Acquaintance APIs, which are inclusive open APIs and they are open to everyone complying with a predefined set of requirements. Developer portals distribute this type of API. Merchant access to POS is an excellent example of this category.
5. Public APIs, which can be accessed by anyone, typically for identification or authentication purposes.

Public APIs are available to anyone with no or little contractual agreement. Public APIs allow organizations that provide open APIs to create business platforms, through which innovators can develop applications and pay a fee for using the API. Monetization is a crucial part of the API economy. The implication of open APIs leads to new business models and competition in the marketplace (Zachariadis & Ozcan, 2017).

2.3 Creating value with an open API

By using API technologies, digital market participants share the benefits and the burden in creating the end-customer value. Value creation is categorized as the following (European banking association, 2016):

1. Building applications on top of the platform. Examples are Facebook, Amazon, eBay, PayPal, Twitter and Google. Developers can reuse the existing functionality or use data sources to improve their applications. It speeds time to market and lowers costs, but on the other hand, it creates dependencies on third-party developers. For API providers, the benefit is a broader distribution network, traffic creation and minimization of costs for innovation.
2. Social sharing for market purposes. Examples in this category are Flickr, Twitter, YouTube, Delicious, Facebook and LinkedIn. Social sharing is about posting and sending videos, photos and product recommendations to contacts within the network. Social sharing is useful for marketing, branding and generating web traffic. Banks could use social sharing principles to retain or increase brand awareness.
3. Syndicate products and services across different platforms. Examples in this category are eBay and Google. Multiple market participants work together to create and provide a service to a customer. The fees paid by customers are distributed amongst the syndicate membership.

Well-known market participants from non-financial industries provide strong evidence for the success of open API strategies. Salesforce, which is delivering customer relationship management (hereinafter: CRM) solution, is using open API to offer customers the integration of CRM into their existing workflows. Twitter is creating a mutually beneficial relationship with third-party developers to enable more functionalities for customers. LinkedIn provides organizations access to their database to help them make better decisions regarding human resources and professional networking (European banking association, 2016).

Open APIs enable banks to collaborate with external partners to offer their customers innovative services. There are many ways to monetize APIs (Capgemini, 2017b). API call

occurs every time a user makes a call to the server in the name of the application using an API. For each request, a fee can be charged and it is the preferred model of banks and fintechs. Monetization can also be achieved based on value delivered or support provided. This approach is used to provide services such as reconciliation of service, virtual accounts as a service or insights and data which provide new revenue streams. Another monetization is based on revenue sharing between organizations, based on a percentage of sales. This type of approach inspires banks and fintechs to search for new opportunities, which leads to higher market share. APIs can form the basis of new revenue streams that will be generated by value-added services and would differentiate a bank from competitors or enable a bank to distribute its services to new clients. Banks can also leverage transaction data to provide analytics, which will help third-parties build customized offerings.

Banks should use the opportunity and become the platform for services that need multiple stages of approvals. For example, buying a home involves several different players such as estate agents, solicitors, mortgage brokers and a bank. All of it could be served on one platform and could be viewed as a single home buying service from a user perspective (Delloite, 2017).

In the UK, the Competition and Markets Authority (hereinafter: CMA) analyzed that there is a lot of potential in saving money for customers if they would use the current account, which is best suited to their needs. They have calculated that an average customer could save up to £70 a year by switching to the most optimal account (Open Banking Working Group, 2015). Over the past three years, only 8% of customers changed their current accounts. On the other hand, 31% changed their energy provider. An open banking API could simplify a price comparison among different providers. The customer would give a price comparison service permission to access their bank account data and the application would do the rest. The same analogy could be made in other personal financial products, for example, mortgages and credit cards or other lending and savings products. Personal finance management (hereinafter: PFM) tools help customers to better budget and understand their consolidated financial position. PFM helps customers to categorize and manage their spendings using visualizations and predictive cash flow tools. They can gather information from different financial service products (credit cards, savings, current accounts, etc.). It can help customers to save money by understanding their spending patterns and by providing alternatives. Historical transactional data is currently only available to the current account provider.

The fact is that 90% of SMEs obtain loans from their primary banking relationship, while 50% of customers are likely to purchase a new banking product from their current bank. With open banking API businesses, individuals will be able to share transactional data securely with potential providers of credit to achieve the best possible deal. This API would also solve a long-lasting affordability check, which is an essential part of the loan application (Open Banking Working Group, 2015). Another interesting use-case is notifications on fraudulent activities. Customers trust their account providers to notice these activities. Third-parties, which are specializing in security and the detection of fraudulent transactions may offer better quality monitoring and notification services especially if the third-party aggregates data across multiple

accounts or products and can spot patterns which single product providers would otherwise not see.

Business APIs are central to a stable API strategy. They prepare an organization for any disruption and more importantly make an organization disrupt itself through innovative business models (Capgemini, 2016). Banks could expand their service portfolio beyond traditional banking, which could lead to differentiation and new sources of revenue. Imagine a bank that already has a robust digital infrastructure for collaborative business models. Such a bank can create an application with an API to online travel service, which books a high volume of international travel. Through the API, the bank can offer its customers the opportunity to purchase foreign currency at the time when they are booking international travel. A new business model opens a new revenue stream at low sales and distribution costs. By opening an API, a bank can access a partner's entire customer base.

There are five critical business use cases which present the main benefits of open APIs (3SCALE, n.d.):

1. Mobile enablement. First-generation mobile applications offered functionalities, which were only limited to the operation of the device itself. Applications gradually provided a better experience and more utility. Applications are now available for multiple operating systems and devices, which increases audience reach.
2. Customer and partner ecosystem growth. A common challenge for companies is to serve the needs of customers. Serving needs is leading to significant post-sales engineering teams to provide customizations and installations. Platformization, in this sense, is crucial and it means exposing key sets of content in a way that third-parties can create long-running integrations on top of the functionality.
3. Developing massive reach for content and transactions. Platform thinking has been most valuable in powering distribution. In the new API economy, there are more opportunities for distribution than ever before. A multichannel strategy is a strategy to pursue.
4. New business models. Many API use-cases involve extending existing business models. Nevertheless, some are focused on the creation of entirely new business opportunities or the establishment of new primary channels. For example, Google Maps uses an API that adds maps to a wide range of third-party applications. Although maps are free to use for the customer, Google does charge usage above a certain level to the third-parties.
5. Internal innovation. Internal use of API drives innovation in large companies. Those companies are exposed to large internal systems, which add a layer of complexity in the way of delivering a product or a service. If a company is actively defining the nature of interfaces to different internal systems, departments and processes, it creates an environment that is ready for change and innovation.

2.4 Disruption of other industries

A classic example of disruption comes from the IT sector. When IBM pioneered API, they first wanted to build a closed system. Connectivity and interoperability were limited to the IBM network only. When they opened up, the IT revolution increased momentum (Salmony, 2014). Nowadays, not only did the economy benefit from open, interconnected IT but also IBM flourished. IBM embraced the change, shaped it actively and developed a mutually beneficial system with other participants, through contract regulated liabilities and fair market-based fees. Another example can be found in telecommunication. Telecommunication market players had firstly resisted liberalization as long as they could. Today, across all major EU markets, the ex monopolists generally still control the most considerable part of the market share. Telecoms were being forced to open up but were granted the right to be paid for providing accessibility of their customers and other services they provided to the new entrants on the market. Everybody won in this situation and surprisingly ex monopolists were not destroyed by the new competitors, but are continuing to be the winners in an even larger market. The benefits of liberalization can be seen in many other industries. The latest example from the smartphone area demonstrates the rapid rise of the market share of the open Google Android operating system, again showing the incredible rise of open systems. We can observe that the open system has a tendency to win in the end and that liberalization and opening up to third-parties are beneficial to the whole economy and surprisingly to ex monopolists. Now it is time for the banks to open up.

The emergence of Uber or Airbnb in industries that are both firmly based on physical activities or on-site attention to clients, hence transportation and hotels are showing that technological revolution is not far away in the banking industry as well and no industry as such is safe from disruption (Gonzalez, 2017).

Sport clothing companies, for example, Nike became a sports social network, which aggregates data from thousands of users every day. In 2008 they have started with the business of wearable electronic devices with their tracking pod and quickly developed a community. With the help of APIs, Nike created an ecosystem of partner applications around its platform. They partnered with the Techstars Startup Accelerator to boost innovation (3SCALE, n.d.). Hardware companies such as Apple had combined hardware devices with software operating systems, cloud services and applications. Home appliance companies are getting connected to internet servers and can, therefore, allow for remote configuration and provide up to date information. Construction companies, for example, Bechtel have installed extensive monitoring and IT systems, which enable them to provide custom applications for on-site teams in severe conditions. Netflix supports over 800 different partner hardware devices in its API economy. They help to deliver content via Netflix's APIs. Expedia generates more than $4 billion a year through its global API powered network comprised of thousands of small partners. NPR powers hundreds of affiliate radio stations content listings via its API. EBay has a vast ecosystem of power seller and reseller tools that drives over 60% of its listings. General Motors is providing APIs to access car data from certified applications. They are also enabling smartphone

applications, which can remotely control multiple vehicle functions. Similarly to General Motors, Belking is developing home automation devices. Connected devices include power sockets, light switches, motion detectors and baby monitors.

2.5 From open API to Open banking

Open banking is a frequently used term in commercial banking and the root of it is the standardization of how banks allow their customers more choice by enabling sharing of their data for use in third-party applications (European banking association, 2016). It is characterized as a technology-driven evolution of the banking business. Furthermore, open banking is a movement which is connecting technology-driven companies with banks. Fintechs are usually the ones who are creating innovative functionalities. Subsequently, customers are now able to choose different financial products and the concept of customer ownership is changing to customer sharing between banks and competitors.

Examples of open APIs in the financial industry are the following (European banking association, 2016):

1. Paypal has extended its transaction services to other platforms.
2. Credit Agricole APIs provide authentication, credit and location-based functionalities. Applications include social applications, games and support of sight-impaired clients.
3. BBVA enabled access to authorized third-party to functionalities such as money transfer, profile data, account data and aggregated card profiles.
4. VISA classifies APIs in payment methods, general services, risk and fraud. They provide customers with a new e-commerce experience based on Visa technology.
5. MasterCard offers APIs which provide functionalities concerning payment, security or location.
6. SWIFT's APIs provide a supporting function to the core messaging service to enable worldwide funds transfer.

The proportion of banks which are offering open API access grows fast, primarily due to the introduction of PSD2 (CGI, 2017), which is going to be further discussed in chapter 3. APIs play a large role in enabling this development, which is expected to bring closer the open banking standard. APIs make it easy for software programs to talk to each other and can provide access to an organization's data. Access means faster connectivity and real-time visibility of banking activity.

There is a high possibility that fintechs, technology giants and price comparison websites are going to own a high share of customer relationships due to open banking (Delloite, 2017). As a result, they could become the brands, which people use the most, without ever taking customer deposits or lending into their balance sheets. However, traditional banks, which are going to tackle open banking to create new sources of income, have a significant advantage, given their access to existing customers, strong brands and expertise. Therefore they have high chances of

winning the battle for customer interface and customer relationship. Ownership of the data has given banks an advantage in terms of pricing and credit scoring for a long time and that may now be eroded. Furthermore, data can now be used by third-parties to create innovative value-added banking services. Potentially larger competition is very likely going to reduce banks' ability to cross-sell. Fintechs and other challengers have already begun to disrupt commercial banking. Therefore a potential shift is expected in an opened, marketplace model, which puts the customer in the middle of banking.

Open banking will increase competition and innovation within the banking and it will create new demands on banks' business strategies, challenge profitability and put pressure on future revenue streams (CGI, 2016). Banks will need to have a clear focus on their customers and markets and will probably collaborate with other companies to push their positions by using digital technology. Europe is currently represented as a benchmark and is leading the way in open banking due to PSD2, while the rest of the world is closely watching how innovation and competition will change the European banking sector. However, the financial industry in non-European countries is not passive. Collaborative partnerships are developing among traditional players in North America. Citi has leveraged the IBM cloud platform and APIs to enable third-party developers to create new products and services through its mobile banking platforms. Card payment services providers Braintree and Paypal have APIs to support e-commerce sites. BBVA has partnered with Dwolla and they are now supporting real-time payments by leveraging Dwolla's FiSync API. Banks should perceive open banking, not as a threat but an opportunity to increase payment transaction revenues, exploit customer transaction data and implement new business models.

2.6 Non-bank players in the financial industry leveraging on open APIs

There are many different competitors in the financial sector and some of them already established themselves in open banking (CGI, 2016). They are classified in the following order:

1. Fintechs, for example, Transferwise, which connects buyers and sellers of different currencies and enables cheap and secure currency transfers.
2. Challenger banks, for example, N26 and Revolut. They have entered the market and are offering a more customer-centric model. They are offering their products and are additionally offering relevant third-party products and services. Their business models are based on APIs and they operate more like fintechs than traditional banks. Some additional examples of challenger banks are Starling and Atom in the UK.
3. Technology giants, for example, Facebook, Samsung, Google and Apple. They are showing interest in leveraging financial information available through open APIs to expand their product and service offerings based on their already massive customer bases. They are refining their marketing strategies, brand presence and share of wallets.
4. Non-financial service sectors, for example, utility companies. They have the chance to expand their products and services into offering also financial ones, to grow revenues and

to improve monetization of their existing customer data sets. In France, the telecommunication company Orange has bought a 65% stake in Groupama Banque and subsequently entered into mobile banking services.

5. Aggregators, for example, Mint in the US. These companies are going to develop PFM tools and will aggregate basic account information and will offer simple budget planning software applications. Customers are going to have consolidated views of their overall financial status in one place.
6. Payment service providers, for example, PayPal can offer payment services from its applications.

Even some traditional banks, which are creating their digital alternatives, have removed their parent bank's IT infrastructure. In France, a lot of banks have launched subsidiary digital banks with separate brands from their parent companies to cut a shortage of revenues on the parent side. For example, BNP Paribas Hello Bank and Credit Mutuel Arkea Monabanq (CGI, 2016).

Big technological firms, such as e-commerce, social media and telecommunications companies represent an even more significant threat than fintechs due to their superior data processing capabilities and strong relationships with their customers (Capgemini, 2017a). There is a lot to learn from fintechs due to the fact they bring new ideas, opportunities and approaches, but when we take a look into the size of built infrastructures, the established technology companies have the edge.

These companies have economic resources to overcome any problems generated by insufficient infrastructure or lack of experience in the business (Gonzalez, 2017). However, the financial industry was not one of the markets to enter due to a highly regulated sector.

Amazon is about to become the third biggest United States bank and it is estimated that over 70 million customer relationships will be established over roughly five years, the same as the third biggest bank currently, Wells Fargo (Franck, 2018). It is also estimated that 25% of Amazon's Alexa users would also consider Amazon for everyday banking.

The average rank of whose financial services would US citizens use is the following (Franck, 2018):

1. Primary bank,
2. Banks in general,
3. PayPal,
4. Amazon,
5. Apple,
6. Google,
7. Microsoft,
8. Facebook,
9. Snapchat.

Amazon is in the early talk with financial institution J.P. Morgan Chase (Franck, 2018). They are aiming for young customers and those without a banking account. Traditional banks have barely touched technologies that are used in everyday life. Three-quarters of the most youthful adults aging from 18 to 24 expect to buy a financial product from technology firms. Once Amazon establishes its co-branded basic banking service, they will probably expand their product offerings.

