Vysoká škola ekonomická v Praze

Národohospodářská fakulta

Hlavní specializace: Hospodářská politika

THE CHALLENGES TRADITIONAL BANKING FACES IN THE ERA OF DIGITALIZATION: THE CASE OF THE CZECH REPUBLIC

Diplomová práce

Autor: Bc. Michaela Onuferová

Vedoucí práce: doc. PhDr. Ing. Marek Loužek, Ph.D.

Rok: 2018

Prohlašuji na svou čest, že jsem diplomovou práci vypracovala samostatně a s použitím uvedené literatury.

Michaela Onuferová

V Praze, dne 12.12.2018

Poděkování

Touto cestou bych chtěla vyjádřit velké díky panu doc. PhDr. Ing. Markovi Loužkovi, Ph.D. za jeho cenné rady a připomínky.

Dále bych chtěla poděkovat Anně Richtrové ze společnosti Fundlift a Michaele Brodecké ze společnosti Zonky za poskytnutí e-mailových interview, která mi poskytla cenné statistiky nad rámec veřejně dostupných informací.

Zadání práce

University of Economics, Prague
Department of Economic and Social Policy

Faculty of Economics
Academic year: 2018/2019

DIPLOMA THESIS TOPIC

Author of thesis: **Bc. Michaela Onuferová**

Study programme: Economics and Economic Administration

Field of study: Economic Policy

Topic: **The Challenges Traditional Banking Faces in the Era of Digitalization: The Case of the Czech Republic**

Guides to writing a thesis:

1. Banking sector has traditionally been crucial for a modern, democratic economy. Indirectly, it presents a basis for monetary policy, allowing central banks to reach strategic goals. For its importance and volume of trade (as for the Czech economy, the sum of credits provided to residents has been increasing steadily, reaching 5,427 billion CZK in February 2018) as well as its ability to destabilize the economy if not operating appropriately, the banking sector has become a matter of regulators' primary interest.
2. With increased digitalization, traditional banking is facing new challenges. FinTech companies present an emerging competition in many of the services that were originally provided by the banking sector; a new EU directive PSD2 effective of January 2018 is a further step towards the loss of a valuable portion of competitive advantage over the clients' data; and better information as well as the trend of removing administrative barriers have contributed to clients' increased switching rates.
3. The aim of the diploma thesis is to review and accurately illustrate these challenges on the case of the Czech economy. By providing a comprehensive view at the emerging FinTech companies and analyzing a modern customer of the banking sector, the diploma thesis will describe a new trend in one of the largest and most strategic sectors of the economy as well as highlight possible future challenges in regulation.
4. The theoretical part will specify the terms in use, list the banking services in question, provide an explanation of the necessity of clients' microdata in the banking industry and sum up the existing academic literature on the topic.
5. Using available data (banks' annual reports, existing surveys) and data assessed from own quantitative questionnaire survey, the practical part will analyze the FinTech sector in the Czech Republic and assess the recent behavioral trends of the Czech banks' clients. Based on the results, a conclusion will be provided regarding (i) regulation of the transforming sector, (ii) possible competition advantages the traditional banking sector should concentrate on to keep its status in the digitalized era and (iii) behavioral trends of a bank's modern consumer.

Length of thesis: 80 pages

Selected bibliography:

1. BELÁS, Jaroslav, Eva CIPOVOVÁ and Valer DEMJAN. Current trends in area of satisfaction of bank clients in the Czech Republic and Slovakia. Transformations in Business and Economics. 2014, 13(3), 219-234.
2. CUONG, Dinh Xuan, Pham Thuy LINH and Pham Ngoc HA. "Factors affecting intention to use facebook-banking of generation Y in Vietnam." International Journal of Financial Research 6, no. 4 (2015): 68.
3. HARKER, Patrick T. "Fintech: Revolution or Evolution?" Presentation, Federal Reserve Bank of Philadelphia, University of Pennsylvania, Philadelphia (April 3) (2017).
4. OMARINI, Anna. "The Digital Transformation in Banking and The Role of FinTechs in the New Financial Intermediation Scenario." Internationl journal of trade, economics, and finance 1, no. 1 (2017): 1-6.
5. PEREZ, Coralie. "Digitalisation and Artificial Intelligence: the New Face of the Retail Banking Sector. Evidence from France and Spain." Virtuous circles between innovations, job quality and employment in Europe? Case study evidence from the manufacturing sector, private and public service sector (2018): 178-229.
6. PHILIPPON, Thomas. The fintech opportunity. No. w22476. National Bureau of Economic Research, 2016.
7. REGA, Federico Giovanni. The Bank of the Future, the Future of Banking – An Empirical Analysis of European Banks. Naples, 2017. Dissertation. Second University of Naples. Available at SSRN: https://ssrn.com/abstract=3071742
8. SKINNER, Chris. The Future of Banking in a Globalised World. 1. Chichester, England: Wiley Finance, 2007.
9. WALKER, Andrew. "Banking without banks: Exploring the disruptive effects of converging technologies that will shape the future of banking." Journal of Securities Operations & Custody 7, no. 1 (2014): 69-80.

Diploma thesis topic submission date: March 2018

Deadline for submission of Diploma thesis: September 2018

Bc. Michaela Onuferová
Solver

doc. PhDr. Ing. Marek Loužek, Ph.D.
Thesis supervisor

doc. Ing. Miroslav Ševčík, CSc.
Head of department

doc. Ing. Miroslav Ševčík, CSc.
Dean NF VŠE

Abstrakt

Diplomová práce reaguje na trend digitalizace ve finančních službách. Rychlost adopce nových technologií se v globalizovaném světě stále zvyšuje, a výrazné změny v mnoha sektorech ekonomiky mohou být přičítány primárně komercializaci internetu v 90. letech.

Bankovnictví, sektor s tradičně vysokými překážkami vstupu a přísnou regulací, aktuálně čelí nové konkurenci ze strany malých, agilních firem které narušují trh kombinací nejnovějších technologií a finančních služeb – tzv. FinTech. Díky jejich koncentraci na zákazníka, vhodné uživatelské zkušenosti a plnému fungování v onlinu získávají jejich služby (například crowdfunding či peer-to-peer půjčky) na oblibě a značně rostou také globální investice do těchto firem. Dále je možné sledovat trend změny chování zákazníka banky, pramenící ze změny dominance ve vztahu banka-zákazník v neprospěch banky.

Cílem diplomové práce je popsat tyto trendy na případu České republiky. Jádrem práce je statistické vyhodnocení dotazníků zaměřených na postoj respondentů k bankám a FinTech společnostem s primárním zjištěním, že zejména Mileniálové a obyvatelé hlavního města jsou méně věrní svým bankám a více ochotni zkoušet nové možnosti v oblasti finančních služeb; téměř třetina respondentů uvedla, že takové služby již využívá. Dotazník je doplněn případovými studiemi třech úspěšných českých FinTech společností (Fundlift, Twisto, Zonky) a přehledem klíčových indikátorů předpovídajících možný úspěch FinTech společností na českém trhu.

Na závěr autorka diskutuje výhody a nevýhody bank a FinTech společností i budoucnost jejich koexistence na trhu.

Klíčová slova: FinTech, Digitalizace, Digitální transformace, Česká republika, Disrupce v bankovnictví, Finanční služby, Chování spotřebitele, Crowdfunding, P2P lending, Alternativní poskytovatelé

JEL klasifikace: G21, G23, O16, O30

Abstract

The diploma thesis responds to an increasing trend of digitalization of financial services. The globalized world is adopting new, quickly diffused technologies with an increasing speed, with the commercialization of the Internet in the 1990s being the primary reason for turbulent changes in many sectors of the economy.

Banking, a sector with strict regulation and high barriers to entry, is currently facing the competition of small, agile companies that disrupt the market by combining technology and financial services – the FinTech. Their customer-centricity, convenient user experience and online-only approach have resulted in the growing popularity of the services (such as crowdfunding or peer-to-peer lending) and significant global investments into the new entrants. Furthermore, a shift in customer behaviour is noticeable, turning the previous banks' dominance in the customer-bank relationship around.

The aim of the thesis is to accurately describe these trends on the case of the Czech Republic. The core of the thesis is the statistical evaluation of online questionnaires aimed at the respondents' approach to the incumbents and the new entrants, finding out that especially Millennials and capital city residents are less loyal to their banks and more willing to try the new possibilities in financial services, with almost a third of respondents already using them. The questionnaire is complemented by case studies of three successful FinTech companies (Fundlift, Twisto, Zonky) and an overview of the key indicators predetermining the possible success of the FinTech in the Czech Republic.

Finally, the author discusses the strengths and weaknesses of banks and the FinTech and their future coexistence on the market.

Key words: FinTech, Digitalization, Digital Transformation, Czech Republic, Banking, Disruption in Banking, Financial Services, Consumer Behaviour, Crowdfunding, P2P Lending, Alternative Providers

JEL classification: G21, G23, O16, O30

Table of Contents

Introduction

In 1994, Bill Gates famously said: „*We need banking but we don't need banks anymore.*" (Venkatesan, 2016). 20 years later, the global investments into disruptors of the traditional banking, the FinTech companies, reached the amount of 19.9 bn US dollars, and this amount doubled in 2017 (Global FinTech, 2018).

In a world that is inter-connected by social media with almost no real-time delays and where time is perceived as the most valuable asset, consumers seek alternative solutions to the rigid banking system that still requires visiting the branches, personal signatures at every change of the product or lengthy client assessment times for loans. The digital transformation has brought players that provide such solutions. Financial-Technological companies (further addressed as "the FinTech companies" or simply "the FinTech") are able to offer their product regardless of place or working hours, assessing the clients' liquidity leveraging the available information such as social media behaviour though processes of automation or machine learning, and often acting more transparently and fairly with the clients. In short, the trend of customer-centricity that has been increasingly noticeable in most industries has appeared in the financial services, but banks are the last actors to act.

Developed economies have also seen a significant rise of a new clientele – the "de-banked"; sophisticated consumers that found that with PayPal or mobile payments, there is no longer a vital need for traditional banking services to survive in the modern world.

The root of these changes lies in technology and, primarily, the Internet. The rate of adoption of new technologies and technology-related services in the developed countries has increased rapidly; while the process of diffusion of television took 22 years, it was only 7 years for the Internet and it took no longer than 2 years for consumers to massively adopt Facebook (King, 2012). Not only does the young generation – with no or little legacy of traditional banking - present a great opportunity for the FinTech; it is possible that the banking sector's incumbents will have to start fighting over their long-established clients as well.

Finally, the regulation remains strict in terms of accessing the banking market, but the borders are starting to melt. The new directive PSD2, effective of January 2018, practically destroys the banks' monopoly over the clients' data, allowing third-party providers to access the bank account information and removing the bank as the necessary

intermediator in payments. While this can only occur when the third-party provider obtains a banking license, it is nevertheless a progress in the possibilities of financial services and with the difficulties the applicants meet when trying to obtain the banking licenses, it is likely the directive will be revised.

These forces – and mainly, the technological advancement and changes in customer behaviour – have changed many industries, Uber or Amazon to name a few. This thesis will concentrate on whether and how the banking industry is being reshaped, what changes and trends in customer behaviour we can observe, and which financial services are being disrupted.

The theoretical part consists of three chapters: Chapter 1 introduces the reader to the main banking functions and current trends; Chapter 2 offers a brief overview of theories of innovation (creative destruction, disruptive innovation and diffusion of innovation), explaining some of the key terms and describing the phenomenon of FinTech; Chapter 3 concentrates on the consumer, explaining the main motives behind the behaviour shift and describing the change in the behaviour related to the financial services and banking.

The practical part opens with Chapter 4, an evaluation of the data collected through an online questionnaire in the hope of describing the consumer trends and opinions of the Czech consumers in terms of banking and the FinTech. Chapter 5 offers a closer look on three successful Czech FinTech companies – Fundlift, Twisto and Zonky (as the topic is quite broad and the FinTech solutions are numerous, the thesis concentrates mainly on the areas of payment solutions, lending and investments, leaving out for example the topic of cryptocurrencies). Chapter 6 provides an outlook for the Czech economy, describing different indicators (such as e-commerce) in possible FinTech adoption, and comparing the Czech Republic to the EU or the CEE (Central and Eastern Europe region) countries. Finally, Chapter 7 discusses the strengths and weaknesses of the traditional banks (the incumbents) and the FinTech (the new entrants) and suggests the best strategy for the two parties' coexistence.

1. Banking in a modern economy

Banks[1] as an institution have risen with the introduction of one of the most important invention in human history – money, which enabled the division of savings and investments. Banks have since acted as the intermediators placing the free capital between debtors and lenders and remain dominant in this role even though other actors (insurance companies, fonds etc.) have partly entered the market.

Economically, Dvořák (2005) further divides this role into 4 main functions:

A. Financial intermediation

In the strict sense of the term, the banks perform financial intermediation between debtors and lenders with the aim of profit while transforming the capital in several possible ways, such as quantitative (gaining capital from several small depositors and lending it consolidated to one debtor, or vice versa), time (different due payment dates) or territorial (inter-regional or international).

B. Issue of cashless money

While central banks are the only actors that issue cash in most economies, commercial banks issue cashless money by changes in the clients' bank statement records due to lending.

C. Enabling payments

Dvořák (2005) considers the *"quick, safe and relatively cheap payment system between two subjects"* (p. 31) one of the crucial pillars of functioning economy. This function has gained its importance with the rise of cashless payments.

D. Intermediation of investments on the money and the capital market

Some banks offer services such as portfolio management or assist their clients in issuing their bonds.

[1] In the thesis, all characteristics speak about all the banks except for the central banks.

1.1 Current trends and changes in banking

Matthew and Thompson (2005) state that over the last few decades, the banks in the developed economies have been facing the following three trends shaped the changes within the industry:

1.1.1 Deregulation

The authors state that deregulation of the banking sector was especially noticeable in the last quarter of the 20th century. This deregulation has however been mostly concentrated on the competitive scale, removing specializations between banking and non-banking financial institutions as well as barriers of entry (allowing companies such as GE or Tesco to enter the market of financial services, and, eventually, creating the opportunity for the FinTech companies that constitute a large part of this paper), while in terms of the financial position, the regulation had strengthened over the same period.

1.1.2 Financial innovation

While the second pillar spurring the change in the banking sector was mainly allowed by new technologies, Matthew and Thompson (2005) state that the instability of the financial environment has also played a role. 1970s stagflation has called for new products and instruments aimed for example at hedging risk, the recent global financial crisis helped the rapid increase in crowdfunding or peer-to-peer (P2P) lending; financial innovation will be discussed more thoroughly in Chapter 2.

1.1.3 Globalization

The trend of globalization in banking has started after the 2nd World War with the growing presence of US banks (for example Citibank) overseas and spread quickly not only due to founding new branches in foreign countries, but also due to alliances, acquisitions and mergers. The strong growth in banks' foreign claims is illustrated in Figure 1. Globalization has been both cause and consequence of harmonization in regulation.

Total foreign claims ($bn)					
Country	*1983*	*1988*	*1993*	*1998*	*2003**
France	70.8	97.8	115.5	189.7	120.3
Germany	33.7	93.2	179.6	399.5	250.4
Japan	61.1	338.9	405.9	295.9	1201.5
Switzerland	16.7	36.5	51.8	83.9	147.3
UK	85.8	99.4	184.9	337.7	1568.5
USA	21.4	162.3	179.3	305.0	788.6

Figure 1: Foreign claims of French, German, Japanese, Swiss, UK and US banks, 1983 – 2nd quarter of 2003, in billions of dollars. Source: BIS data through Matthews and Thompson (2005).

1.2 Technological changes in banking

In the recent years, technological changes have been the most remarkable ones. Berger (2003) notes that most technological changes benefit mainly to the customer (such as Internet banking), as the banks are cost-bearers due to their effort to keep or increase their market share.

Berger mentions Internet banking, electronic payments technologies and information exchanges (benefiting, on the other hand, mainly to the provider) as the three main technologies reshaping the industry. With the implementation of these technologies (and ATMs in the 1990s), the perception of the banks has switched from a physical place to a virtual place, steadily empowering the customers.

Confirming the conclusions of a widely cited article *Are Banks Dead? Or Are the Reports Greatly Exaggerated?* by Boyd and Gertler (1995), a worldwide study for which the views of over 32 000 banking customers were used, Accenture (2018) finds that customers are still interested in traditional values offered by traditional banks, only mixed with the mobility and flexibility digitalization made everybody accustomed to.

The (not only) Czech banks have been relying on large players in adopting new technologies and solutions, increasingly purchasing from international companies such as IBM, Microsoft, SAP, Oracle, Infosys, Teradata, SAS etc. (Deloitte, 2016). The greatest challenge for banks is currently transferring to Cloud that offers greater flexibility and agility but is not easy to implement due to legacy infrastructure.

2. Disruption of banking in the age of digital transformation

Recently, the term disruption has been used in context with multiple industries, from bookstores (disrupted by Amazon), taxi service (Uber) or accommodation (Airbnb) to banking. Disruption was first characterized in a 1997 book *The innovator's dilemma: When New Technologies Cause Great Firms to Fail* by Clayton M. Christensen and will be further characterized below.

This chapter will provide theoretical basis, moving from Schumpeter's theory of creative destruction to Christensen's disruptive innovation and Rogers' diffusion of innovation, define the widely used terms "digitalization" and "digital transformation", describe the disruption trend in banking and the main changes to the industry and introduce the FinTech. Closer attention will be given to the disruption in the field of the banks' basic services: payments, loans and deposits.

2.1 Creative destruction

Joseph Schumpeter (1943/2010) uses the term "creative destruction" as the building block of the never stationary, always evolving capitalism. He states that the "new consumers, goods, the new methods of production or transportation, the new markets, the new forms of industrial organization that capitalist enterprise creates" are the primary movers that charge the industrial revolution and evolution, and that bring about the qualitative changes in economy by destroying the old structure by creating a new one.

Schumpeter also highlights the importance of competition, but not in the sense of price as competition was mainly seen by the classical political economists. According to Schumpeter, companies that can use new technology, new supplies or new processes and in effect change the whole foundation of their industry form the most effective competition.

2.2 Disruptive innovation

Christensen (2013) bases his theory of disruptive innovation (that we could denote as Schumpeter's effective competition's results) on three pillars.

Firstly, he makes a distinction between what he calls "sustaining technologies" and "disruptive technologies". He characterizes sustaining technologies as the technologies that the mainstream customers in major markets have historically known and valued.

While sustaining technologies can improve the products' performance, they rarely bring about the failure of leading firms. Disruptive technologies, however, change the whole paradigm of the given market. Having characterized them as technologies that can make the product cheaper or more convenient to use, Christensen mentions the personal desktop computer or small off-road motorcycles as examples. The author also says that "in the near future, internet appliances may become disruptive technologies to suppliers of personal computer hardware and software" –we can already observe this disruption with the emergence of Cloud technology.

Secondly, Christensen mentions the different time trajectories of market needs and technology improvement. While at time *t*, the new technology may seem not suitable for the market use, it may be exactly the product or technology the customers will be willing to pay for in time *t+1*. In context of the thesis, we can observe this phenomenon in the latency in banks' adoption of latest technologies, which becomes increasingly more problematic as the rate of adoption of the new technologies becomes faster in time (more on the processes of diffusion and adoption of technologies in part 3.1).

Lastly, the author argues why the large companies do not heavily invest in disruptive technologies. As for the profit potential, the large companies are generally not interested in creating cheaper and simpler products, as the margins on such products tend to be lower. Another reason according to Christensen is that such technologies usually arise on emerging or insignificant markets, which the FinTech also confirm. This claim is underlined by Capgemini and Efma (2016); the report states that the FinTech penetration is highest in Latin America (77.4 %), Central Europe (68.9 %) and Middle East and Africa (63.3 %).

2.3 Diffusion of innovation

Rogers' theory of diffusion of innovations (1983) is highly relevant when speaking of digitalization or digital transformation, and will be touched upon later in this chapter as well as in the third chapter dealing with the changes in consumer behavior. Rogers characterizes **diffusion** as *"the process by which an innovation is communicated through certain channels over time among the members of a social system"* (Rogers, 1983, p. 5). The author further characterizes **communication** as *"a process in which participants create and share information with one another in order to reach mutual understanding"*. The author concludes that diffusion is a *"special type of communication, in which the messages are concerned with a new idea"* (p. 5), which is special by certain uncertainty given by its newness and two-fold act within the communication process.

Once the innovation gets diffused to the members of society, there comes a time for their decision-making of whether to adopt the innovation or not. Based on the rate of adoption the innovation, Rogers categorizes the population into 5 categories: **the innovators**, who are willing to risk due to their social status, contact and financial liquidity and who represent the first 2.5 % of the society, being the cretors of the innovation; **the early adopters**, usually well-educated people with good social status (13.5 % of the population); **the early majority**, who are in contact with the early adopters and reach above-average living conditions within the population (34 %); **the late majority**, who tend to be skeptical and negative towards the innovation and only adopts it once the average participant does (34 %); and **the laggards**, who are usually the older people among the population, averse to change, with little social contact, lowest finances and social status (16 %). The theory forms a graph of Gaussian (normal) distribution and can be discribed by Figure 1 below.

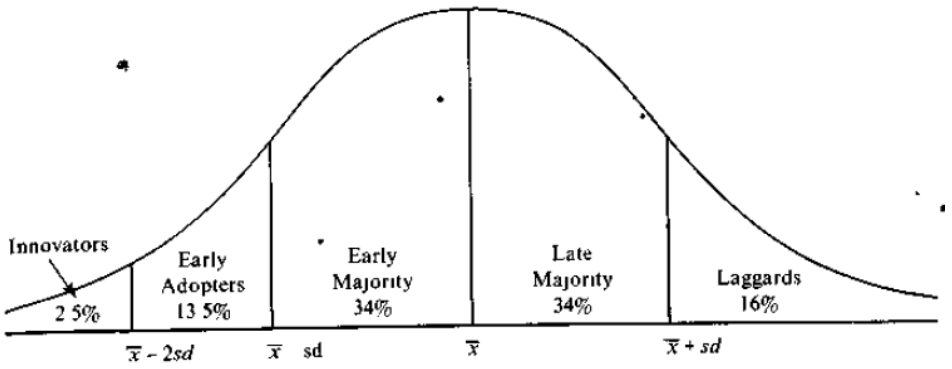

Figure 2: The Gaussian curve of adoption of the innovation among the population. Source: Rogers, 1983.

2.4 Digitalization & Digital transformation

Innovative disruption as characterized by Christensen (2013) is primarily enabled by the new technologies and their fast adoption. This enabling environment is the process of digitalization, which Gartner glossary defines as *"the use of digital technologies to change a business model and provide new revenue and value-producing opportunities".* Other definitions entail a stronger emphasis on digital communication and new paradigm of social life or highlight the importance of increasing efficiency through automation (Bloomberg, 2018).

While digitalization is mainly project-based, implemented on micro-level and might even be short-term, digital transformation means a customer-driven strong shift for the whole business and strategy, changing the paradigm of the established ways; digital transformation thus usually includes several digitalization projects as well as the change in thinking about the business overall. Furthermore, customers are considered the important movers of the digital transformation; Bloomberg (2018) states that in the process of digital transformation, business becomes fully customer-driven.

With respect to banking, we can thus speak not only of digitalization of the processes, but also of the more holistic digital transformation of the whole industry, which is further reasoned in chapter 3, *The shifts in the modern consumers' behaviour*.

2.5 Disruption in banking

Dictionary.com defines disruption in business as *"a radical change in an industry, business strategy, etc., especially involving the introduction of a new product or service that creates a new market"*; Forbes quotes Clayton Christensen explaining that the difference between disruption and innovation is in that *"a disruption displaces an existing market, industry or technology and produces something new and more efficient and worthwhile"* in a process that is both destructive and creative at once (Howard, 2013).

Several cases of disruption due to digitalization throughout different segments have gone global fast. Airbnb, the largest worldwide accommodation provider that does not own a single room, became operational in 2008[2]; Uber, the largest worldwide taxi service that

[2] Airbnb.com

does not own a single taxi, in 2009[3]; and AliExpress, one of the largest retail stores has no own goods, in 2010[4]. These three and other companies have managed to change their industry and take a significant market share within a decade.

As for banking, due to large barriers of entry imposed by high level of regulation and protection, the industry could be characterized as an oligopoly with a few players with slightly differentiated product that did not need to adapt to their clients, but rather it was the other way around. Only in the recent years did the banks become more customer-oriented, which is driven by decline in trust in banks after the global financial crisis and the change of the structure of the market itself, with the emerging competition of FinTech companies (Přibylová and Teplý, 2016).

Unlike large legacy-burdened incumbents, the new entrants in the banking industry utilize the new trends in customer behaviour and the data to bring services that are more user-friendly, tailor-made and flexible to use, optimizing the processes in a way they not only penetrate the unbanked or underbanked technically able younger generation, but also customers that have used services provided by traditional banks for years. Furthermore, with fast rate of new innovations and technologies, banks are in a disadvantage compared to small, agile FinTech companies due to large fixed cost (IT infrastructure, wages, real estate and its maintenance). And finally, due to increasing regulatory directives, there is little differentiation of product possible for banks, making it easier for the disruptors to be distinctive and find their place on the market.

Přibylová and Teplý (2016) identify three forces that forge the new standard in banking:

i. **Qualitative New Standard** describes the qualitative changes in banking in both internal and external sense. Qualitative new standard is shaped by multiple forces; digitalization, globalization, trends in consumer behaviour, the speed of adoption of new technologies, but also new competition that forces the banks to be more customer-oriented and agile, software providers that increasingly pressure banks to invest in adopting Cloud solutions all create an ecosystem to which the banks need to adapt, which is highly complicated due to the amount of legacy processes and infrastructure.

[3] Uber.com

[4] Alibabagroup.com

ii. **Regulatory New Standard** has emerged with the increased precaution after the global financial crisis of 2007-2009. This standard includes mainly capital reserves requirements or a leverage ratio. The authors point out that several studies have debated the effectivity of regulations of financial markets, often representing smaller benefits than what the costs of regulation are.

iii. **Quantitative New Standard** is then defined by the authors as the result of joint effect of the Qualitative and the Regulatory, characterized by lower profitability (further strengthened by the global trend of low interest rates) of the banking sector, which is illustrated by *Figure 1*. Significant drop in Return on Equity can be seen especially in case of European banks in total; Czech ROE %, while dropping after the crisis, remained high above the World level until 2014 and remains above the European level.

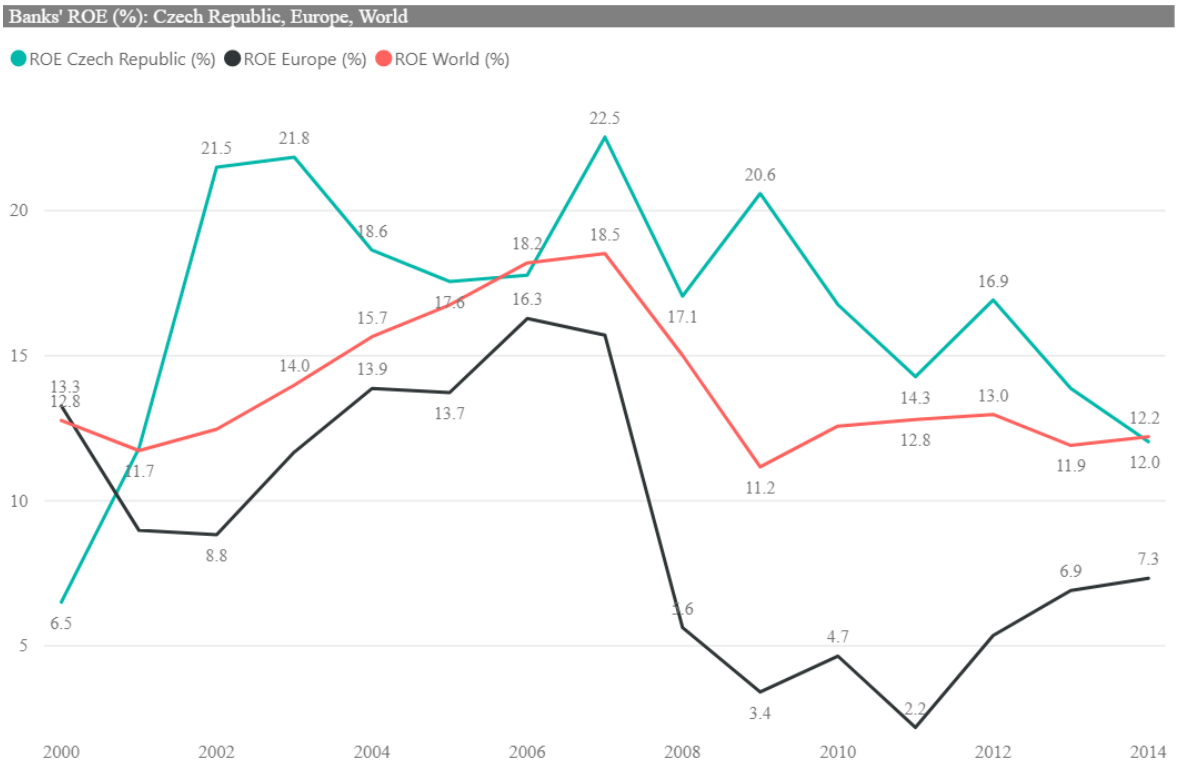

Figure 3: ROE % of the banking sector: World, Europe and the Czech Republic comparison. Source of the data: World Bank through St. Louis FED: FRED Economic Data. Own work.

2.6 FinTech: How banking gets done outside banks

Though the term „FinTech" does not resonate with everyone, the businesses that *„aim at providing financial services by making use of software and modern technology"*[5] – as defined by FinTech weekly – spread quickly. According to EY (2017), FinTech adoption[6] reached 33.3 % globally in 2017 (up from 16 % in 2015), with 13 % of consumers regularly using the service of 5 or more FinTech. The awareness of such services is also rapidly increasing, from 62 % in 2015 to 84 % in 2017.

In their search for FinTech' origin, Brandl & Hornuf (2017) analysed a dataset of 433 German FinTech companies as well as the biographies of 348 FinTech founders. The authors find that one of the reasons behind the rise of the FinTech was the economic crisis that originated in 2007; not only did the customers' trust in banks lower, but obtaining capital was made more complicated for companies. The need of alternative funding created the concept of crowdfunding and crowdlending FinTech in the early stages of the crisis. The FinTech are thus created as companies that aim to increase efficiency of the market, which can be seen across different types of FinTech, from payment systems that remove friction and provide the service to the underbanked or unbanked population to lending customers who would not have been provided a loan by a bank, although their profile appears good with better use of data (more on the topic in section 2.7.4).

The FinTech tend to be founded by well-educated people; the paper states 92 % of German FinTech founders have achieved a diploma from a higher educational institution, and 14 % completed doctoral education. 55 % have a degree in business administration, management, finance or accounting, 18 % a degree in science or engineering and surprisingly, only 9 % studied computer science. As for career background, previous employees of banks or insurance companies lead the charts among FinTech founders (28 %) followed by founders who had worked in consulting (19 %) (Brandl & Hornuf, 2017).

[5] FinTech Definition. *FinTech Weekly* [online]. [cit. 2018-11-30]. Available at: https://www.fintechweekly.com/fintech-definition

[6] In the study, EY defines FinTech adoption as share of digitally active users who have used 2 or more FinTechs within the past 6 months.

2.6.1 The success behind FinTech

Looking at the success of FinTech companies, EY (2017) identifies 3 business models that drive adoption. Firstly, the FinTech companies revolutionize the economics of the market. As we will further discuss in the next chapter, price tends to be one of the primary movers of customer dissatisfaction. Due to economies of scale, low fixed costs, no burden of legacy technologies and higher efficiency, the FinTech are able to offer their services cheaply at no cost, often also generating cost from advertisements within the app rather than directly charging the customer. Secondly, many FinTech companies do not seek to compete with incumbents; rather, they offer they more efficient solutions through business partnerships, reaching to an already existing customer base. Thirdly, they launch new products or types of service that the market has been missing.

Moreover, the FinTech are strong in marketing. Using digital channels, the companies are able to target their customers well, create a strong brand that the customers can identify with, and use the potential of the social media to go viral.

Traditional banks have long been criticized for non-human approach. According to PwC (2016), this is what customers most value in FinTech companies. 75 % of respondents stated they are better able to meet the changing customer needs; 51 % appreciated better use of data and analytic, and 42 % stated the new entrants build trusted relationships and enhance business with sophisticated operational capabilities.

2.6.2 FinTech in numbers

In 2017, EY estimated the FinTech companies achieved mass adoption by the early majority[7] in most markets; in leading China and India, the rates of adoption have reached 69 % and 52 % respectively (EY, 2017). Apart from the two leaders, the FinTech adoption in 3 other emerging economies – South Africa, Mexico and Brazil – have exceeded the global average, mainly due to the population being unbanked or underbanked, with growing demand that the traditional services cannot satisfy.

[7] Rogers' *Diffusion of Innovations* theory from part 2.3 of this thesis

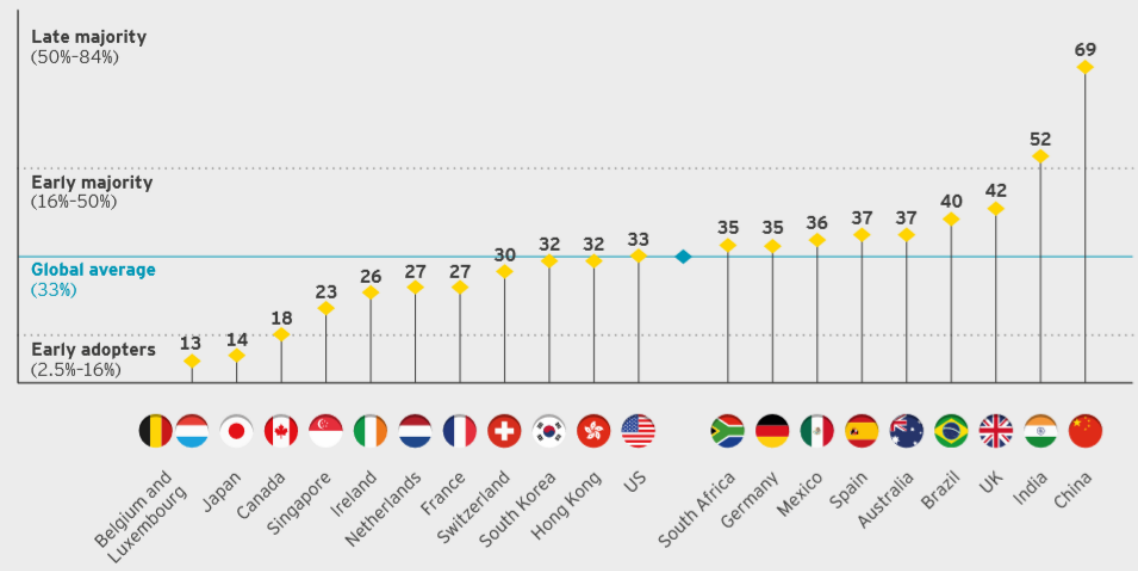

Figure 4: FinTech adoption level of chosen countries benchmarked to the global FinTech adoption level. Source: EY FinTech Adoption Index 2017.

Already in 2016, VB Profiles market intelligence platform estimated the number of global FinTech at over 1 000 companies worth 870 billion USD. Most FinTech were at the time located in California (219), the UK (133) and New York (95) (Su, 2016).

The FinTech are an increasingly popular target for investors. Globally, the investments had increased from 19.9 bn USD in 2014 to 39.4 bn USD in 2017, reaching 3-year CAGR of 18.5 %. The 2017 total value of investments was surpassed by the first 6 months of 2018 by more than 2bn dollars; there is also a noticeable trend of less investment deals, but at higher value. This is illustrated in Figure 6; while in 2014, deals with under 1 million USD dominated with 41 % share on all deals, they represent only 3.4 % in 2018 where the dominance was taken over by the largest deals (in 2018, 38.2 % of all deals are of 20 million dollar value or higher). The record value of one investment deal was 14 billion USD in H1 2018 into Ant Financial (Global FinTech, 2018).

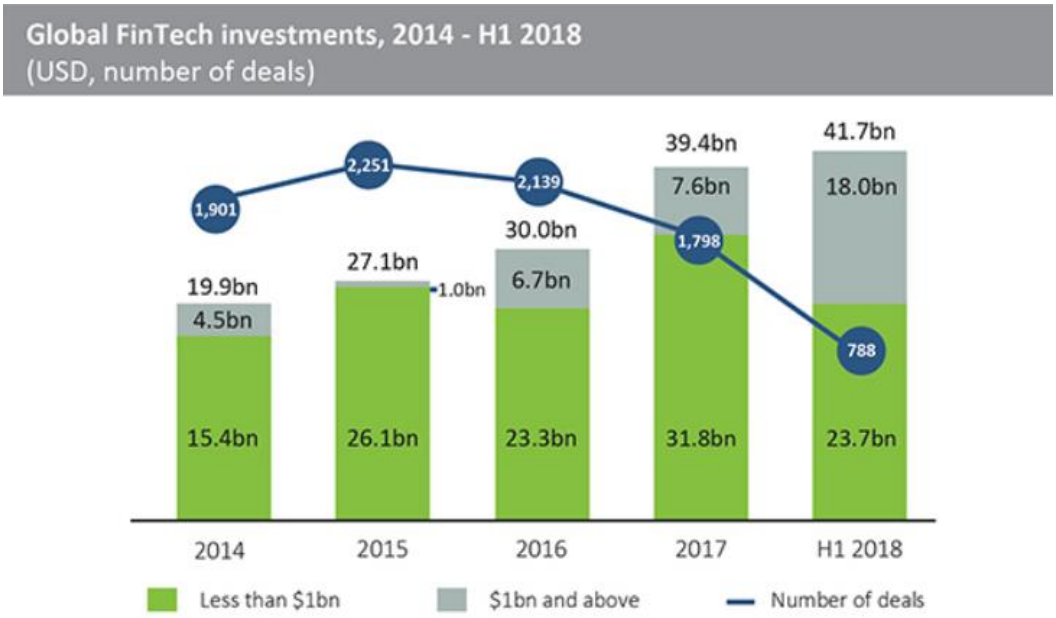

Figure 5: Global FinTech investments in USD and number of deals between 2014 and H1 2018. Source: Global FinTech, 2018.

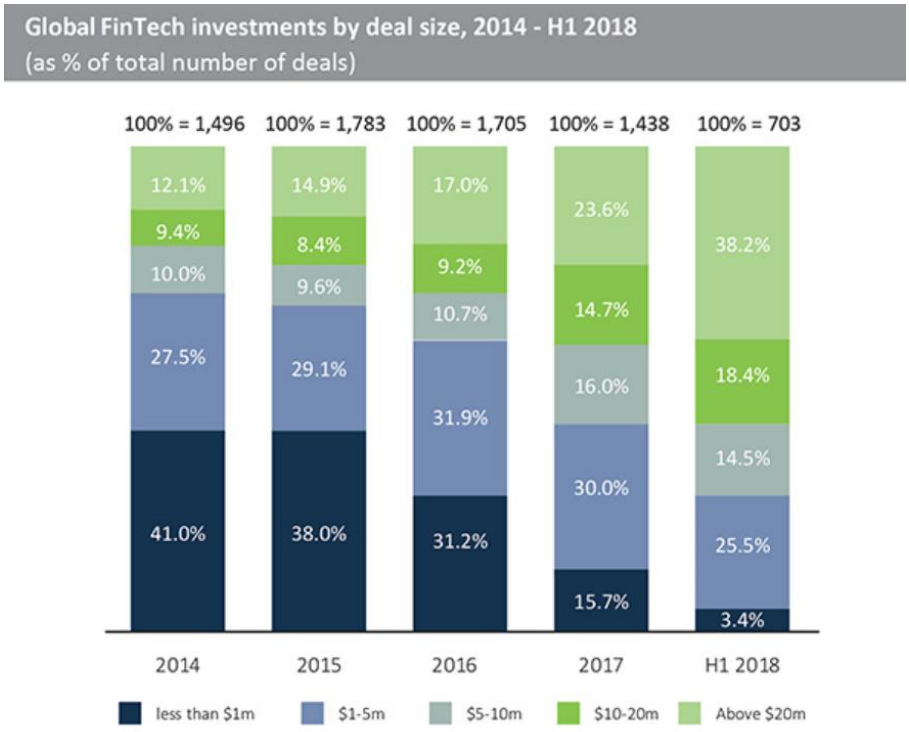

Figure 6: Investments by deal size, 2014 – H1 2018. Source: Global FinTech, 2018.

2.6.3 Who are the FinTech companies‘ customers?

Demographically, the FinTech services are most used among the 25-34-year-old consumers with 48 % FinTech adoption, as this generation is technologically skilful and in need of financial services, followed by 35-44-year-olds (41 %). Slightly lower number (37 %) can be observed within the 18-24-year-old group that, while technologically skilful, does often work only part-time or study full-time. The FinTech adoption percentage lowers with age, with 9 % at the „75 and above“ age category (EY, 2017).

The study formed an interesting conclusion: while both FinTech users and non-users are similarly likely to read terms and conditions, worry about their data protection and security and like to get a financial advice prior to making a decision, the groups differ in three aspects: FinTech users prefer to manage as many aspects of their life online (64 % FinTech users vs 38 % non-users), use mainly smartphones to access their financial services applications (54 % vs 29 %) and are willing to pay more for the most convenient financial service (54 % vs 34 %). FinTech users are also more likely to use sharing economy on a monthly basis (41 % of FinTech users vs 11 % non-users) and seek out for quality online paid services.

2.6.4 Disruption across financial services

EY (2017) recognizes 17 kinds of services provided by the FinTech which they categorize into:

i. money transfer and payments,
ii. financial planning,
iii. savings and investments,
iv. borrowings,
v. and insurance.

Across the categories, money and transfer payments offers the most widely used services, with adoption rate of 50 % among the digitally active population[8].

[8] EY (2017) uses the term “digitally active” for all consumers who are active online.

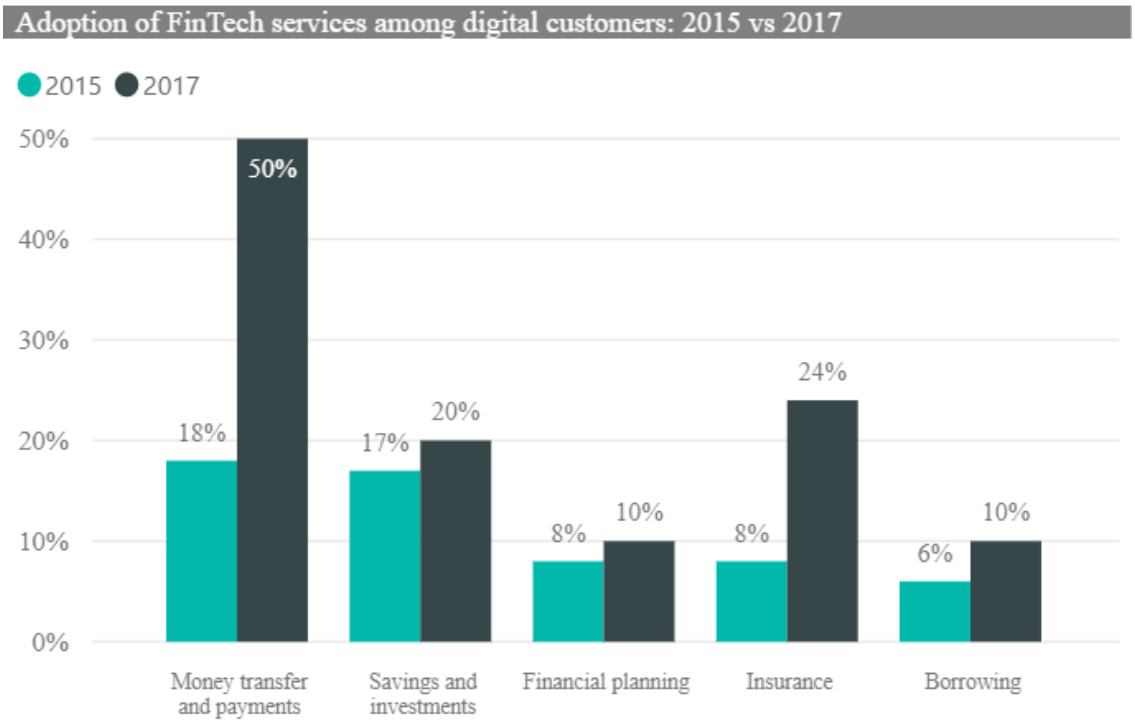

Figure 7: Global changes in adoption of FinTech's services in digital customers between 2015 and 2017. Source of the data: EY FinTech Adoption Index 2017. Own work.

PwC study (2016) asked their respondents which banking services are most likely to be disrupted by the FinTech within the next 5 years. 80 % stated they believed consumer banking to become most disrupted (consumer lending and savings in terms of the EY study), 60 % believed fund transfer & payment to be in the greatest risk of disruption.

As the thesis focuses on disruption of banking, and as the main functions of a bank have been defined in the previous chapter, the thesis will mainly concentrate on the disruption in the Czech Republic in the following three areas:

a. Lending
b. Payments & virtual accounts
c. Savings and investments

2.6.4.1 Digitalized lending

As King (2014) states, lending is the banks' oldest service, with first archaeological findings about lending and the related terms such as interest rates (even back then regulated by the law) dating 3000 years back to the Mesopotamian era. Although lending has many forms today – mortgage and credit cards being an example - the principle has not much changed since.

The risk assessment of the applicants within traditional banking institutions has not seen much change either. Based on the client's history rather than on consumer behaviour and actual trend, the U.S. Public Interest Research Group found 79 % of credit reports to be erroneous (King, 2014). Thus, the system carried out by the traditional banks establishes allocative or time inefficiency, often not granting loans clients who need it when they need it, although new risk assessment methods would find many of these clients have a low or moderate risk profile.

New approaches to either risk assessment or interest rates are employed by emerging players on the field. Peer-to-peer (P2P) lending connects people with spare money and people who need to borrow, improving the market inefficiency due to the absence of the large banking apparatus in the middle. For risk assessment, the P2P lending companies use traditional as well as alternative data, leveraging consumer behaviour data in the modelling and reaching incredible results with the approach. For example, Zopa, the first P2P lending company in the world (founded in the UK in 2005) can boast with annual credit losses below 0.5 %, as opposed to traditional banks' annual losses of 3-5 %. Giles Andrews, Zopa's CEO, attributes part of the success to the psychological effect of P2P lending as well, as some evidence suggests consumers prioritize paying their debts at Zopa as they know the money was borrowed to them by other people directly[9].

P2P lending companies offer higher interest from the investment than when investing at traditional institutions, at lower risk than the stock market presents, which makes it an attractive platform for the investors. At the same time the interest rate is often more advantageous for the lenders due to variance in the interest rates and better and more accurate assessment. Moreover, the P2P lending companies are working at lower margins than traditional institutions (3 % margin vs about 10 % margin). Due to much lower costs,

[9] From an interview with Giles Andrews, CEO Zopa, in King, 2014

improved agility and better risk modelling, they present a business model the incumbents can hardly compete with.

The P2P lending business gains popularity quickly in the developed economies; as an example, in the UK where Zopa started in 2005 as the first P2P lending company, the whole business constituted 3 % of the total retail non-mortgage lending on the UK market already in 2012, with Zopa's lending volume at £100,000,000; by 2017, this number has increased almost ten-fold (King, 2014; Stodart, 2018).

2.6.4.2 The FinTech & Payment

Payment, as a second building block of banking services, has seen its decline from the traditional institutions with the foundation of the first massively successful FinTech company – PayPal. The company became a part of the eBay online shopping platform in 2000 (and remained until 2014 when the PayPal's management decided to split the successful solution from eBay) at the time when the possibilities of payment could be summed up by debit/credit cards, bank-to-bank payments or international transfers, for the latter two of which the bank was the place to call or visit. This posed a great obstruction to the emerging segment of online shopping that ultimately, PayPal solved by allowing for electronic transactions and simplifying payment process from the traditional bank requirements (such as bank account number or swift code) to simply filling in the recipient's email or phone number. Today one of the most successful payment providers, PayPal's volume of total payments was $456 billion in 2017 (Reddy, 2017; Statista, 2018).

Not only for PayPal's global recognition, the payment disruption is the most widely noticeable. Capgemini (2015) states the number of cashless transactions in Europe alone has risen from 76.8 bn in 2009 to 90.9 in 2013, and the number has likely sharply increased since. King (2014) gives an example of Uber, a service that requires no cash exchange nor card handling, and yet can identify the user and withdraw money from his account without any action required other than order a taxi and take a ride.

It seems that in the developed economies, FinTech solutions for payment could be pre-determined for success. One of the indicators is the rate of adoption of NFC (near-field-communications; a transmission system used by credit card companies for contactless payment), which was extremely high in Europe – King (2014) states that in France, the UK or Australia, the contactless transactions constituted 25-80 % of all payments (with

stark contrast to 0.9 % in the US). Considering King's *Breaking Banks* was released in 2014 and the contactless payment was widely introduced in 2007 (Mackie, 2016), Europe and Australia's numbers for NFC payments are starkly high. The Czech Republic is keeping up with the technology, with second highest share of contactless card payments on card transactions after Australia (CzechTrade, 2018).

It is however not only the developed countries in which the new payment methods flourish. An interesting example of banking disruption – or, in this case, rather a substitution – would be M-Pesa payment service, mainly operating in Kenya and Tanzania, largely unbanked economies; 80 % of Kenyans reportedly do not have access to a basic bank account. Vodafone company saw an opportunity in high mobile phone penetration within the nation, launching a service that enables the users to deposit, transfer, withdraw money or pay using their mobile phone device. The transfer is executed by simply sending a PIN-secured text message to another user within the network. In 2012, 64 % of adults in Kenya were using M-Pesa, boasting larger penetration than any bank in the country. Similar opportunities await in other under-developed economies throughout the world (The Economist, 2015b; King, 2014).

The incentives for disrupting the payment system can thus be summed up into 2 primary movers that improve the market efficiency:

i. Removing friction – such as the necessity for filling in detailed information when sending money, or even taking out the card to pay
ii. Providing a payment system to unbanked to underbanked subjects (number of which is estimated at 2.5 billion) (King, 2014).

2.6.4.3 Savings & Investments in the age of the FinTech

While Augustine and Nava (2015) confirm the FinTech is still most appealing to the Millennials and younger generations in general, they argue that the lower cost (for example for portfolio management) and the intelligence behind the services start appealing to the older users as well. Compared to the 1-3 % annual portfolio management fee the banks charge, the FinTech' automated portfolio management apps offer automated service at 0.25 – 0.35 % fee, and with little to non-existent cost of management the solutions have the potential of high profit. The authors also argue that due to precise risk assessment algorithms and low required investments, the services are suitable to beginners as well as experienced investors.

The FinTech companies already offer differentiation in their products. The report gives an example of Betterment as the "basic" platform for less demanding users with no minimal amount of investment and mere 0.15 % advisory fee; in the 7 years of the apps existence, it gained trust of 65 thousand investors (2015 figures); on the other hand, complex personalisation is offered for example by Wealthfront with advisory fee of 0.25 % and $5,000 minimum investment, which in 2015 served 17,400 investors holding on average $115,000 in assets[10].

While automated portfolio management experiences sharp growth, in 2015, traditional portfolio managers held $17 trillion assets, compared to the FinTech' $20 billion (The Economist, 2015a). The sophisticated clients still prefer personal interaction and more complex services, such as tax advisory. However, 60 % of traditional advisors already admitted in 2015 they considered the type above described FinTech companies a threat.

The FinTech companies have also brought the phenomenon of online crowdfunding[11], which in some cases falls under the investment category. Originating with the U.S. Jumpstart Our Business Startups (JOBS) Act of 2012, investment crowdfunding has become a popular way for start-ups and small businesses to communicate their vision to many potential investors to acquire capital with less bureaucracy and regulations involved (Hayes, 2018).

Crowdfunding investments tend to be very volatile and risky due to financing mainly starting businesses. Some Fintech companies however reduce the risk by pre-selecting the start-ups they present to the potential investors. This is for example SeedInvest that has a status of regulated broker-dealer. Most crowdfunding investment companies however allow any idea to catch the investors' attention without further regulation, such as the largest WeFunder (Wile, 2017).

[10] Source of figures: Goldman Sachs company reports through The Economist, 2015

[11] Oxford Living Dictionaries define crowdfunding as "the practice of funding a project or venture by raising money from a large number of people who each contribute a relatively small amount, typically via the Internet."

2.7 GAFAM in financial services

To complete the image of banking disruption, GAFAM companies (Google, Amazon, Facebook, Apple, Microsoft) need to be mentioned. Pavel Kysilka, ex-governor of the Czech National Bank, sees the tech giants as greater disruptive potential than smaller FinTech companies due to their great comparative advantage in the amount of big data; the GAFAM can leverage their position to create financial products tailored to different groups of customers, offering those most relevant based on patterns in data and use of artificial intelligence (AI) (Průcha and Šoltés, 2018).

So far, payment solutions are the most widespread among the tech giants; each of the GAFAM companies have developed their payment system (Google Pay, Amazon Pay, Apple Pay, Microsoft pay) aiming at seamless and quick payments. This does not apply to online payments only; in the Czech Republic, for example, several large retailers (Billa, Albert, H&M, Lidl, Penny Market etc.) have incorporated Google Pay as one of the acceptable in-store payment methods. Facebook has chosen to partner with PayPal to provide its users with peer-to-peer payment system through the Messenger application, this function is however available in the US only.

3. The shifts in the modern consumers' behaviour

Since the creation of the banks, the long-established banker-consumer relationship has seen little changes – up till now. While still quite recently, the customer was in the position of one being evaluated and assessed on credibility, ability to pay and revenue potential, the sides have now turned. With information accessible easier than ever before (Internet, other users' opinions on social media or Internet forums, targeted ads), the customers have become empowered in their choice of provider, easily changing products or providers in case of the slightest dissatisfaction due to lower (or in some cases, non-existent) switching costs. The most valuable assets in the digitalized world – flexibility, mobility and most of all, time – are now values that the banks are trying to incorporate in their customer approach, though with so many legacy procedures, the banks' rigidity can hardly compete with new players that build their businesses around these core values of today (King, 2012).

This part of the thesis will discuss the mentioned customer's changing behaviour in the processes of diffusion & adoption and access to information, cover the stages of behavioural disruption we can now observe and assess the results of some studies that had observed trends in behaviour of banks' customers.

3.1 Adoption of technologies

Related to banking and the FinTech, King (2012) builds upon Rogers' theory of diffusion of innovations and defines the rate of diffusion as *"the speed at which a new idea spreads from one consumer to the next"* (King, 2012, location 423 of Kindle e-book). In terms of this paper, the "idea" from this definition can be changed for "technology" or "innovation". Adoption, on the other hand, is defined by King as a further process, dealing with the *"psychological processes an individual goes through, rather than an aggregate market process."* (King, 2012, location 423-424 of Kindle e-book).

Both the rates of diffusion and adoption have become much faster than in the beginning of the digitalization era that we can date to the end of the 19th century with inventions such as the automobile (1886), airplane (1903) or the radio (1906). Of course, many factors stand behind the speed of the processes today, mainly the Internet (commercialized in 1997) which overcame demographic and geographic borders; however, even before the world started sharing the information in real time with a few

clicks, the rate of innovation (cleverly demonstrated in King (2012) on IBM's Chairman Thomas Watson in his 1943 quote: *"I think there is a world market for maybe five computers"* just thirty years before the personal computer was invented by the same company) and its diffusion/adoption has been shortening over the past hundred years. The following graphs show the rate of adoption based on "Our World in Data" data:

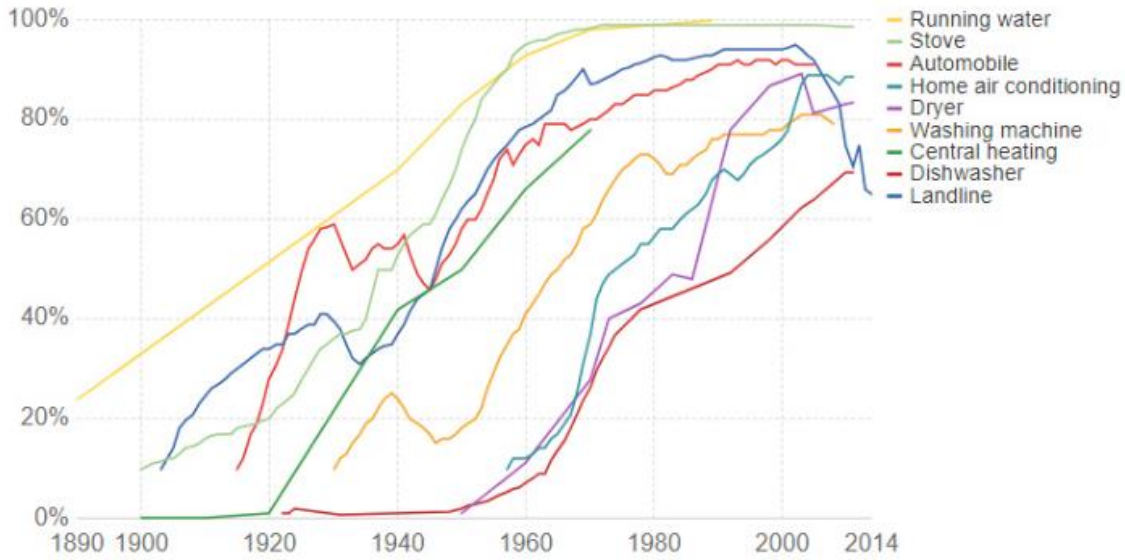

Figure 8: Rate of adoption of chosen technologies. Source: *Our World in Data* data via *Visual Capitalist*

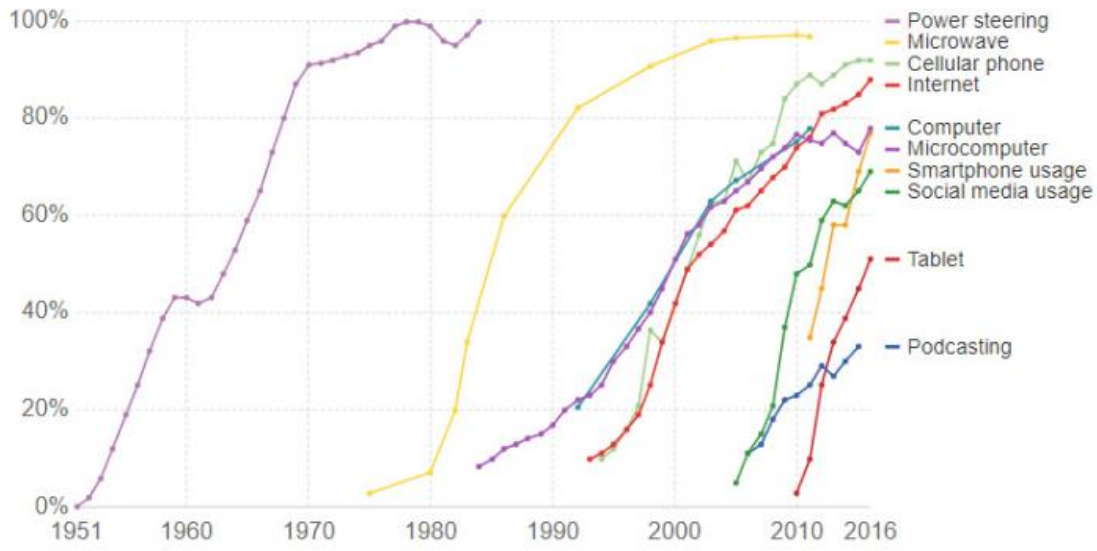

Figure 9: Rate of adoption of chosen recent technologies. Source: *Our World in Data* data via *Visual Capitalist*

We can see that the mass adoption of technologies we now deem an inseparable part of our lives took us much longer in the past than getting accustomed to the most recent

technologies; the contrast to the flat curves of the adoption of the washing machine (approx. 80 years to get to 80 % adoption), stove (50 years) or central heating (40 years) is stark compared to the sharp rate of adoption of personal computer (20 years) or smartphone usage (5 years). King (2012) also stated that the mass adoption of Facebook took mere 2 years.

This is the circle we now exist in; due to having so many technologies in our lives, we get easily accustomed to the idea of everyday innovation and with sophisticated adds, low competitive prices and accessible information, it has never been easier to try out the most recent ones. Fast adoption rates encourage innovation; and large businesses weighed down by legacy technologies often struggle to keep up, opening an opportunity for the agile start-ups that manage to adopt the newest technology in the same rate as the consumers do, matching the shifted consumer demand better. The fast process of adoption of new technologies also undermines the argument of waiting for potential return on investment estimation – this all acts out as the competitors' advantage.