In chapter 2, we have firstly reviewed that APIs enable communication between software applications and that we distinguish between closed and open APIs. Furthermore, we have reviewed that APIs enable the creation of added value such as building applications on top of existing platforms, social sharing for marketing purposes and finally enabling different market participants to work together and create a service to the customer across different platforms. Consequently, open APIs allow banks to collaborate with external partners and third-party developers to offer innovative services to customers. Examples of innovative services are connecting a holistic service for buying a home on the bank's platform, offering PFM, provide historical transaction data from different providers to provide better credit scoring, solving fraudulent activities, etc. Open APIs have helped to disrupt other industries, such as transportation and accommodation. The emergence of Uber or Airbnb in sectors that are both firmly based on physical activities or on-site attention to clients is showing that the technological revolution is not far away in the banking industry as well and no industry as such is safe from disruption. Furthermore, we have reviewed that open banking is a frequently used term in commercial banking and the root of it is the standardization of how banks allow their customers more choice by enabling sharing of their data for use in third-party applications. Open banking is a movement which is connecting technology-driven companies with banks. It enables third-parties to own the primary customer relationship, by allowing, for example, accounts from different providers to be accessed through a single customer interface. Finally, we have reviewed that competitors in commercial banking, which could leverage from open banking, are fintechs, challenger banks, technology giants, non-financial service companies, aggregators and payment service providers.

3 OPEN API REGULATIONS AND INITIATIVES

In chapter 3 we will get to know how do regulators contribute to the evolution of the financial industry, what is PSD2, how does it affect commercial banking and current business models, what is the timeline of PSD2, when it will officially start and last but not least what are other open banking initiatives around the globe.

3.1 Importance of regulation on the evolution of the financial industry

Regulators play an essential role in nurturing the collaboration between banks and fintechs. They are introducing regulatory sandboxes, which allow financial organizations to test new

ideas for a limited period with live customers and loosened regulatory restrictions (Ernst & Young, 2017a).

Regulators have always had a crucial role in the evolution of the financial industry. They were never exceptionally interested in stimulating innovation and they have only recently considered encouraging competition (Gonzalez, 2017). Subsequently, banks have been slower in the digitalization process than other sectors. Regulation makes the system stable and therefore prevents or minimizes the effects of banking crises and protects the customers. Nowadays, regulators are beginning to recognize the importance of a competitive and efficient financial system. Such a system drives economic growth and takes care of well being of customers. Technology improvements are increasing productivity. The primary assignment of regulators is balancing the value of new digital proposals with protection from the corresponding risks.

Boosting fintech initiatives, such as steering groups, task forces and sandboxes, have been launched worldwide by policymakers to encourage and regulate the sector. Fintech is seen as a mean of encouragement of economic activities and improvement of industry efficiency by providing better services to customers. Furthermore, fintech is seen as a potential to meet underserved demands in the market and an opportunity to implement modern technology without having to address legacy systems (Ernst & Young, 2017c).

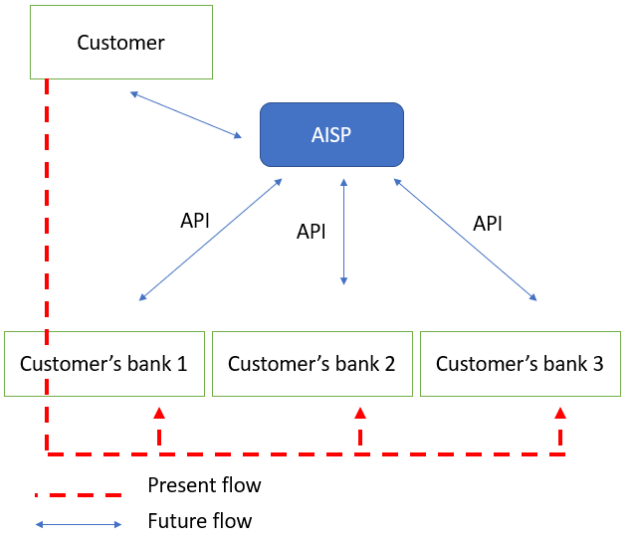
Fintech could significantly change the commercial banking and financial industry, but it could also entail new risks. The key challenge in the future is regulation and monitoring. Policymakers need such regulation that will keep pace with fast speed fintech is growing but on the other hand, not stop the benefits which are being brought to the industry (World Bank Group, 2018). Low regulation, on the one hand, allows fintechs to test their services with real customers. On the other hand, it helps authorities to understand the functioning of new services better.

3.2 Payment service directive 2

PSD2 is enabling bank customers, both retail and business entities, to use a TPP to manage their finances. Hence, soon users will be able to use Google or Facebook to make transfers, pay bills, and analyze spendings, while the money will still be kept in the current bank (EVRY, n.d.). Banks are obliged to provide TPPs access to their customers' accounts via open API, which will enable TPPs to build additional services on top of a bank's infrastructure. Hence, banks will no longer compete only with each other, but also against every TPP, which is going to be licensed to offer financial services. European Commission aims to improve innovation, reinforce customer protection and improve the security of internet payments and account access within the EU and EEA. The directive is introducing two new types of players to the financial landscape, account information service provider (hereinafter: AISP) and payment initiation service provider (hereinafter: PISP).

As we can see in Figure 2, AISP is a service provider with access to the account information of bank customers. AISP could use transaction data to aggregate account information from several banks into one overview or analyze user's spending behavior.

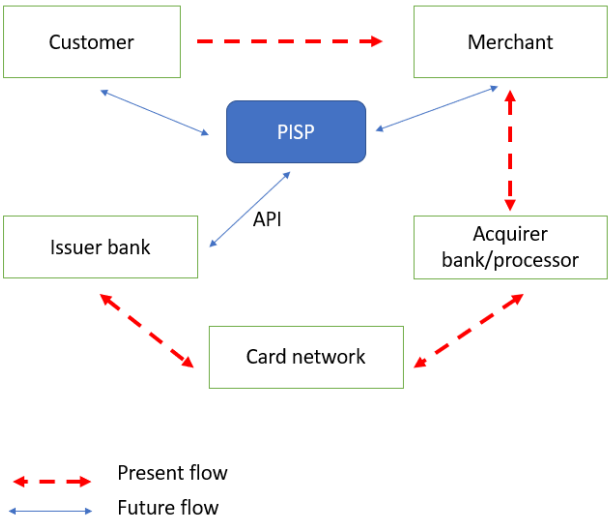
Figure 2: Account aggregation model



Source: Accenture (2016a).

A PISP is a service provider, which is initiating payment on behalf of the user. Nowadays, a retailer receives a customer's card details and then it requests and receives the payment through its bank, a card scheme and the customer's bank. As we can see in Figure 3, PISP creates a software connection between the customer's and the retailer's accounts, where the necessary information is exchanged to make the transaction. This solution involves fewer parties and does not require the customer to reveal its payment card details.

Figure 3: Card payment model including a PISP



Source: Accenture (2016a).

Open access to accounts is a crucial step to open banking and it is a high potential for financial institutions to innovate and create new revenue streams. The key for banks is to understand the threats they face and to adapt to the evolving landscape by leveraging APIs as enablers of new products and services (SWIFT Institute, 2015).

PSD2 is a response to fast technological developments that already affect banking such as mobile internet, growing capabilities of smartphones, API economy, data analytics and cloud computing. It introduces an open banking regulatory framework that enables the secure sharing of customer data between banks and authorized third-parties to benefit customers (Delloite, 2018a).

PSD2 is an evolution and extension of payment service directive 1 (hereinafter: PSD1) regulation. It claims to champion frictionless payments, which is suitable for customers. It is a regulation, which begins a new customer journey that will evolve in the future, as demands for new payment methods continue to grow (Chandramani, 2017).

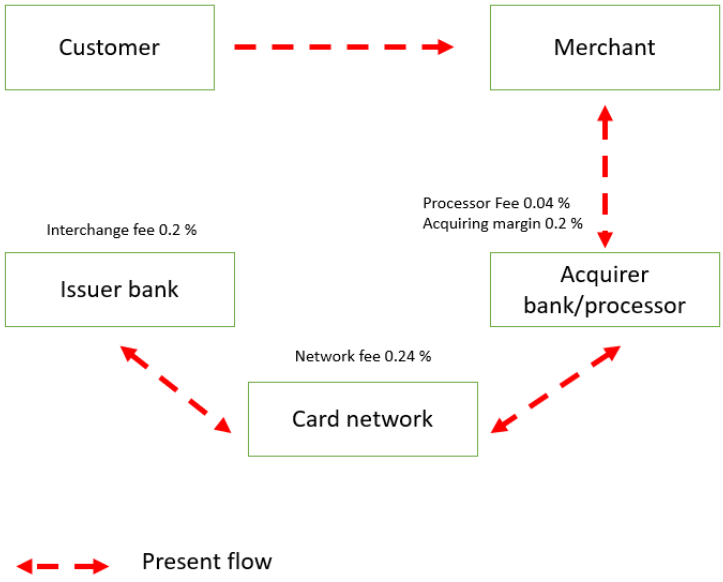
The main difference between PSD2 and PSD1 is the requirement to provide TPPs access to the customer's account (Capgemini, 2016). TPPs will be able to obtain access to customer account for account information or payment initiation service based on a customer's consent. Such access is a significant security concern for banks and furthermore a considerable business risk in being disintermediated by third-parties. PSD2 lowers the barriers to entry for TPPs with new ideas for value-added services. Nowadays, TPPs with great ideas are often unable to execute, due to their small customer base and due to banks, which are not willing to share the account information of a customer.

TPPs are not covered in the PSD1 and are therefore not regulated at the level of the EU. Consequently, PSD2 was proposed and it is bringing those TPPs under the same standards of regulation and supervision as existing payment service providers (SWIFT Institute, 2015).

Access to accounts is directly disrupting fees from card-based transactions. They are generating more revenue for retail banks than interbank credit transfers, which are many times, even free of charge for retail customers (Accenture, 2016a). On the other hand, an issuing bank still receives up to 0.2% of the transaction value as an interchange fee on debit cards and up to 0.3% on credit cards as we can see in Figure 4.

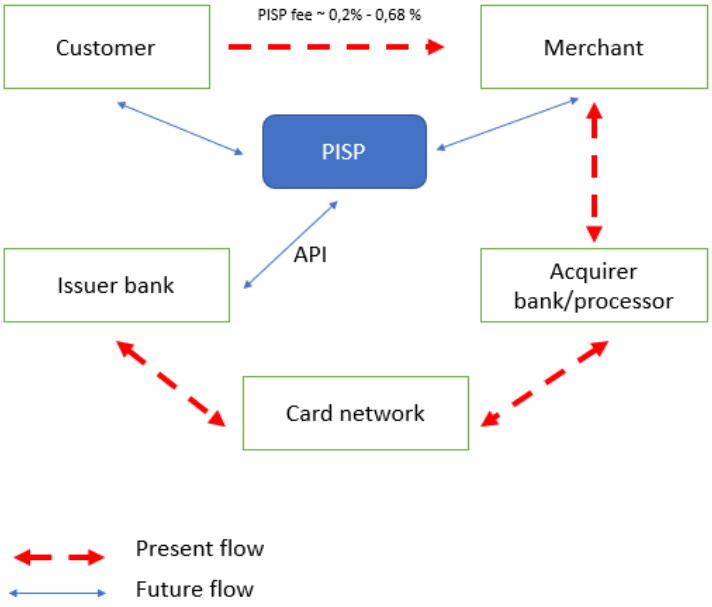
In the PSD2 model, the card network can be completely disintermediated. In such a transaction, payment is initiated by the PISP directly from the customer's bank account through an API call to the originating bank. In Figure 5, we can see how could all interchange and acquirer fees currently received by the issuing and acquiring bank be completely displaced.

Figure 4: Card payment model including fees



Source: Accenture (2016a).

Figure 5: Card payment model including a PISP and fee



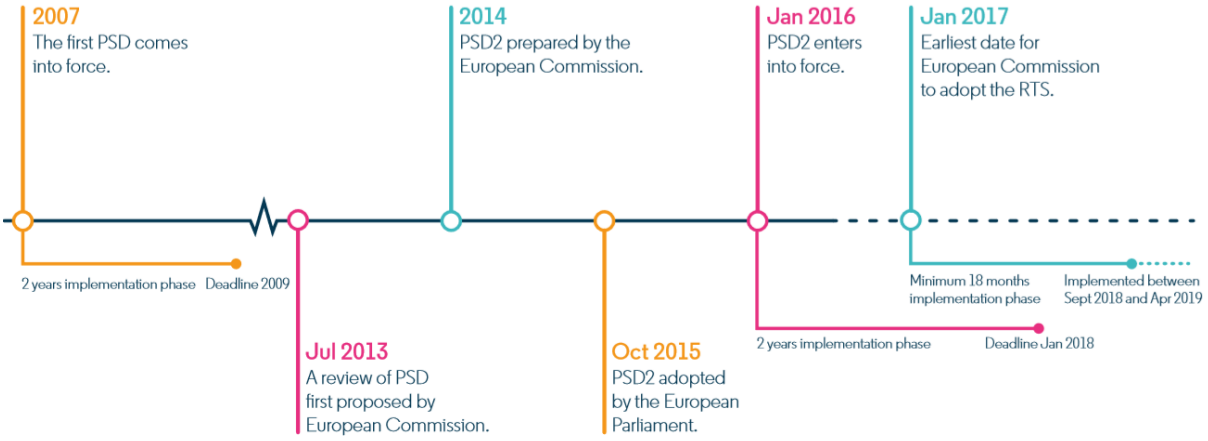
Source: Accenture (2016a).

The severity of card network disruption will correlate with the adoption level of PISP services. The average merchant service charge in the UK is about 0.68% of the transaction value for debit cards. In the PSD2 model, the PISP is the only intermediary to which the charge is going to be distributed. Consequently, we can expect that PISP services will be offered at a significant discount to the existing charges and the industry will drive those downwards. Due to this fact, the merchants will be incentivized to advocate the use of PISP service instead of card payment. The PSD2 model also removes the liquidity risk for the merchant with the faster clearing of the

funds. Furthermore, the merchants with sufficient size have the opportunity to establish themselves as a PISP and consequently retain all of the merchant service charges. Under PSD2, interbank transfers apply to POS transactions in case, where PISP is integrated into a contactless mobile wallet application. There is a high possibility that mobile wallet providers, such as Apple Pay, will consider a transition to the PISP model in the future. These kinds of developments will reduce the volume of card-based transactions within Europe and related revenue streams for banks (Accenture, 2016a).

Timeline and critical implications of PSD2

Figure 6: Payment service directive timeline



Source: EVRY (n.d.).

In Figure 6, we can see that the initial deadline for the compliance with EU's PSD2 was January 2018 and has passed with no significant impact. Banks have required extensions to the PSD2 compliance deadline to complete the complex cultural and technical shift to open API banking and to comply with European Banking Authority's Regulatory Technical Standards (hereinafter: RTS) on strong customer authentication and secure open standards of communication. These regulations will govern how banks permit access to customer data to the authorized third-parties. The deadline to be compliant with RTS is 14.9.2019 and consequently, this is the date when PSD2 officially kicks-off (Banco Bilbao Vizcaya Argentaria, 2018).

3.3 Open banking initiatives

There are many open banking initiatives around the globe (Capgemini, 2017b) and here are a few of them:

1. Bank charter for fintech firms was established in December 2016 in the US and it allows those, which offer loans through online platforms and payment services through applications and online channels to apply for a federal charter to become a special purpose national bank. Such an initiative is expected to reduce cost and complexities of doing business for fintechs while increasing government oversight of the industry.

2. In the US, the customer financial protection bureau has advocated data sharing to improve competition and some banks and industry players have offered API based solutions in collaboration with third-party players.
3. The regulatory framework for fintechs, the US treasury office organization, has launched a regulatory sandbox, which enables fintechs to offer new services under relaxed regulatory oversight.
4. Open API banking regulation in the UK has enabled third-party applications to get access to the bank's customer data to encourage innovation and boost competition. It was transposed before PSD2 in the EU. The initiative is intended to accelerate technology changes in UK retail banking and benefit customers by enabling customized banking solutions.
5. In India, the national payments corporation of India, as a part of the digital India initiative has launched India Stack in July 2016, which is a set of APIs to create a payment ecosystem across various sources.
6. The South Korean government launched a platform to promote open architecture initiatives and to build a competitive ecosystem for all stakeholders.
7. Australian house of representatives standing committee in economics has recommended banks to open up their architecture and share access to SMEs and customer's data to competition by July 2018.