3.2 Access to information

Over the past three decades, the world has been shaped mainly by the commercialization of the Internet in the 1990s. While the Western world takes immediate access to information, possibility of sharing various content with the rest of the world and new trends in communication for granted, about half of the world population does not have any or regular access to the Internet either due to poverty or restriction by the authorities (ICT Facts and Figures, 2017).

The importance of the Internet was highly recognized by the UN (United Nations) in adopting the right to use the Internet freely a human right in their July 2016 A/HRC/32/L.20 resolution (Sandle, 2016).

According to the ICT Facts and Figures 2017 report, 81 % of the total population within the developed countries have internet access, with young people's usage being generally higher that the total population throughout the categories (see Figure 10).

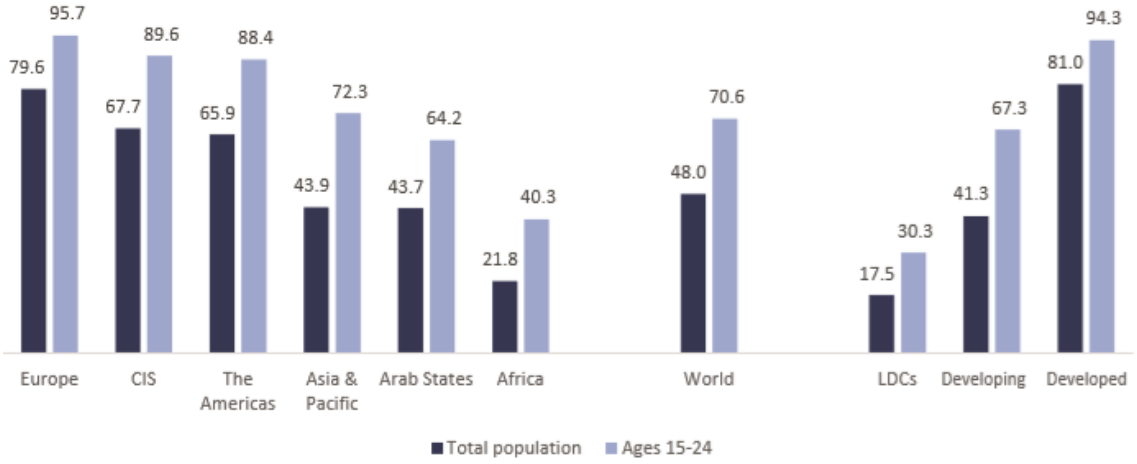

Figure 10: Internet access in the world, by % of population; differences in total population vs the young population. Source: ICT Facts and Figures 2017

The process of innovation adoption is illustrated on Internet usage in Figure 11 that contains data from various sources (extracted from Internet World Stats); most data are shown for December of the given year, except for 2001 (March), 2002 (July) and 2010 (June).

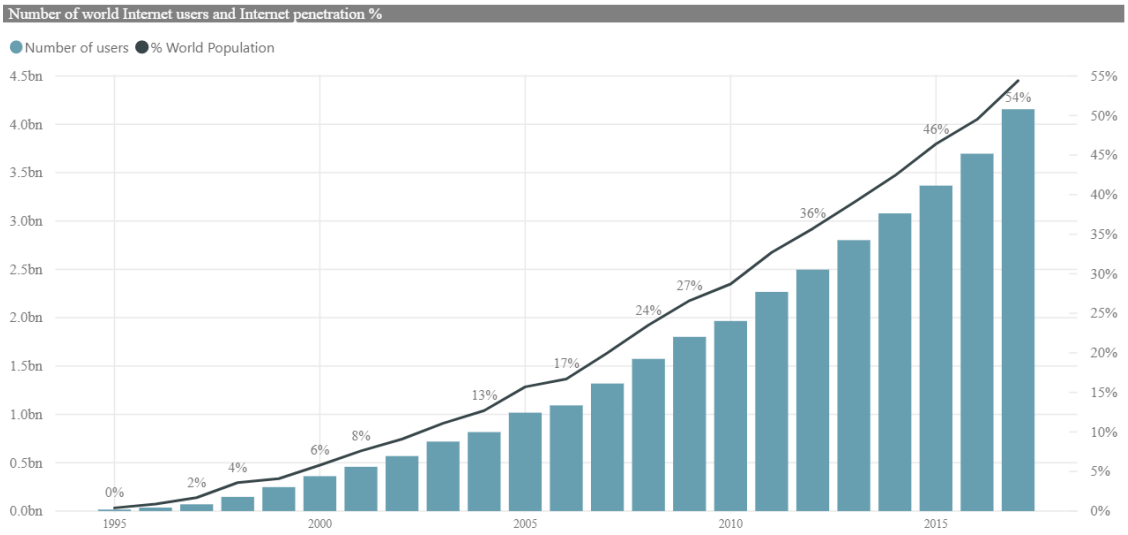

Figure 11: Number of world Internet users and Internet penetration %. Own work based on Internet World Stats (Internet growth statistics) data

3.3 The social media's role in behavioural disruption

When talking about disruption from the banks' customers' perspective, King (2012) speaks about the phenomena of the Internet, the social media and smartphones. While these technologies are mostly popular with the youngest generations (Generation Y, Generation Z) and accepted with reluctance by the Baby Boomers or Generation X consumers, the trends are – and will continue to be – on the rise with increasing change of the generations in the productive age.

The Internet is the fundamental cause behind the customer-bank relationship; as discussed previously, due to better access to information as well as easier process and lower costs of switching, the customers moved to an advantageous position. The Internet has also changed the primary contact from branches towards more time-friendly and mobile possibilities of e-banking.

King (2012) identifies the two-way interaction that the Internet enabled as the main differentiator from the traditional media. This has been crucial in empowering the customer; not only has the access to the information become easier than ever before, but the feedback and reviews have changed from word-of-mouth to sentences anyone can read, further comment on, and base decisions on them.

The social media have played a great role especially in brand recognition & recommendation, and their role is likely to strengthen; Facebook's users, for example, amounted to 2.27 billion users in Q2 2018, with a stabile growing trend (see Figure 12).

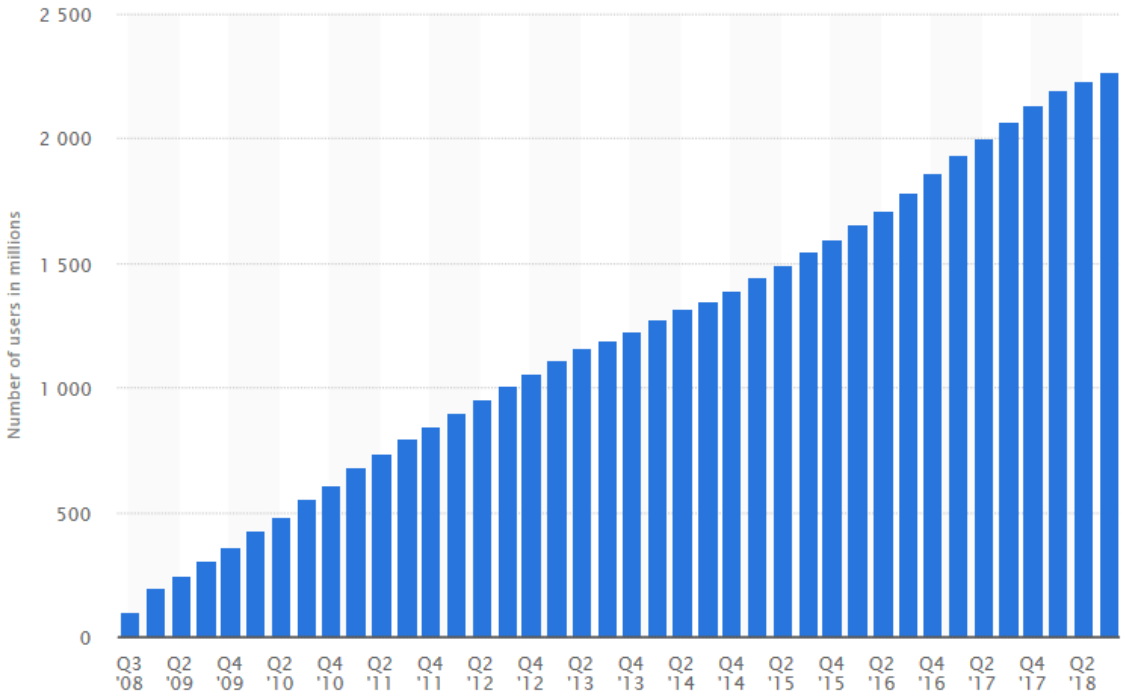

Figure 12: The number of Facebook users in time. Source: Statista (Number of monthly active Facebook users worldwide as of 2nd quarter 2018, accessed 12.10.2018)

The power of the social media is perfectly demonstrated on the Bank of America case; when the bank started charging the basic accounts a $5 monthly fee, the opposition of the social media crowd that quickly gathered more than 300,000 signatures at Change.org petition portal was so strong the decision was reversed (Katchpole, 2011).

With the rise of smartphones, the users now can and do access the Internet and the social media more often than in the past; the fast adoption of smartphones accelerates the changes in consumer behaviour due to instant connection from anywhere. Zenith media agency estimated that in 2018, more than 66 % of the population of 52 key countries[12] will own a smartphone, which is a significant growth from 2017's 63 % and 2016's 58 % (Zenith, 2018). The demand for smartphones, while flatter than in previous years, is still growing, with 1.3 % year-on-year growth in Q1 2018 with 384 million devices sold (Gartner, 2018). With increasing smartphone and more available data, we can expect all

[12] Zenith, 2018, states that the *„countries used for the report were Argentina, Australia, Austria, Belarus, Belgium, Bosnia-Herzegovina, Bulgaria, Canada, China, Colombia, Czech Republic, Denmark, Ecuador, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, India, Ireland, Israel, Italy, Japan, Latvia, Lithuania, Malaysia, Mexico, Netherlands, New Zealand, Norway, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Russia, Serbia, Singapore, Slovakia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Ukraine, the UK and the USA, representing 65 % of the world's population".*

the mentioned phenomena to strengthen over time. The trend of mobility and Internet anywhere is confirmed by the estimation that 73 % of Internet consumption will be through smartphones or tablets in 2018 (Zenith, 2018).

The behavioural disruption in customers is an opportunity, as Frank Eliason, Citi Group's Director for Global Social Media, said for an interview for Brett King's *Breaking Banks* (2014): *"The banking industry has always been about relationships. The social media is about relationships. The two go hand-in-hand."* (page 76). With the right communication, the banks have a great opportunity to cheaply communicate their vision, values and brand image to the customers.

3.4 Current trends in consumer behaviour

Globalization and digitalization have shaped a new consumer behaviour that the banks need to adjust to in order to stay relevant. Today's consumers primarily value flexibility and convenience. Van Belleghem (2015) reasons that big success companies, such as Uber, Instagram or Booking.com achieved their status not due to their product being perfect from the start, but because the product is easy and fast to use and allows connection and support around the clock. Both simplicity and saving time in a solution become increasingly important with the increasing amount of services and applications.

Apart from being impatient and convenient, today's consumer becomes more and more in control; this is well-observed recently in the banking sector where the banks long held dominance over the consumer, and large incumbents struggle with keeping up to their new competitors' personalized solutions and approach (Bolen, 2018).

Finally, the importance of social media was already mentioned above. The modern consumer becomes more opinionated, more likely to express their opinion on the social media and prone to form their own opinion of the service he does not know based on other users' reviews.

The following part will cover the existing studies on trends in banks' consumers' behaviour, further concentrating on the Czech market.

3.4.1 Global trends in consumer behaviour

Due to digitalization and globalization, the consumer behaviour has gone through significant changes in the recent years. Schoemaker (2013) sums the changes up into four categories:

- Decreased customer loyalty and trust, especially for industries that played a role in the recent financial crisis (EY study estimates that trust has been negatively impacted in 45 % of European bank customers) (EY, 2017);
- Customer empowerment due to easy online comparison;
- Increased customer diversity;
- Confusion with the amount of received information and data.

Clearly, banking is one of the industries in which the changes in customer are the most noticeable. Firstly, banking played a central role in the global financial crisis of 2007-2013, with irresponsible behaviour of the market with mortgages often being stated as the first cause starting the downward economic spiral (The Economist, 2013). Secondly, with the emergence of online comparison tools, it is easier for the consumer to quickly assess the information about banking products that are usually more complex and difficult to understand. Thirdly, until recently, the banks did not have an incentive to differentiate their product for the needs of different customer microsegments, as they were in the dominant position of the customer-bank relationship.

The main message of PwC's study Digital Banking Consumer Survey (2018) is that *"banks need to think "mobile first" to win [the banking] market."* (page 1 of the report). The preferences of consumers have switched from digital-only (interacting with banks through laptops, PCs, tablets or smartphones without preference) to a forming preference for smartphone interaction. In 2017, 25 % of customers were laptop/PC dominant, 10 % mobile-dominant and 15 % indifferent between the two; in 2018, the numbers have changed to 20 %, 15 % and 14 % respectively (PwC, 2018).

The survey has also found 65 % of the customers choose their primary bank based on the proximity of its branches; this shows that while people prefer to communicate online on a daily basis, it is important for them to know there is a possibility of physical contact; for example, 59 % of respondents stated they would prefer to apply for a loan in a branch

rather than online, which may be caused by the complexity of the product and its conditions.

Interestingly, the data showed many users are becoming less engaged, communicating with their banks less, even though the prediction in the world where the channels are easier and more flexible to use and the information is more available than before, would be opposite. Out of the 5 channels in question (Online, ATM, Bank branch, Mobile banking, Telephone agent), only Mobile banking interactions have increased (PwC, 2018). This may be partly explained by the seamless online payment systems and the trend of lower need for cash.

Another study performed by EY (2010) shows that there is a noticeable trend in higher switching rates; while 24 % of respondents changed the bank at some point in their life, 10 % did it in the last 2 years and 11 % wish to change imminently, with price being the main driver (43 %), followed by the quality of service (42 %) and offer of products (31 %). At the same time, when asked about the most important criteria for choosing a bank, service quality was a priority for most of the respondents.

Loyalty is further undermined by the fact that 19 % of banking clients only hold one product with their primary bank and choose different providers for different services.

3.4.2 Trends in consumer behaviour in the Czech Republic

The internet penetration of the Czech population reaches about 90 %; in 2016, there were 9.3 million of internet users (Internet Live Stats: Czech Republic Internet Users); smartphone penetration was estimated at 74.6 % for 2015 (eMarketer, 2015). According to a study conducted by ESET and Seznam.cz companies, smartphones have also become the device through which the Czechs connect to the internet most often. In June 2017, 79 % of respondents stated they accessed internet through their smartphones, with 71 % of respondents accessing the internet through laptop and 59 % through PC (ESET, 2017).

Regarding new technologies in finance, there are two sides of the coin; on one hand, the Czech citizens are leaders in contactless card payments within the European Union and second globally, with 91 % contactless card transactions share on total card transations (CzechTrade, 2018). In a questionnaire survey performed by Mihoková (2016), 91 % of respondents stated they owned contactless card and preferred it to the contact card.

The survey further showed that 46 % of the respondents were users of mobile banking, while 21 % refused to use mobile banking for safety concerns and 7 % stated mobile banking was inconvenient for them to use as it is too small and uncomfortable to operate with. Only 2 % respondents stated they did not know how to use mobile banking.

76 % of the survey respondents also expressed clear preference for banking accessed through PCs or laptops, compared to 14 % of users who preferred smartphone access. Only 10 % of respondents preferred visiting the branch personally. On the other hand, while the Czechs tend to compare the products of different banks (11 % often, 64 % sometimes), they show reluctance to use non-banking providers of the financial services or even the possibility of connecting the overview of different accounts within one bank's application (Mihoková, 2016).

A STEM/MARK agency survey performed in January 2018 on request of AirBank showed that only 40 % Czechs use the services of a single bank; 29 % use two banks, 28 % use three or more. Only 3 % of adult population are unbanked (Sovová, 2018). The analysis further pointed at a rather low willingness to provide financial data to non-banking providers. While the customers would generally be willing to connect their accounts from different banks within one bank's mobile banking application (88 % believing this would make any process faster and easier, 67 % believing their general overview of their finances would improve), only 15 % stated they would be willing to connect to their account through 3rd party application, with 46 % having a negative opinion on this idea. Of those who would be willing to use non-banking companies' applications, 50 % would trust large tech companies and 24 % telecommunications companies; only 9 % stated they would trust the FinTech with their financial data. Interestingly, retail companies (namely Tesco in the questionnaire) would be trusted by 14 % of respondents (AirBank, 2018).

Data concerns were the primary trigger that would make the customers avoid using either banking or non-banking companies' application to connect to their accounts (or, in case of banks' applications, to the accounts held in the other banks); this concern was expressed in 57 % respondents in case of the banks' applications and in 64 % in case of applications of non-banking companies (AirBank, 2018).

Low trust in the FinTech however does not mean incumbents are safe with their clients. 14 % of Czech bank customers changed their primary bank in 2016, slightly over 11 % in 2017. Largest Czech banks, such as Česká spořitelna, ČSOB or Komerční banka are

losing their clients to new, low-cost banks (for example Air Bank, Fio Banka or Equa bank) that may not provide full scale of services, but offer current accounts at little or no cost. Fio Banka's clientele has grown from 0.55 million to 0.82 million clients between 2015-2017 and Air Bank from 0.42 million to 0.62 million within the same timeframe, while large incumbents experienced decrease (Česká spořitelna and MONETA Money Bank) or stagnation (Komerční banka) (Němec, 2018; Bureš, 2018).

4. Czech consumers' behaviour regarding financial services: Own survey

The history of Czech commercial banking as we understand it today does not go far back; until 1989, the only bank operating on the Czech market and providing services to both the public and private sector, was SBČS (Státní banka československá, State Bank of Czechoslovakia). In the 3 decades of commercial banking, however, the evolution has been turbulent due to influx of new technologies and their availability, fast diffusion and acceptance.

Moreover, new competition has emerged. Digitalization has allowed non-banking and non-financial institution to offer basic banking services, offering new platforms for payments, deposits/investments and lending. With little legacy processes and infrastructure, innovative usage of data, customer-oriented approach and economies of scale, these new entrants offer unique user experience combined with service that can be more worth, flexible, differentiated and customer-tailored.

To illustrate the current behavioural trends of Czech consumers, the data was collected in November 2018 with an online questionnaire through *vyplň.to* platform. The survey was in Czech and was narrowed down to Czech respondents between 18-60 years old. The total number of respondents was 369, with 3 respondents' answers excluded from the sample due to unmet age criteria. Six questions were aimed at banking, five questions on the FinTech and last three questions on demographics, asking for the respondents' age, education and region of residence. The full questionnaire in Czech – as well as its translation into English – can be found in Appendices 1 and 2. If applicable, the statements or possible answers within questions were presented in randomized order.

4.1 Demographics of the respondents

4.1.1 Age structure

The full age structure of the 366 eligible respondents is described by the graph below, with 18-29- year-olds constituting 74 % of the sample:

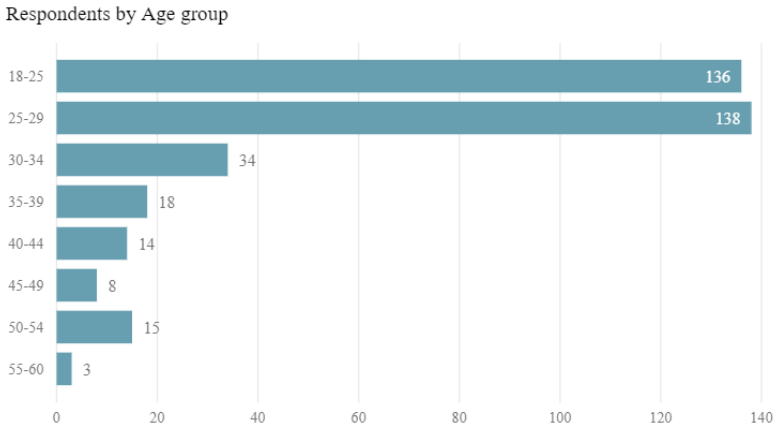

Figure 13: Age structure of the respondents. Source: Own work.

For further analyses of their answers, the respondents were sorted into Generation X, Generation Y, Generation Z and Baby Boomers groups. There may be slight differences between the definition of these generations among the scholars; this paper used the classification used in Přibylová and Teplý (2015). The most represented group within the respondents is the Generation Y, defined in as people born between 1977 – 1994, followed by Generation Z (1995 +) and Generation X (1965 – 1976). The replies were also recorded by 4 Baby Boomers (born until 1964), representing the negligible 1.1 %.

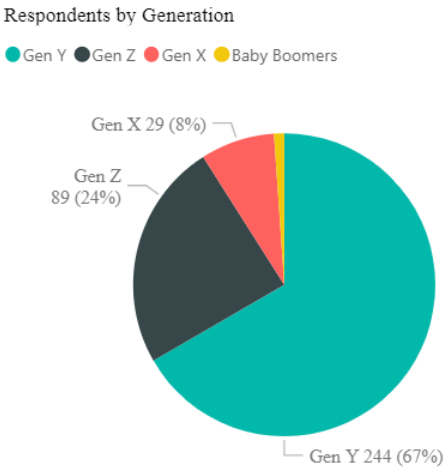

Figure 14: Respondents categorized by generation as defined in Přibylová and Teplý (2015). Source: Own work.

Another widely recognized grouping is the Millennials/non-Millennials split. This paper defines Millennials as people born after 1980[13]. The Millennials are often also labelled as "digital natives", a term originally used by Prensky in his 2001 paper Digital Natives, Digital Immigrants. Prensky argues that the Digital Natives *"think and process information fundamentally differently from their predecessors"* (page 1 of Prensky, 2001), prefer to use gamification and graphics in their learning, multi-task, and have a reluctance to the legacy processes and institutions they no longer find effective. Digital Immigrants, on the other hand, were born and grew up in the pre-digitalized world, being „immigrants" to the new trends that feel natural to the Digital Natives and only slowly adapt to new technologies.

The Millennials constitute 88 % of the survey's respondents.

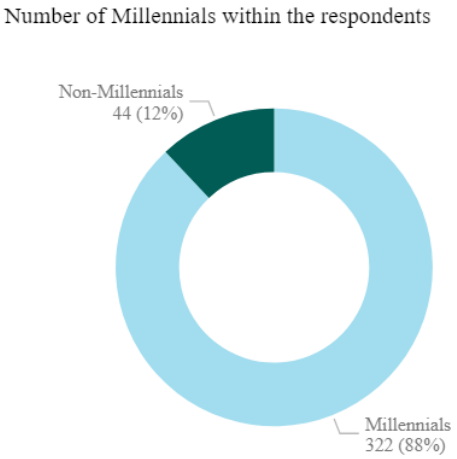

Figure 15: Share of Millennials and non-Millennials within the sample. Source: own work.

[13] Using the classification of Pew Research paper *Millennials: Confident. Connected. Open to Change.*

4.1.2 Education

Education plays an important role in the level of critical thinking about banking and financial services, with more educated individuals predetermined to better finance management as well as have more money for investing or, alternatively, potentially willing to risk a larger loan to finance their businesses.

34 % of the respondents stated their highest achieved education was high school and 63 % stated having completed university education (30 % bachelor's degree, 33 % master's degree or higher). 5 respondents stated primary school as their highest achieved education, and to prevent distortion, their responses were taken out of the sample for the following analyses, finalizing the sample size at 361 respondents.

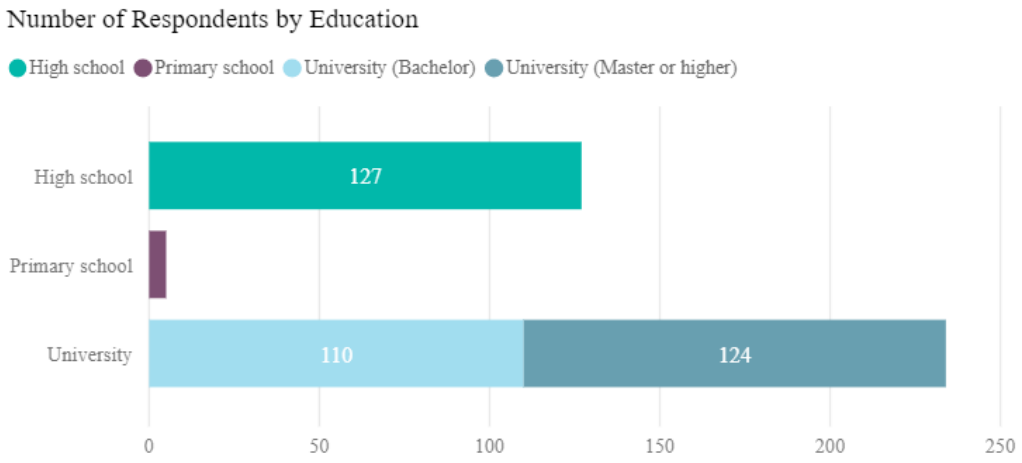

Figure 16: Classification of respondents by education. Source: Own work.

The share of Millennials in both High school and University group is 88 %.

4.1.3 Region of residency

From the geographical point of view, the respondents are quite evenly distributed between Prague and non-Prague regions, with 42 % of the respondents living in the capital. The structure of the respondents from other regions is quite flat, with the average of 13.4 respondents per region, except for Pardubice region (49 respondents; not calculated in the previously stated average). Rather than tracking each region's trends, the paper will further concentrate on the Prague/non-Prague split, supposing Prague citizens would be more prone to trying out or looking for the banks' alternatives. 92 % of Prague respondents are Millennials; in the other regions, their share is 85 %.

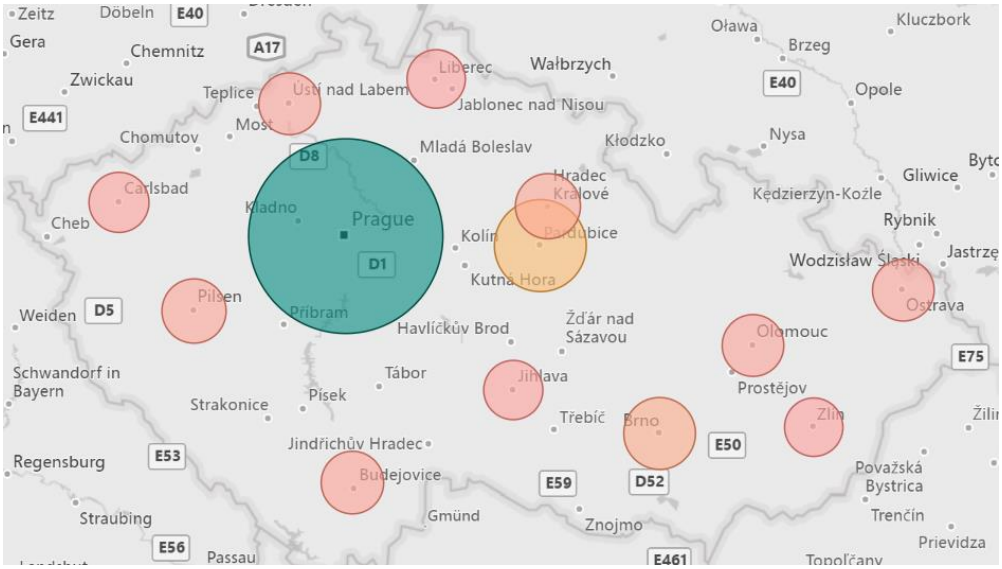

Figure 17: Structure of respondents by regions. (Prague: 150, Pardubice region: 49, South Moravian region: 24, Central Bohemian region: 22, Hradec Králové region: 17, Plzeň region: 15, South Bohemian region: 13, Moravian-Silesian region: 12, Olomouc region: 12, Ústí and Labem region: 12, Karlovy Vary region: 10, Vysočina region: 9, Liberec region: 8, Zlín region: 8.) Source: Own work.

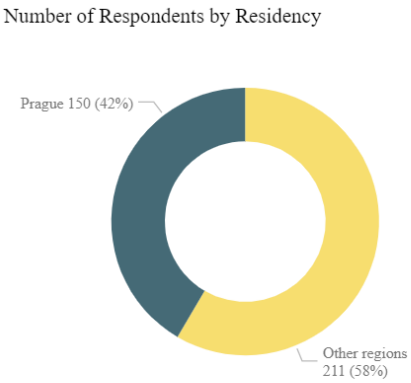

Figure 18: Classification of respondents by residency. Source: Own work

4.2 Banking-related statements

The first part of the survey concentrated on the respondents' attitudes towards banks. The trend of higher switching rates was observed within the first two questions, first asking the respondent whether he/she had considered changing his primary bank within the last 5 years, the second one asking whether the change actually happened. 58 % stated they did consider changing the bank, 50 % of whom had also changed the bank.

While the share of respondents who stated they considered changing their primary bank was similar within the group of Millennials and non-Millennials (59 % and 50 %), out of those who stated they considered changing the bank only 36 % actually did so in case of non-Millennials, with Millennials switching to another bank in over 50 % of the cases. While this is an interesting trend, a chi-square test was performed to test the statistical significance and *H_0: The rate of changing the bank is equal between Millennials and non-Millennials* could not be rejected at 5 % nor 10 % level of significance with $\chi^2=0.354$[14].

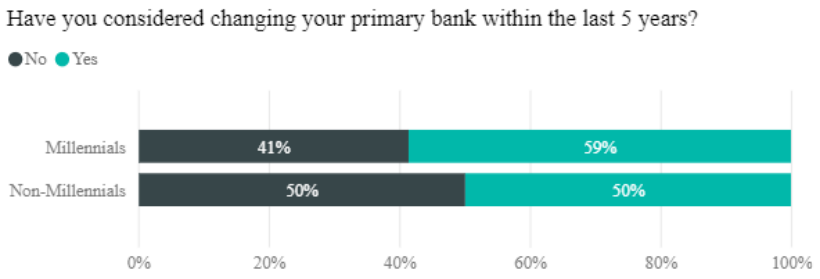

Figure 19: Question 1 results, on respondents considering the change of their primary bank, split by Millennial/non-Millennial grouping**.** Source: own work

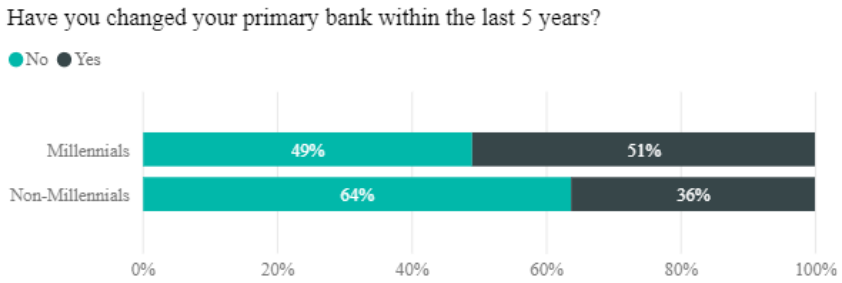

Figure 20: Question 2 results, answers of the respondents who had previously stated they had considered the change of their primary bank, split by Millennial/non-Millennial grouping. Source: own work.

[14] Detail of the testing can be found in Appendix C, part A

The reasons for change of the primary bank are depicted by Figure 22. The respondents could choose up to 3 answers; the amount of fees was stated as a problem in 43 %, followed by insufficient offer of services and low interest rates on deposits.

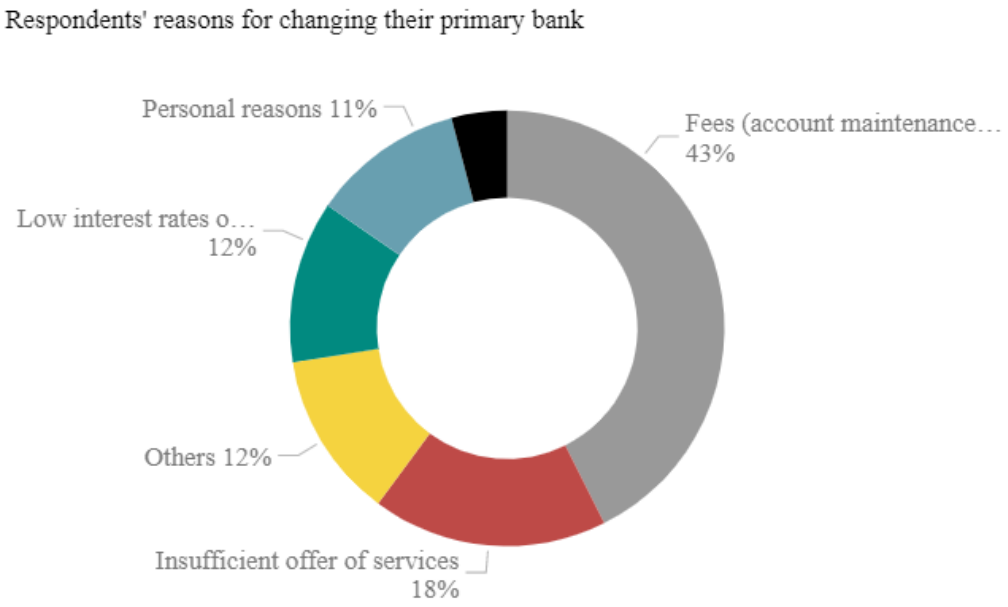

Figure 21: Stated reasons for changing the primary bank. Source: Own work

Exploring the results further, all the non-Millennials who had changed the bank stated fees and other, not further specified reasons as their primary motives, followed by insufficient offer of services. Millennials demonstrated similar aversion to fees, further stating insufficient offer of services or low interest rates on deposits as the main reasons for switching banks.

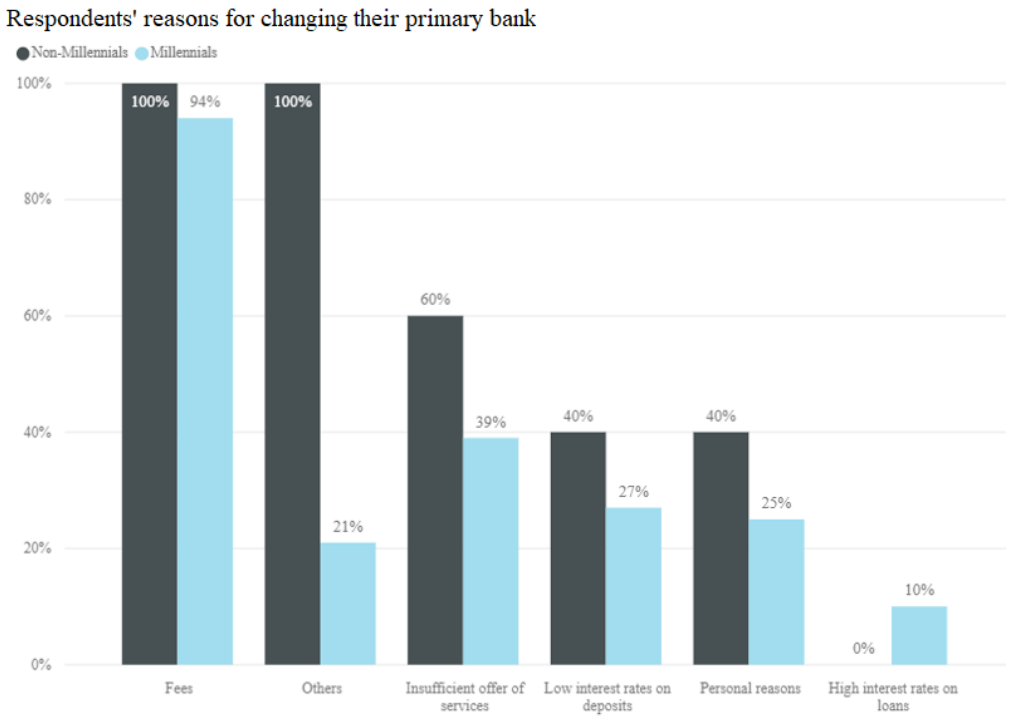

Figure 22: Reasons for changing the primary bank, by Millennial/non-Millennial split. Source: own work.

In terms of communication, the Internet is the clearly preferred medium, with 85 % of respondents most communicating over their PC or laptop (53 % of the total) or their smartphone (32 %).

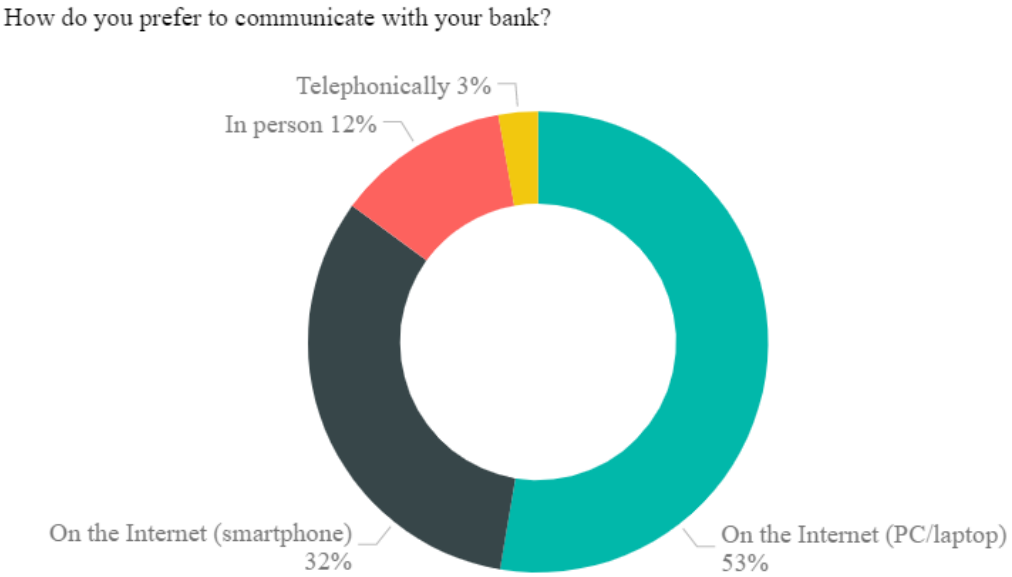

Figure 23: Respondents' preferred communication with the bank. Source: own work.

Since some trends have formed when further exploring this question, chi-square test was performed for more variables. Firstly, when splitting the data by Millennial/non-Millennial grouping, there is a clear stronger preference for smartphone usage (37 %) in Millennials compared to 24 % non-Millennials. Both groups prefer online communication (88 % of Millennials, 96 % of non-Millennials), and interestingly, 10 Millennials stated they preferred telecommunication while none of the non-Millennials chose this option, and the percentage of in-person communication is also higher in the Digital-native group (41 Millennials prefer in-person communication compared to 3 non-Millennials within the sample). This does not confirm the logic of the digitalized Millennials prefering online services more than non-Millennials.

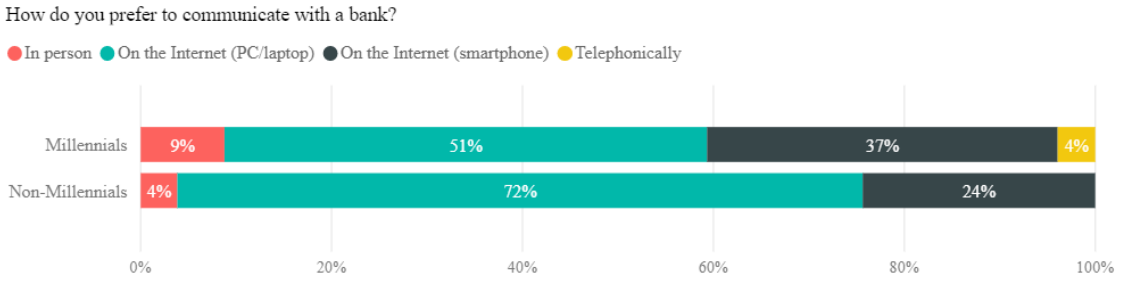

Figure 24: Preferred channel of communication, by Millennials/non-Millennials split. Source: own work.

To further test the numbers, a chi-square test was performed with the following hypotheses:

- H_0: There are no significant differences between the groups of Millennials and non-Millennials regarding the preferred channel of communication.
- H_1: There exist significant differences between the groups of Millennials and non-Millennials regarding the preferred channel of communication.

With χ^2=0.00568, we can reject the null hypothesis at 5 % level of significance[15].

As the smartphones are increasingly preferred as the main channel of communication and connection to the Internet, another chi-square was performed to test for the Millennials' and non-Millennials' preferences regarding the technology through which they communicated with the bank in case they chose the Internet as their preferred medium.

[15] Detail of the testing can be found in Appendix C, part B

Stating the hypotheses as:

- H_0: There is no significant difference between preferred usage of PC and laptops versus smartphones between the groups of Millennials and non-Millennials, and
- H_1: There is a significant difference between preferred usage of PC and laptops versus smartphones between the groups of Millennials and non-Millennials,

we can reject the null hypothesis at 10 % significance level with χ^2=0.0658[16]. Millennials preference for smartphone usage in communicating with a bank is thus statistically significant.

Further examining the smartphone vs PC/laptop preference, we can observe that the smartphone usage increases with younger generations, with no Baby Boomers[17] preferring smartphones compared to almost 50 % preference within the youngest generation.

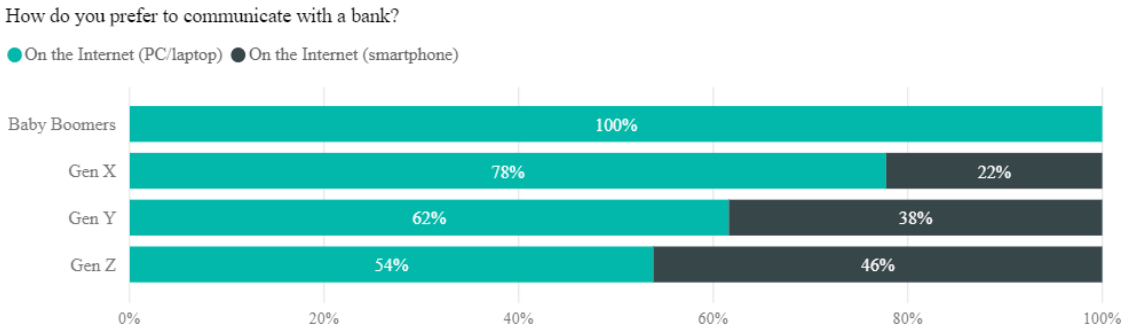

Figure 25: PC or laptop versus smartphone usage in online communications with a bank by generations. Source: own work.

Larger differences were not found when grouping the data by education or region, although respondents with high school seem to seek out in-person communication more than respondents with university degree (17 % versus 10 % respectively).

While 54 respondents prefer to communicate with a bank either in person or telephonically, only 4 respondents stated they do not use internet banking. 71 % of respondents stated they found their smartphone-accessed internet banking easy to use. The satisfaction with the user experience however relates mainly to Millennials, out of

[16] Detail of the testing can be found in Appendix C, part C

[17] It is neccessary to bear in mind that the Baby Boomers data is very limited, as N=4

whom 76 % expressed their user satisfaction, compared to only 34 % of non-Millennials. This inter-group difference was tested by chi-square test; H_0: *There are no differences between Millennials and non-Millennials regarding user experience satisfaction with internet banking* was rejected at 5 % level of significance with χ^2=0.00205[18]. This conclusion is in line with the preferred channel of communication with a bank from the previous question.

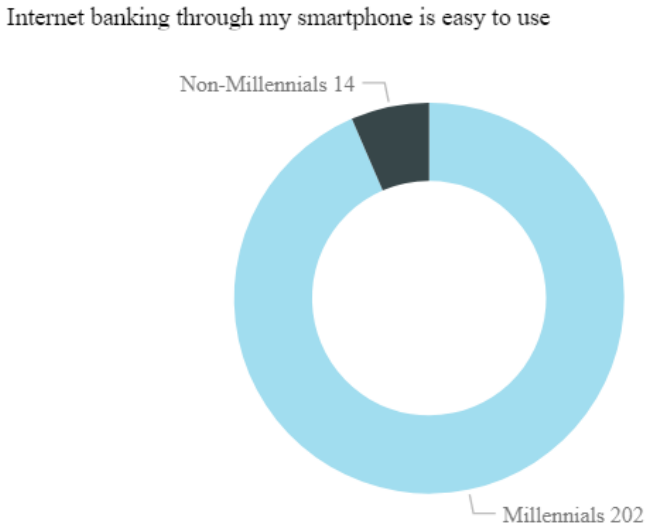

Figure 26: Respondents who find internet banking through their smartphone easy to use; Millennials (N=317) and non-Millennials (N=44). Source: own work.

The respondents were further asked whether the internet banking lets them perform everything they need on a daily basis. 60 % of respondents agreed with the statement, again presenting a large discrepancy between the "Digital Natives" (Millennials; 64 % in agreement) and "Digital Immigrants" (Non-Millennials; 32 % in agreement). The Chi-square test presented significance in this case on 5 % level as well, H_0: *There are no differences between Millennials and non-Millennials regarding the sufficient possibilities of internet banking for the daily use* being rejected with χ^2=0.0104[19].

[18] Detail of the testing can be found in Appendix C, part D

[19] Detail of the testing can be found in Appendix C, part E

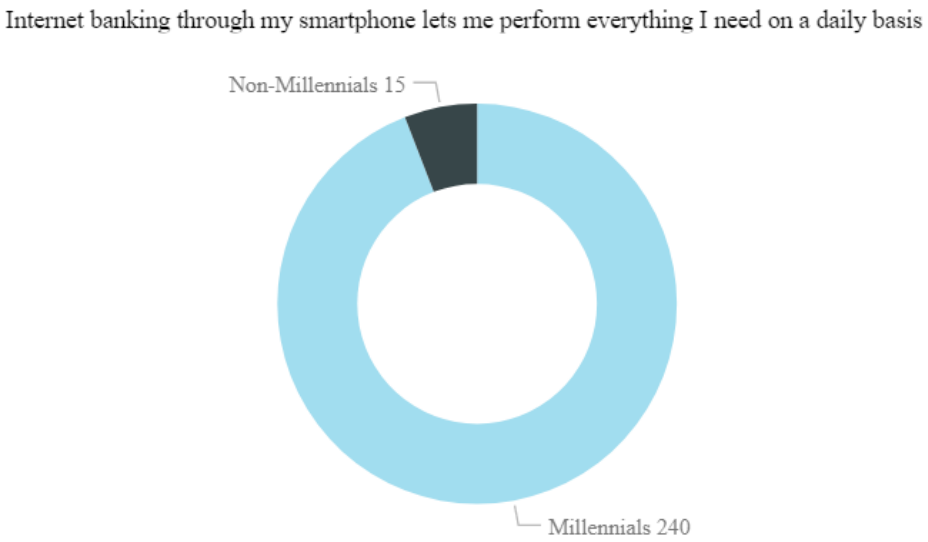

Figure 27: Respondents who find internet banking through smartphone lets them perform all the actions they need on a daily basis; Millennials (N=317) and non-Millennials (N=44). Source: own work.

Lastly within the first section, the respondents were evaluating several statements and were asked to tick those they agreed with. The results show there is quite a high level of trust for the banks (48 %), with almost no perceived differences between the individuals that were and were not considering changing the bank (48 % vs 52 % respectively). Interestingly, only 30 % out of those who changed their bank stated they trusted their bank, compared to 70 % full trust in the respondents who did not change their bank. This may indicate certain level of scepticism, as 50 % of the respondents who had changed the bank also stated they regularly look up information on the services provided by the competition. Generally, not a large share of respondents does so, constituting only 12 % of the sample.

22 % of respondents believe the banks are effective and only 12 % believe the Czech banking sector is innovative. 14 % consider personal visits to a branch necessary and personal contact with a banker is important only to 16 % of respondents (14 % in case of Millennials, 30 % in Non-Millennials). These results, together with the preference for online communication, indicate the further trend of de-branching.

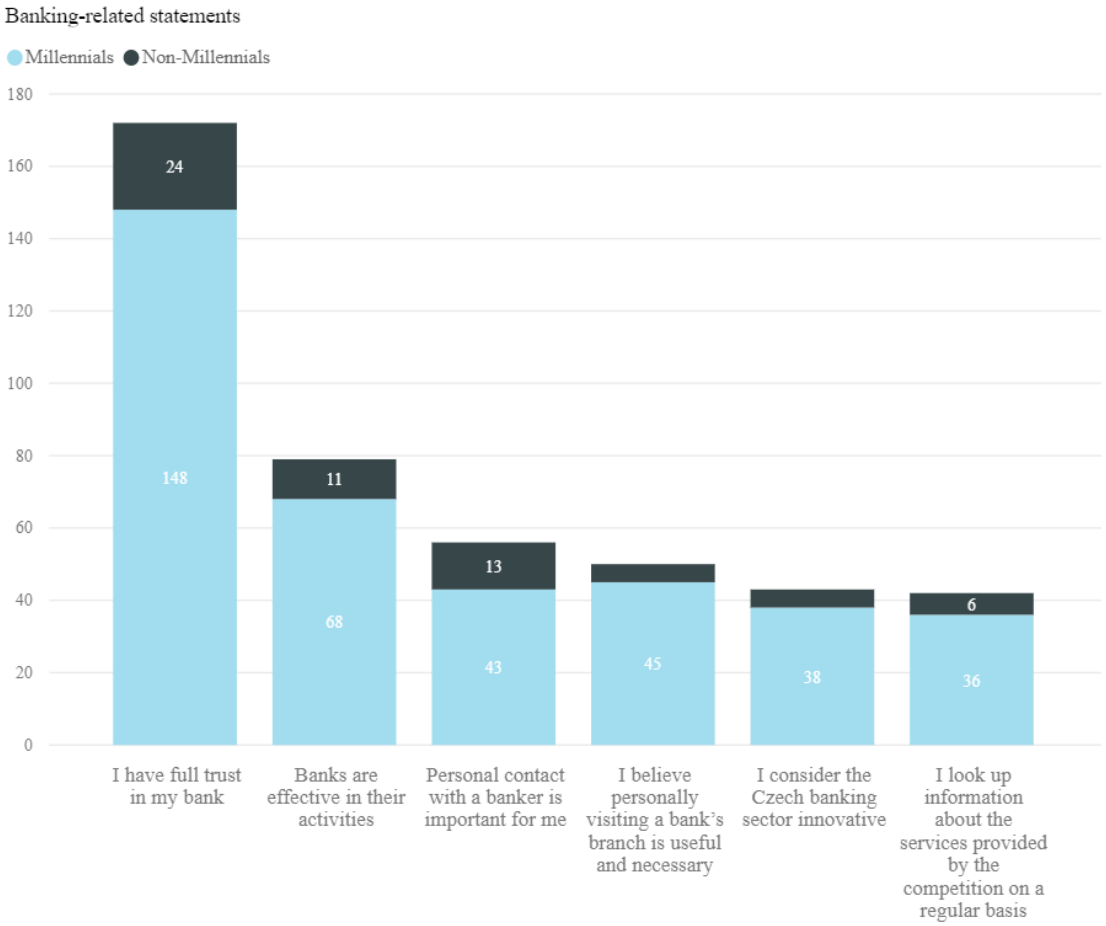

Figure 28: Respondents who agreed with the various statements on banking, split by Millennial (N=317) and non-Millennial (44) groups. Source: own work.

4.3 FinTech recognition & opinions

The second part of the questionnaire concentrated on the FinTech usage and recognition. Firstly, it is important to note that the term itself did not resonate with many respondents; only 37 % stated they were familiar with it. This share was considerably lower at non-Millennials (20 %) than at Millennials (39 %). Further examining the results from the generations point of view, the term is most known at Generation Y (41 %) and least at Generation X (21 %).

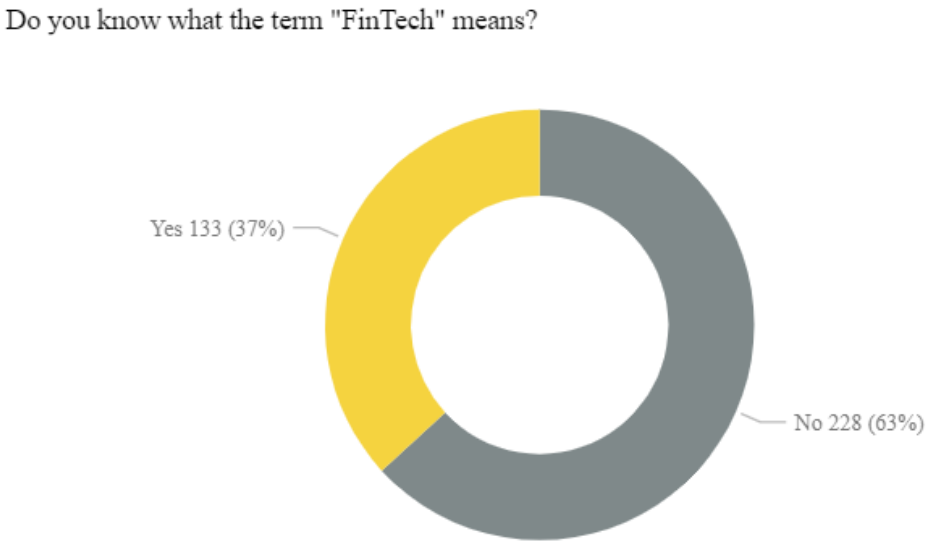

Figure 29: Respondents' familiarity with the term "FinTech". Source: own work.

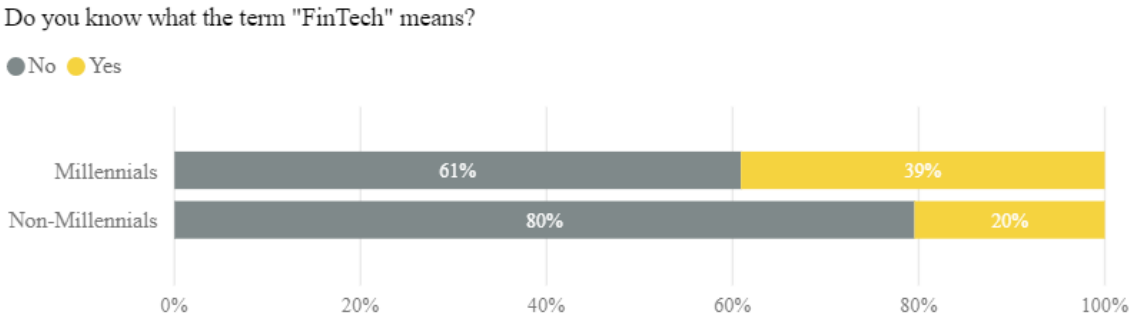

Figure 30: Respondents' familiarity with the term "FinTech", by Millennial/non-Millennial grouping. Source: own data.

Prague residents are more familiar with the term (44 %) than non-Prague residents (32 %), and similar difference can be observed between the two education groups, university graduates recognizing the term in 40 % of the cases, high-school graduates in 31 % of the

cases. 54 % of Prague citizens with master's degree or higher falling within the Millennial category – potentially the most profitable clients – recognize the term.

The next question explained the term „FinTech" as follows:

„The FinTech companies could be characterized as companies that penetrate the financial market with technological solutions. In the Czech Republic, it is for example Twisto (payments), Spendee (application for management of personal finance), Zonky (lending), Startovač or HitHit (crowdfunding)."

While 29 % of the respondents replied after the definition that they indeed have used such services, it is interesting to see they were also used by 18 % of the respondents who did not know what FinTech meant, though of course the share of usage is considerably larger within the respondents who were familiar with the term (49 %).

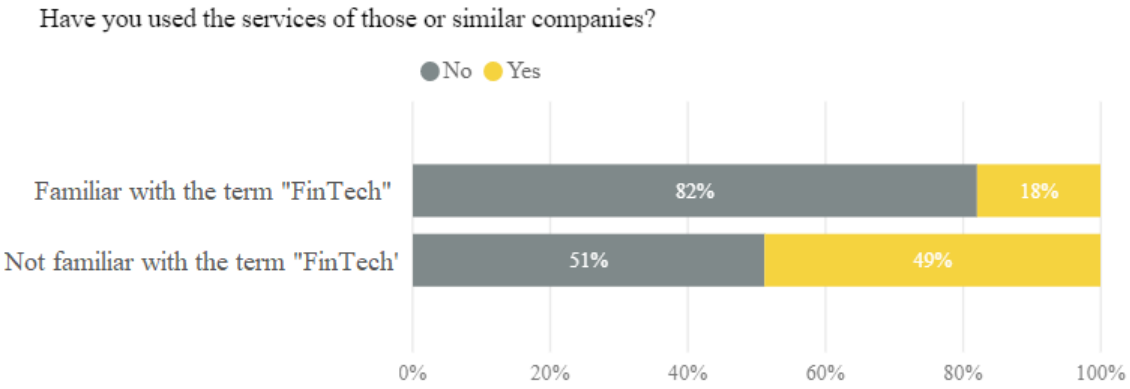

Figure 31: FinTech usage versus familiarity of the respondents with the term. Source: own work.

Age-wise, the Millennials are more prone to using the FinTech, with 32 % of users compared to 9 % of users among non-Millennials. The H_0: *There are no differences between Millennials and non-Millennials regarding usage of the FinTech* was rejected at 5 % level of significance with χ^2=0.00809[20].

Generation Y exhibits the largest usage at 34 % compared with other generations; Generation Z respondents use FinTech in 21 % of cases, Generation X respondents in 14 %.

[20] Detail of the testing can be found in Appendix C, part F

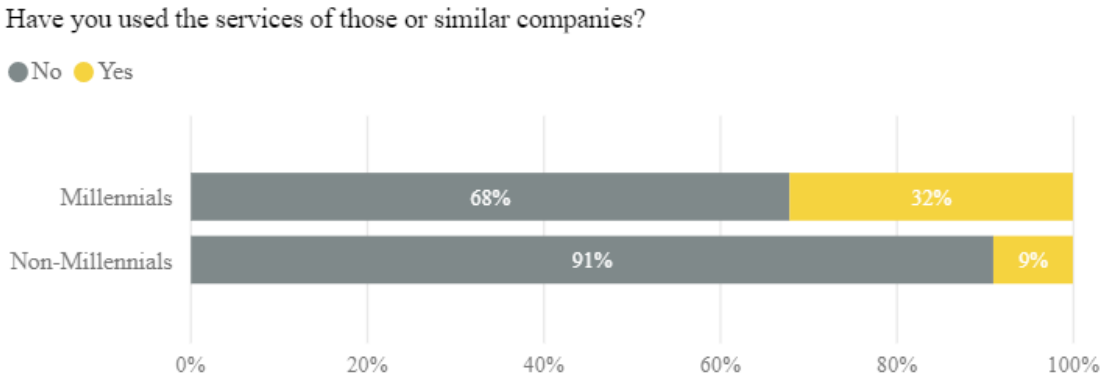

Figure 32: FinTech usage by Millennial/non-Millennial grouping. Source: own work.

More users of FinTech can also be found in Prague compared to other regions. With χ^2=0.00497, the H_0: *There are no differences between Prague and non-Prague residents regarding usage of the FinTech* can be rejected on the 5 % level, pointing out the statistically significant relationship between the residency in the capital and FinTech usage[21].

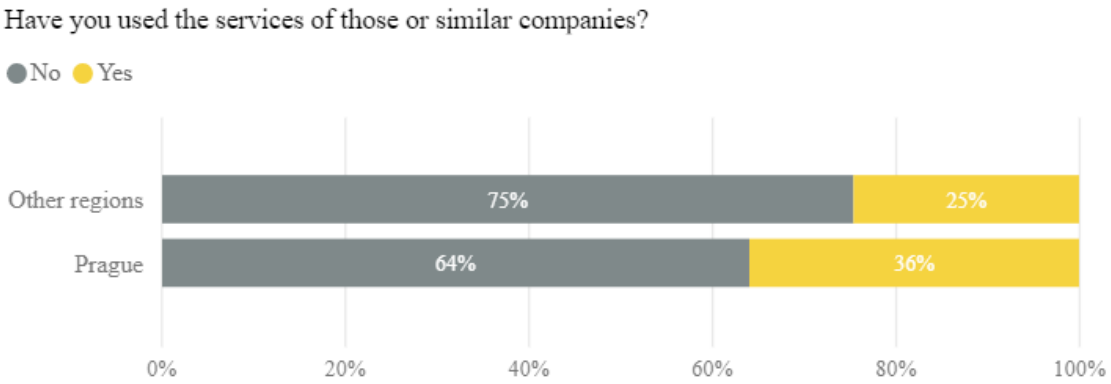

Figure 33: FinTech usage by residency. Source: own work.

Lastly, the data has shown that the individuals who considered changing or changed their bank were using the FinTech in 35 % or 40 % of cases respectively, compared to those who did not consider or did not change their bank with 22 % and 23 % of cases respectively.