A lot of new competitors in the payment system come from non-financial sectors and are not familiar with the rules, such as, anti-money laundering (hereinafter: AML), which payment companies must obey. Asian regulators were generally supportive of innovation in retail payments but have, on the other hand, emphasized the need to control risks (Creehan & Borst, 2017). In December 2015 the Thai government released the National ePayment Master Plan, which is expected to create an integrated infrastructure for electronic payments, including digital wallets and mobile payments. In August 2016 the Monetary Authority of Singapore released the Singapore Payments Roadmap which outlined regulatory changes that help promote innovations in the payments sector. Hong Kong Monetary Authority announced regulations on digital wallets, which require operators that receive a license, to obey AML standards and to be subject to regulatory examination. In December 2015, the People's Bank of China announced new regulations on non-bank payment accounts which require stricter identification requirements for customers and limits on the number of total payments in a year. Asian regulators are most likely to support innovation in the future on retail payments while putting in place new protection as issues arise.

Regulators have created innovative projects and have designed sandboxes to observe and support the innovators (Brody and others, 2017). Sandboxes usually include the following:

1. Innovation Hub, which helps startups understand and navigate the regulators' authorization process.
2. Cooperation agreements with other regulators to provide cross border assistance.

3. Hackathon events, where banks and technology companies develop prototype solutions for various regulatory problems.

In chapter 3, we have firstly reviewed that regulators have always had a crucial role in the evolution of the financial industry. They provide the system's stability and the protection of customers. Furthermore, regulators have an essential role in nurturing the collaboration between banks and fintechs. They are introducing regulatory sandboxes, which allow financial organizations to test new ideas for a limited period with live customers and loosened regulatory restrictions. Additionally, we have reviewed that PSD2 is enabling the bank's customers to use TPP solutions to manage their finances. Soon users may be using Google or Facebook to pay bills, making transfers and analyzing spendings, while still having money placed in the current bank. Banks will no longer compete only with each other, but also against every TPP, which is going to be licensed to offer financial services. The initial deadline for compliance with the EU's PSD2 was January 2018. Because banks have required extensions to the PSD2 compliance deadline to complete the complex cultural and technical shift to the open API banking and to comply with RTS. Therefore, the deadline was extended to 14.9.2019. Finally, we have reviewed other open banking initiatives around the world such as Bank charter for fintech firms and Regulatory framework for fintechs in the US, Open API banking regulation in the UK, digital India initiative and initiatives from South Korea and Australia.

4 READINESS FOR PSD2

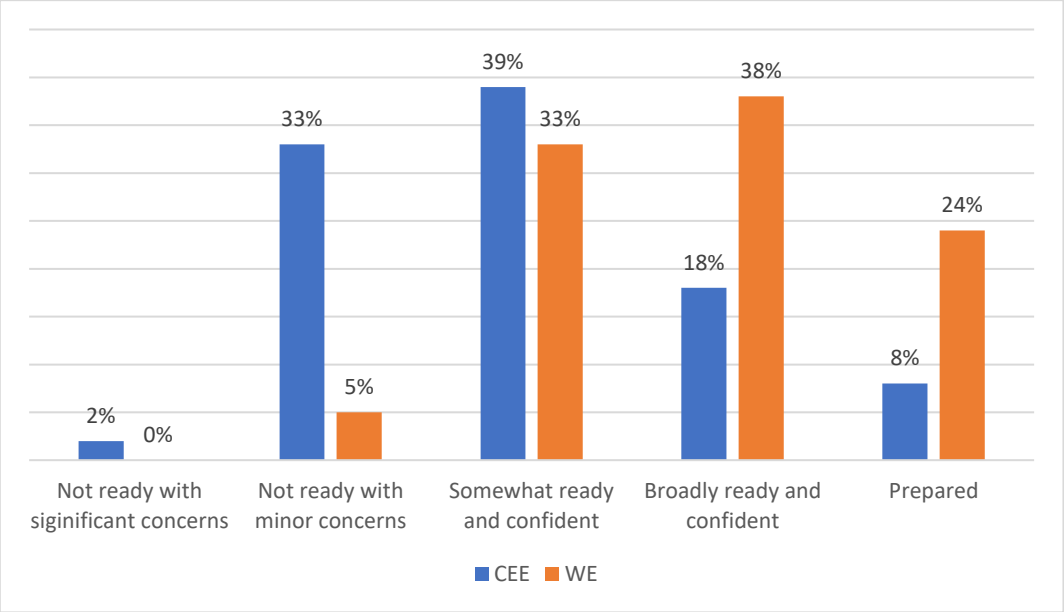
In chapter 4, we will get to know how are European banks prepared to implement PSD2 requirements and what are their positions regarding PSD2. Furthermore, we will get to know four recommended strategies, which banks should pursue to be successful when PSD2 kicks off and finally we will get to know what actions can banks take to be more innovative.

4.1 Comparison between Western and Eastern European banks

European banks are divided into two types based on response to PSD2, challengers and minimalists. 24 Western European (hereinafter: WE) banks and 66 Central European (hereinafter: CEE) banks were involved in the analysis. Challengers are actively preparing for PSD2 and are doing more than to be compliant with regulation. Most of them have a clear vision regarding PSD2 impacts and know how they will respond. Minimalists are aiming to meet the regulatory requirements only and have a lack of strategy perspectives and budget. Furthermore, they do not have a clear vision regarding PSD2 (Delloite, 2018a). WE banks are mostly parent banks of subsidiaries operating across CEE. They share the views of CEE Challengers, but they are significantly more advanced in their compliance preparations. As we can see in Figure 7, there is a difference in compliance readiness to PSD2 between CEE and WE banks. In Figure 8, we can see which banks are better strategically prepared for PSD2. Again, WE banks are better prepared. A majority of WE banks are pursuing a more aggressive approach to gain a more significant market share. Most European banks regard PSD2 as an opportunity, but they

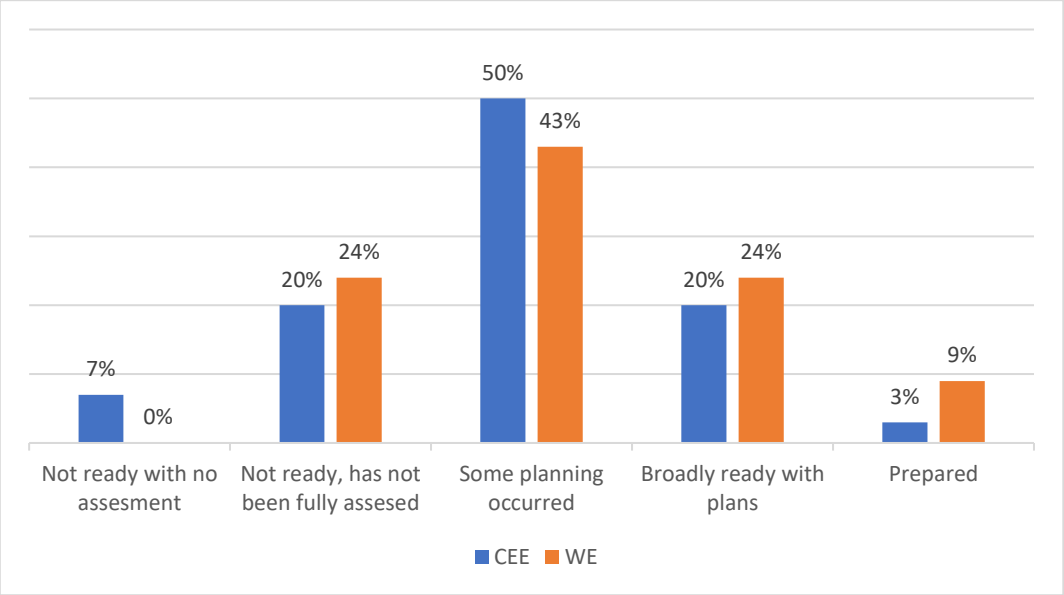
also remain highly aware of the threats to their business models. Banks have so far spent most of the time on responding to PSD2 from a compliance perspective rather than a strategic one. Only a quarter of them feels ready and confident about their strategic plans, which may be caused because many banks see PSD2 as a medium to long term trend that needs to be resolved and most of the banks do not wish to be early movers or adopters. Such adopting explains a relatively high share of banks with a defensive strategy, which is at first to be compliant with the directive and have open options for the future. Most CEE and WE banks expect the most significant impact of PSD2 between a year or three from its effective date. National regulators need to complete the third-party licensing and critical components of the ecosystem, such as API standards, which are still missing in many countries. The overall message from the banks, however, is that PSD2 is not expected to have a booming impact. It is expected that the effects will be gradual and irreversible. Both CEE and WE banks expect that PSD2 will have the most significant impact on retail and SME banking and a large proportion of them are identifying opportunities in payments and customer lending. Half of the participating banks are planning to become a PISP or AISP. Furthermore, around half of those intend to launch new products and services through APIs. About 30% of banks expressed interest in partnering with fintechs or other challengers. 50% of the CEE banks see fintechs and large banks as their most significant threats in the open banking ecosystem. There is a general sense that large banks are the most attractive partners for fintechs. Challenger banks pose a threat more in CEE than in WE. Surprisingly, technology giants are not yet perceived as significant threats, despite the ability to disrupt the payments market.

Figure 7: Comparison of readiness between CEE and WE banks



Source: Delloite (2018a).

Figure 8: Comparison of strategic response readiness between CEE and WE banks



Source: Delloite (2018a).

As we can see in Figure 7 and Figure 8, WE banks are more ready both in PSD2 compliance and strategic response readiness as their CEE peers are.

4.2 Recommended strategies for banks regarding PSD2

PSD2 is creating new opportunities that could enable banks to strengthen their revenues. The earning potential will depend on the strategic options that banks will choose to pursue (Accenture, 2016a). Prospects are the following:

1. Compliance with PSD2 (recommended for banks with low digital ambitions).
2. Facilitation and monetization of API.
3. Provision of advice and new products or services.
4. Expansion of the ecosystem and aggregation of value (recommended for the banks with high digital ambitions).

4.2.1 Compliance with PSD2

Strategic option 1 is basic compliance with PSD2 and nothing more. It is expected that those banks will be exposed to a loss in volume and quality of customer interactions. Competition is increasing in the commercial banking and financial service industry and banks need to have a clear strategy for developing and maintaining their core business (Accenture, 2016a). For some banks, it is a sound decision to focus their business model on providing liquidity and infrastructure services. Consequently, in strategic option 1, the bank will eventually become a utility, which will manage underlying customer accounts, process payment transactions and

provide liquidity and credit services that are offered to customers from third-parties, who will own the customer relationship.

4.2.2 Facilitation and monetization of API

Strategic option 2 is an extension of strategic option 1. PSD2 mandates only to open APIs for account transactions balance data and credit transfer initiation. Following this strategical option, banks could offer additional access via APIs. For example, they could provide customer demographics, identity documentation and also direct debit mandates (Accenture, 2016a). Banks have a choice to extend their API access beyond the minimal requirement and enable customers to retrieve additional data. There are lots of functionalities customers could further access from their TPPs. By taking this kind of approach, banks can collaborate with third-parties to create new products and monetize additional APIs. An example of such cooperation is the sharing of customer's mortgage data and identity documents with a home insurance provider.

4.2.3 Provision of advice and new products or services

Strategic option three is based on leveraging customer insights to provide a customer-centric, digital banking portal. By doing this, a bank can create a customer value ecosystem between a bank and a TPP. Such services are expected to increase customer loyalty and new revenue opportunities for a bank and a third-party (Accenture, 2016a). A bank is expected to improve its ability to sell customer insight by additionally offering PISP and AISP services. In the mortgage application, the monetization of insight includes brokered services such as discounts on a real estate agent, home insurance or electricity provider. The bank receives a fee from the partner, the customer receives a highly relevant and discounted offer and the partner obtains new business at a lower cost of acquisition. A bank can also offer new services such as tailored savings plan for new home decoration. Another monetization opportunity is to aggregate customer transaction data to isolate and identify spending patterns correlated to age, region, store and then selling these insights to business and corporate which are in search of a better understanding of their market. In a case where a bank will operate as a regulated AISP, it would create a portal for multi banked customers to view account and transaction details. If a bank would combine this service with a financial management tool to automatically categorize transactions and enable budgeting, goal setting and data visualization, that would already be an exciting customer proposition. In offering AISP services, the bank benefits from the opportunity to monetize additional features such as integration with ERP system and cashflow management driven by predictive analytics and from increased customer interactions.

The availability of additional customer data from third-parties would also provide the bank with new customer insight, which could increase cross-selling to the customer and potentially identifying their needs before they are even aware of them (Accenture, 2016a). For retail customers, data could be monetized via identification and prediction of customer needs for both financial and non-financial services. An example is an identification of a flight purchase, which

would initiate the bank to offer the customer a holiday loan or a credit card product and add a travel advice service, savings plan or partner referrals. An alternative indicator could involve the identification of excess funds in a customer's accounts at the end of a specified period and initiating a proposal to open a new saving or investment product. In a case where a bank will operate as a regulated PISP, it will have the opportunity to capture an additional piece of transaction revenue while also adding customer loyalty schemes and other cross-selling opportunities. Furthermore, customers are more likely to feel more secure when using the payment service of a bank they know and trust, opposing to using those from new market entrants. The availability of PISP will be dependent on the preferences of the merchant. In e-commerce, merchants will likely form partnerships with selected PISPs based on beneficial fee structures. Large merchants will also probably decide to establish a PISP service themselves and therefore eliminate the intermediary and a merchant service charge. Customers of these PISPs are probably going to be encouraged through the provision of discounts or other loyalty schemes at the point of sale. An example of a bank acting as a PISP is when a customer is purchasing an expensive holiday or flights on a travel website, the bank will have a visibility of the transaction amount, payee's IBAN and customer account balance. At the point of sale, a customer could be offered a pre-approved credit to cover the cost of the transaction or to avoid a shortfall of money between the purchase and next salary payment. Furthermore, a customer could also receive loyalty points for each purchase with rewards and incentives based on his known preferences.

4.2.4 Expansion of the ecosystem and aggregation of value

Strategic option four is based on expanding the ecosystem and it goes further than monetization of APIs and creating value based on customer insights. Banks, which will follow this strategy, will be exposed to more integrated partnerships within and outside of the financial services industry. Such banks will provide an online portal on which they will offer new products or services owned by third-parties. With the help of API infrastructure, such portals will become platforms, which will reflect the customer's everyday needs. A bank could become a center of the ecosystem of both financial and non-financial services and could become a pivotal part of a customer's daily life (Accenture, 2016a). A bank could provide advice, for example, specific buying suggestions, which are based on in-depth customer knowledge and purchasing algorithms. Furthermore, a bank could gather financial and non-financial information to create a solution that customers could use daily. The ecosystem could allow for real-time and geo-located offers for customers on the banking platform. For example, a retail customer who is purchasing a new suit using a mobile wallet could be presented with suggestions for a related complementary product in a nearby location. When the ecosystem expands and customer data from third-party sources such as utility or telecom providers and retailers are available on the banking platform, the proposition for the customer can become much more focused around user experience and convenience, with relevant new services provided in partnership with third-parties.

Most of the banks wish to own a platform, which means taking a strategic approach 3 and 4. The reality is that only a few large and essential banks are expected to build an attractive value-adding API ecosystem, which will be attractive to third-parties (Accenture, 2016a). Banks need to perform a self-assessment analysis in the transition period to the world of open banking and based on the thorough review they can define their desired open banking strategy.

4.3 The way to become an innovative bank

An advanced strategy to be more innovative is to introduce a »fail fast« and »learn quickly« culture in which employees are disruptive and creative. Banks are advised to foster internal collaboration by diminishing department and product closed containers of information. They should organize a flatter organizational structure, which will enable more collaboration and more distributed business decisions (Delloite, 2017). Collaboration with third-parties is one of the crucial factors and ideal partners are the ones whose solutions can yield quick dividends with a long term potential for the bank. Therefore, to fully realize the potential relationship, banks have to match their long term vision with the partner. Partnerships can range from simply sharing information to acquisitions. Furthermore, banks need to structure their relationships with their partners, for example, through joint ventures, strategic stakes and acquisitions.

Banks that will not search for ways to transform will likely be stuck in trying to be modern and will be on a slow path to extinction (McKinsey & Company, 2015b). For most banks, requirements for innovation fall into two categories. Firstly, reimagining the customer relationship and integrating digital approaches into the bank's core. Banks that are already digitally strong can innovate with the help of third parties but should manage their innovation carefully. Secondly, banks should put a customer in the center. Many times banks and also companies, in general, are centered around their products and do not even know whether they are solving customer's pains or not. To improve the customer relationship banks need to shift their cultures to embrace digital and changing customer expectations. If a bank cannot retain and attract the right people, the shift is going to be harder. The proper workers to perform the digital transformation are millennials, whose priorities are flexibility, agility and innovation. A bank should find this kind of people and put them in teams and show others their quality and make them visible to the rest of the organization. It is critical to invest in engaging employees who are often the main representatives of the brand to the customers. Furthermore, banks need to improve their brands. The old messages of strength and stability are no longer enough. Younger generations put their trust in emotionally appealing brands and technology. Banks should preserve equity in their brand but should also appeal millennials. For a retail customer, opening a current account is the most crucial factor for a long term relationship. From a bank's point of view, about 75% of all cross-sell opportunities arise in the first three months of a relationship. Therefore it is very important to create a compelling user experience at the start of the relationship. There are four functions banks should focus on (McKinsey & Company, 2015b):

1. Data and IT architecture. The banks currently realize only 10 to 20% of the potential value of their data. Banks should design a new model for data governance and management and define the ownership and responsibilities and appoint a chief data officer. Furthermore, they should innovate data technology and architecture to extract essential customer data.
2. Banks will need to dramatically lower their costs to stay price competitive with other players. The current estimation is that banks' costs exceed competitors' costs on average by 25 to 30%. Digitalization is the best weapon, but there is also a simplification of product portfolio, outsourcing and IT transformation.
3. Change of the current risk management approaches to machine learning techniques. The message is that banks should automate processes to cut costs and improve efficiency.
4. Banks should provide multichannel connectivity and use technology and analytics to improve the user experience, develop segment-specific pricing and find emotional connections with customers at lower costs as today.

Banks have to be willing to go outside of their comfort zones and be ready to redefine their product entirely and start from scratch (Capgemini, 2017a). The best place to start is in the identification of customer needs, investing in the company's culture and talented staff. Critical success factors for applying innovation in companies are the following:

1. Executive leadership support.
2. The cultural mindset of the organization needs to be agile and innovative.
3. Clear strategic vision and plan.
4. Willingness to take calculated risks.
5. Willingness to think outside of the box and challenge traditional business models.
6. Strategic budget allocation.
7. Willingness to replace legacy technology.
8. Ensuring innovation plan and business are in sync.

BBVA started to transform the process in 2007 when it invested in the digital infrastructure. The bank has made considerable progress, but they are aware that it has to be a constant process to keep pace with technological changes (Gonzalez, 2017). They have built data protection architecture and advanced cybersecurity on the platform. Furthermore, the platform can extract greater knowledge about the customers and therefore, the bank can create meaningful products and services. Along with the technological transformation, BBVA quickly understood that change involves all their activities and especially corporate culture. In 2014 they launched a digital banking division to handle the management of the transformation process and in 2015, a new organizational structure was created. Spurring results and providing necessary resources and skills to compete in the modern banking industry successfully, were two fundamental goals of a new structure. BBVA was able to speed up products and services, attract digital talents and develop agile, flexible, entrepreneurial and collaborative corporate culture. BBVA is also maintaining many partnerships with cutting edge companies. They have teams that are performing researches in design, data architecture, big data and process engineering. Even though they have changed their corporate culture, their ultimate focus remains on clients. Their

efforts are aimed to define the relation with their customers. BBVA is placing the technology and information in the customer's hands and subsequently improves relationships with them. They have decided to become a knowledge bank that uses data to gain a better knowledge of their clients and therefore help them make financial decisions while also providing cutting edge personalized solutions in a flexible, agile and transparent manner. BBVA's purpose is »To bring the Age of Opportunity to everyone«. Such a powerful transformation can succeed if there is a clear vision, committed leadership and firm principles of prudence, integrity and transparency at all stages in the company.

A large part of building innovative business cases is to observe the fintech ecosystem (Beach, 2018). There are people in the BBVA who keep track of new ideas and players. Therefore BBVA specifically addresses Open Talent competition, which gathers the greatest fintech startups to the challenge by offering them the funding, mentorship and global customer base. It is of significant importance that BBVA adopted a cultural change in which they actively engage with the disruptors of the ecosystem. They also have interesting ventures to partner and collaborate externally, for example with Simple Bank, Maldiva, Spring Studio, Holvi and Atom Bank. BBVA's strategy is to solve the most common banking issues their customers have.

In chapter 4, we have firstly reviewed that European banks are divided into two types based on response to PSD2, challengers and minimalists. Challengers, which are mostly WE banks, are actively preparing for PSD2 and are doing more than to be compliant with regulation. Most of them have a clear vision regarding PSD2 impacts and know how they will respond. Minimalists, which are mostly CEE banks, are aiming to meet the regulatory requirements only and have a lack of strategy perspectives and budget. Challengers are in general better prepared to comply with PSD2. Furthermore, we have reviewed that banks should follow four different strategies based on their digital ambitions. Compliance with PSD2, facilitation and monetization of API, provision of advice and new products or service for only financial services and expansion of the ecosystem and aggregation of value within and outside of financial services. Finally, we have reviewed what actions should banks take to be competitive in the digital era.

5 FUTURE OF BANK TO CUSTOMER RELATIONSHIP

In chapter 5, we will get to know what transaction and relationship banking are, how does IT influence them and what is the expected role of a physical branch in the future.

5.1 Influence of IT on relationship and transaction banking

Transaction banking techniques are established on hard, hence measurable and indisputable information and are mostly used by large banks. Activities are performed on a one time focus with a single client, are scalable and can be easily reflected on other customers (Marinč, 2013). On the other hand, relationship banking techniques are based on soft information and are mostly used by smaller banks. Through multiple interactions, relationship banks gather specific

information about a customer. Such information is hard to quantify and costly to produce. But this explanation is too simple. Each of the techniques contains a transaction and a relationship component. Large banks are better in using the transaction, size-related component and small banks, on the other hand, are better in the relationship component. The critical difference in techniques is that relationship banks take risks with substantial knowledge about a client. The bank gains this knowledge and soft information through an ongoing relationship. IT helps banks to keep better track of the relationships and therefore improves the monitoring of risk. Consequently, relationship bank is more able to develop tailored services to individual needs and even increase the relationship with the client. On the other hand, IT allows banks to capitalize on scale and scope economies, which are more obvious in transaction banking. With better IT, transaction banks are more able to process and transfer quantifiable data. For example, banks use digitized credit scoring models when approving loans to retail or SME customers. Furthermore, IT and online banking help relationship banking because clients, which adopt online or mobile banking perform more transactions and are less inclined to switch. Relationship banks should use digital banking complementary to a strong branch network because through the internet a bank cannot get as much soft information as it would through the meeting in the branch. The use of IT improves both transaction and relationship banking, but efficiency improvements are more significant for transaction banking activities. Relationship oriented banks should use IT to build long term relationships with their customers and not completely give in to the transaction nature of banking.

Financial markets prosper when they push financial institutions away from relationship banking (Boot, 2017). Doing transactions has become easier and banks have therefore increased these activities. Relationship-based activities depend more on employing human capital and engaging with potential clients. It is easier for banks to mobilize resources and engage more in transaction-oriented banking opposingly to relationship banking activities. IT has a significant impact on relationship banking and can add value to it, particularly the way information is obtained from data analysis and interactions via social media. Payment systems and distribution are changing and it is already affecting the business and competitive positioning of banks.

Strong user experience will lead to attracting customers, which will directly help relationship banking. Satisfied customers will buy more products over time. In banking, the idea is to create an experience that enables customers to get what they want, starting with easy access to relevant information, fast and efficient transaction processing and tailor-made service across all channels (Ernst & Young, 2017b). According to the EY survey, 36% of customers would provide more personal information if the bank would provide better solutions. Digital channel is not everything for all customers, but in general, it is critical, regarding the fact that more and more millennials and younger generations are entering commercial banking services.

Banks should not think of IT development only to save on costs, but even more importantly, to increase the relationship component of their services (Jakšič & Marinč, 2015). Relationship banking is facing considerable challenges due to IT-driven innovations, which have increased efficiency in transaction banking (payments, clearing systems, internet banking and transaction

lending) due to diminishing the factor of distance. The core of relationship banking became how to select the right people who will know how to extract and evaluate soft information most effectively.

5.2 Branch of the future

Most of the banks are not able to completely remove a branch channel. Functions like a change of address, password reset or high-value payments must still in some cases be done in the branch. Nowadays, mobile banking is the fastest-growing channel in retail banking and even though it is on the rise, the physical presence of a branch still has meaning among customers today (Citi GPS, 2016). A lot of customers value the consultation about investment advice or about getting a mortgage. It is expected that branches will not look as they do today but will be hubs where customers will meet with advisors. A branch is only one of the channels, which has an important but diminishing role. An increasing number of customers are satisfied with mobile channels and, likely, banks will eventually look like Uber. Costs associated with running a branch network and associated staff represents around 60% of a total cost base for a bank with an extensive branch distribution network which also includes errors due to manual processing jobs. Between 60 and 70% of retail banking, employees are doing manual processing jobs. If at least some of those jobs are replaced by automation, the costs for the bank could drop significantly. A key function of a physical branch presence is client acquisition. Many traditional banks and internet-only banks have digital onboarding, which allows a customer to open an account online. But often, many banks still require a physical visit to the branch for identity verification due to particular regulations, such as KYC for example. The following statistics from 2015 shows how US customers research and buy banking products (Citi GPS, 2016):

1. In-person (66%);
2. Online desktop/laptop (21%);
3. By phone (5%);
4. Online cell phone (3%);
5. Online tablet (3%);
6. By mail (2%).

The number of bank branches in Europe fell from 186,255 in 2008 to 149,353 in 2016 (Jakšič & Marinč, 2015). Humans are still critical in banking, but their role needs to be reconsidered. Banks need to understand how people think and act. Furthermore, they need to understand herding behavior, behavioral biases and people's emotions. Nowadays information spread quickly across social networks and subsequently makes society more exposed to herding and information manipulation.

It is expected that the number of branches will decrease furthermore in the future, but it is also likely that innovative banks will create an ecosystem of value-added services, which will also include non-financial activities. In the new competitive environment, the new services will be

a benefit for the bank and will increase stickiness and loyalty with their customers (Ernst & Young, 2017b). New potential services are the following:

1. Education about retirement savings, buying a home or college tuition.
2. Consulting services, business planning, networking and market intelligence for SMEs.
3. Predictive analytics services, which rely on artificial intelligence or machine learning.
4. Unique offerings for particular segments, for example, teenagers, frequent travelers, retirees or expatriates.

In chapter 5, we have firstly reviewed that transaction banking techniques are established on hard, hence measurable and indisputable information and are mostly used by large banks Activities are performed on a one time focus with a single client, are scalable and can be easily reflected on other customers. Relationship banking techniques are based on soft information and are mostly used by smaller banks. Through multiple interactions, relationship banks gather specific information about a customer. Furthermore, we have reviewed that IT helps banks to keep better track of the relationships and therefore improves the monitoring of risk. Consequently, relationship banks are more able to develop tailored services to individual needs and even increase the relationship with the client. On the other hand, IT allows banks to capitalize on scale and scope economies, which are more obvious in transaction banking. The use of IT improves both transaction and relationship banking. Finally, we have reviewed that branches will not look as they do today but will be hubs where customers can meet with advisors. A branch is only one of the channels, which has an important but diminishing role. An increasing number of customers are satisfied with mobile channels and, likely, banks will eventually look like Uber. It is expected that the number of branches will decrease in the future, but it is also likely that innovative banks will create an ecosystem of value-added services, which will also include non-financial activities. In the new competitive environment, the new services will benefit the bank and will increase stickiness and loyalty with their customers.

6 READINESS FOR NEW GENERATION OF BANKING SERVICES

In chapter 6, we will get to know what is the adoption of mobile-only and alternative banking solutions. Furthermore, we will get to know which customers should banks focus on, how are customers from the UK responding to changes in the banking industry and finally we will get to know the digital awareness of CEE banks' customers and how do they react to changes.

6.1 The adoption of alternative banking solutions

58% of customers using a mobile bank would change a provider if they could perform more banking-related actions through a mobile phone. Digital channels, such as mobile phones, tablets and laptops, are becoming the primary tool for customers to talk to the bank. They are preferred by 66% of customers to initiate a domestic payment order or to check the balance.

Competitors, which embrace a digital transformation, can differentiate themselves by offering improved customer proposition, which combines better user experience and enhanced price transparency (Delloite, 2018b). According to Delloite, if a provider is more transparent in prices, offers a higher number of functionalities in the mobile banking app and its solutions are more comfortable to use, then half of the respondents would be inclined to switch the financial provider. Furthermore, 34% of those respondents would additionally be willing to use mobile-only solutions. Respondents have shown interest in viewing and managing accounts from different providers and using personalized money management tools. Furthermore, they have shown interest in using an interface of a non-traditional provider to access their banking services.

Most influential factors which would sway people to use to a mobile-only bank are the following (Delloite, 2018b):

1. Better returns on current or savings account.
2. Greater rewards than the one offered by a current bank.
3. More banking-related functionalities via a mobile bank.
4. More transparent pricing than the one offered by the current bank.
5. Better customer service over the phone than the one offered by the current bank.
6. The mobile bank which is more comfortable to use than the one offered by the current bank.
7. More personalized service than the one offered by the current bank.
8. To be possible to access mobile bank through biometrics alone.
9. Better budgeting tools and predictive tools than the one offered by the current bank.
10. The provision of financial services products from third-parties through the mobile bank.
11. A possibility to ask questions via social media.
12. Ability to view and manage all accounts from different providers.
13. Ability to apply for loans, mortgages or credit cards using personal transaction data to get better deals.
14. Ability to receive personalized offers from retailers based on the user's transaction history.
15. Ability to receive personal financial advice based on personal transaction data.

Customers are becoming much more comfortable with online-only financial services. Subsequently, customers are also more satisfied with managing more digital tools from several financial services providers (Ernst & Young, 2017b). According to analysis, more than 75% of customers hold products or services with at least three providers and more than 25% with at least four. 71% of customers believe that technology has enabled having products across multiple financial providers. Banks are regarded as providers of less easy to use digital solutions, particularly by digitally savvy customers. Customers are more willing to share their personal information if there is better user experience, engagement and trust. According to the survey, 36% of customers would provide more personal data if the banks would anticipate their needs better. Only 29% of customers disagreed with that proposition. Many customers still want personal interactions when they are looking for a new product or have questions about it. Ironically, digital customers have a perception that banks are lacking in digital capabilities,

while branch users feel pushed towards digital channels. Digital is not for all customers but is a critical and most competitive playground.

Fintech adoption across age brackets is the biggest between 25−34 and counts for 48% of the respondents. The second biggest segment is 35−44 with 41% and the 3rd one is 18−24 with 37% (Ernst & Young, 2017c). For those who do not use fintech solutions yet, there are four main reasons for it. Firstly, they are either unaware of its existence. Secondly, there is no need for fintech solutions, thirdly, they rather use a traditional financial service provider, or finally, they did not see the advantage of a fintech over the financial service provider. Customers decide to use fintech based on their behaviors and preferences. Mostly fintech users are digitally aware and are more likely to use digital services across many areas of their lives. The number of digitally savvy customers will increase in time and consequently, the digital approach in financial services will eventually be the norm.