Chi-square test was performed to test the significance of the FinTech users split between those who did and did not change the bank. H_0: *There are no differences between those*

[21] Detail of the testing can be found in Appendix C, part G

who did and did not change their bank within the last 5 years regarding usage of FinTech was successfully rejected pro H_1: *There are significant differences between those who did and did not change their bank within the last 5 years regarding usage of FinTech* at 5 % level of significance with χ^2=0.00433[22].

The factor of changing a bank is also statistically significant within the millennials group. H_0: *There is no significant difference in FinTech usage between Millennials who have changed their bank in the last five years and Millennials who have not change their bank in the last five years* was rejected with χ^2=0.0118[23].

The next section asked the respondents to type in the name of the FinTech they were using. The results show the respondents prefer crowdfunding/investment platforms (such as HitHit, Startovač, Fundlift or Kickstarter) and the FinTech combining more solutions (Revolut, Twisto, Curve).

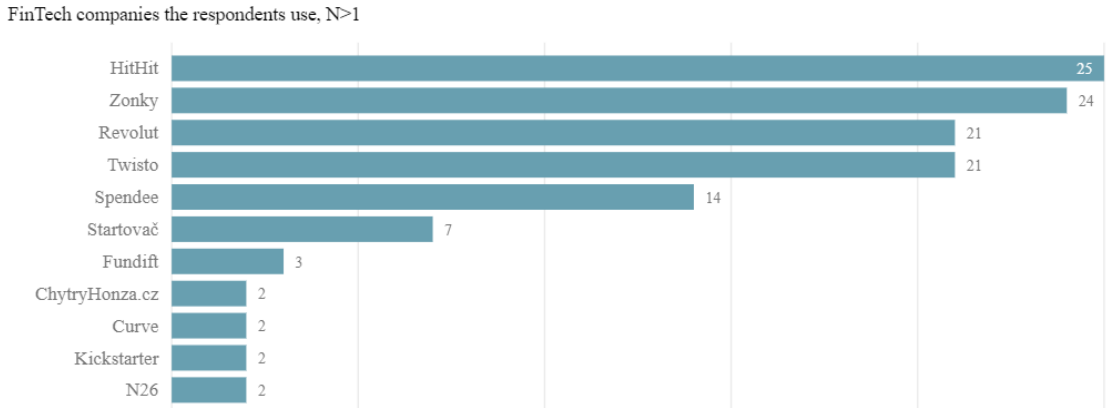

Figure 34: FinTech companies whose services the respondents use; the graph only shows those that were mentioned more than once[24]. Source: own work.

Before looking further into the data on usage and combining them with the recognition of different groups of FinTech companies, an outlook of the question of FinTech recognition

[22] Detail of the testing can be found in Appendix C, part H

[23] Detail of the testing can be found in Appendix C, part I

[24] Other companies that were mentioned once and their primary area of service: Akcenta (foreign exchange), BitStamp (cryptocurrencies), BudgetBakers/Wallet (finance management app), CoinMate (cryptocurrencies), Mintos (crowdfunding & investments), MoneyLover (finance management app), Portu (crowdfunding & investments), Roger (lending for companies), RoklenFx (foreign exchange), Settle Up (finance management app), Transferwise (foreign exchange), Trezor (cryptocurrencies), Upvest (crowdfunding & investments)

will be presented. Significant Czech FinTech companies[25] were presented to the respondents who were asked to tick all the FinTech companies they had knowledge of. The recognition of Czech FinTech is illustrated by Figure 36.

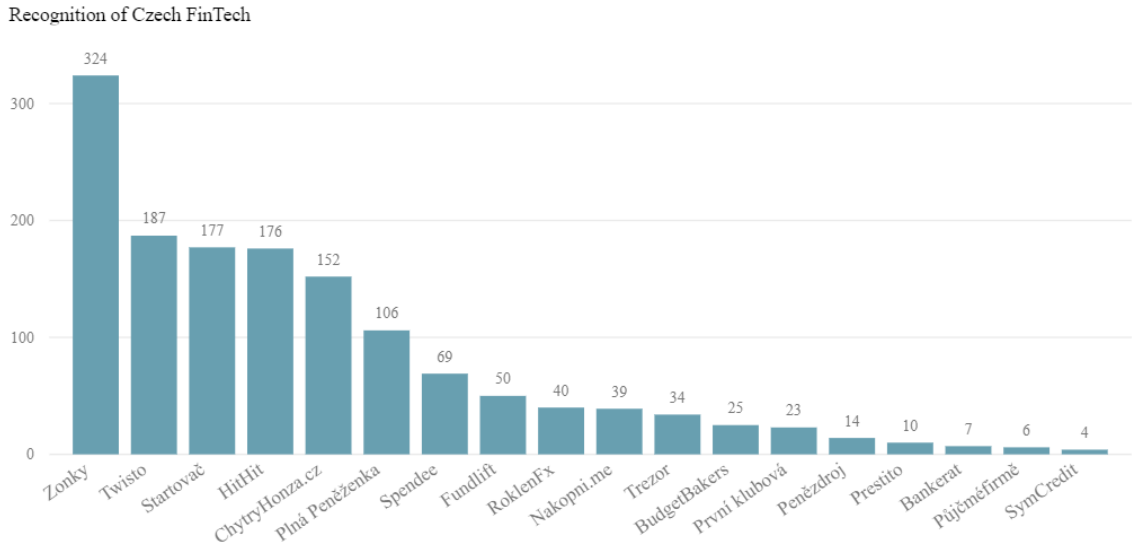

Figure 35: Respondents' recognition of Czech FinTech companies. Source: own work.

For the next section, some of the FinTech companies were grouped into 4 general groups that will further be analysed:

A. Crowdfunding & Investments

Crowdfunding & Investments group contains all the FinTech through which an individual can either support a project or a company without any profit claim or invest. Regarding the FinTech the respondents stated they used, the following companies are in question:

- HitHit
- Startovač
- Kickstarter
- Fundlift
- Mintos
- Portu
- Upvest

[25] Chosen on the basis of Tóthová (2016), leaving out the companies that had already terminated their activities

Regarding the Czech FinTech from which the respondents chose the ones they had knowledge of, the following companies are in question:

- Startovač
- HitHit
- Fundlift
- Nakopni.me
- Penězdroj
- SymCredit

Zonky, the FinTech the most people have knowledge of, will be analysed under the P2P lending section, though it is important to state it could also be perceived as an investment platform due to its peer-to-peer lending nature. Mintos, for example, uses a similar principle, but the loans that are meant to be invested in are input by loan originators rather than borrowers themselves, which is why it was sorted under this category instead.

B. Payment solutions/Virtual accounts

The FinTech sorted under the virtual accounts label provide the users with multiple options, such as consolidation of the users' accounts, debit payments with delayed payback, alternative payment solutions (for example application that substitutes the card, or Twisto bracelet), foreign exchange or travel insurance.

Regarding the FinTech the respondents stated they used, the following companies are in question:

- Curve
- Revolut
- Twisto

Regarding the Czech FinTech from which the respondents chose the ones they had knowledge of, Twisto will be analyzed.

C. P2P lending

Peer-to-peer companies connect end users with spare money with end users looking for a loan. Regarding usage, Zonky is the only company that was mentioned by the respondents; regarding the Czech FinTech from which the respondents chose the ones they had knowledge of, the following companies are in question:

- Zonky
- Bankerat
- Prestito

D. Finance management

Finance management is often connected with the companies sorted into virtual accounts, some FinTech however offer just this functionality; a review of one's account balance as well as cash balance.

Regarding the FinTech the respondents stated they used, the following companies are in question:

- Spendee
- Moneylover
- Budgetbakers (Wallet)

Regarding the Czech FinTech from which the respondents chose the ones they had knowledge of, the following companies are in question:

- Spendee
- BudgetBakers

4.3.1 Crowdfunding & Investments FinTech

As for the crowdfunding & investments, 40 respondents stated they do use them, this share being slightly higher with Millennials (12 %) and negligible at non-Millennials (3 %). Prague residents use the crowdfunding and investments FinTech companies more than the respondents from other regions, in 14 % of cases compared to 9 %.

HitHit is the most used FinTech within this field, with 24 users, followed by Startovač (7 users) and Fundlift (3 users).

Regarding the recognition of the FinTech, Startovač is the most widely recognized FinTech within the category with 177 respondents' recognition (49 % of the sample), followed by more widely used HitHit (176 respondents, 49 %) and Fundlift (50 respondents, 14 %).

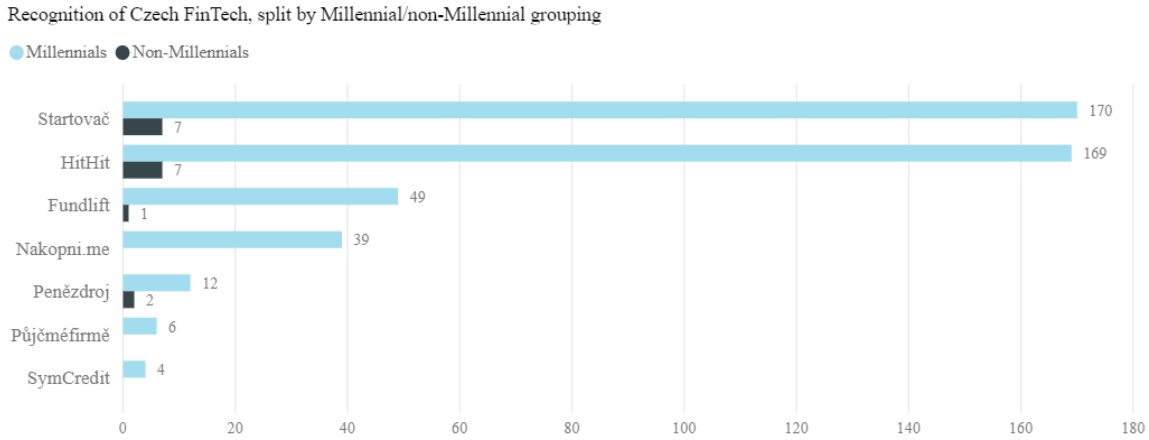

Figure 36: Crowdfunding & investments FinTech recognition, by Millennials/non-Millennials split. Source: own work.

No significant differences were found between the education or residency group, although HitHit was more recognized in Prague than outside Prague (97 vs 79 respondents); Startovač, on the other hand, is more recognized in the other regions (96 vs 81).

4.3.2 Virtual accounts FinTech

The usage of FinTech offering the greatest scale of solutions was stated at 44 (or 12 % of) the respondents, 96 % of whom were millennials[26]. 86 % of users fall under the 25-29- or 18-25-year-old categories, within which they represent 19 % and 9 % respectively. 2/3 of the users are university graduates. Revolut and Twisto are both used by 21 users.

Twisto was the only FinTech from this category in the question on recognition, and was second highest recognised, with 187 respondents (52 %). The split is highly uneven between Millennials, 56 % of whom know the FinTech, and non-Millennials, where the recognition stands at 18 %. Most respondents who recognize Twisto are between 25-34 years of age, also showing the highest recognition within the given age group (57 % of 25-34- year-old respondents know Twisto). For comparison, 52 % of 30-39- year-old respondents and only 14 % of 40-49-year-old respondents recognized Twisto.

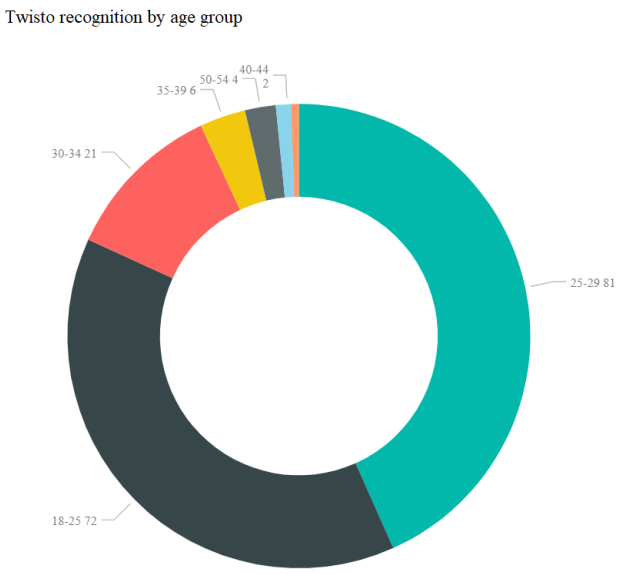

Figure 37: Twisto recognition by age group. Source: own work.

Prague residents also have higher recognition of the FinTech compared to residents from other regions (59 % versus 46 %). This may be partly explained by Twisto cooperating with some large services, such as online shopping Rohlik.cz, that distributes the goods only in the Prague area.

[26] It was checked that each respondent has stated they were using only one of the three FinTechs in question.

4.3.3 Finance management FinTech

Finance management FinTech are used by 4 % of the sample[27], all of them Millennials. Most of the users are 25-29 years old, no users exceed 34 years of age; none of the users steps outside the Gen Y or Gen Z category, supposing the finance management apps are more popular with the younger users, which is further supported by the recognition data. 70 % of users are Prague citizens.

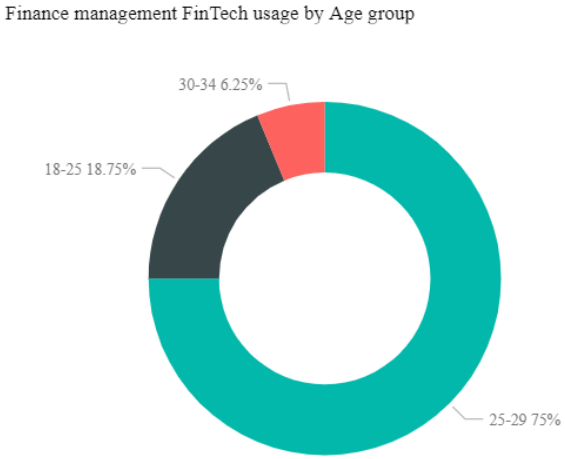

Figure 38: Finance management apps usage by age groups. Source: own work.

As for the Czech FinTech recognition, Spendee or BudgetBakers were acknowledged 94 times, with the majority (98 %) coming from the Millennials. Interestingly, the two non-Millennials recognized the less widely known and less used BudgetBakers. The recognition also mainly resides in Prague (69 %).

[27] It was checked that each respondent who used finance management FinTech stated just one of the FinTechs in question.

4.3.4 P2P lending FinTech (Zonky)

Zonky was the only P2P lending platform the respondents stated they used, which occurred in 7 % (24 respondents). All of the Zonky users are Millennials, with most respondents from Prague (58 %).

As for recognition, Zonky was recognized by 90 % of the respondents (staying far ahead the next most-recognized FinTech Twisto with 52 % recognition), the share of Millennials‘ and non-Millennials‘ respondents similarly high, with both groups being proportionately represented. Prestito and Bankerat, however, were recognised by 10 and 7 respondents respectively, all of them Millennials except for one non-Millennial who recognised Bankerat. Similarly, while the share of Zonky’s recognition was approximately the same in Prague and non-Prague residents, the respondents who live in the capital recognised the other P2P lending FinTech more.

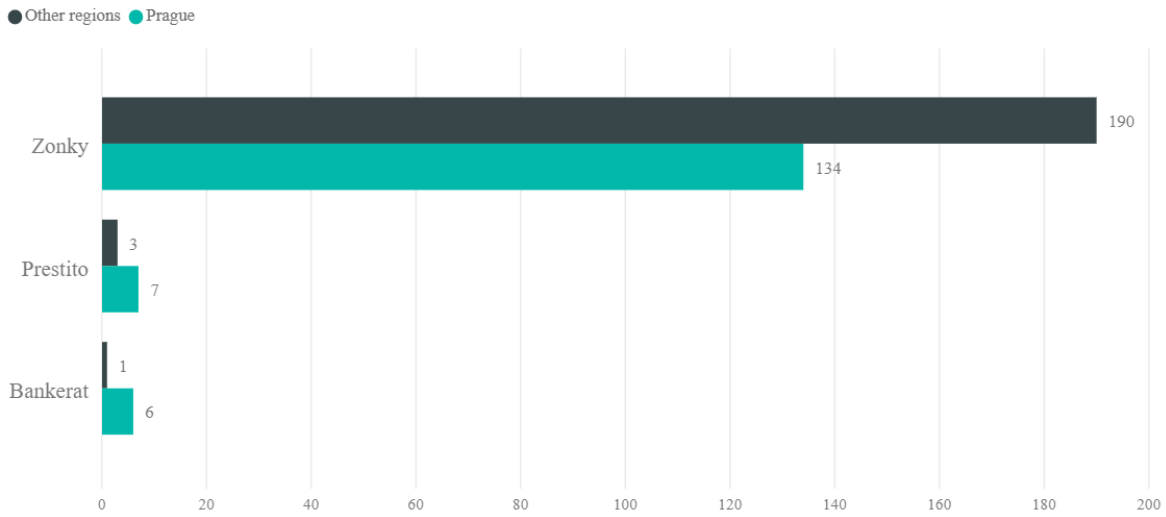

Figure 39: P2P lending platforms recognition, by residency. Source: own work.

4.4 FinTech-related statements

Last section of the questionnaire presented the respondents with 8 FinTech-related statements, out of which they selected those they agreed with; the full statements and number of responses is depicted in Table 1.

Statements on FinTech	Respondents
I consider the FinTech companies to be a healthy competition for the traditional banks	209
I would be willing to use the financial services of big tech companies (Google, Apple, Facebook, Amazon, Microsoft)	171
I would be willing to use the financial services of FinTech companies	155
I would be willing to use payment solutions of FinTech companies	145
I currently use the services of FinTech companies or believe I will within 5 years	144
I would be willing to invest through FinTech companies	132
I would be willing to borrow money through FinTech companies	75
I regularly seek out the information on financial services provided by non-banking subjects	38

Table 1: FinTech-related statements by number of respondents who agree with them. N=361. Source: own work.

The statement most respondents agreed with is on the FinTech being the healthy competition for traditional banks (58 %). 40 % further stated they believe they will use the FinTech services within the next five years, which is only 10 percentage points higher than the share of respondents who stated they were already using the FinTech services. The relatively low share may be partly explained by a small fraction of respondents who actively seek out options of financial services provided by non-banking subjects, which is a little over 10 %.

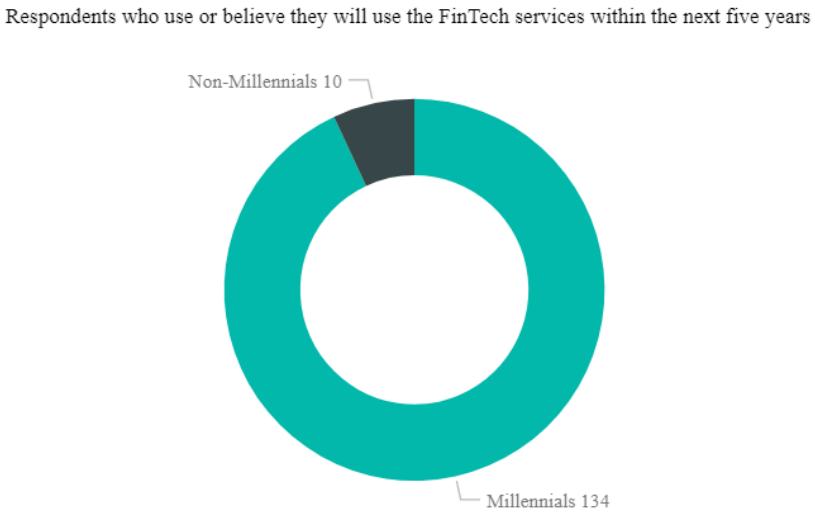

Figure 40: Respondents who believe they will use the FinTech services within the next five years or use them already. Source: own work.

Interestingly, the share of the respondents who stated they did not use the FinTech services but believe they will within the next five years does not differ much between Millennials and non-Millennials, at 22 % and 18 % respectively.

More people would trust their money to the big tech companies (namely GAFAM) than to the FinTech companies (47 % versus 43 % respectively). The difference is especially noticeable in non-Millennials, who would be willing to use the financial services provided by the GAFAM companies in 36 % of cases, compared to 20 % with the FinTech. Millennials would be willing to use GAFAM and the FinTech in 54 % and 49 % respectively. More detail shows that the Generation Z is the only generation that trusts the FinTech companies more than the GAFAM.

To test the statistical significance of generation in the responses, Chi-square test was performed[28]. The following hypotheses were set:

- H_0: There is no significant difference in willingness to use financial services provided by big tech companies (Google, Apple, Facebook, Amazon, Microsoft) between the generations X, Y and Z,
- H_1: There is a significant difference in willingness to use financial services provided by big tech companies (Google, Apple, Facebook, Amazon, Microsoft) between the generations X, Y and Z.

With χ^2=0.0816[29], the null hypothesis was rejected at 10 % confidence level.

Similarly, significance of generation in willingness to use FinTech companies was tested with the following hypotheses:

- H_0: There is no significant difference in willingness to use financial services provided by FinTech companies between the generations X, Y and Z,
- H_1: There is a significant difference in willingness to use financial services provided by FinTech companies between the generations X, Y and Z.

The null hypothesis was again rejected at 10 % confidence level with χ^2=0.0976[30].

[28] The testing was performed only for Generation X, Y and Z due to small amount of data in Baby Boomers.

[29] Detail of the testing can be found in Appendix C, part J

[30] Detail of the testing can be found in Appendix C, part K

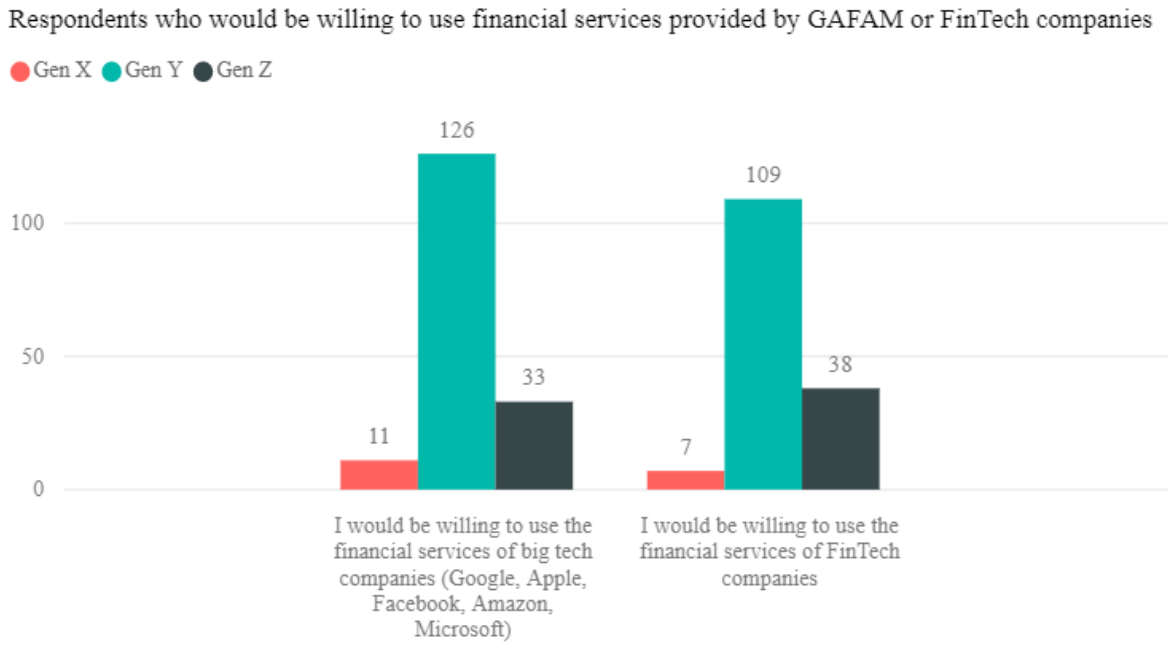

Figure 41: Respondents who would be willing to use financial services provided by GAFAM or Fintech companies, by generation. Source: own work.

Filtering the data further by Prague and non-Prague residents, there is an obvious trend for Prague citizens to be more willing to use the financial services provided by both GAFAM and FinTech companies compared to residents of other regions. While the share of Prague citizens who would be willing to use GAFAM financial services is 57 %, the same share is only 40 % within the non-Prague group. Similar trend can be observed regarding willingness to use FinTech financial services, with the shares at 53 % and 36 % respectively.

Once again, statistical significance was tested. The following hypotheses were formulated to test willingness to use GAFAM:

- H_0: There is no significant difference in willingness to use financial services provided by big tech companies (Google, Apple, Facebook, Amazon, Microsoft) between Prague and non-Prague residents,
- H_1: There is a significant difference in willingness to use financial services provided by big tech companies (Google, Apple, Facebook, Amazon, Microsoft) between Prague and non-Prague residents.

With χ^2=0.00101[31], the null hypothesis could be rejected at 5 % level of significance.

To test the statistical significance in difference between the Prague and non-Prague residents regarding the willingness to use FinTech companies' financial services, the following hypotheses were stated:

- H_0: There is no significant difference in willingness to use financial services provided by FinTech companies in Prague and non-Prague residents,
- H_1: There is a significant difference in willingness to use financial services provided by FinTech companies in Prague and non-Prague residents.

The null hypothesis was rejected at 5 % confidence level with χ^2=0.00119[32].

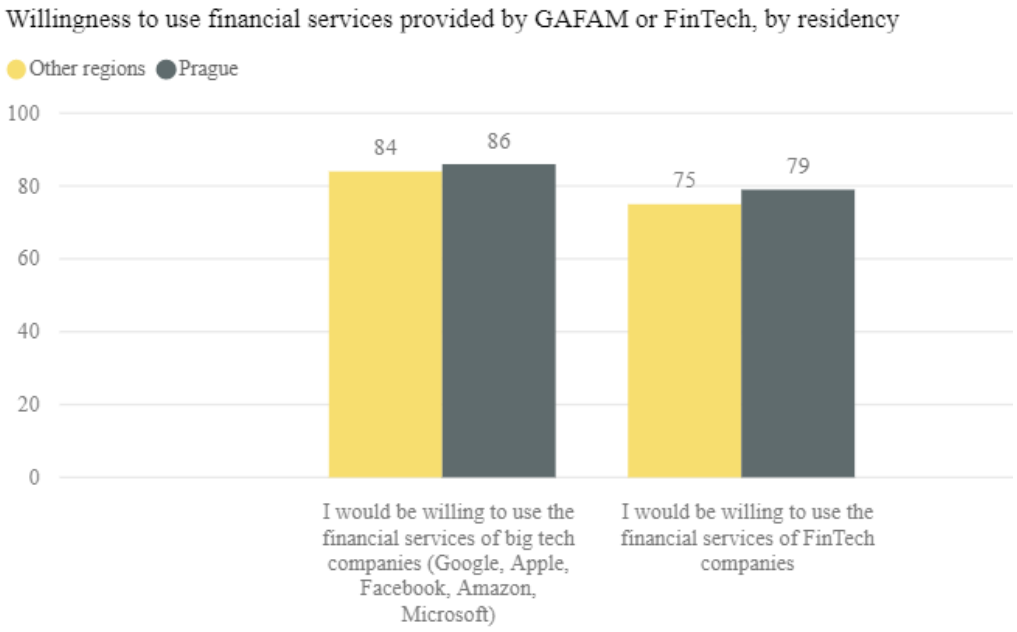

Figure 42: Respondents who would be willing to use financial services provided by GAFAM or Fintech companies, by residency. Source: own work.

Lastly, the respondents were asked whether they would be willing to borrow, invest or use payment solutions of the FinTech companies. Payment solutions are perceived as the least controversial, with 40 % respondents agreeing with the statement; this share is highest with Generation Y respondents (43 % of the sample), followed by Generation Z (36 %) and Generation X (31 %). While similar results were procured when asking about

[31] Detail of the testing can be found in Appendix C, part L

[32] Detail of the testing can be found in Appendix C, part M

willingness to invest, willingness to borrow through the FinTech was shown only at 21 % of the respondents, constituting 26 % respondents in Generation Y, 13 % in Generation Z and 7 % in Generation X.

Similarly, greater propensity to use payment methods, invest or borrow was shown at Prague residents (51 %, 45 %, 26 % respectively) than at the rest of the respondents (32 %, 30 % and 17 % respectively).

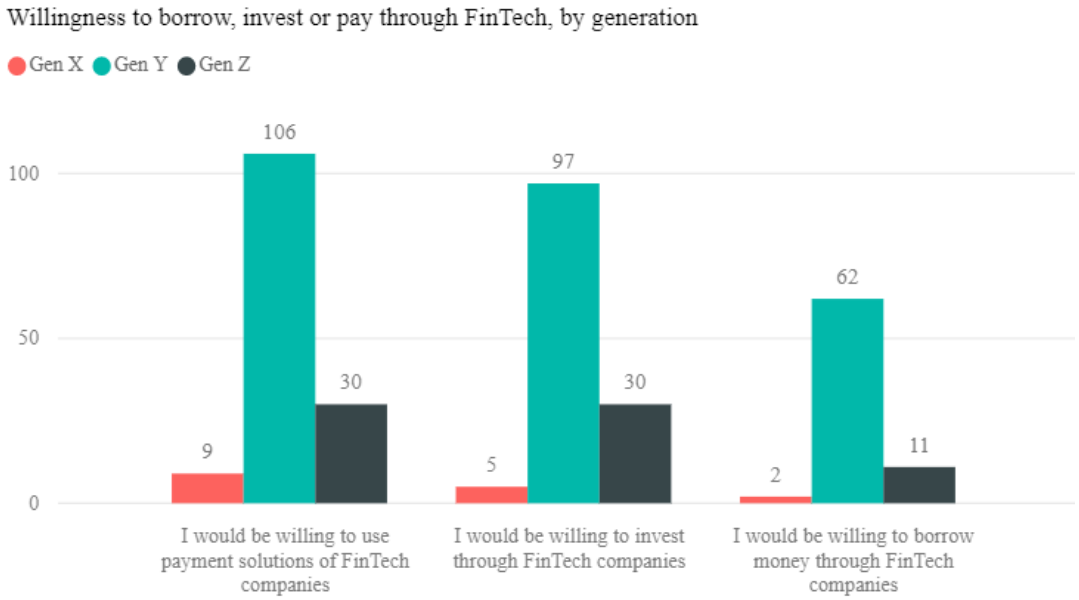

Figure 43: Willingness to borrow, invest or use the payment methods of FinTech companies by generation. Source: own work.