Top reasons to use digital banking services are the following (Capgemini, 2017a):

1. Quick account opening.
2. Ability to digitally update account details.
3. Location-independent and 24/7 access to aggregated information on all financial products.
4. Digitally update transaction limits.
5. Real-time alert notifications.
6. Real-time information to better manage financial life.
7. Initiate or close a loan from digital channels.
8. Real-time loan quotes on a mobile phone.
9. Transparent fee structure.

An increasing interest in fintechs and challenger banks has changed the industry. Traditional banks are still the first choice for most customers, but their relevance is eroding (Ernst & Young, 2017b). Globally, 6% of customers have already moved their main financial service away from a traditional bank and the rate is even higher in emerging markets. Furthermore, 4 out of 10 customers are expressing excitement about what challengers can provide. 42% of customers have used an online or mobile-only non-bank solution in the last year. 21% have not used such a company but would consider one in the future. 41% of customers would change financial service provider if another offered a better experience and only 23% disagreed with that. Openness to switching is mostly applicable to digitally savvy customers, but these represent a large amount of customer base in any bank. 40% of respondents described themselves as being comfortable with online-only financial services. Curiosity and excitement over banking solutions and sophisticated digital tools mean that customers are more likely to leave traditional banks. Fintechs and other challenges are expected to enhance their offerings and the overall experience even further. 62% of customers agreed that being able to switch easily between different ways of interacting with a bank is important.

6.2 Banks should focus on millennials and baby boomers

Baby boomers are the generation born between 1946 and 1964 and in the US, they comprise more than 20% of the population. For a long time boomers made up the most substantial part of the population, but since 2015, millennials outpaced them. Due to their openness to new forms of technology, millennials are frequently the target market of startups and larger institutions. But the catch is that boomers account for half of the customer spendings and companies cannot afford not to target them (Banco Bilbao Vizcaya Argentaria, 2017). Many boomers are forced or decide to work longer and live active lifestyles and are therefore earning and spending more money. For example, the number of people aged between 65 and 69 that are employed has doubled since ten years ago.

It is challenging for banks to meet the expectations of a particular group of customers. To meet proper expectations, banks must understand what motivates and what matters to their customers (Gallagher, 2018). Millennials are the generations that are set to dictate the direction of the banking industry and are therefore long term customers. Millennials have lived through a massive shift in attitudes towards banks by growing up in the 2008 financial crisis. 71% of millennials in the USA say that they would instead go to the dentist than listen to what banks are saying. Millennials are satisfied with performing financial services online, but they are also open to advice when they need it and they want their bank to help them. 90% of millennials aged from 18 to 25 would be happy if their bank offered loyalty programs and reward schemes with retailers. Furthermore, 70% of them would appreciate recommendations from their financial institutions based on their banking history and similar customers. Millennials do not want to micromanage their money on day to day basis but would rather have innovative products that will help them with cash flow, budgeting and savings with targeted and appropriate advice and support.

Millennials are the generation born between 1980 and 2000. They are rapidly gaining economic strength, social influence and political power. Consequently, they represent the most significant challenge and the highest growth potential for banks (Fair Isaac Corporation, 2014). Millennials are more likely to consider non-traditional payment companies. Mobile payment usage such as Apple Pay, Google Wallet and others is still low but is about to grow among millennials rapidly. Furthermore, when asked about P2P lending, they are ten times more likely to use it than people, who are over 50 years old. Many of surveyed customers expressed interest in looking at non-traditional banking providers. Bank's customers want to receive relevant and personalized communications from their banks. However, nearly half of the surveyees do not believe they are receiving proper offers. 75% of customers said that they are not receiving too many offers from the bank. Therefore they are open to more communication. Banks should take advantage of the rich transaction information they possess to make better offers and communicate them in the preferred channel. 43% of millennials argue that banks do not communicate with them in their preferred channel. These are email, text messages, bank website and mobile applications. Hence, millennials conduct most banking-related activities via digital channels. One interesting fact is that mobile applications are not for all millennials. According to the report, websites are

more critical than mobile apps. Surveyed customers would instead check their balance and perform internal or external transfers via the bank's website. One might expect that millennials prefer SMS or mobile app notifications for communications, but that is not always the case. Often email is better than text or push. Therefore, banks need a comprehensive and analytical based communications infrastructure to understand each customer and deliver the right message through the right channel.

Millennials will make up over 40% of the workforce by 2022 (American Bankers Association, 2018). Compared with older generations, millennials have had a rough start and are earning less, which is leading them to delay major life events. They are working to build their finances, 86% put money into savings each month and they are set to inherit around 35% of today's household net worth over the next 30 to 40 years, but they do not think banks have what they need. 53% do not think that their bank offers anything unique and 68% say that the way we access our money will be different in 5 years. Millennials are three times more likely to open a new account with their phone rather than in person. 61% said that mobile has made tracking and spending their money better.

6.3 UK customer reactions on PSD2

53% of account holding adults would be comfortable with third-parties initiating payments on their behalf. 24% are indifferent and 23% disagree. It is expected that one in every three online debit card transactions and one in every ten online credit card transactions will move to a PISP by 2020. Trusted brands are expected to win the PISP market share. 76% of survey respondents would choose traditional bank as their first preference for a PISP provider (Accenture, 2016b). Followers are online retailers, social media companies, aggregators, fintechs, challenger banks, traditional retailers, telecommunication companies and utilities. While customers are open to using PISP services, companies that are not already performing payment activities will struggle to gain market traction. Security is a critical factor for the adoption of PISP services. 94% of customers stressed that any new payment service must be at least as secure as the current method they use for paying. Online discounts and incentives are not critical factors in deciding on the adoption of PISP services. Merchant's strategic approach is vital. Large merchants and the partnership they form will be a crucial factor in the adoption of PISP services. New entrants may not be able to gain a critical customer base unless they offer compelling pricing and operating model to merchants. According to Accenture, large merchants and retailers will become PISP themselves and will actively encourage existing customers to use their own PISP service. Furthermore, trusted brands are also likely to win the AISP battle. Traditional banks are the first preference for 65% of the survey respondents for AISP services. Trust remains essential when handling banking information. 70% of respondents would not trust a third-party as much as a bank. A critical point for AISPs to be successful is to have a PFM tool, which will boost their attractiveness. Customers would be very attracted to a service that could warn them if they were likely not to be able to perform a payment. Corporate and SME customers will be heavy users of AISP, according to Accenture. The main feature for them is a multi banking

solution and their need for real-time account information to view their financial position. To sum up, traditional banks and online retailers have a head start over other competitors according to Accenture's study on UK customers.

6.4 Central and Eastern European customer analysis

CEE markets are highly differentiated regarding banking channel usage. For example, typical branch centric are Bulgaria and Romania in which more than 90% of customers are active in the branch and less than 20% are digitally engaged. On the other hand, in the Czech Republic, there is more than 70% of digitally active customers. Poland, Slovakia and Hungary are in the transition period, a lot of customers are visiting the branch, but more than 50% are using digital channels as well. In general, 55% of CEE customers represent traditional customers, who are visiting a branch. 20% use only digital channels and 25% use both. 18% of customers are "branch hostages". They would prefer to perform all their banking activities online, but they are forced to go to the branch (Delloite, 2018b). They represent approximately 11 million people and are a significant opportunity for PSD2 digital challengers. They will need to build trust among customers to leverage the upcoming market opportunities. Only 26% of CEE customers would feel comfortable to share their account information with an institution other than their primary bank. CEE customers are most likely to use aggregated account management and aggregated financial dashboards as new services enabled by PSD2.

In chapter 6, we have firstly reviewed that digital channels such as mobile phones, tablets and laptops are becoming the primary tool for customers to talk to the bank. They are preferred by 66% of customers for initiating a domestic payment order or to check the balance. If a provider is more transparent in prices, offers a higher number of functionalities in the mobile banking app and its solutions are more comfortable to use, then half of the respondents would be inclined to switch the financial provider. Furthermore, 34% of those respondents would additionally be willing to use mobile-only solutions. Moreover, we have reviewed that the most significant adoption of fintech is between 25 and 34 years of age. Banks should focus on the generation of millennials due to their openness to new forms of technology. They are frequently the target market of startups and larger institutions. But the catch is that boomers account for half of the customer spendings and companies cannot afford not to target them. Additionally, we have reviewed that 53% of account holding adults from the UK would be comfortable with third-parties initiating payments on their behalf. 76% of survey respondents would choose traditional bank as their first preference for a PISP provider. Trusted brands are also likely to win the AISP battle. Traditional banks are the first preference for 65% of the survey respondents for AISP services. Finally, we have reviewed that CEE markets are highly differentiated regarding banking channel usage. For example, typical branch centric are Bulgaria and Romania in which more than 90% of customers are active in the branch and less than 20% are digitally engaged. On the other hand, in the Czech Republic, there is more than 70% of digitally active customers. In general, 55% of CEE customers represent traditional customers, who are visiting a branch. 20% use only digital channels and 25% use both. 18% of customers are "branch hostages".

They would prefer to perform all their banking activities online, but they are forced to go to the branch. They represent approximately 11 million people and are a significant opportunity for PSD2 digital challengers. Only 26% of CEE customers would feel comfortable to share their account information with an institution other than their primary bank. CEE customers are most likely to use aggregated account management and aggregated financial dashboards as new services enabled by PSD2.

7 THE USAGE OF ALTERNATIVE BANKING SOLUTIONS IN SLOVENIA

In chapter 7, we will get to know what is the usage of alternative banking solutions among Slovenians and we will test 3 hypotheses regarding the usage of alternative banking solutions. We will get to know the details of the performed survey, what is the purpose of it, its results and statistical analysis. Furthermore, we will get to know what is the most significant independent variable which determines that one has used an alternative banking solution in the last six months. Finally, we will find out if Slovenians are ready to use PSD2 solutions.

7.1 Survey settings

The online survey questionnaire, which is comprised of 11 questions, was prepared only in the Slovenian language. It was created with the online survey tool www.1ka.si. The survey was active from 2.3.2019 to 26.4.2019. 440 people have opened the survey and 238 of them successfully finished it. I have contacted surveyees through email and social media.

Email, containing a link to the survey, was sent to people working in the following companies:

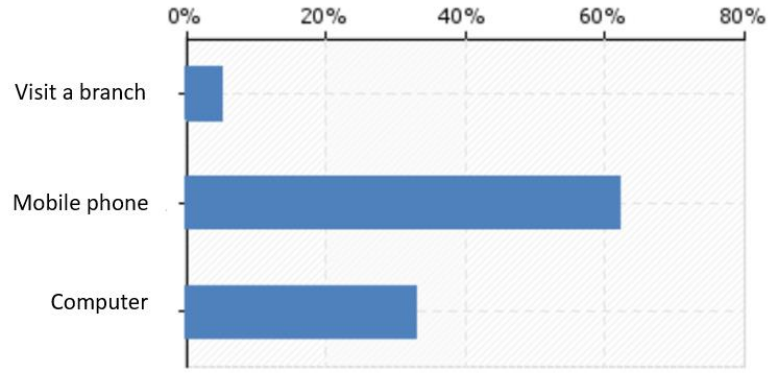
1. Halcom's working community (Halcom is a digital banking software provider to the banking sector).
2. Elit'avia's working community (Elit'avia is a company whose business are personalized aviation services).
3. SODO's working community (SODO is a system operator for distributed electricity network).

I was able to distribute the email due to my connections in those companies.

Additionally, I have posted a link to the survey on my Facebook and LinkedIn profile and therefore, it was available to people who are my connections on these social media platforms. Moreover, some of my friends shared the post on their profiles and Facebook groups. Subsequently, a larger group of people was able to reach the survey. Average time to complete it was 2 minutes and 20 seconds.

7.2 Results of the performed online survey

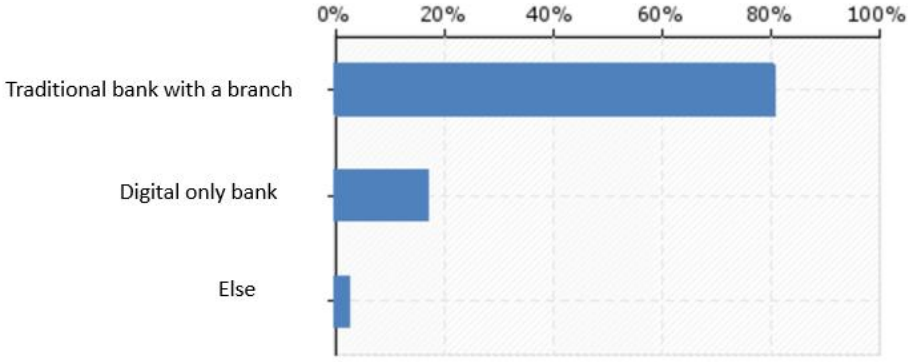
Figure 9: Question 1 (Q1), which of the following options do you prefer to make a payment or to check account balance?



Source: own work.

In Figure 9, there is a representation of results regarding what option do surveyees prefer to make a payment or to check the account balance. The question was mandatory and 238 surveyees responded to the question. 12 of them (5%) prefer to go to the branch, 148 of them (62%) use their mobile phones and 78 of them (33%) use a computer.

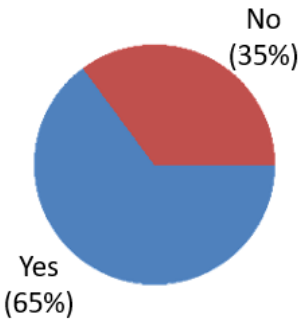
Figure 10: Question 2 (Q2), at which financial institution do you hold an account, which you use the most?



Source: own work.

In Figure 10, there is a representation of results regarding at which financial institutions do surveyees hold an account, which they use the most. The question was mandatory and 238 surveyees responded to the question. 192 of them (81%) hold the main account at a traditional bank, 40 of them (17%) hold the main account at an alternative institution and 6 of them (3%) use both options the same.

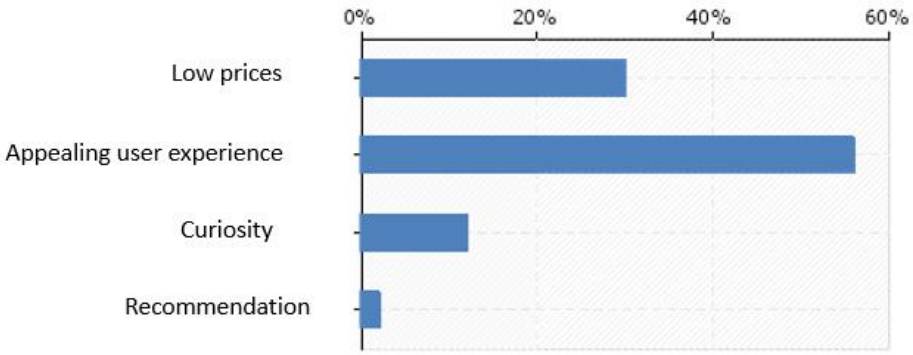
Figure 11: Question 3 (Q3), have you used an alternative banking solution in the last six months?



Source: own work.

In Figure 11, there is a representation of results regarding whether surveyees have used alternative banking solution or not. The question was mandatory and 238 surveyees responded to the question. 154 of them (65%) used alternative banking in the last six months and 84 of them (35%) did not.

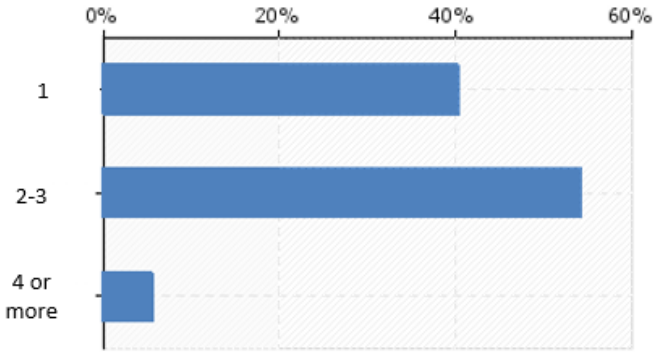
Figure 12: Question 4 (Q4), what persuaded you the most to use an alternative banking solution?



Source: own work.

In Figure 12, there is a representation of results regarding what persuaded surveyees the most to use alternative banking solution. Question 4 was optional and available for those who answered »Yes« in Q3. 151 surveyees responded to the question. 45 of them (30%) were persuaded by low prices, 85 of them (56%) by appealing user experience, 18 of them (12%) by curiosity and 3 of them (2%) by recommendation.

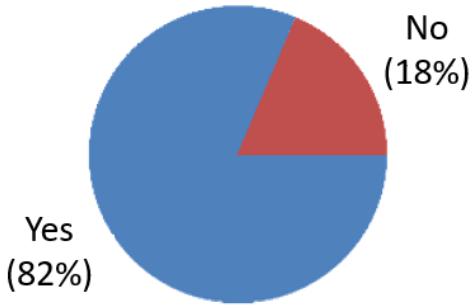
Figure 13: Question 5 (Q5), how many current accounts do you have?



Source: own work.

In Figure 13, there is a representation of results regarding how many current accounts do surveyees have. The question was mandatory and 238 surveyees responded to the question. 97 of them (41%) have one, 128 of them (54%) have two or three and 13 of them (5%) have four or more. The question serves as a scale for financial education. The more accounts one has, the more he is financially educated.

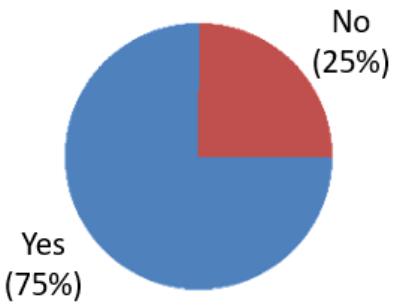
Figure 14: Question 6 (Q6), would you use a solution, which would enable you to access all your accounts and have an overview of consolidated balance in one place?



Source: own work.

In Figure 14, there is a representation of results whether surveyees would use a solution, which would enable them to access all their accounts and have an overview of consolidated balance in one place. The question was mandatory and 238 surveyees responded to the question. 194 of them (82%) would use such a solution and 44 of them (18%) would not.

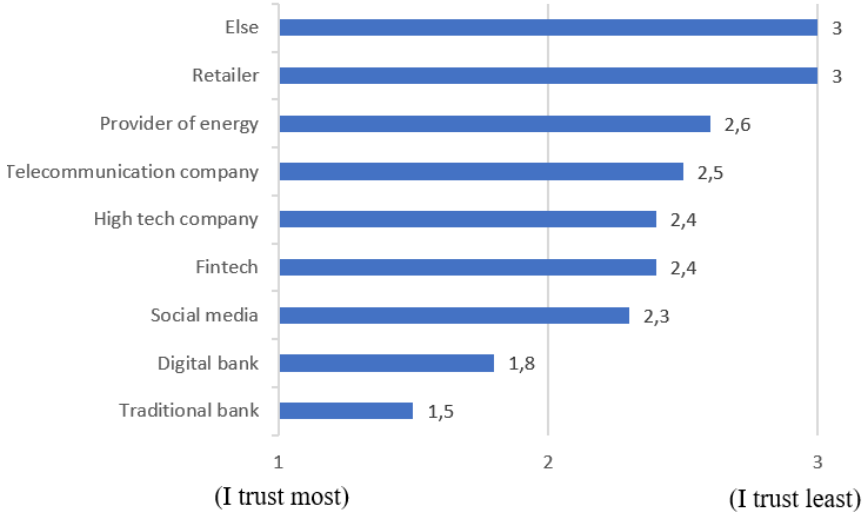
Figure 15: Question 7 (Q7), in the solution mentioned in Q6, would you use the possibility to pay from any of the connected accounts?



Source: own work.

In Figure 15, there is a representation of results whether surveyees would use the possibility to pay from any of the connected accounts in the solution mentioned in question 6. The question was mandatory and 238 surveyees responded to the question. 179 of them (75%) would use such a solution and 59 of them (25%) would not.

Figure 16: Question 8 (Q8), if you were using the solution mentioned in Q6 or Q7, which of the following providers would you trust the most? (choose 3 and rank them from 1–3, where 1 is "I trust the most")

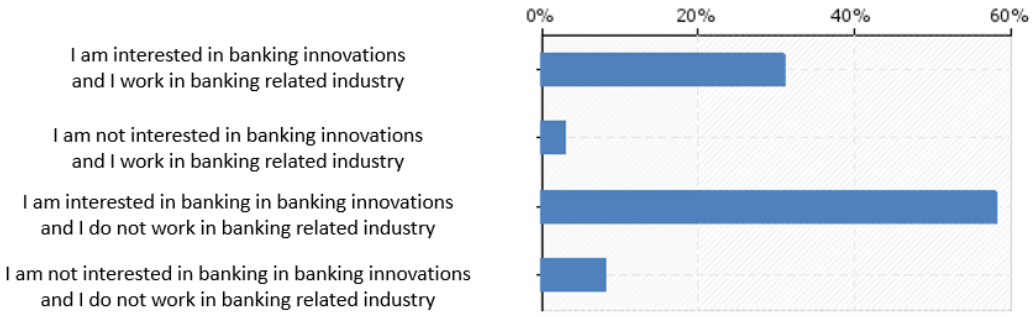


Source: own work.

In Figure 16, there is a representation of results regarding who would surveyees trust the most if they would use a solution which would enable them to access all their accounts in one place and have an overview of consolidated balance or pay from any of the connected accounts. Score 1 is the most trusted and score 3 is the least trusted. Question 8 was mandatory and available only for those who answered »Yes« in Q6 or Q7 and 197 surveyees responded to the question. 106 of them (54%) would trust traditional bank the most, 63 of them (32%) would trust digital-only bank the most and 13 of them (7%) would trust high technological company the most. Furthermore, 13 of them (7%) would trust fintech the most, 1 of them (1%) would trust the

energy provider the most, 1 of them (1%) would trust telecommunication company the most and nobody would trust a social media company, a retailer and other providers.

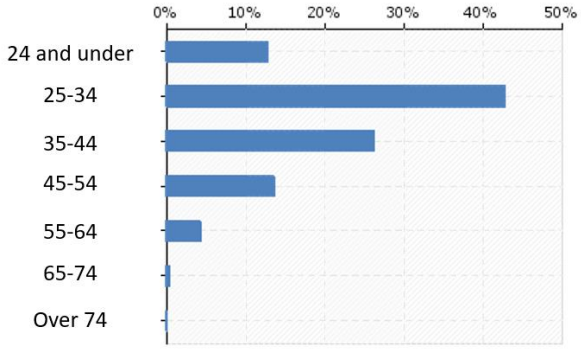
Figure 17: Question 9 (Q9), which of the following is the most accurate statement?



Source: own work.

In Figure 17, there is a representation of results whether surveyees work in a banking-related industry or not and whether they are interested in banking innovations. The question was mandatory and 238 surveyees responded to the question. 74 of them (31%) work in a banking-related industry and are interested in banking innovation, 7 of them (3%) work in a banking-related industry and are not interested in banking innovation, 138 of them (58%) do not work in a banking-related industry and they are interested in banking innovation and 19 of them (8%) do not work in a banking-related industry and are not interested in banking innovation.

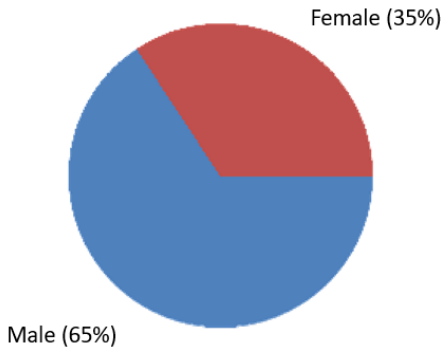
Figure 18: Question 10 (Q10), your age in years.



Source: own work.

In Figure 18, there is a representation of results regarding the age of surveyees. The question was mandatory and 238 surveyees responded to the question. 30 of them (13%) are 24 years of age and younger, 102 of them (43%) are between 25 and 34, 62 of them (26%) are between 35 and 44, 33 of them (14%) are between 45 and 54, 10 of them (4%) are between 55 and 64, 10 of them (4%) are between 65 and 74 and none of them is above 75.

Figure 19: Question 11 (Q11), gender.



Source: own work.

In Figure 19, there is a representation of results regarding the gender of surveyees. The question was mandatory and 238 surveyees responded to the question. 83 of them (35%) are females and 155 of them (65%) are males.

7.3 The purpose and statistical data analysis of the survey

The purpose of the survey was to explore the usage of alternative banking solutions among Slovenians. Alternative banking solution is considered as the one, which is not offered by a traditional bank with branches and is usually offered by digital-only banks, fintechs, large technological companies, social media institutions or energy providers. Based on theoretical findings in chapter 6 and personal interests, I have set the following hypothesis:

1. Financially savvier users are more active in using alternative banking solutions.
2. Younger people are using alternative banking solutions more.
3. People who work in a banking-related industry use alternative banking solutions more.

Logistic regression was used to analyze the results. Logistic regression is a statistical method for analyzing a dataset in which there are one or more independent variables that determine an outcome (Hosmer, Lemeshow & Sturdivant, 2013). In logistic regression, the dependent variable is binary. Hence it has only two results, true or false. The goal of the regression is to find the best fitting model to describe the relationship between the dependent variable and a set of independent variables.

Logistic regression is the most basic statistical model in which the dependent variable is binary. Independent variables can be descriptive and/or numerical (Košmelj, 2001).

In the following analysis, there are many independent variables, which are explaining the dependent variable. Therefore the model of multivariate logistic regression will be used.

By running a logistic regression, I was trying to find out the following:

1. Is there a significant difference in the usage of alternative banking solutions between financially savvier and standard users?
2. Is there a significant difference in the usage of alternative banking solutions between younger and older people?
3. Is there a significant difference in the usage of alternative banking solutions between people who work in the banking-related industry and the ones who do not?
4. What is the smallest collection of questions, which could suggest that a person uses an alternative banking solution with a reasonably high probability?

The performed regressions measured the influence of independent variables on the dependent one and provided a contingency table of a diagnostic ability of the model. In each regression, significant coefficients and diagnostic model will be interpreted.

The dependent variable in all the following regressions is Q3.

Table 1: Contingency table legend

		True condition		
		Condition positive	Condition negative	
Predicted condition	Predicted condition positive	True positive	False positive	
	Predicted condition negative	False negative	True negative	
	All conditions	All positives	All negatives	
	Accuracy	Accuracy of positives	Accuracy of negatives	Overall accuracy

Source: Fawcett (2007).

Table 1 represents a legend of the contingency table, which will be used as an interpretation of the diagnostic model in the following regressions.

Between chapters 7.3.1 and 7.3.4, the results of 4 different regressions will be represented. The first regression will include 17 independent variables and the last regression only one independent variable. The goal of such a sequence is to figure out, which are the most significant independent variables, which should be used in determining whether a person uses an alternative banking solution or not. Furthermore, in the last regression, it will not only be important that an independent variable is significant, but also that it is comfortably used in practice.

7.3.1 Regression number 1 (The full model)

In the first regression, independent variable Q4 (»What persuaded you the most to use an alternative banking solution?«) was excluded, due to complete correlation to the dependent variable.

Pearson's correlation coefficient was used in determining the correlation among variables.

Table 2 represents the variables, which were used in the regression, their coefficients and their level of significance to the dependent variable indicated by p-value.

Table 2: Applied variables and their significance level in the regression number 1

Name of the variable	**Dependent variable**	**Coefficient**	**Significance**	**P-value**
Q3	Question 3: Have you used an alternative banking solution in the last six months?			
	Independent variable			
Q1	Question 1: Which of the following options do you prefer to make a payment or to check account balance?	-0.339	Not significant	0.206
Q2	Question 2: At which financial institution do you hold an account, which you use the most?	0.972	Significant	0.042
Q5	Question 5: How many current accounts do you have?	0.662	Significant	0.028
Q6	Question 6: Would you use a solution, which would enable you to access all your accounts and have an overview of consolidated balance in one place?	-0.291	Not significant	0.849
Q7	Question 7: In the solution mentioned in Q6, would you use a possibility to pay from any of the connected accounts?	-0.456	Not significant	0.465

Table continues

Table 2: Applied variables and their significance level in the regression number 1 (cont.)

Q8(a)	Question 8 (a): If you were using the solution mentioned in Q6 and Q7, which of the following providers would you trust the most? (choose 3 and rank them from 1− 3, where 1 is "I trust the most") = Fintech	0.028	Not significant	0.836
Q8(b)	Question 8 (b): Digital bank	0.225	Not significant	0.127
Q8(c)	Question 8 (c): Social media	0.241	Not significant	0.405
Q8(d)	Question 8 (d): Traditional bank	0.240	Not significant	0.181
Q8(e)	Question 8 (e): High tech company	0.003	Not significant	0.975
Q8(f)	Question 8 (f): Telecommunication company	-0.245	Nearly significant	0.071
Q8(g)	Question 8 (g): Provider of energy	0.107	Not significant	0.643
Q8(h)	Question 8 (h): Retailer	-0.046	Not significant	0.790
Q8(i)	Question 8 (i): Else	-0.234	Not significant	0.197
Q9	Question 9: Which of the following is the most correct statement? (Work/not work in the banking-related industry)	-0.153	Not significant	0.648
Q10	Question 10: Your age in years	-0.117	Not significant	0.424
Q11	Question 11: Gender	0.602	Marginally significant	0.063

Source: own work.

As observed in Table 2, Q2 and Q5 are significant in determining whether a person is using an alternative banking solution and Q8(f) and Q11 are nearly significant. Significance is defined by p-value and significant independent variables are those, which p-value is lower than 0.05. P-value of nearly significant variables is between 0.05 and 0.1. These are close to being significant and the term was introduced to use these variables in the following regressions.

Coefficient b2 is the average difference in the value of Q3 between the category for which Q2=1 (traditional bank) and the category for which Q2=2 (digital-only bank) if all other independent variables remain constant. Therefore the prospect of the usage of alternative banking solutions is expected to be 2.64 (exp 0.972) times higher in the group of users which use digital-only bank the most as in the group in which traditional bank is the most used if all other independent variables remain constant.

Coefficient b5 represents the difference in the predicted value of Q3 for each one unit difference in Q5 if all other independent variables remain constant. Therefore the prospect of the usage of alternative banking solution is on average 1.94 (exp 0.662) times higher in the group of people who possess 2 or 3 current accounts as in the group who possess only one account if all other independent variables remain constant. Similarly, the prospect of the usage is on average 1.94 times higher in the group of people who possess 4 or more accounts as in the group of people who possess 2 or 3 accounts if all other independent variables remain constant.

Table 3: Contingency table for regression number 1

		True condition		
		Condition positive	Condition negative	
Predicted condition	Predicted condition positive	133	45	
	Predicted condition negative	21	39	
	All conditions	154	84	
	Accuracy	86.3%	46.4%	72.2%

Source: own work.

In Table 3, we can observe that a model predicts 133 out of 154 positive outcomes correctly. A positive outcome is when a surveyee did use an alternative banking solution in the last six months. Furthermore, we can observe that a model predicts 39 out of 84 negative outcomes correctly. A negative outcome is when a surveyee did not use an alternative banking solution in the last six months. The overall model accuracy is 72.2%. It is much better in predicting positive outcomes, it predicts the accuracy of them with 86.3% and it is not that good in predicting negative outcomes, it predicts them with the 46.4% accuracy.

7.3.2 Regression number 2 (The low correlation model)

In the second regression, the following independent variables were additionally excluded due to high correlation to other independent variables:

1. Q6 (»Would you use a solution, which would enable you to access all your accounts and have an overview of consolidated balance in one place?«).
2. Q7 (»In the solution mentioned in Q6, would you use the possibility to pay from any of the connected accounts?«).
3. Q8(c) (»If you were using the solution mentioned in Q6 or Q7, which of the following providers would you trust the most? Social media«).
4. Q8(d) (»If you were using the solution mentioned in Q6 or Q7, which of the following providers would you trust the most? Traditional bank«).