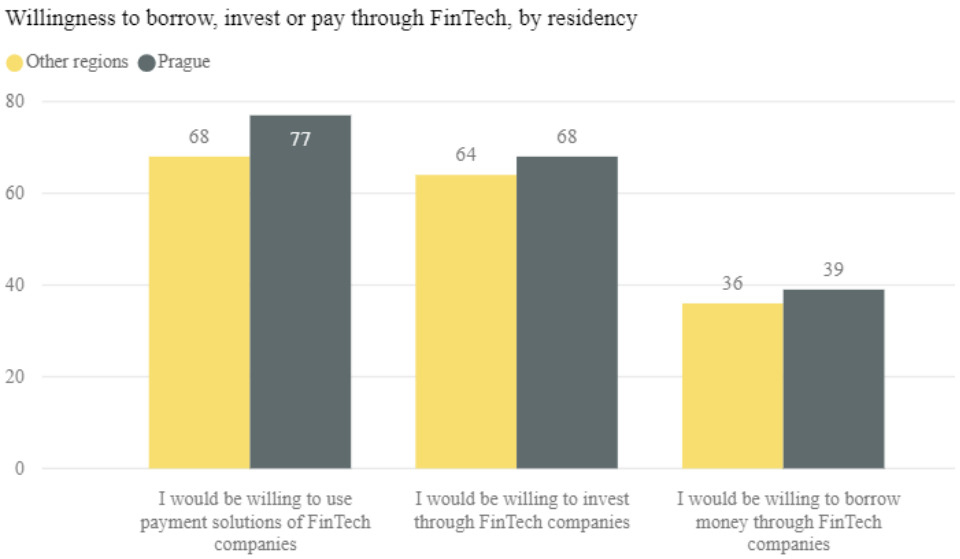

Figure 44: Willingness to borrow, invest or use the payment methods of FinTech companies by residency. Source: own work.

These differences were also tested by Chi-square test, summarized in Table 2. Except for using the payment solutions enabled by FinTech, where the results do not significantly differ between generations, significant statistical differences were found in all cases.

Null hypothesis	**Alternative hypothesis**	**Test result**	**Conclusion**
H_0: There is no significant difference in willingness to use FinTech' payment solutions between generations.	H_1: There is a significant difference in willingness to use FinTech' payment solutions between generations.	χ^2=0.253[33]	Null hypothesis not rejected.
H_0: There is no significant difference in willingness to invest through the FinTech between generations.	H_1: There is a significant difference in willingness to invest through the FinTech between generations.	χ^2=0.0575[34]	Null hypothesis rejected at 10 % level of significance.
H_0: There is no significant difference in willingness to borrow through the FinTech between generations.	H_1: There is a significant difference in willingness to borrow through the FinTech between generations.	χ^2=0.00866[35]	Null hypothesis rejected at 5 % level of significance.
H_0: There is no significant difference in willingness to use the FinTech' payment solutions between Prague and non-Prague residents.	H_1: There is a significant difference in willingness to use the FinTech' payment solutions between Prague and non-Prague residents.	χ^2=0.000263[36]	Null hypothesis rejected at 5 % level of significance.

[33] Detail of the testing can be found in Appendix C, part N

[34] Detail of the testing can be found in Appendix C, part O

[35] Detail of the testing can be found in Appendix C, part P

[36] Detail of the testing can be found in Appendix C, part Q

H_0: There is no significant difference in willingness to invest through the FinTech between Prague and non-Prague residents.	H_1: There is a significant difference in willingness to invest through the FinTech between Prague and non-Prague residents.	χ^2=0.00354[37]	Null hypothesis rejected at 5 % level of significance.
H_0: There is no significant difference in willingness to borrow through the FinTech between Prague and non-Prague residents.	H_1: There is a significant difference in willingness to borrow through the FinTech between Prague and non-Prague residents.	χ^2=0.0391[38]	Null hypothesis rejected at 5 % level of significance.

Table 2: Chi-square tests of significance for borrowing, investing and using payment solutions enabled by FinTech companies for inter-group differences regarding generations and residency. Source: own work.

[37] Detail of the testing can be found in Appendix C, part R

[38] Detail of the testing can be found in Appendix C, part S

4.5 Survey conclusions

The survey has several limitations that need to be mentioned. Firstly, while the structure of the respondents was quite even in terms of residency and education (high school, bachelor's and master's or higher), the age structure was biased toward the younger generation, with 75 % of the respondents being 18-29. However, due to interpreting the data with shares within the groups rather than total and due to Chi-square testing in-between groups, the author believes the conclusions are nevertheless relevant.

Secondly, the usage of the FinTech may have been underestimated as the users typed the FinTech they were using rather than chose from a list. However, the aim was to include the foreign usage as well which would require a very lengthy list that would likely deter the respondents from further continuing the questionnaire. This might have resulted in some users forgetting or not realising they were using the FinTech; none of the respondents mentioned the worldwide spread PayPal, for example.

Based on the analysis, a few trends can be assumed for the Czech market:

i. **The Millennials are more likely to change their bank when dissatisfied, or look for alternatives**

Although the chi-square test did not confirm statistical significance in higher share of Millennials who changed their primary bank within the last 5 years, the 51 % of those who had considered the change (59 %) is nevertheless a figure the banks should be looking out for.

The Millennials (especially the youngest generation, though mainly those who probably have full-time jobs already) also state they often look for alternatives (from both banking and non-banking subjects), recognize and use more FinTech companies and are more positive about their usage of the FinTech in various ways in near future. In short, the Millennials are more flexible, less bound by personal legacy and less loyal if they feel their loyalty could belong to a player who deserves it better. As "digital natives", they also trust the online world and access to their finances more and are not afraid to leverage various benefits the latest applications and solutions provide.

ii. Prague citizens are more advanced in terms of technology in financial services than the rest of the Czech Republic

Prague citizens are more aware of the term "FinTech" than the average of the sample (44 % vs 37 %) and stated significantly higher level of FinTech usage compared to the respondents from other regions. Their level of recognition or usage was also generally higher across the FinTech categories, being especially high in terms of finance management FinTech.

The Prague residents also show higher willingness to use GAFAM or the FinTech for their finances, the latter for all the three categories mentioned by the questionnaire (payment, investment, borrowing).

iii. Big tech companies (GAFAM) have better position as potential disruptors of the Czech financial market than the FinTech companies

While the Millennials approved more of the possibility to use GAFAM's financial services than the FinTech, the difference was only 4 ppts; the same difference was however 16 ppts in case of non-Millennials, 36 % of whom would consider using GAFAM as opposed to 20 % willing to use the FinTech. The older generation shows higher level of trust to the established players, which could play to the tech giants' advantage, possibly making profits of both the Millennials who simply choose the best product, and the non-Millennials, already past the financially instable part of their lives, mistrusting the small, new entrants and perceiving the GAFAM as trustworthy competition to the banks.

iv. The Czechs are already using or willing to use the FinTech's payment solutions but reluctant to borrow

While the willingness to use payment services provided by the FinTech is quite high (and the recognition of the Czech FinTech providing alternative payment, Twisto, is second highest at 52 %) and willingness to invest is only slightly lower, the Czechs do not trust the FinTech enough to use them for a loan. Even though Zonky has come out of the survey with most recognition (90 % of respondents), the usage was at 7 % only and unfortunately, it cannot be determined whether these users behaved as debtors or as investors at the platform. Although the share of the Prague citizens and younger generations in willingness to borrow was generally higher than in their counterparts, the drop from payment solutions and investments solutions possible usage is clear.

5. Czech FinTech: A closer look on three significant disruptors in payment, lending and investments

In 2016, the Czech FinTech association (ČEFTAS) was founded by financial group Roklen (standing behind Roklen Fx or Fundlift FinTech) and two more FinTech – Twisto and BudgetBakers – with the aim of establishing a strong voice on the market and co-creating legal and tax conditions for the FinTech (Němeček, 2016). ČEFTAS currently has 31 members and 10 associated members (PwC or Accenture among the rest) and has partnered with organizations on international level – such as CEE-FinTech or Global FinTech Association (Deloitte, 2018).

According to Deloitte (2018), FinTech companies have reached revenue of 400-800 million CZK in 2017, with the potential of 3-8 billion CZK considering the market. The investments into FinTech companies are second largest within the CEE region after Poland, representing more than 25 % of the total value of investments within the region.

The following part takes a closer look on three Czech FinTech companies that succeeded in the three categories established earlier as previously purely bank-provided financial services in which the companies has reached significant penetration already – payment solutions/virtual accounts, lending, and savings & investments.

To gain additional insights, the author first reached out to 10 most recognized Czech FinTech and in the end was promised an interview on the business to leverage in this paper by Twisto (payment solutions/virtual accounts), Zonky (lending) and Fundlift (investments). Unfortunately, the answers were in the end not delivered by Twisto; the FinTech is covered below nevertheless as it dominates one of the three areas in which the banks are facing disruptors the most.

5.1 Twisto case study

The area of FinTech payment solutions/virtual accounts supposedly has the highest probability of success on the Czech market. With over 40 000 e-shops, the Czech Republic boasts the largest number of e-shops per capita (Česká e-commerce); 35 % of e-shops offer payment through the world's largest FinTech, Paypal (Deloitte, 2018); and the fact that the expensive cash on delivery remains the dominant service in online shopping creates an opportunity for cheaper alternatives' penetration.

The largest FinTech on the market is the Czech Twisto (or Twisto payments) that also got high recognition in the questionnaire (52 % across all respondents, second best result) and relatively high usage (6 % of all respondents). Twisto was founded in 2013 and by 2017, it had won over 200 000 customers and processed over 1 million transactions; in 2017, the volume of payments processed reached 500 million Czech crowns (Hanáková, 2017). The company is currently cooperating with more than 400 e-shops.

In July 2018, Twisto in cooperation with ING Bank Śląski expanded to Poland, a highly attractive country within the CEE region due to the size of the market; the company hopes the Polish customer base would sum up to 50 000 by the end of the year (Brejčák, 2018). The expansion was largely helped by an investment of 5 million EUR that Twisto received in 2017 from ING Group and UNIQA; in its beginnings, the FinTech was invested in by investment group ENERN, Miton or Czech businessman Tomáš Čupr, among others (Ptáček, 2017).

5.1.1 Provided services

While the number of services provided has grown over time, the FinTech's original service is to **delay the customer's payment**, technically paying for him/her and charging the customer later. **Twisto account** thus represents a new type of financial service on the market (although very similar to credit cards), for which Twisto was awarded with the best FinTech of 2017 award[39] by top Czech bankers and experts (E15, 2017) as well as APEK E-commerce Award in 2015 (Krčmář, 2018).

The basic Twisto account offers payments for up to 5 000 CZK, with no necessary identification; Twisto account with Twisto card offers the limit of 10 000 – 15 000 CZK,

[39] The poll was initiated by E15 online journal, asking the panel for their assessment of the FinTech they would most likely invest in.

or 15 000 – 25 000 CZK for users Twisto has had experience with, under the condition of ID scan or the copy of the latest monthly bank statement. The allowed limit however differs for individual users as Twisto considers the user's monthly income and expenses, monthly bank statement or public records, such as the Insolvency Register (Kročil, 2017; Twisto, 2018).

Twisto charges its users monthly, always on the 15th day of the month. The customer can either pay the whole amount with no extra fees, or choose to pay at least 10 % and defer the rest of the liability to the next month at the fee equal to annual percentage rate of charge (in the interval of 10.86 % to 54 %) for every 100 CZK payment delayed (Twisto gives the example of a fee of 4.50 CZK in case of 100 CZK deferred, or 905 CZK fee in case of 100 000 CZK deferred). The revenue from fees for payment deferral reached 9.2 million Czech crowns in 2017 (Twisto financial statement, 2017).

In 2017, the start-up introduced their **Twisto card** with which the customer can pay in stores with the same option of delayed charge from his account (Sonták, 2017). With Twisto card, the FinTech also entered the market of foreign exchange. If a customer pays with Twisto card in a foreign country or at foreign servers (such as AliExpress or Booking.com), these payments are automatically converted to Czech crowns at the best possible exchange rate on the market of the given moment. The FinTech is also standing out by the option of water-resistant payment bracelets that contain a small payment card and allow to customer to pay quickly and more conveniently. Twisto card also includes UNIQUA insurance agency's **travel insurance** for the whole family for up to 30 days of consecutive travelling.

Another service Twisto offers is **Twisto Snap**. If a customer has any paper bills or invoices to pay, all he needs to do is take a picture of the given document within the Twisto mobile application or send it as an email attachment to a dedicated email. Twisto then automatically reads the payment information, pays the amount and charges the customer on the 15th day of the next month, together with the rest of the liabilities.

Twisto also offers **cashback from payments** at selected e-shops and connecting their Twisto account with Mastercard Priceless Specials program for more cashback options and benefits (Kořínková, 2018).

On November 23, 2018, the FinTech has added a new feature to their portfolio, called **Twisto Split**. Split solves the problem of splitting a bill between a group of people by

simply sending the people in question an email or a text message with payment instructions; the service is even simpler for Twisto users, as the money gets charged directly between the Twisto accounts.

5.1.1.1 Pricing

Twisto has three different pricing schemes: Online, Standard and Premium. The services and pricing are summarized below:

A. **Online (free of charge)**
    - Online payments
    - Twisto Snap
    - Deferring payments
    - Cashback from online payments
B. **Standard (49 CZK per month, first three months for free)**
    - All that is included in Online
    - Twisto Split
    - Twisto card (including cashback from MasterCard Priceless Specials program)
C. **Premium (99 CZK per month, first three months for free)**
    - All that is included in Standard
    - Travel insurance
    - Best foreign exchange rate while paying outside the Czech Republic or on foreign e-shops

5.1.1.2 Twisto performance

In terms of net turnover, Twisto has had 70 % 2-year CAGR between 2015 and 2017[40], reaching 21 million CZK turnover in 2017. The FinTech is investing heavily, reaching -50 million CZK deficit in 2017.

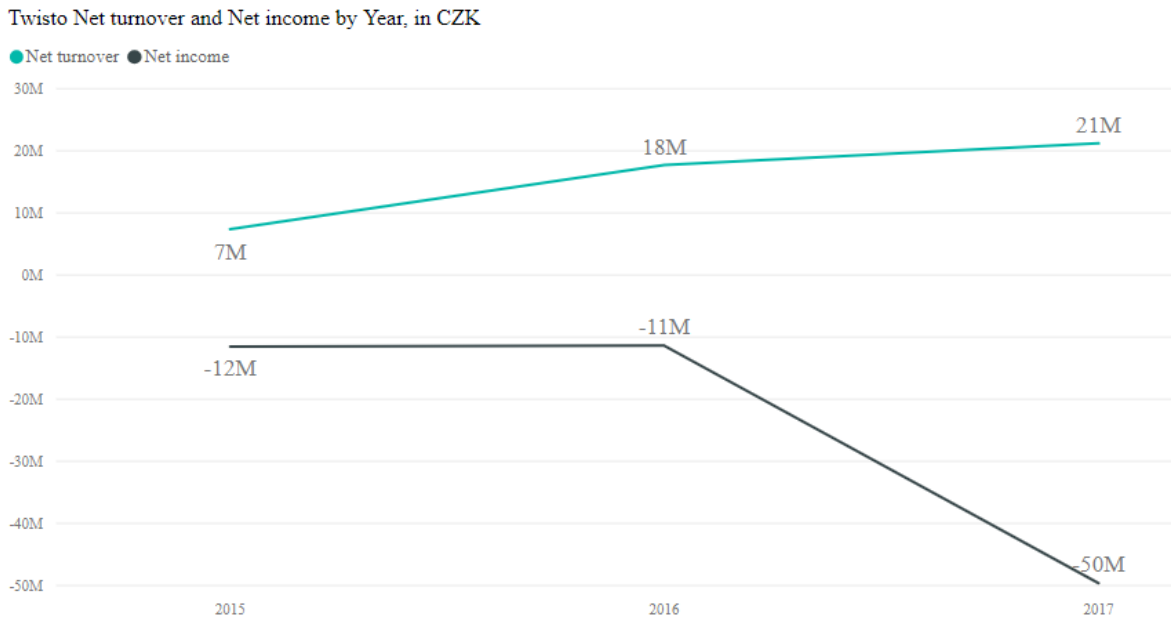

Figure 45: Twisto's net turnover and net income between 2015 and 2017, in Czech crowns. Data: Twisto financial statements 2016 & 2017. Own work.

[40] CAGR (Compound Annual Growth Rate) shows a cumulated growth rate of more (in this case, 2) periods. Own calculation based on Twisto financial statements.

5.2 Zonky case study

Used by 8 % Millennials of our sample and recognised by 90 % of all respondents, Zonky is one of the most widespread Czech FinTech, although similar services are provided by two more Czech FinTech on the market – Bankerat and Prestito.

Zonky was founded in 2016 as a project of Home Credit financial group that belongs to one of the largest Czech investment groups, PPF; in 2017, the FinTech was already mediating the volume of 120 million CZK monhtly (Chadalíková, 2017). The ambition of the young company is increasing their 3 % share on the Czech market with loans to 10 % by 2021 (e-mail interview with Michaela Brodecká) and expansion to new markets; in a 2018 interview, CEO Pavel Novák mentions Asia or Western Europe as Zonky's primary aims (Kudrnová, 2018).

In 2018, Zonky was awarded the biggest Czech financial product award, Zlatá koruna, in the FinTech category (Ty Internety, 2018).

At this point, the author would like to thank Michaela Brodecká, PR Manager Zonky, for an e-mail interview with valuable insights that are used below.

5.2.1 Provided services

As mentioned before, Zonky is a peer-to-peer lending platform, connecting the individuals with excess liquidity with the ones looking for loans. Zonky claims that due to technology and their role of a mediator, the loans are cheaper than in banks, with the convenience of purely online service.

The debtors can borrow the minimum of 20 000 CZK and maximum of 750 000 CZK, choosing their own monthly payments from the interval that differs for each loan level, with the interest rates starting at 3.99 % per annum, with the amortization period of 6 months to 7 years. Zonky subtracts 2 % from the loan as their profits as an additional expense to the debtor. Based on all the information the technology can assess, the debtor is then rated (A** to D, the full range of ratings and per annum interest rates are illustrated in Figure 47) and the demand is placed on the marketplace for potential investors together with an anonymous story for the investors. Each loan requirement stays at the marketplace for up to 2 days, most of them being invested in within hours.

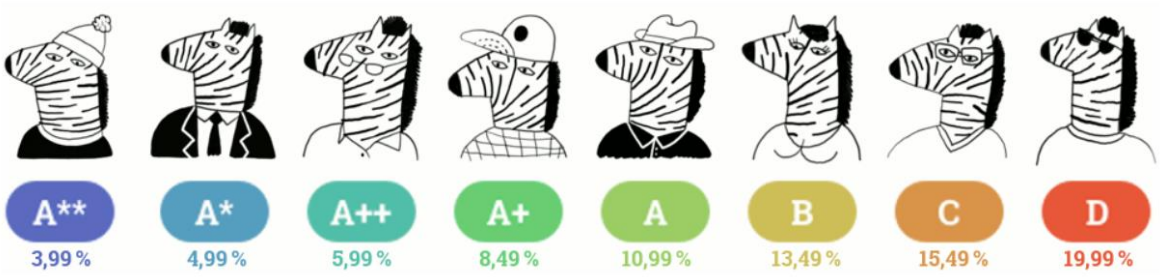

Figure 46: User ratings and per annum interest rates at Zonky. Source: Zonky.cz.

The debtors then pay on a monthly basis, with a possibility of preliminary amortization.

Zonky loans are accessible to all adult EU or Ukraine citizens permanently residing and owning a bank account in the Czech Republic that upload two scanned identification documents, 3 most recent monthly bank statements and in some cases, additional documents such as validation of income from the employer.

Zonky also offers **Záchranná vesta** (Life jacket) service, which is a Maxima insurance company service in case of sick leave, job loss, severe invalidity or death. The fee for the insurance is 6.9 % of the monthly amortization.

As for the investors, the minimum **investment** into one debtor starts at 200 CZK, with the maximum depending on the number of active investments. The investors can expect an average profit of 6.03 %. Zonky charges the investors with a monthly fee from the invested money depending on the rating of the loan into which they invested; this spread is illustrated by figure 48.

A**	A*	A++	A+	A	B	C	D
3,99 % p.a.	4,99 % p.a.	5,99 % p.a.	8,49 % p.a.	10,99 % p.a.	13,49 % p.a.	15,49 % p.a.	19,99 % p.a.
0,2 %	0,5 %	1,0 %	2,5 %	3,0 %	3,5 %	4,0 %	5,0 %

Figure 47: The per annum interest rate (row 1) and investors' fee to Zonky (row 2) depending on the debtor's rating. Source: Zonky.cz.

The requirements for the investors are adulthood, Czech phone number, two identification documents scanned, and a bank account.

In November 2018, Zonky has taken a step that helps establishing its position of the technology leader regarding loans. The FinTech has introduced a **fast loan that promises the users to receive the money within 5 minutes**, removing the previously necessary

process of contract sign-off, displaying the query to the market of investors at Zonky and sending the money to the client after it was fully financed. This is enabled in case the client has their account in one of the 5 banks where (Holzman, 2018).

5.2.2 Zonky in numbers

Zonky has so far mediated loans in the volume of 5 450 million CZK to 30 000 individual users and registers 23 000 investors out of which 60 % are active monthly. 35 % of investments are done through the mobile application that is used by 50 % of investors (e-mail interview with Michaela Brodecká). The average investment stands between 25 000 – 30 000 CZK (Kudrnová, 2018).

Most of the users who ask for loans are between 30-50 years old, with high school education, 2/3 of them men. Geographically, most loans are granted to users in Praha, Brno and Ostrava – regional capitals and largest Czech cities. The applicants mostly request loans for refinancing of current loans, household, automobiles or own projects. The average loan stands at 150 000 CZK (e-mail interview with Michaela Brodecká).

Zonky's 2-year CAGR in net turnover was 882 % between 2015 and 2017, reaching 43 million CZK turnover in 2017. The net income is in sharply increasing deficit, from -0.4 million CZK in 2015 to -272 million CZK in 2017 (numbers and calculations based on Zonky's financial statements).

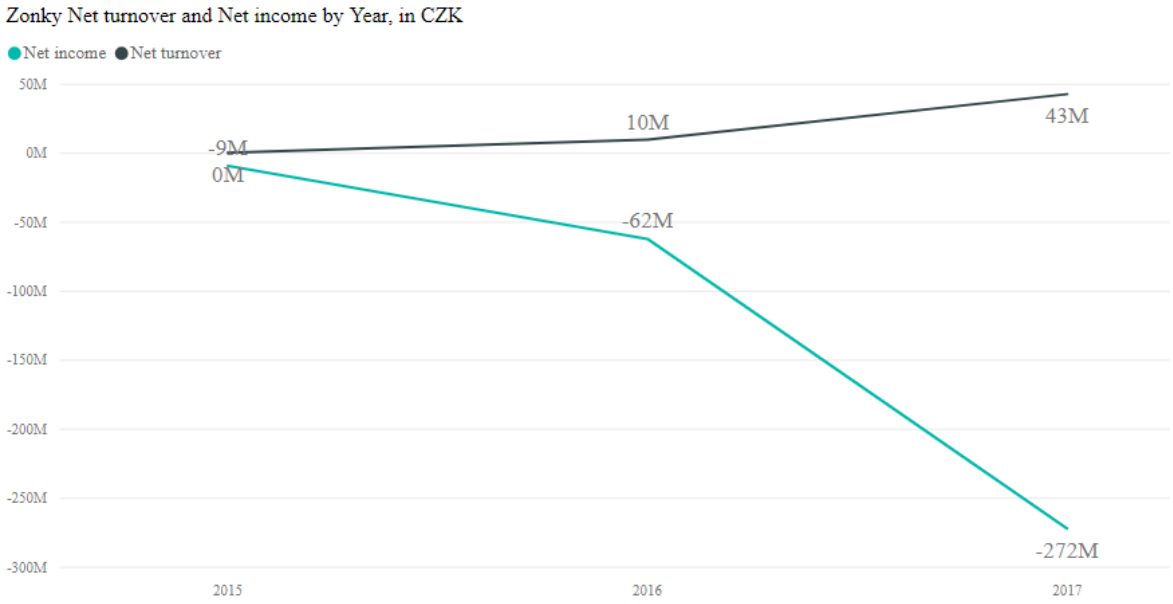

Figure 48: Zonky's net turnover and net income between 2015 and 2017, in Czech crowns. Data: Zonky financial statements 2016 & 2017. Own work.

5.3 Fundlift case study

The crowdfunding & investments area has several FinTech in the Czech Republic; the questionnaire respondents mainly recognized Startovač (49 % of respondents), HitHit (49 %) and Fundlift (14 %). 11 % of respondents also stated they were using crowdfunding/investments FinTech.

Founded in 2015, Fundlift, project of financial group Roklen and investment group Rockaway, is a crowdfunding platform for investors who receive bonds[41]; it thus also fits the label of investment FinTech.

The author would like to thank Anna Richtrová, Associate Fundlift, for an e-mail interview providing valuable insights.

5.3.1 Provided services

Fundlift provides services for two types of users: investors and project owners.

Project owners who would like to get financed though Fundlift first send the information about the project, such as its identification, financial plan and the planned use of finances obtained through Fundlift) to the platform; if the stakeholders deem the project worth financing, they meet with the project owners to assess the project further, and eventually create the online campaign on Fundlift. Fundlift is unique in its selectness of the projects; only 2-3 campaigns are presented monthly, with 95 % rejection rate. The stakeholders in the decision are not only within the team of Fundlift; the final decision depends on Roklen investment committee (e-mail interview with Anna Richtrová).

The **investors** (EU residents) need to open an investment account at Fundlift by registering and signing an online contract. Then, they can choose which projects to fund and with how much money (the minimum is 500 CZK and can be stated higher at some projects; maximum is not determined, yet the sum of investments through Fundlift within a year is regulated to 1 million EUR). Fundlift offers the option of not displaying the investor's name to the project owners.

[41] Fundlift issues 3 types of bonds that are subject to different legislations: minibonds, investment certificates and shares

Fundlift further **promotes the projects** through Roklen24.cz portal and social media, presents the project to individual investors or informs the target group through conferences.

If the campaign gets fully financed, Fundlift issues the bonds that will appear in the investment accounts of the investors (the total share offered through Fundlift is decided by the project owner and approved by Fundlift) and transfers the money to the project owners (excluding the 5 % fee of the final sum). In case the project does not reach its goal, the money returns to the investors and no additional cost is charged to the project owners. If the campaign receives more than 100 % in the given timeframe, the project owners and Fundlift team discuss the option of overfunding; the project owners would have to incorporate the excess finances into the financial plan. 90 % of campaigns on Fundlift get financed, which is high success rate compared to Czech and even foreign competition (e-mail interview with Anna Richtrová).

5.3.2 Interesting projects

The high selectivity ensures high concentration of interesting, successful projects Fundlift can be proud of. For example, **ARTSTAQ**, an online real-time global exchange with art was partially funded through Fundlift in 2016 with 6.65 million CZK, was classified as one of the 250 most successfully developing start-ups in the world.

Most of the projects offer per annum interest rate of 6-8 %; combined with the pre-selectiveness that Fundlift communicates, the trust and demand of the investors is high. This is also reflected in the speed of investments. **Dobroty s příběhem**, a food—processing workshop employing handicapped people, received 800 thousand Czech crowns within 1 hour; acoustic boxes producer **SilentLab** received 2 million CZK within 2.5 hours; **Bidli**, the first developer project on Fundlift, exceeded the demanded 10 million CZK within a week (e-mail interview with Anna Richtrová) and finally got to 13 million CZK from 290 investors (Novák, 2018). Bidli also had the status of the largest successful crowdfunding campaign in the Czech Republic, and was only recently topped by another Fundlift project, **NWT – Park Tower**. The developer project requested 10 million CZK investment, and in the end received 25 million CZK with the help of 263 investors, with the highest single-investor contribution of 1,1 M CZK.

5.3.3 Fundlift in numbers

In over 2 years of Fundlift's existence, the platform has helped to finance 35 projects with 183 million CZK. The number of registrated investors was at 7 921, with 91 % of them being men, with the average age of 37 years old (data for June, 2018; e-mail interview with Anna Richtrová).

Almost 50 % of the individual contributions are lower than 50 000 Czech crowns, 16 % are within the interval of 200 thousand – 1 million CZK, and 2 % exceeded 1 million CZK. The average individual investment stands at 35 thousand CZK. 72 % of investors invested in 1-5 projects, while 1 % has invested into more than 20 projects. The highest volume of investments came from Prague (over 72 million CZK), followed by Central Bohemia (over 31 million) South Moravia (over 20 million) and North Moravia (over 16 million) (data for June, 2018; e-mail interview with Anna Richtrová).

Fundlift's net income in 2016 was 15 thousand CZK (the only one of the 3 FinTech showcased in black numbers), net turnover was at 1.9 million CZK. Unfortunately, the financial statement for 2017 is not available.

So far, Fundlift is operating in the Czech Republic only, but has the ambition of expanding into middle and eastern Europe.

6. FinTech is the future? The Czech Republic outlooks

In their 2016 report *FinTech in CEE*, Deloitte estimated the FinTech market size for Czech Republic to be 190 million EUR – second behind Poland and Austria. The Czech Republic has a very good position to be among the (Central) European leaders in FinTech advancement. The factors are numerous; the author has split them into 4 categories which will be briefly addressed below. Firstly, general economy indicators that may bring further investment into the region will be listed, followed by technology-related indicators that show the potential of the possible investments as well as potential of use within the population. Next, the banking sector figures and some e-commerce statistics will be covered, as the Czech Republic is the leader in number of e-shops per capita, from which some conclusions may be made.

6.1 General economy indicators

The Czech economy is deemed healthy and stabile, with 2017 GDP of 216 billion USD, growing 4.3 % YoY (World Bank).

The Czech national debt relative to GDP is generally low compared to the other EU countries (this indicator being in the spotlight due to its status of one of the Maastricht criteria); with the value of 36 %, the Czech Republic is keeping the criteria of maximum 60 % GDP debt, unlike most developed economies; the EU value currently stands at 82 %.