Pearson's correlation coefficient was used in determining the correlation among variables.

Table 4 represents the variables, which were used in the regression, their coefficients and their level of significance to the dependent variable indicated by p-value.

Table 4: Applied variables and their significance level in the regression number 2

Name of the variable	**Dependent variable**	**Coefficient**	**Significance**	**P-value**
Q3	Question 3: Have you used an alternative banking solution in the last six months?			
	Independent variable			
Q1	Question 1: Which of the following options do you prefer to make a payment or to check account balance?	-0.362	Not significant	0.174
Q2	Question 2: At which financial institution do you hold an account, which you use the most?	0.861	Marginally significant	0.057
Q5	Question 5: How many current accounts do you have?	0.636	Significant	0.029
Q8(a)	Question 8 (a): If you were using the solution mentioned in Q6 and Q7, which of the following providers would you trust the most? (choose 3 and rank them from 1− 3, where 1 is "I trust the most") = Fintech	0.037	Not significant	0.699
Q8(b)	Question 8 (b): Digital bank	0.245	Significant	0.031
Q8(e)	Question 8 (e): High tech company	0.005	Not significant	0.953
Q8(f)	Question 8 (f): Telecommunication company	-0.254	Significant	0.012
Q8(g)	Question 8 (g): Provider of energy	0.134	Not significant	0.532
Q8(h)	Question 8 (h): Retailer	0.006	Not significant	0.969
Q8(i)	Question 8 (i): Else	-0.215	Not significant	0.164
Q9	Question 9: Which of the following is the most correct statement? (Work/not work in the banking-related industry)	-0.169	Not significant	0.610
Q10	Question 10: Your age in years	-0.114	Not significant	0.426
Q11	Question 11: Gender	0.597	Marginally significant	0.061

Source: own work.

In Table 4, we first observe the significance of variables Q5, which indicates financial savviness, Q10, which indicates age and Q9, which indicates occupation, related to Q3. P-value of Q5 is 0.029 and therefore we can say that there is a difference in the usage of alternative banking solutions between financially savvier and standard people. P-value of Q10 is 0.426 and consequently, we cannot confirm that there is a difference in the usage of alternative banking solutions between younger and older people. P-value of Q9 is 0.610 and therefore, we can not confirm that there is a difference in the usage of alternative banking solutions among people who work in banking-related industries and the ones who do not. Furthermore, we observe that Q5, Q8(b) and Q8(f) are significant and Q2 and Q11 nearly significant to the dependent variable.

Coefficient b5 represents the difference in the predicted value of Q3 for each one unit difference in Q5 if all other independent variables remain constant. Therefore the prospect of the usage of alternative banking solution is on average 1.89 (exp 0.636) times higher in the group of people who possess 2 or 3 current accounts as in the group who possess only 1 account if all other independent variables remain constant. Similarly, the prospect of the usage is on average 1.89 times higher in the group of people who possess 4 or more accounts as in the group of people who possess 2 or 3 accounts if all other independent variables remain constant.

Coefficient b8(b) represents the difference in the predicted value of Q3 for each one unit difference in Q8(b) if all other independent variables remain constant. Therefore the prospect of the usage of alternative banking solutions is on average 1.28 (exp 0.245) times higher in the group of people which would trust digital bank less for using the solution mentioned in Q6 and Q7 if all other independent variables remain constant.

Coefficient b8(f) represents the difference in the predicted value of Q3 for each one unit difference in Q8(f) if all other independent variables remain constant. Therefore the prospect of the usage of alternative banking solution is on average 22% lower in the group of people which would trust telecommunication company less for using the solution mentioned in Q6 and Q7 if all other independent variables remain constant.

Table 5: Contingency table for regression number 2

		True condition		
		Condition positive	Condition negative	
Predicted condition	Predicted condition positive	132	45	
	Predicted condition negative	22	39	
	All conditions	154	84	
	Accuracy	85.7%	46.4%	71.8%

Source: own work.

In Table 5, we can observe that a model predicts 132 out of 154 positive outcomes correctly. A positive outcome is when a surveyee did use an alternative banking solution in the last six months. Furthermore, we can observe that a model predicts 39 out of 84 negative outcomes correctly. A negative outcome is when a surveyee did not use an alternative banking solution in the last six months. The overall model accuracy is 71.8%. It is much better in predicting positive outcomes, it predicts the accuracy of them with 85.7% and it is not that good in predicting negative outcomes, it predicts them with the 46.4% accuracy.

7.3.3 Regression number 3 (The significant model)

The third regression was performed by using only independent variables which were significant or nearly significant to the dependent variable in the regression number 2.

Table 6 represents the variables, which were used in the regression, their coefficients and their level of significance to the dependent variable indicated by p-value.

Table 6: Applied variables and their significance level in the regression number 3

Name of the variable	**Dependent variable**	**Coefficient**	**Significance**	**P-value**
Q3	Question 3: Have you used an alternative banking solution in the last six months?			
	Independent variable			
Q2	Question 2: At which financial institution do you hold an account, which you use the most?	0.943	Significant	0.032
Q5	Question 5: How many current accounts do you have?	0.776	Significant	0.005
Q8(b)	Question 8 (b): Digital bank	0.219	Significant	0.018
Q8(f)	Question 8 (f): Telecommunication company	-0.248	Significant	0.009
Q11	Question 11: Gender	0.527	Marginally significant	0.090

Source: own work.

As observed in Table 6, only Q11 is not significantly related to the dependent variable. The most significant independent variable is Q5, which is also very convenient to use in practice.

Coefficient b2 is the average difference in the value of Q3 between the category for which Q2=1 (traditional bank) and the category for which Q2=2 (digital-only bank) if all other independent variables remain constant. Therefore the prospect of the usage of alternative banking solutions

is expected to be 2.57 (exp 0.943) times higher in the group of users which use digital-only bank the most as in the group in which a traditional bank is the most used if all other independent variables remain constant.

Coefficient b5 represents the difference in the predicted value of Q3 for each one unit difference in Q5 if all other independent variables remain constant. Therefore the prospect of the usage of alternative banking solution is on average 2.17 (exp 0.776) times higher in the group of people who possess 2 or 3 current accounts as in the group who possess only one account if all other independent variables remain constant. Similarly, the prospect of the usage is on average 2.17 times higher in the group of people who possess 4 or more accounts as in the group which owns 2 or 3 accounts if all other independent variables remain constant.

Coefficient b8(b) represents the difference in the predicted value of Q3 for each one unit difference in Q8(b) if all other independent variables remain constant. Therefore the prospect of the usage of alternative banking solutions is on average 1.24 (exp 0.219) times higher in the group of people which would trust a digital bank less for using the solution mentioned in Q6 and Q7 if all other independent variables remain constant.

Coefficient b8(f) represents the difference in the predicted value of Q3 for each one unit difference in Q8(f) if all other independent variables remain constant. Therefore, the prospect of the usage of alternative banking solutions is on average 22% lower in the group of people which would trust a telecommunication company less for using the solution mentioned in Q6 and Q7 if all other independent variables remain constant.

Table 7: Contingency table for regression number 3

		True condition		
		Condition positive	Condition negative	
Predicted condition	Predicted condition positive	132	47	
	Predicted condition negative	22	37	
	All conditions	154	84	
	Accuracy	85.7%	44%	71%

Source: own work.

In Table 7, we can observe that a model predicts 132 out of 154 positive outcomes correctly. Furthermore, we can observe that a model predicts 37 out of 84 negative outcomes correctly. The overall model accuracy is 71%. It is much better in predicting positive outcomes, it predicts them with the 85.7% accuracy and it is not that good in predicting negative outcomes, it predicts them with 44% accuracy.

We can observe that only five independent variables in regression number 2 have produced only slightly worse model to the one in regression number 2. The difference was only in predicting the negative outcomes and the regression model 2 is worse for 2.6 percentage points.

7.3.4 Regression number 4 (The convenient model)

The fourth regression was performed using only the most significant independent variable from regression number 3.

Table 8 represents the variables, which were used in the regression, their coefficients and their level of significance to the dependent variable indicated by p-value.

Table 8: Applied independent variable and its significance level in the regression number 4

Name of the variable	**Dependent variable**	**Coefficient**	**Significance**	**P-value**
Q3	Question 3: Have you used an alternative banking solution in the last six months?			
	Independent variable			
Q5	Question 5: How many current accounts do you have?	1.084	Significant	0.000

Source: own work.

Coefficient b5 represents the difference in the predicted value of Q3 for each one unit difference in Q5 if all other independent variables remain constant. Therefore the prospect of the usage of alternative banking solutions is on average 2.95 (exp 1.084) times higher in the group of people who possess 2 or 3 current accounts as in the group who possess only one account if all other independent variables remain constant. Similarly, the prospect of the usage is on average 2.95 times higher in the group of people which possesses 4 or more accounts as in the group which owns 2 or 3 accounts if all other independent variables remain constant.

Table 9: Contingency table for regression number 4

		True condition		
		Condition positive	Condition negative	
Predicted condition	Predicted condition positive	108	33	
	Predicted condition negative	46	51	
	All conditions	154	84	
	Accuracy	70%	60%	66.8%

Source: own work.

In Table 9, we can observe that a model predicts 108 out of 154 positive outcomes correctly. Furthermore, we can observe that a model predicts 51 out of 84 negative outcomes correctly. The overall model accuracy is 66.8%. It is better in predicting positive outcomes, it predicts them with the 70% accuracy and it predicts negative outcomes with the accuracy of 60%.

We can observe that only one independent variable in regression number 4 has produced a model which is overall worse from regression number 3 only for 4.2 percentage points. In practice, this means that asking a surveyee only question number 5 gives us more than 2/3 chances of a correct prediction, whether a surveyee has used an alternative banking solution in the last six months. The more current accounts a surveyee has, the bigger the chance he has used an alternative banking solution in the last six months.

In chapter 7, we have firstly reviewed that 65% of surveyees have used an alternative banking solution in the last six months. Traditional banks still hold the majority of user interactions. We have confirmed that the usage of alternative banking solutions is higher among financial savvier people. Furthermore, we cannot confirm that there is a difference in the usage of alternative banking solutions between younger and older people and between people that are employed in the banking-related industry and those who are not. Furthermore, we have reviewed that Q5 is the most significant independent variable which determines whether one has used an alternative banking solution in the last six months. Finally, we have reviewed that the Slovenian market is ready to use PSD2 solutions, which will be enabled on the 14th of September 2019. 81% of surveyees would use AISP services and additionally 75% would use PISP services and they would trust traditional banks the most.

CONCLUSION

Deposit-taking, lending, managing current accounts and transaction services are banking's core business. Due to the appearance of fintechs and other non-bank competitors, customers are now able to switch a financial provider much more comfortable than ever before. Fintech is a term

that describes the junction between technology and finance and it refers to innovative financial service offerings, which disrupts the existing financial services market. Fintechs are driving the digital revolution by offering advantages such as lower prices due to lower operating costs. They are creating more intuitive and compelling customer experiences and they benefit from experimentation. Banks usually have clients, but fintechs have the innovation edge. Fintechs operate in payments, lending and account management and their activities are concentrated mostly in the retail segment. Good customer experience focuses on the simplicity and convenience of interactions across a variety of channels. Investments in fintechs have grown from $1.8 billion to $19 billion from 2010 to 2015. Fintech services are mostly used in China, India, UK and Brazil. The connection between fintechs and banks is possible with the help of technology.

Application programming interfaces, APIs, enable communication between software applications. Therefore, APIs enable the creation of added value such as building applications on top of existing platforms and enabling different market participants to work together and create a service to the customer across different platforms. Consequently, open APIs enable banks to collaborate with external partners and third-party developers to offer innovative services to customers. Innovative services are, for example, connecting a holistic service for buying a home on the bank's platform, offering personal finance manager with data from different accounts, providing historical transaction data from various providers to offer better credit scoring, solving fraudulent activities, etc. Open APIs have helped to disrupt other industries, such as transportation and accommodation. The emergence of Uber and Airbnb in industries that are both firmly based on physical activities or on-site attention to clients is showing that the technological revolution is not far away in the banking industry as well and no industry is safe from disruption.

Open banking is a frequently used term in commercial banking and the root of it is the standardization of how banks allow their customers more choice by enabling sharing of their data for use in third-party applications. Open banking is a movement which is connecting technology-driven companies with banks. It enables third-parties to own the primary customer relationship, by allowing, for example, accounts from different providers to be accessed through a single customer interface. Competitors in commercial banking, which could leverage from open banking, are fintechs, challenger banks, technology giants, non-financial service companies, aggregators and payment service providers. Regulators have always had a crucial role in the evolution of the financial industry. It guarantees the system's stability and protects customers. Regulators play an essential role in nurturing the collaboration between banks and fintechs. They are introducing regulatory sandboxes, which allow financial organizations to test new ideas for a limited period with live customers and loosened regulatory restrictions. Payment service directive 2, PSD2, is enabling the bank's customers to use third-party provider solutions to manage their finances. Users are able to use Google or Facebook to pay bills, making transfers and analyzing spendings, while still having money placed in the current bank. Banks no longer compete only with each other, but also against every third-party provider, which is

licensed to offer financial services. The deadline for compliance with the EU's PSD2 was the 14th of September 2019.

European banks are divided into two types based on response to PSD2, challengers and minimalists. Challengers, which are mostly Western European banks, are actively preparing for PSD2 and are doing more than to be compliant with regulation. Most of them have a clear vision regarding PSD2 impacts and know how they will respond. Minimalists, which are mostly Central European banks, are aiming to meet the regulatory requirements only and have a lack of strategy perspectives and budget. Challengers are in general better prepared to comply with PSD2. Banks are recommended to follow four different strategies based on their digital ambitions. Firstly, compliance with PSD2, secondly, facilitation and monetization of API, thirdly, provision of advice and new products or service for only financial services and finally, expansion of the ecosystem and aggregation of value within and outside of financial services. Banks should introduce a »fail fast« and »learn quickly« culture, to be more competitive. Furthermore, banks should foster internal collaboration by diminishing department and product closed containers of information and move to a less hierarchical organizational structure. Partnering and collaborating with fintechs enable banks to experiment with new services and solutions. Consequently, banks that are going to achieve this will be exposed to lots of opportunities, driven by technological improvements and strategic collaboration.

Physical branches will not look as they do today but will be hubs, where customers will be able to meet with advisors. A branch is only one of the channels, which has an important but diminishing role. An increasing number of customers are satisfied with mobile channels and, likely, banks will eventually look like Uber. It is expected that the number of branches will decrease in the future, but it is also likely that innovative banks will create an ecosystem of value-added services, which will also include non-financial activities. In the new competitive environment, the new services will benefit the bank and will increase stickiness and loyalty with their customers. Digital channels such as mobile phones, tablets and laptops are becoming primary tools for customers to talk to the bank. They are preferred by 66% of customers for initiating a domestic payment order or to check the balance. If a provider is more transparent in prices, offers a higher number of functionalities in the mobile banking app and its solutions are more comfortable to use, then half of the users would be inclined to switch the financial provider. Furthermore, 34% of those users would additionally be willing to use mobile-only solutions. The most significant adoption of fintech is between 25 and 34 years of age. Banks are advised to focus on the generation of millennials due to their openness to new forms of technology. They are frequently the target market of startups and larger institutions, but the catch is that boomers account for half of the customers' spendings and banks cannot afford not to target them.

PSD2 is introducing third-party providers to the financial landscape. Account information service providers and payment initiation service providers, AISPs and PISPs. AISP is a service provider with access to the account information of bank customers and could use transaction data to analyze user's spending behavior or aggregate account information from several banks

into one overview. A PISP is the service provider, which is initiating payment on behalf of the user. 53% of account holding adults from the UK would be comfortable with third-parties initiating payments on their behalf. 76% of survey respondents would choose traditional bank as their first preference for a PISP provider. Trusted brands are also likely to win the AISP battle. Traditional banks are the first preference for 65% of the survey respondents for AISP services. CEE markets are highly differentiated regarding banking channel usage. For example, typical branch centric are Bulgaria and Romania in which more than 90% of customers are active in the branch and less than 20% are digitally engaged. On the other hand, in the Czech Republic, there is more than 70% of digitally active customers. In general, 55% of CEE customers represent traditional customers, who are visiting a branch. 20% use only digital channels and 25% use both. 18% of customers are "branch hostages". They would prefer to perform all their banking activities online, but they are forced to go to the branch. They represent approximately 11 million people and are a significant opportunity for PSD2 digital challengers. Only 26% of CEE customers would feel comfortable to share their account information with an institution other than their primary bank. CEE customers are most likely to use aggregated account management and aggregated financial dashboards as new services enabled by PSD2. 65% of Slovenians have used an alternative banking solution in the last six months. Traditional banks still hold the majority of user interactions.

In this thesis, three hypotheses were set for the Slovenian market based on the theoretical background. Firstly, the usage of alternative banking solutions is higher among financial savvier people and I was able to confirm the hypothesis. Secondly, the usage of alternative banking solutions is higher among younger people and I was not able to confirm the hypothesis. Thirdly, the usage of alternative banking solutions is higher among people that are employed in the banking-related industry and I was also not able to confirm the hypothesis. The most significant independent variable which determines whether one has used an alternative banking solution in the last six months or not is the number of current accounts, which one has. The Slovenian market is ready to use PSD2 solutions. 81% of surveyees would use AISP services and additionally 75% would use PISP services and they would trust traditional banks the most.

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APPENDICES

Appendix 1: Povzetek (Summary in Slovene language)

Osnovne dejavnosti bank so omogočanje pridobivanja depozitov, kreditiranje, vodenje tekočih računov in transakcijske storitve. S pojavom finančnotehnoloških podjetij, fintehov in drugih konkurentov lahko stranke zamenjajo finančnega ponudnika veliko lažje kot kadarkoli prej. Finteh je izraz, ki opisuje presečišče med financami in tehnologijo. Nanaša se na tehnične inovacije, ki se uporabljajo v tradicionalnih finančnih storitvah. Fintehi spodbujajo digitalno revolucijo, njihovi glavni prednosti pa sta nižja cena in privlačnejša uporabniška izkušnja. Dobra uporabniška izkušnja je izražena v preprostosti uporabe in udobnosti interakcij, ki so omogočene skozi več kanalov. Banke imajo še vedno več strank, toda fintehi so bolj inovativni in delujejo predvsem na področju plačil, kreditiranja in vodenja računov. Fintehi predstavljajo največjo konkurenco bankam v segmentu fizičnih oseb. Naložbe v finteh podjetja so med letoma 2010 in 2015 narasle iz 1,8 na 19 milijard dolarjev. Storitve fintehov se največ uporabljajo na Kitajskem, v Indiji, Veliki Britaniji in Braziliji. Povezava med fintehi in bankami je možna z uporabo tehnologije.

Odprti aplikacijski programski vmesniki, API-ji, omogočajo komunikacijo med programskimi aplikacijami. Posledično API-ji omogočajo ustvarjanje dodanih vrednosti, kot sta na primer gradnja aplikacij na obstoječih platformah in sodelovanje različnih udeležencev na trgu pri ustvarjanju enotne storitve za stranke. API-ji omogočajo bankam sodelovanje s tretjimi strankami, da bi tako na preprost način svojim komitentom ponudile izpopolnjene storitve. Primeri inovativnih storitev so povezovanje celostne storitve za nakup doma na bančni platformi, omogočanje osebnega finančnega asistenta s podatki iz različnih računov, zagotavljanje zgodovinskih podatkov o transakcijah različnih finančnih ponudnikov za boljše kreditno točkovanje in reševanje goljufivih dejavnosti. Pojav »Uber-ja« in »Airbnb-ja« v industrijskih panogah, ki močno temeljijo na fizičnih aktivnostih, kaže, da tehnološka revolucija ni tako daleč niti v bančnem sektorju in da nobena industrija ni varna pred digitalnimi konkurenti.

Odprto bančništvo se osredotoča na standardizacijo načina varnega deljenja podatkov z aplikacijami tretjih strank. Je gibanje, ki povezuje tehnološko usmerjena podjetja z bankami. Tretjim strankam omogoča, da imajo v lasti primarni odnos s komitenti, tako da na primer svojim strankam omogočijo dostop do vseh računov preko enega samega uporabniškega vmesnika. Konkurenti v poslovnem bančništvu, ki bi lahko izkoristili odprto bančništvo, so fintehi, neobanke, tehnološki velikani in ponudniki plačilnih storitev. Regulativni organi so od nekdaj imeli ključno vlogo pri razvoju finančne industrije in dandanes spodbujajo sodelovanje med fintehi in bankami, skrbijo za stabilnost sistema in zaščito strank. Finančnim organizacijam omogočajo, da preizkušajo nove zamisli v omejenem obdobju z olajšanimi regulatornimi omejitvami. Direktiva o plačilnih storitvah 2, PSD2, strankam banke za upravljanje njihovih financ omogoča uporabo rešitev tretjih strank. Uporabniki lahko tako za plačevanje položnic in analizo porabe uporabljajo Google ali Facebook, medtem ko imajo denar še vedno na banki. Banke ne tekmujejo več same med seboj, temveč tudi proti vsakemu digitalnemu konkurentu,

ki je pridobil licenco za nudenje finančnih storitev. 14. 9. 2019 se je iztekel zadnji rok za skladnost s PSD2.

Evropske banke so glede odziva na PSD2 razdeljene na dve vrsti, na izzivalce in na minimaliste. Izzivalci so večinoma zahodnoevropske banke, ki se aktivno pripravljajo na PSD2 in delajo več kot le to, da bi bile skladne z direktivo. Večina jih ima jasno vizijo glede vplivov PSD2 in pozna ustrezne odzive. Minimalisti pa so banke v srednji in vzhodni Evropi, ki si prizadevajo le za izpolnjevanje zakonskih zahtev. Primanjkuje jim tudi strateških perspektiv in proračuna. Izzivalci so na splošno bolje pripravljeni na vplive direktive.

Bankam predlagamo upoštevanje štirih različnih strategij. Izbrana strategija je odvisna od digitalnih ambicij banke. Prva strategija predstavlja izključno skladnost z direktivo, druga poenostavitev in unovčevanje API-jev, tretja svetovanje in uvajanje novih proizvodov ali storitev samo za finančne storitve, zadnja pa širitev ekosistema in združevanje vrednosti znotraj in zunaj finančnih storitev. Da bi bile banke konkurenčnejše v inoviranju, predlagamo, da izboljšajo organizacijsko hierarhijo in uvedejo kulturo hitrega učenja. Sodelovanje s fintehi omogoča bankam, da preizkusijo nove storitve, saj bodo tiste, ki bodo omenjene novosti preizkušale, izpostavljene številnim priložnostim, ki jih prinašajo tehnološke izboljšave.

Fizične poslovalnice ne bodo izgledale tako kot danes, ampak bodo predstavljene kot središča, kjer se bodo stranke srečevale s svetovalci. Podružnica je le eden od kanalov, ki ima vse manj pomembnejšo vlogo. Vse več strank je zadovoljnih z mobilnimi kanali, zaradi česar bodo banke najverjetneje delovale vse bolj digitalno. Pričakovano je, da se bo število podružnic v prihodnje zmanjšalo in da bodo inovativne banke ustvarile ekosistem storitev z dodano vrednostjo, v katerem bodo vključene tudi nefinančne dejavnosti. V novem konkurenčnem okolju bodo nove storitve povečale zvestobo bančnih strank. Digitalni kanali, kot so mobilni telefoni, tablični računalniki in prenosni računalniki, postajajo osnovna orodja, s katerimi stranke komunicirajo z banko. Omenjene digitalne kanale za domači plačilni nalog ali preverjanje stanja uporablja 66 % strank. 34 % od teh strank pa bi bilo pripravljenih uporabljati samo mobilne rešitve. Uporabniki največkrat zamenjajo finančnega ponudnika, če je novi cenovno preglednejši, ponuja več funkcij v mobilni aplikaciji in če so njegove rešitve enostavnejše za uporabo. Rešitve fintehov so najbolj priljubljene med uporabniki, starimi med 25 in 34 let. Bankam predlagamo, da se osredotočijo na generacijo milenijcev. Slednji so zaradi svoje odprtosti do novih tehnologij ciljni segment zagonskih podjetij in večjih institucij. Dodatno bankam predlagamo, naj ne pozabijo na generacijo »Baby boom«, pripadniki katere so po vsoti nakupov vpleteni v več kot polovico porabe vseh kupcev.

PSD2 v svet finančnih storitev uvaja nove udeležence, tretje stranke. To so ponudniki storitev zagotavljanja informacij in ponudniki storitev odreditve plačil, AISP-ji in PISP-ji. AISP je ponudnik storitev, ki ima dostop do podatkov strankinega bančnega računa. PISP je ponudnik storitev, ki v imenu uporabnika sproži plačilo. 53 % odraslih iz Združenega kraljestva bi bilo zadovoljnih s plačevanjem iz aplikacij tretjih strank. 76 % anketirancev bi kot prvo izbiro za PISP-ja izbralo tradicionalno banko. Tradicionalne banke so tudi prva izbira za 65 %

anketirancev za AISP storitev. Trgi v srednji in vzhodni Evropi se glede uporabe bančnih kanalov zelo razlikujejo. Na primer, tipična uporaba banke v Bolgariji in Romuniji je v fizični poslovalnici. Poslovalnico obiskuje 90 % ljudi, digitalno aktivnih pa je manj kot 20 %. Po drugi strani je na Češkem digitalno aktivnih več kot 70 % uporabnikov. Na splošno 55 % strank v srednji in vzhodni Evropi predstavljajo tradicionalne stranke, ki poslovalnico obiskujejo fizično. 20 % strank uporablja samo digitalne kanale, 25 % pa oba načina. 18 % vseh strank so »talci« podružnic, ki bi vse svoje bančne dejavnosti raje opravljali na spletu, vendar so »prisiljeni« oditi v poslovalnico. Skupno je slednjih 11 milijonov in predstavljajo veliko priložnost za digitalne izzivalce znotraj PSD2. Le 26 % kupcev v srednji in vzhodni Evropi bi se počutilo udobno, če bi svoje podatke o računu delili z institucijo, ki ni njihova tradicionalna banka. Stranke iz srednje in vzhodne Evrope bodo kot nove storitve, ki jih omogoča PSD2, najverjetneje uporabljale agregirano upravljanje računov in združene finančnonadzorne plošče. 65 % Slovencev je v zadnjih šestih mesecih uporabilo alternativno bančno rešitev. Tradicionalne banke imajo pod nadzorom še vedno večino uporabniških interakcij.

Na podlagi teoretičnega ozadja smo v magistrskem delu postavili tri hipoteze za slovenski trg. Prvič, uporaba alternativnih bančnih rešitev je višja med finančno bolj izobraženimi osebami. To hipotezo lahko potrdimo. Drugič, uporaba alternativnih bančnih rešitev je višja med mlajšimi osebami. Te hipoteze ne moremo potrditi. Tretjič, uporaba alternativnih bančnih rešitev je višja med osebami, zaposlenimi v bančni industriji. Tudi slednje ne moremo potrditi. Najpomembnejša neodvisna spremenljivka, ki določa, ali je oseba v zadnjih šestih mesecih uporabila alternativno bančno rešitev, je število tekočih računov, ki jih ima oseba. Slovenski trg je pripravljen za uporabo PSD2 rešitev. 81 % anketirancev bi uporabljalo storitve AISP, dodatno pa bi 75 % anketirancev uporabljalo storitve PISP. Pri obojem bi Slovenci najbolj zaupali tradicionalnim bankam.

Appendix 2: Survey questionnaire in Slovene language.

Uvod

Pozdravljeni,

Moje ime je Uroš Šepec, sem študent na Ekonomski fakulteti v Ljubljani in v sklopu magistrske naloge »Vpliv odprtih aplikacijskh programskih vmesnikov na poslovno bančništvo« raziskujem, v kolikšni meri se v Sloveniji uporabljajo alternativne storitve za opravljanje plačil ter vpogleda v stanje na transakcijskih računih.

Alternativna rešitev pomeni, da storitve ne ponuja tradicionalna banka s poslovalnico, temveč je rešitev digitalizirana in največkrat jo ponujajo digitalne banke, »fintechi«, velika tehnološka podjetja, socialna omrežja, telekomunikacijska podjetja, energetiki, trgovci ipd.
Prosim, da si vzamete 2 minuti in s klikom na Naslednja stran pričnete z izpolnjevanjem ankete.

Stran 1

Q1 Obvezno vprašanje

Katera izmed sledečih možnosti je vaša najljubša za opravljanje plačila ali pregleda stanja na računu?

- ○ Obisk fizične poslovalnice
- ○ Mobilni telefon
- ○ Računalnik

Q2 Obvezno vprašanje

Pri kateri finančni instituciji imate odprt račun, katerega največ uporabljate?

- ○ Tradicionalna banka s poslovalnicami
- ○ Digitalna banka brez poslovalnic
- ○ Drugo:

Q3 Obvezno vprašanje

Ali ste v zadnjih 6 mesecih uporabili kakšno izmed alternativnih bančnih rešitev?

- ○ Da
- ○ Ne

- **IF** (1) **Q3** = [1]

Q4

Kaj vas je najbolj pritegnilo k uporabi le-teh?

- ○ Cenovno ugodne storitve
- ○ Privlačna uporabniška izkušnja
- ○ Radovednost
- ○ Priporočilo

ENDIF (1)

- **IF** (2) **Q3** = [1]

ENDIF (2)

Q5 Obvezno vprašanje

Koliko transakcijskih računov imate odprtih?

- ○ 1
- ○ 2-3
- ○ 4 ali več

Q6 Obvezno vprašanje

Ali bi koristili rešitev, ki bi vam omogočala povezavo do vseh vaših računov in pregleda stanja na enem mestu?

- ○ Da
- ○ Ne

Q7 Obvezno vprašanje

Ali bi v tej rešitvi koristili možnost plačevanja iz kateregakoli izmed povezanih računov?

- ○ Da
- ○ Ne

Q8 Obvezno vprašanje | Validacija

Kateremu izmed sledečih ponudnikov te rešitve bi najbolj zaupali? (izberite 3 in jih razvrstite od 1 do 3, kjer je 1 najbolj zaupam)

- Fintech
- Digitalna banka
- Socialno omrežje
- Tradicionalna banka
- Veliko tehnološko podjetje
- Telekomunikacijsko podjetje
- Energetik
- Trgovec
- Ostalo

1 [ ]

2 [ ]

3 [ ]

ENDIF (3)

Q9 Obvezno vprašanje

Katera izmed sledečih trditev je za vas najbolj pravilna?

- ○ Inovacije pri uporabi bančnih rešitev me zanimajo. Delam v bančništvu ali v podjetju, ki ustvarja bančne rešitve.
- ○ Inovacije pri uporabi bančnih rešitev me ne zanimajo. Delam v bančništvu ali v podjetju, ki ustvarja bančne rešitve.
- ○ Inovacije pri uporabi bančnih rešitev me zanimajo. Ne delam v bančništvu ali v podjetju, ki ustvarja bančne rešitve.
- ○ Inovacije pri uporabi bančnih rešitev me ne zanimajo. Ne delam v bančništvu ali v podjetju, ki ustvarja bančne rešitve.

Q10 Obvezno vprašanje

Vaša starost:

- ○ Do 24 let
- ○ 25 - 34 let
- ○ 35 - 44 let
- ○ 45 - 54 let
- ○ 55 - 64 let
- ○ 65 - 74 let
- ○ nad 74 let

Q11 Obvezno vprašanje

Spol:

- ○ Ženski
- ○ Moški

Zaključna stran

Zaključek

Odgovorili ste na vsa vprašanja v tej anketi. Hvala za sodelovanje.