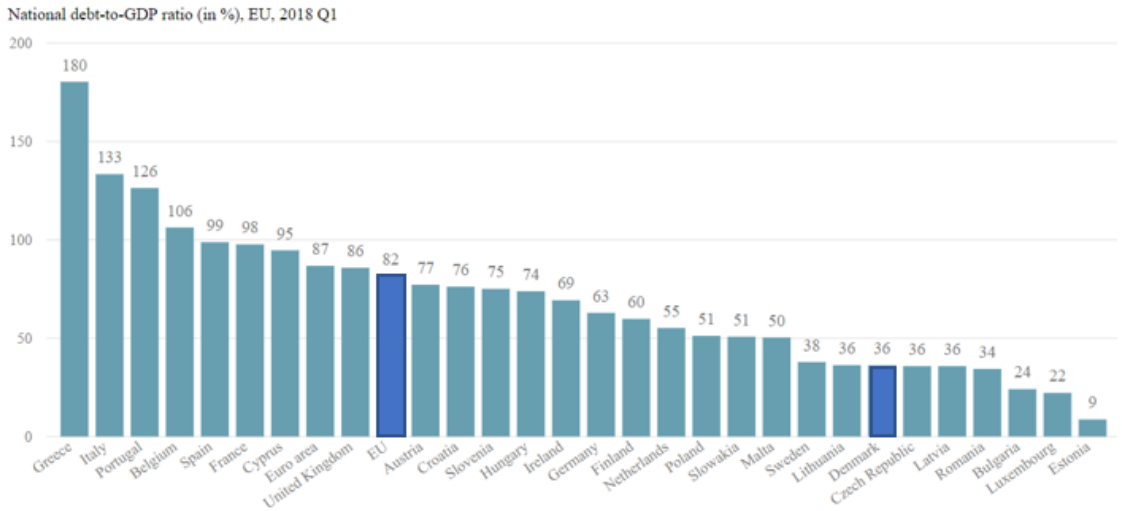

Figure 49: National debt-to-GDP ratio for EU countries in Q1 2018. Data: Statista. Graph: Own work.

Regarding government surplus/deficit share on GDP, as another of the Maastricht criteria, the Czech Republic is yet again showing one of the best results within the EU, with 1.5 % surplus (relative to GDP) in 2017. While in the current conjuncture many economies have started to report surpluses, the EU figure stands at -1 %. The only country not keeping the criteria of maximum 3 % debt is Spain with -3.1 % government debt/GDP.

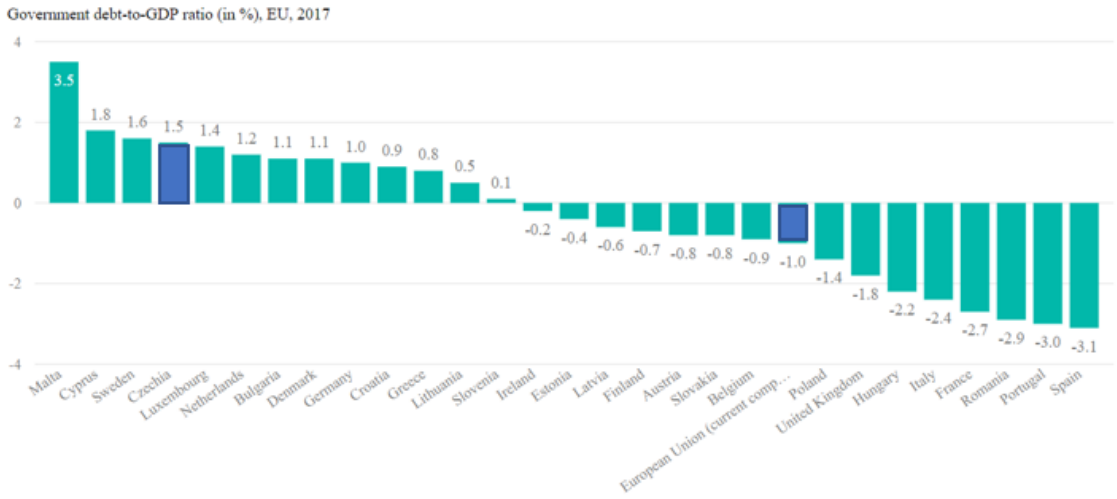

Figure 50: Government debt-to-GDP ratio for EU countries in 2017. Data: Eurostat. Graph: Own work.

The inflation rate has been stabilizing at +-2 % targeted by the Central Bank (2.3 % YoY for October 2018; Trading Economics: Czech Republic Inflation Rate), which is considered a healthy rate.

Labour cost per hour is far below EU average; for 2017, Eurostat states 11.7 EUR labour cost (including taxes, minus subsidies), while the whole EU value stands at 26.8 EUR and Euro area value (EU19) at 30.3 EUR. Furthermore, the labour productivity in the Czech Republic is on a sharp increase, growing by 10 % between 2010 and 2017 compared to 6 % productivity increase in the EU in the same period.

All these factors combined with geographical convenience contribute to big tech companies choosing the Czech Republic (and Prague, specifically) as strategic location within the Central and Eastern Europe economic region.

6.2 Technology-related indicators

The Czech Republic has experienced an increasing share of R&D spend on GDP until 2014 (1.97 %); decreasing trend is currently noticeable, with 1.68 % share in 2016. Compared to the EU, the Czech Republic was below the value of 1.93 % in 2017 and only exceeded EU value in 2014. On the other hand, the Czech Republic has a good position in R&D within the CEE region, standing third behind Austria (3.1 % in 2015) and Slovenia (2.2 % in 2015) (World Bank data).

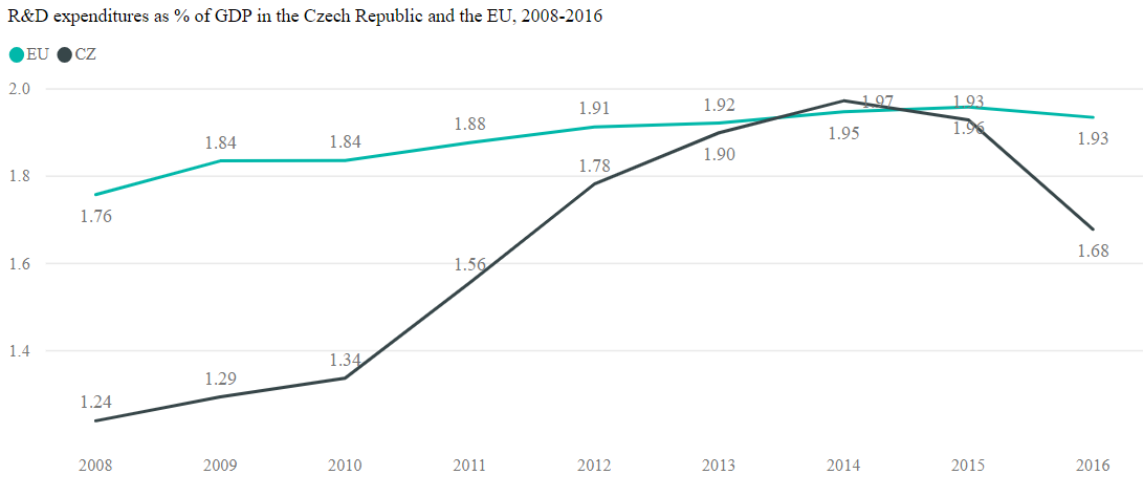

Figure 51: R&D expenditures as % of GDP in the Czech Republic and the EU, 2008-2016. Data: World Bank. Graph: Own work.

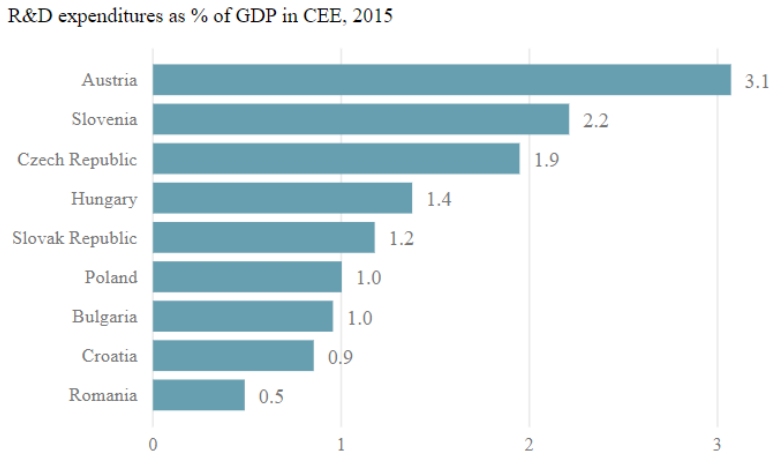

Figure 52: R&D expenditures as % of GDP in the CEE region, 2015. Data: World Bank. Graph: Own work.

While the share of ICT personnel on employment is rather average in terms of the EU countries (2.8 %), the share is third highest within the CEE EU countries after Hungary (3.4 %) and Slovakia (2.9 %).

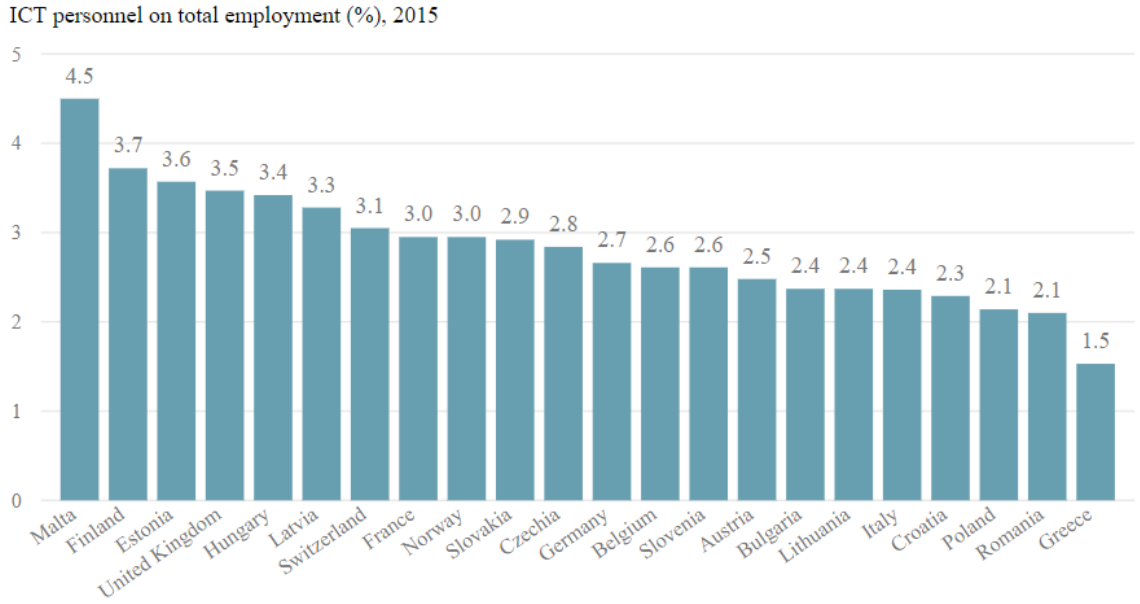

Figure 53: Share of ICT personnel on total employment, 2015. Data: Eurostat. Graph: Own work.

The ICT sector's share on GDP is quite high relative to the other EU countries (4.3 %), outrunning even more developed economies such as Germany (4.2 %), France (3.9 %) or Austria (3.4 %). Within the CEE region, Hungary and Slovakia again show higher values, at 5.9 % and 4.4 % respectively.

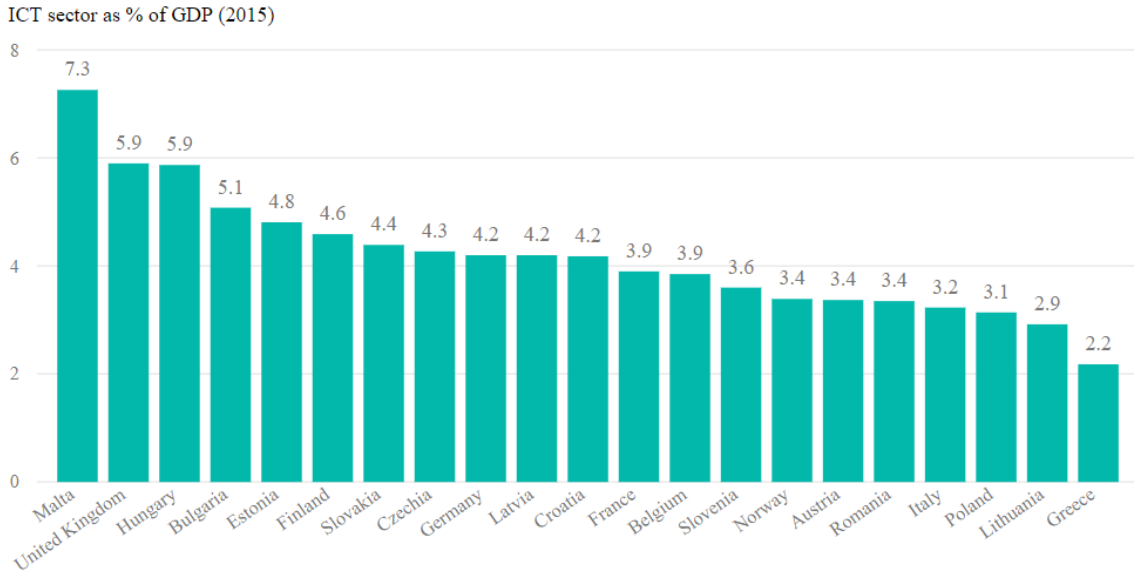

Figure 54: Share of ICT sector on GDP, 2015. Data: Eurostat. Graph: Own work.

Internet availability for households is slightly lower than EU average (82 % versus 85 %), the value is nevertheless highest out of the CEE region except for Austria (85 %). Unsurprisingly, more developed economies such as Luxembourg, Netherlands and the Nordics lead the statistics.

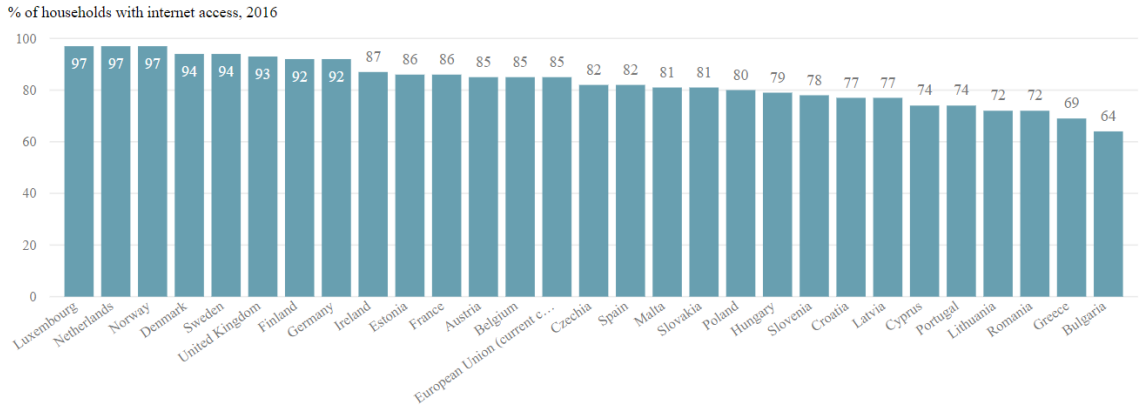

Figure 55: Percentage of households with internet access in the EU countries, 2016. Data: Eurostat. Graph: Own work.

6.3 Banking & financial services indicators

According to Deloitte, 2018, the Czech Republic is one of the countries with highest share of unbanked population (19 % in adults); this is the second highest number within the CEE region after Hungary (25 %), developed economies tend to be at the scale of 0-4 %. At the same time, only 10 % of the unbanked population consider the banking account unnecessary. This presents a potential for FinTech penetration; for example, for a solution similar to M-Pesa described in Chapter 2.

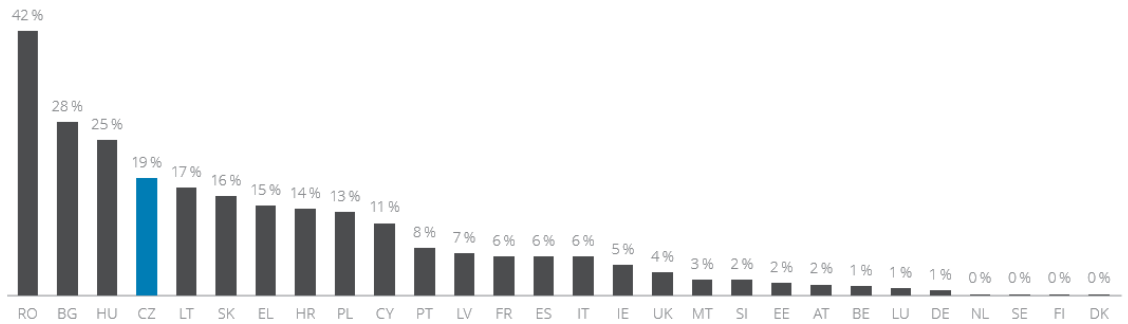

Figure 56: Share of unbanked adult population. Source: Deloitte, 2018.

On the other hand, the Czech clients have high trust in their banks (50 %), which is the highest result in the CEE region and indicates that clients are not incentivized to look for alternative financial services providers. This trust seems to be well-deserved, with the financial sector rated as stable and resilient (Deloitte, 2016).

Table 3 illustrates the penetration of financial activities processed over the internet within the population of the Czech Republic and the EU as a whole. While the Czech residents are on a similar level as EU value in terms of insurance over the internet, there is a lower proportion of individuals who take loans over the internet, and significantly low share of individuals who buy or sell shares over the internet.

Financial activity	Czech Republic	The EU
Individuals bought or renewed existing insurance policies, including those offered as a package together with another service (e.g. travel insurance offered together with a plane ticket) over the internet	10 %	11 %
Individuals bought or sold shares, bonds, funds or other investment services over the internet	0 %	4 %
Individuals took a loan or arranges credit from banks or other financial providers over the internet	1 %	2 %
Individuals carried out at least one of the financial activities over the internet	11 %	14 %

Table 3: The share of population by financial activities over the internet, Czech Republic versus the EU, 2017. Data: Eurostat.

The potential of the Czech economy is further implied by the Czech financial sector share on GDP standing at 7 %, relatively low compared to the EU value of 9.9 % (Deloitte, 2018).

6.4 E-commerce indicators

The Czech Republic is strong in the e-commerce sector, further promoting the opportunity for FinTech's alternative payment and lending solutions. In 2018, the per capita spend on online shopping stands at 273 EUR, the second largest spend in Central and Eastern Europe, topped only by richer Austria (Deloitte, 2016).

By the end of 2018, the sector's revenue is estimated at almost 2.5 bn USD, growing by 8.8 % year-over-year (Statista: eCommerce, Czech Republic), and over 42 thousand active e-shops make the Czech Republic the country with the highest number of e-shops per capita. High user penetration is another strong characteristics of the sector, with 7.3 million users in 2018 (or 71.6 % of total population) (Česká e-commerce).

E-commerce is currently standing at 9.1 % of total retail turnover, but this number has a big opportunity to grow. The trend of smartphone usage for online shopping is strong, growing by 30 percentage points over the last 5 years; in 2017, 41 % of online shopping was done through smartphone, slightly over 50 % through desktop appliance (PCs or laptops) which have long lost their dominant position (in 2013, the desktop appliances were the platform for 80 % of online shopping). With the extreme mobility of smartphones, their dominance as well as the share of e-commerce on total retail have a good outlook for sharp growth for the next years (Česká e-commerce).

Interestingly, cash-on-delivery remains the most used option in payment, though it usually generates extra cost to the online shopper. This option is chosen at 50 % of transactions, with bank transfer being second at 32 %, with online card transaction standing only at 10 % and E-wallet at 5 %. This may present another opportunity for the FinTech in terms of payment solutions as not only do online card transactions or E-wallet solutions generally more user-friendly, but also the European trend tends towards these solutions (in 2018, online card transactions or E-wallet payment solution was used at almost ¾ of all online shopping in Europe) (Česká e-commerce; Statista: eCommerce, Europe).

Despite these statistics, the share of the population who had purchased goods or services online remains low compared to the EU level, at 34 % (CZ) compared to 48 % (EU). The trend of growth however seems to be slightly sharper for the Czech Republic, lowering the percentage points change from 16 in 2010 to 14 in 2017 (Eurostat).

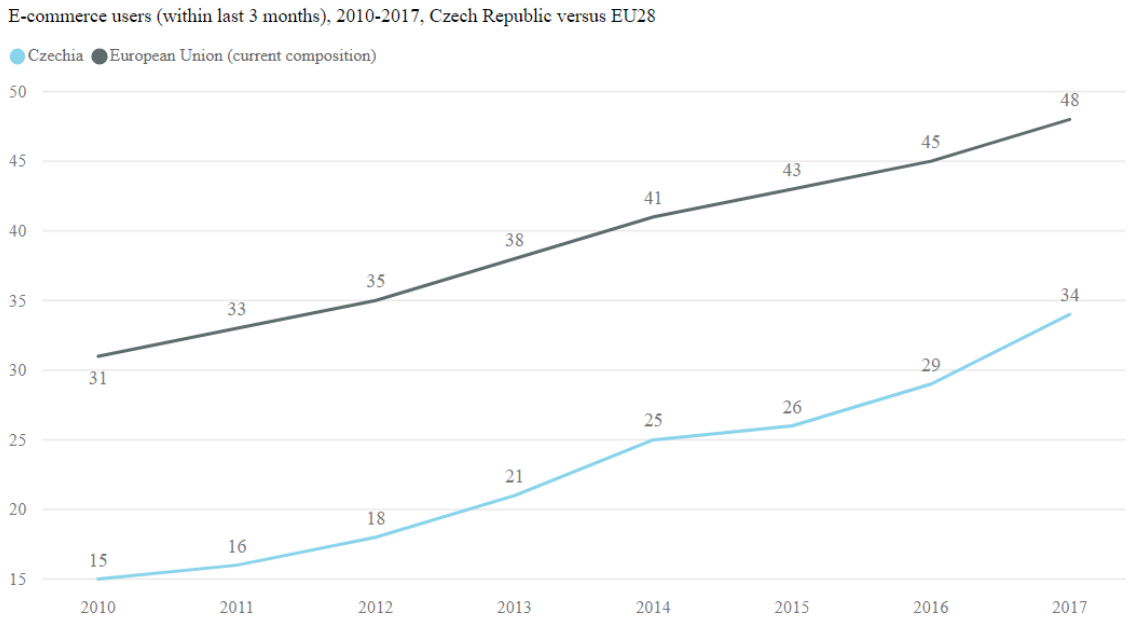

Figure 57: Share of population who made an online purchase within the last three months, Czech Republic versus the EU, 2010-2017. Data: Eurostat. Graph: Own work.

7. The relationship between the FinTech & the incumbents on the Czech market – a discussion

The trends stated in the previous chapter – especially e-commerce and financial services – suggest the FinTech growth in the Czech Republic is still at its beginnings; with increasing percentage of smartphone users and online shoppers and lowering individual's loyalty to his or her bank, the potential of the new entrants in terms of financial services is certainly significant.

The growing number and significance of the FinTech in the Czech Republic was recently acted upon by the Czech National Bank (ČNB). On October 1, 2018, a specialized body was founded within the organization: The Department of Payments Regulation and Financial Innovation within the section of regulation and international cooperation (ČNB, 2018).

PSD2, the second Payment Services Directive, was implemented in the EU legislation in 2018 and has been a widely discussed topic regarding the FinTech. In effect, the PSD2 disrupts the banks' monopoly over the clients' data regarding their payments (in case the client approves) by opening their internet banking's API (application programming interface), enabling the data to the third-party provider. For this reason, the PSD2 is often perceived as an accelerator of the banking disruption, removing the bank as the previously necessary intermediator (Cortet, Rijks and Nijland, 2016).

While PSD2 is often perceived as a threat to banks, it opens new opportunities for the incumbents to stay relevant. Some Czech banks (Česká spořitelna, Air Bank) have already announced they would allow the users to see also their accounts from other banks within their platform, which means higher convenience for the user (Holzman, 2018).

However, PSD2 has one great disadvantage that blocks the FinTech from using it, slowing the further step in digital transformation that might have been seen had the regulation been designed more competitive; the FinTech that wish to use PSD2 need to obtain a banking license (Kysilka, 2018). Most FinTech companies operating on the Czech market (and all operating in the areas this thesis describes) need to have a license for providing the financial services, these licenses are however less strict than the banking licenses; despite the implementation of PSD2 (described below) in January 2018, none of the FinTech companies that have applied for a banking license necessary for leveraging the PSD2 have been granted it yet (Souček, 2018).

The incumbents' big disadvantage is the low agility and flexibility compared to small, online only FinTech. The legacy IT infrastructure is generating costs that could have been prevented in Cloud yet remains the one area that might be the easiest for the banks to change, as the processes, rigid culture and non-IT infrastructure permeate the whole organizations.

Furthermore, it does not seem the banks have managed to adjust to the customer as some other fields were forced to become due to competition (Telcom being an example). A high level of bureaucracy, often unnecessary paperwork or the need of the client to visit the bank in person for services that might easily be done online in the age when electronic signatures have become the normal practice in business does not seem innovative nor customer-centric.

The agility, flexibility, online-only approach, innovation and IT skills are, on the other hand, the FinTech's advantages that clash with the insufficient customer base and lower trust especially in the older generations. Capgemini (2018) mentions that as a result, the FinTech are likely to fail as they struggle to gain market share for their unique product quickly enough.

The author of this paper thus believes the most logical strategy for the banks is to cooperate with the FinTech, outsourcing the development of new solutions to the agile companies, rather than developing new solutions themselves. While the banks may lose some of their services to the FinTech in case of cooperation and thus higher visibility for the new entrants, their most profitable products remain to be mortgages and servicing enterprises (Gromek, 2018), while the majority of the FinTech concentrates on B2C model.

If personal experience can be mentioned, the author has considered leaving her primary bank because the bank in question does not cooperate with Spendee nor BudgetBakers, two clever applications that allow the user to track their expenses, see the categories of their expense or start a saving plan within the application. The questionnaire showed that these applications are most used by the people who are starting to be economically active, and the financial management applications can be very relevant on this field.

The World FinTech report (Capgemini, 2018) states that the *"most successful FinTech firms have focused on narrow functions or segments with high friction levels or those underserved by traditional financial institutions, but have struggled to profitably scale on*

their own. Traditional financial institutions have a vast customer base and deep pockets, but with legacy systems holding them back, many are increasingly open to innovation through collaboration and APIs rather than building on their own" (page 10 of the report). The author believes that mutual collaboration of the FinTech, in either B2B relationship (the FinTech developing services for the banks) or B2C (FinTech serving the customer, although under the flag of the customer's bank), can bring the most benefits to all parties, including the customer, who in the end benefits the most.

Furthermore, the bank-FinTech collaboration would also make it more difficult for the big tech companies to gain significant market share quickly. While they have the agility, IT skills and customer convenience the FinTech possess, they also have a large market presence, customer base, significant amount of data (and best possible data-analysing tools) and, last but not least, the funds the FinTech lack. As described in the beginning of the paper, all the GAFAM companies have already developed their own payment solution, and with progressive (de)regulation of the banking industry, more penetration in terms of financial services can be expected.

8. Conclusion

The diploma thesis was dealing with the changes in the banking sector (or rather the sector of financial services provided by banks) that arise in the age of digitalization of digitalization. With the turbulent changes in consumer behaviour, sped up by the circle of globalization and faster rates of technology diffusion and adoption, this topic is not only relevant for the incumbents who need to determine their strategy on the market that used to be of highly oligopolistic nature, with high barriers of entry, but also for the regulators whose aim it should become to create a competitive market environment that induces innovation and benefits the customer. The case of the long awaited PSD2 has shown that so far, there are high limits to the effectiveness of such solutions.

The disruption brought by technologies is a phenomenon that can be observed through various sectors of the economy (for example retail, accommodation or transport, to name a few). The disruption of banking on such scale is relatively new but may be even more difficult to react to by the incumbents for various reasons. Firstly, the incumbents have historically been dominant relative to the customer, which has now been changing. Secondly, the banks are burdened by the legacy processes and infrastructure that significantly lowers their agility in producing the innovation on the market. And thirdly, the banks can be characterized by legacy thinking "inside the box", while the most important innovations both on the market with financial services or on the markets previously mentioned could be labelled as "disruptions" – a whole new approaches to the traditional processes and services enabled by technology.

Small and flexible FinTech companies are on the other hand praised for better meeting the customer demand, superior use of data and analytics and sophisticated operational capabilities (PwC, 2016). Their solutions often meet the needs of clients that either do not reach the financial service provided by banks (for example, the Kenyan case of M-Pesa), or offer lower interest rates on loans or better exchange rates than traditional providers, further strengthening the trust by high-frequency communication in the interest of the client, such as reminding the client of an upcoming instalment or sending the client a text with the exchange rate they just used (both is done, for example, by Twisto).

The banks also face a threat from the large tech companies (such as GAFAM) as the possible new competition. These companies combine the advantages of FinTech in their agility, technical skills, ideas, skilful personnel and customer-centricity with the large

funds and customer base of the traditional banks. Compared to the FinTech, the big tech companies also have the advantage of trust, which was confirmed by the questionnaire results where more respondents stated they would be willing to use financial services of the GAFAM than of the FinTech (47 % versus 43 %), with the difference being especially high in terms of non-Millennials (36 % versus 20 % for GAFAM/FinTech willingness).

EY (2017) labels the FinTech users as primarily 25-34-year-old (48 % FinTech adoption) or 35-44-year-old (41 % FinTech adoption); generally, the adoption is lowering with older generations, as a certain level of interest in technology and applications is a predetermination to trusting the money to a completely new entity. At the same time, the adoption is higher within the economically active group, which is the reason why the under-25 generation is not in the lead of the statistics.

Age-wise, similar conclusions were formed by the data from the Czech respondents. While without explanation, the term FinTech resonated with 37 % of the respondents (39 % Millennials, 20 % non-Millennials), after the explanation 32 % of Millennials stated they were using the services of the FinTech (with the highest share in generation Y) compared to 9 % of non-Millennials.

As for FinTech recognition, the Czech respondents were most familiar with Zonky (P2P lending), Twisto (payment solutions/virtual accounts) and Startovač or HitHit (crowdfunding). However, the willingness to borrow was significantly low compared to the other two categories.

Finally, based on the questionnaire results, four conclusions were formed:

i. The Millennials are more likely to change their bank when dissatisfied, or look for alternatives,
ii. Prague citizens are more advanced in terms of technology in financial services than the rest of the Czech Republic,
iii. Big tech companies (GAFAM) have better position as potential disruptors of the Czech financial market than the FinTech companies,
iv. The Czechs are already using or willing to use the FinTech's payment solutions but reluctant to borrow.

While the aim of the following part - the case studies of the three FinTech companies - was primarily to describe the successful Czech FinTech, it was interesting to see that all the companies showed high YoY positive change in turnover, often reaching 2-year-CAGR in hundreds of per cent. Both Twisto and Zonky have also been adding noticeably more services (such as Twisto Split, Twisto Snap or Zonky's loan under 5 minutes) than what their primary aim was. Fundlift then shows a successful business model of high pre-selection of the displayed deals the investors are hungry for, often investing hundreds of thousands of Czech crowns within a few hours.

The author believes the thesis is a small piece in the mosaic of the work on the widely discussed disruption on banking, especially from the sociologic and demographic point of view. While the questionnaire results cannot be applied to non-Millennials and no conclusions could be implied for the older generation of Baby Boomers, the author believes the results for Millennials are describing the Czech Millennials' opinions and approaches accurately.

As the field of the FinTech is very large and far beyond the scale of this thesis, it would be interesting to have a closer look at the different parts of the FinTech, elaborate on the different areas of business (crowdfunding, P2P lending, but also interesting topics that were not covered in the thesis, such as cryptocurrencies) and narrow the surveys and case studies down to the single area. The area of disruption in the financial services is so turbulent the author was often finding new sources describing new breakthroughs, pieces of regulation or new services the FinTech were introducing in the time of finishing the thesis, and due to its high potential, high investors' interest and potential impact on everybody's finances, the topic of disruption in banking will surely be revisited at a higher pace, with the papers keeping their relevance for a short while – just as the new technologies are so quickly replacing what we currently believe to be the highest innovation level.

9. Used Acronyms

API…… Application Programming Interface

Baby Boomers……..…..……. people born until 1964

B2B…….…….…….…….. Business-to-Business

B2C……...……...…….……...…… Business-to-Consumer

CAGR…….…….……...….. Compound Annual Growth Rate

CEE……..……..…Central and Eastern Europe (region)[42]

CZK…….……....….... Czech crowns

ČNB……..……... Czech National Bank (Česká národní banka)

EU……...…...……..…….. the European Union

EUR…….…….. Euro

FinTech…….…. Companies combining technology with financial services

GAFAM……..……. Google, Apple, Facebook, Amazon, Microsoft

Generation X……..……...… people born between 1965 – 1976

Generation Y……..……...…people born between 1977 – 1994

Generation Z…….……. people born after 1995

ICT……..… Information and Communications Technology

IT…… Information Technology

P2P……..…….……..…….. Peer-To-Peer

PSD2…….…… Second Payment Services Directive

USD…….……...…….……. US Dollar

YoY……..…… Year-on-Year (change)

[42] In terms of the paper, the following countries are included: Austria, Bulgaria, Croatia, the Czech Republic, Hungary, Poland, Slovakia, Slovenia, Romania (based on Deloitte, 2016)

10. List of Figures and Tables

10.1 List of Figures

10.2 List of Tables

11. References

2018 is already a record year for global FinTech investment. *Global FinTech* [online]. 2018-07-11 [accessed 2018-10-29]. Available at: http://fintech.global/2018-is-already-a-record-year-for-global-fintech-investment/

6 z 10 Čechů by uvítalo propojení svých účtů, které mají v různých bankách. Nebankovním aplikacím by data poskytlo 15 % lidí. *Airbank* [online]. 10.1.2018 [accessed 2018-12-01]. Available at: https://www.airbank.cz/novinky/6-z-10-cechu-by-uvitalo-propojeni-svych-uctu-ktere-maji-v-ruznych-bankach-nebankovnim-aplikacim-by-data-poskytlo-15-lidi

About Us. *Airbnb* [online]. [accessed 2018-10-10]. Available at: https://press.airbnb.com/about-us/

Amazon Pay. *Amazon Pay* [online]. [accessed 2018-10-30]. Available at: https://pay.amazon.com/us

Anketu E15 o Fintech počin roku ovládl start-up Twisto Payments. *E15.cz* [online]. 2017-03-27 [accessed 2018-12-02]. Available at: https://www.e15.cz/byznys/finance-a-bankovnictvi/anketu-e15-o-fintech-pocin-roku-ovladl-start-up-twisto-payments-1330513

ARTSTAQ se propracoval mezi světovou startupovou elitu. *Fundlift* [online]. [accessed 2018-12-07]. Available at: https://www.fundlift.cz/#/novinka/33

Ask the algorithm. *The Economist* [online]. 2015-05-09 [accessed 2018-12-07]. Available at: https://www.economist.com/special-report/2015/05/09/ask-the-algorithm

AUGUSTINE, Amanda a NAVA, Marcial. Fintech: Changing the Way We Save and Invest. *BBVA Research* [online]. 2015-05-21 [accessed 2018-10-29]. Available at: https://www.bbvaresearch.com/wp-content/uploads/2015/05/150521_US_EW_Fintech.pdf

Bank's Return on Equity for Czech Republic. *St. Louis FED: FRED Economic Data* [online]. [accessed 2018-11-30]. Available at: https://fred.stlouisfed.org/series/DDEI06CZA156NWDB

Bank's Return on Equity for Euro Area. *St. Louis FED: FRED Economic Data* [online]. [accessed 2018-11-30]. Available at: https://fred.stlouisfed.org/series/DDEI06EZA156NWDB

Bank's Return on Equity for World. *St. Louis FED: FRED Economic Data* [online]. [accessed 2018-11-30]. Available at: https://fred.stlouisfed.org/series/DDEI061WA156NWDB

BELÁS, Jaroslav, CIPOVOVÁ, Eva and DEMJAN, Valer. Current trends in area of satisfaction of bank clients in the Czech Republic and Slovakia. Transformations in Business and Economics. 2014, 13(3), 219-234.

BERGER, A. N. (2003). The economic effects of technological progress: Evidence from the banking industry. *Journal of Money, credit and Banking*, 141-176. Available at: https://www.federalreserve.gov/pubs/feds/2002/200250/200250pap.pdf

BLOOMBERG, Jason. Digitization, Digitalization, And Digital Transformation: Confuse Them At Your Peril. In: *Forbes* [online]. [accessed 2018-11-30]. Available at: https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/#32b1dbb02f2c

BOLEN, Alison. Seven characteristics of the modern consumer. *SAS Insights* [online]. 2015-10-13 [accessed 2018-11-19]. Available at: https://www.sas.com/en_gb/insights/articles/marketing/modern-consumer.html%202018

BOYD, John H.; GERTLER, Mark. *Are banks dead? Or are the reports greatly exaggerated?*. No 5045, Working Paper of National Bureau of Economic Research, 1995.

BRANDL, Barbara and HORNUF, Lars. *Where Did Fintechs Come from, and Where Do They Go? The Transformation of the Financial Industry in Germany after Digitalization*. Working paper, 2017.

BREJČÁK, Peter. Twisto vstoupilo do Polska, letos cílí na 50 tisíc klientů. *Ty Internety* [online]. 2018-08-15 [accessed 2018-12-02]. Available at: https://tyinternety.cz/startupy/twisto-vstoupilo-do-polska-letos-cili-na-50-tisic-klientu/

BUREŠ, Michal. Kam plyne zisk 76 miliard Kč z českých bank?. *Finance.cz* [online]. 17.10.2018 [accessed 2018-11-22]. Available at: https://www.finance.cz/496071-kdo-vlastni-ceske-banky/

CAPGEMINI and EFMA. *World Retail Banking Report 2016* [online]. Available at: https://web.uniroma1.it/dip_management/sites/default/files/allegati/World%20Retail%20Banking%20Report%202016.pdf

Cashless made effortless. *Apple Pay* [online]. [accessed 2018-10-30]. Available at: https://www.apple.com/apple-pay/

Časté dotazy, když si chcete půjčit. *Zonky* [online]. [accessed 2018-12-06]. Available at: https://zonky.cz/otazky-a-odpovedi#odpoved1

Časté dotazy. *Fundlift* [online]. [accessed 2018-12-07]. Available at: https://www.fundlift.cz/#/stranka/caste-dotazy

Česká e-commerce [online]. Shoptet, 2008 [accessed 2018-12-10]. Available at: https://www.ceska-ecommerce.cz/

Cestovní pojištění TW+: ZÁKLADNÍ INFORMACE . *UNIQA* [online]. 2018-01-03 [accessed 2018-12-06]. Available at: https://static.twistopay.com/base/docs/pojisteni-informacni-list.596ddd75a1d9.pdf

CHADALÍKOVÁ, Leila. Zázrak jménem Zonky: Vznikli jsme před 18 měsíci jako start-up, nyní půjčujeme 120 miliónů měsíčně, říká ředitel Pavel Novák. *Reflex* [online]. 2017-06-22 [accessed 2018-12-06]. Available at: https://www.reflex.cz/clanek/rozhovory/80246/zazrak-jmenem-zonky-vznikli-jsme-pred-18-mesici-jako-start-up-nyni-pujcujeme-120-milionu-mesicne-rika-reditel-pavel-novak.html

CHRISTENSEN, Clayton. *The innovator's dilemma: when new technologies cause great firms to fail*. Working paper, Harvard Business Review Press, 2013. ISBN 9780062060242.

Cíle. *Czech FinTech Association* [online]. 2018-08-15 [accessed 2018-11-18]. Available at: http://czechfintech.cz/o-nas/#dokumenty

CORTET, Mounaim; RIJKS, Tom; NIJLAND, Shikko. PSD2: The digital transformation accelerator for banks. *Journal of Payments Strategy & Systems*, 2016, 10.1: 13-27.

Crowdfunding. *Oxford Living Dictionaries* [online]. [accessed 2018-10-29]. Available at: https://en.oxforddictionaries.com/definition/crowdfunding

Czech Republic Inflation Rate. *Trading Economics* [online]. [accessed 2018-11-19]. Available at: https://tradingeconomics.com/czech-republic/inflation-cpi

Czech Republic Internet Users. *Internet Live Stats* [online]. [accessed 2018-11-20]. Available at: http://www.internetlivestats.com/internet-users/czech-republic/

Czech Republic Just Tops Russia for Mobile Penetration. *EMarketer.com* [online]. 2015-02-12 [accessed 2018-12-06]. Available at: https://www.emarketer.com/Article/Czech-Republic-Just-Tops-Russia-Mobile-Penetration/1012047

Czech Republic ranks 2nd in the world in contactless payments. *Czech Trade* [online]. 2018-01-24 [cit. 2018-12-01]. Dostupné z: http://www.czechtradeoffices.com/en/th/news/czech-republic-ranks-2nd-in-the-world-in-contactless-payments

Database: Digital economy and society. *Eurostat* [online]. [accessed 2018-12-10]. Available at: https://ec.europa.eu/eurostat/web/digital-economy-and-society/data/database

Database: Labour market. *Eurostat* [online]. [accessed 2018-12-10]. Available at: https://ec.europa.eu/eurostat/web/labour-market/labour-costs/database

DESJARDINS, Jeff. The Rising Speed of Technological Adoption. *Visual Capitalist* [online]. 2018-02-14 [accessed 2018-10-30]. Available at: http://www.visualcapitalist.com/rising-speed-technological-adoption/

Digital Banking Consumer Survey. *PwC Financial Services* [online]. June 2018 [accessed 2018-11-20]. Available at: https://www.pwc.com/us/en/financial-services/publications/assets/pwc-fsi-whitepaper-digital-banking-consumer-survey.pdf

Disruption. *Dictionary.com* [online]. [accessed 2018-11-30]. Available at: https://www.dictionary.com/browse/disruption

DVOŘÁK, Petr. *Bankovnictví pro bankéře a klienty*. 3rd ed. Prague. Linde, 2005. ISBN 807201515X.

E-Commerce: Czech Republic. *Statista* [online]. [accessed 2018-12-10]. Available at: https://www.statista.com/outlook/243/132/ecommerce/czech-republic

ESET: Češi už nechodí na internet nejčastěji na PC, ale přes mobil. Nemyslí však na ochranu. *ESET* [online]. 14.6.2017 [accessed 2018-11-10]. Available at: https://www.eset.com/cz/o-nas/pro-novinare/tiskove-zpravy/eset-cesi-uz-nechodi-na-internet-nejcasteji-na-pc-ale-pres-mobil-nemysli-vsak-na-ochranu/

EY. *EY FinTech Adoption Index 2017: The rapid emergence of FinTech*. 2017. Available at: https://www.ey.com/Publication/vwLUAssets/ey-fintech-adoption-index-2017/$FILE/ey-fintech-adoption-index-2017.pdf

FinTech Definition. *FinTech Weekly* [online]. [accessed 2018-11-30]. Available at: https://www.fintechweekly.com/fintech-definition

FinTech v ČR i ve světě: Vliv nových technologií na finanční sektor. *Deloitte* [online]. November 2018 [accessed 2018-12-05]. Available at: https://www2.deloitte.com/content/dam/Deloitte/cz/Documents/financial-services/FinTech_v_CR_i_ve_svete_v2.pdf

FIŠEROVÁ, Markéta. Agendou FinTech se bude v ČNB zabývat sekce regulace a mezinárodní spolupráce. *ČNB* [online]. 2018-09-27 [accessed 2018-11-19]. Available at: https://www.cnb.cz/cs/verejnost/pro_media/tiskove_zpravy_cnb/2018/20180927_org_zmeny_sekce_regulace.html

Gartner IT Glossary: Digitalization. *Gartner* [online]. [accessed 2018-11-30]. Available at: https://www.gartner.com/it-glossary/digitalization/

Gartner Says Worldwide Sales of Smartphones Returned to Growth in First Quarter of 2018. *Gartner* [online]. 2018-05-29 [accessed 2018-11-15]. Available at: https://www.gartner.com/newsroom/id/3876865

GROMEK, Michal. Why Banks And FinTech Need Each Other... And For How Long. *Forbes* [online]. 2018-07-19 [accessed 2018-12-03]. Available at:

https://www.forbes.com/sites/michalgromek/2018/07/19/why-banks-and-fintech-need-each-other-and-for-how-long/#6e291c681345

HANÁKOVÁ, Nela. 4 roky Twista ve zkratce. *Twisto* [online]. 2017-06-30 [accessed 2018-12-10]. Available at: https://blog.twisto.cz/4-roky/

HARKER, Patrick T. "Fintech: Revolution or Evolution?" Presentation, Federal Reserve Bank of Philadelphia, University of Pennsylvania, Philadelphia (April 3) (2017).

HAYES, Adam. Investment Crowdfunding. *Investopedia* [online]. 2018-04-23 [accessed 2018-10-29]. Available at: https://www.investopedia.com/terms/i/investment-crowdfunding.asp

HELSPER, Ellen Johanna; EYNON, Rebecca. Digital natives: where is the evidence?. *British educational research journal*, 2010, 36.3: 503-520.

History and milestones. *Alibaba Group* [online]. [accessed 2018-10-10]. Available at: https://www.alibabagroup.com/en/about/history?year=2010

HOLZMAN, Ondřej. Na Zonky si lze nově půjčit do 5 minut. Český fintech spouští téměř okamžité zpracování transakcí. *CzechCrunch* [online]. 2018-11-29 [accessed 2018-12-06]. Available at: https://www.czechcrunch.cz/2018/11/na-zonky-si-lze-nove-pujcit-do-5-minut-cesky-fintech-spousti-temer-okamzite-zpracovani-transakci/

HOLZMAN, Ondřej. Petr Dvořák: PSD2 je spíše nevyužitá příležitost. Banky u nás ale inovují už dnes. *Ty Internety* [online]. 2018-03-05 [accessed 2018-11-19]. Available at: https://tyinternety.cz/technologie/petr-dvorak-psd2-je-spise-nevyuzita-prilezitost-banky-u-nas-ale-inovuji-uz-dnes/

HOWARD, Caroline. Disruption Vs. Innovation: What's The Difference?. *Forbes* [online]. 2013-03-27 [accessed 2018-11-30]. Available at: https://www.forbes.com/sites/carolinehoward/2013/03/27/you-say-innovator-i-say-disruptor-whats-the-difference/#28d41a4b6f43

ICT Facts and Figures 2017. *ITU* [online]. Geneva, July 2017 [accessed 2018-10-30]. Available at: https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFactsFigures2017.pdf

Internet Growth Statistics. *Internet World Stats* [online]. [accessed 2018-11-15]. Available at: https://www.internetworldstats.com/emarketing.htm

Jak na to?: Jak investovat na Fundlift?. *Fundlift* [online]. [accessed 2018-12-07]. Available at: https://www.fundlift.cz/#/stranka/jak-to-funguje

KATCHPOLE, Molly. How our petition beat Bank of America's debit card fee. *The Guardian* [online]. 2011-11-02 [accessed 2018-11-15]. Available at:

https://www.theguardian.com/commentisfree/cifamerica/2011/nov/02/petition-bank-of-america-debit-card-fee

KING, Brett. *Bank 3.0: Why banking is no longer somewhere you go but something you do*. John Wiley & Sons, 2012. ISBN 1118589637

KING, Brett. *Breaking banks: The innovators, rogues, and strategists rebooting banking*. John Wiley & Sons, 2014. ISBN 9781118900147.

KRČMÁŘ, Michal. Největší inovace letošního roku. Spouštíme Split. *Objevit.cz* [online]. 2015-05-28 [accessed 2018-12-02]. Available at: http://objevit.cz/michal-smida-twisto-je-okamzity-nakup-s-platbou-pozdeji-t135177

KROČIL, Michal. Limity Twisto účtů mají svá pravidla. Zjistěte, jak nad nimi přemýšlíme. *Twisto* [online]. 2017-12-12 [accessed 2018-12-06]. Available at: https://blog.twisto.cz/limity-na-twisto-uctu/

KUDRNOVÁ, Veronika. Pavel Novák (Zonky): Jakmile zlomíme v půjčování Čechy, zamíříme na zahraniční trhy. *Peak.cz* [online]. 2018-06-27 [accessed 2018-12-06]. Available at: https://www.peak.cz/pavel-novak-zonky-jakmile-zlomime-pujcovani-cechy-zamirime-zahranicni-trhy/

KYSILKA, Pavel. Pavel Kysilka: Způsobí PSD2 disrupci bankovnictví?. *6D Academy* [online]. 2018-01-22 [accessed 2018-12-03]. Available at: https://www.6dhub.cz/kyberprostor/4519id/pavel-kysilka-zpu-sobi-psd2-disrupci-bankovnictvi/

MACKIE, Nick. Contactless: The overnight success story 10 years in the making. *VISA Vision* [online]. 2016-04-26 [accessed 2018-10-29]. Available at: https://vision.visaeurope.com/blogs/contactless-the-overnight-success-story-10-years-in-the-making10217/

MATTHEWS, Kent and John THOMPSON. *The Economics of Banking*. 3rd ed. John Wiley & Sons, 2005. ISBN 1118639200.

Mezi fintechy ve Zlaté koruně 2018 nejvíce zabodovalo Zonky. *Ty Internety* [online]. 2018-06-04 [accessed 2018-12-06]. Available at: https://tyinternety.cz/novinky/mezi-fintechy-ve-zlate-korune-2018-nejvice-zabodovalo-zonky/

Microsoft Pay. *Microsoft Pay* [online]. [accessed 2018-10-30]. Available at: https://www.microsoft.com/en-us/payments

MIHOKOVÁ, Lucie. *Nové trendy v bankovnictví - studie*. Prague, 2016. Diploma thesis. Bankovní institut vysoká škola Praha. Supervisor Marcela Soldánová.

Millennials: A Portrait of Generation Next. *Pew Research* [online]. February 2010 [accessed 2018-11-22]. Available at: http://www.pewresearch.org/wp-content/uploads/sites/3/2010/10/millennials-confident-connected-open-to-change.pdf

Největší inovace letošního roku. Spouštíme Split. *Twisto* [online]. [accessed 2018-11-18]. Available at: https://blog.twisto.cz/spoustime-split/

NĚMEC, Jan. Češi už neváhají změnit banku. Loni s účtem ke konkurenci odešel každý devátý. *Ekonom* [online]. 14.3.2018 [accessed 2018-11-22]. Available at: https://ekonom.ihned.cz/c1-66079050-lide-meni-velke-banky-za-male

NĚMEČEK, Josef. FinTech v Česku sjednotil svůj hlas. Nejen před klíčovým rokem 2018. *Roklen24.cz* [online]. 2016-10-24 [accessed 2018-12-01]. Available at: https://roklen24.cz/a/idSyT/fintech-v-cesku-sjednotil-svuj-hlas-nejen-pred-klicovym-rokem-2018

NOVÁK, Daniel. Rekord českého crowdfundingu padl v realitách. *E15.cz* [online] 2018-07-28 [accessed 2018-12-07]. Available at: https://www.e15.cz/byznys/reality-a-stavebnictvi/rekord-ceskeho-crowdfundingu-padl-v-realitach-1349004

Number of monthly active Facebook users worldwide as of 3rd quarter 2018 (in millions). *Statista* [online]. [accessed 2018-11-15]. Available at: https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/

NWT- Park Tower. *Fundlift* [online]. [accessed 2018-12-07]. Available at: https://www.fundlift.cz/#/projekt/1110

OMARINI, Anna. "The Digital Transformation in Banking and The Role of FinTechs in the New Financial Intermediation Scenario." Internationl journal of trade, economics, and finance 1, no. 1 (2017): 1-6.

PHILIPPON, Thomas. The fintech opportunity. No. w22476. National Bureau of Economic Research, 2016.

Platte tady. Platte tam. Platte kdekoli. *Google Pay* [online]. [accessed 2018-10-30]. Available at: https://pay.google.com/intl/cs_cz/about/where-to-use/

PRENSKY, Marc. Digital Natives, Digital Immigrants. *On the Horizon*. MCB University Press, 2001, **9**(5).

PTÁČEK, Michal. Český fintech startup Twisto.cz získává investici ve výši 5 milionů eur a expanduje do Polska. *CzechCrunch* [online]. 2017-10-04 [accessed 2018-12-06]. Available at:

https://www.czechcrunch.cz/2017/10/cesky-fintech-startup-twisto-cz-ziskava-investici-ve-vysi-5-milionu-eur-a-expanduje-do-polska/

PwC. *Blurred lines: How FinTech is shaping Financial Services: Global FinTech Report.* 2016. Available at: https://www.pwc.com/gx/en/advisory-services/FinTech/pwc-fintech-global-report.pdf

REDDY, Karthik. The First FinTech To Go Global – The PayPal Story, *OECN* [online]. 2017-10-30 [accessed 2018-10-25]. Available at: https://www.ecommerce-nation.com/first-fintech-go-global-paypal-story/

Research and development expenditure (% of GDP). *World Bank* [online]. [accessed 2018-12-10]. Available at: https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS?name_desc=false&view=map

ROGERS, Everett M. *Diffusion of innovations*. 3rd ed. New York. The Free Press, 1983.ISBN 0-02-926650-5.

SANDLE, Tim. UN thinks internet access is a human right. *Business Insider* [online]. 2016-07-22 [accessed 2018-11-15]. Available at: https://www.businessinsider.com/un-says-internet-access-is-a-human-right-2016-7

SCHOEMAKER, Paul. 5 Ways to Know What Your Customers Want Before They Do. *Inc.* [online]. 2015-04-25 [accessed 2018-11-19]. Available at: https://www.inc.com/paul-schoemaker/5-ways-to-know-what-your-customer-wants.html

SCHUMPETER, Joseph A. *Capitalism, socialism and democracy*. 5th ed. London. Routledge, 2010. ISBN 9781135154752.

SKINNER, Chris. The Future of Banking in a Globalised World. 1. Chichester, England: Wiley Finance, 2007.

Smartphone penetration to reach 66% in 2018. *Zenith Media* [online]. [accessed 2018-11-19]. Available at: https://www.zenithmedia.com/smartphone-penetration-reach-66-2018/

ŠOLTÉS, Michal a Jaroslav PRŮCHA. Pavel Kysilka: Finančním trhem zatřesou technologie a mileniálové. *Roklen24* [online]. 2018-10-03 [accessed 2018-10-30]. Available at: https://roklen24.cz/a/SeGJy/pavel-kysilka-financnim-trhem-zatresou-technologie-a-milenialove

SONTÁK, Miloš. Dlouho očekávaná Twisto karta je konečně tady!. *FinTech Cowboys* [online]. 2017-11-24 [accessed 2018-12-06]. Available at: https://fintechcowboys.cz/dlouho-ocekavana-twisto-karta-konecne-tady/

SOUČEK, Ondřej. ČNB zatím bankovní trh fintechům neotevřela. Požaduje specifické pojištění pro novou službu. *E15* [online]. 2018-07-06 [accessed 2018-11-19]. Available at:

https://www.e15.cz/byznys/finance-a-bankovnictvi/cnb-zatim-bankovni-trh-fintechum-neotevrela-pozaduje-specificke-pojisteni-pro-novou-sluzbu-1348544

Statista. *PayPal's total payment volume from 1st quarter 2014 to 3rd quarter 2018 (in billion U.S. dollars)* [online] [accessed 2018-11-03]. Available at: https://www.statista.com/statistics/277841/paypals-total-payment-volume/

STODART, Jordan. P2P's "Big Three": The Race to Expand, *Orca Money* [online]. 2018-06-27 [accessed 2018-10-22]. Available at: https://www.orcamoney.com/blog/p2p-big-three-the-race-to-expand

SU, Jean Baptiste. The Global Fintech Landscape Reaches Over 1000 Companies, $105B In Funding, $867B In Value: Report. *Forbes* [online]. 2016-09-28 [accessed 2018-10-29]. Available at: https://www.forbes.com/sites/jeanbaptiste/2016/09/28/the-global-fintech-landscape-reaches-over-1000-companies-105b-in-funding-867b-in-value-report/#af0f08f26f3d

Tell Bank of America: No $5 Debit Card Fees. *Change.org* [online]. [accessed 2018-11-15]. Available at: https://www.change.org/p/tell-bank-of-america-no-5-debit-card-fees

TEPLÝ, Petr a Libuše PŘIBYLOVÁ. *Retailová banka 2025: Mezigenerační střet nebo shoda?* Česká bankovní asociace, 2016. Available at: https://www.czech-ba.cz/sites/default/files/cba_retailova_banka_2025_brezen_2015_1.pdf

The history of Uber. *Uber* [online]. [accessed 2018-10-10]. Available at: https://www.uber.com/newsroom/history/

The origins of the financial crisis: Crash course. *The Economist* [online]. 7.9.2013 [accessed 2018-11-12]. Available at: https://www.economist.com/schools-brief/2013/09/07/crash-course

Top 10 Trends to Watch in 2018. *Accenture* [online]. 2018 [accessed 2018-11-19]. Available at: https://www.accenture.com/t20180126T061918Z__w__/us-en/_acnmedia/PDF-70/Accenture-Banking-Top-10-Trends-2018.pdf

TÓTHOVÁ, Lucia. Přehled fintech scény v České republice. *FinTech Cowboys* [online]. 2016-05-16 [accessed 2018-11-19]. Available at: https://fintechcowboys.cz/cesko-jeho-fintech-scena/

Twisto karta. *Twisto* [online]. [accessed 2018-12-06]. Available at: https://www.twisto.cz/vychytavky/karta/

Twisto náramek. *Twisto* [online]. [accessed 2018-12-06]. Available at: https://www.twisto.cz/vychytavky/naramek/

Twisto Snap. *Twisto* [online]. [accessed 2018-12-06]. Available at: https://www.twisto.cz/vychytavky/snap/

Účetní závěrka Fundlift, s.r.o., 2016. *Justice.cz* [online]. [accessed 2018-12-07]. Available at: https://or.justice.cz/ias/ui/vypis-sl-detail?dokument=51392148&subjektId=891685&spis=976792

Účetní závěrka Twisto payments, a.s., 2016. *Justice.cz* [online]. [accessed 2018-12-07]. Available at: https://or.justice.cz/ias/ui/vypis-sl-detail?dokument=47876176&subjektId=400325&spis=89630

Účetní závěrka Twisto payments, a.s., 2017. *Justice.cz* [online]. [accessed 2018-12-07]. Available at: https://or.justice.cz/ias/ui/vypis-sl-detail?dokument=53699097&subjektId=400325&spis=89630

Účetní závěrka Zonky, a.s., 2016. *Justice.cz* [online]. [accessed 2018-12-07]. Available at: https://or.justice.cz/ias/ui/vypis-sl-detail?dokument=48869330&subjektId=880547&spis=954984

Účetní závěrka Zonky, a.s., 2017. *Justice.cz* [online]. [accessed 2018-12-07]. Available at: https://or.justice.cz/ias/ui/vypis-sl-detail?dokument=53059548&subjektId=880547&spis=954984

Understanding Customer Behavior in Retail Banking: The Impact of the Credit Crisis across Europe. *EY* [online]. February 2010 [accessed 2018-11-20]. Available at: https://www.ey.com/Publication/vwLUAssets/Understanding_customer_behavior_in_retail_banking_-_February_2010/%24FILE/EY_Understanding_customer_behavior_in_retail_banking_-_February_2010.pdf

VAN BELLEGHEM, Stephen. 4 characteristics of the modern consumer. *Customer Think* [online]. 2015-10-13 [accessed 2018-11-19]. Available at: http://customerthink.com/4-characteristics-of-the-modern-consumer/

VENKATESAN, Ravi. Can banks survive technology? *The Economic Times: Blogs* [online]. 2016-02-09 [accessed 2018-11-30]. Available at: https://economictimes.indiatimes.com/blogs/Musings/can-banks-survive-technology/

Všeobecné obchodní podmínky Twisto payments a.s. *Twisto* [online]. 2018-05-25 [accessed 2018-12-06]. Available at: https://www.twisto.cz/podminky/ucet/

Využívejte Twisto kartu naplno. Zkuste Mastercard Priceless Specials. *Twisto* [online]. 2018-10-11 [accessed 2018-12-06]. Available at: https://blog.twisto.cz/splnte-si-prani-a-ziskejte-slevy-s-twisto-kartou-a-mastercard-priceless-specials/

WALKER, Andrew. "Banking without banks: Exploring the disruptive effects of converging technologies that will shape the future of banking." Journal of Securities Operations & Custody 7, no. 1 (2014): 69-80.

Why does Kenya lead the world in mobile money?. *The Economist* [online]. 2015-03-02 [accessed 2018-10-29]. Available at: https://www.economist.com/the-economist-explains/2015/03/02/why-does-kenya-lead-the-world-in-mobile-money

WILE, Rob. Can you get rich by investing in a startup? How to do it — and the pros and cons of crowdfunding. *CNBC* [online]. 2017-07-05 [accessed 2018-10-29]. Available at: https://www.cnbc.com/2017/07/05/can-you-get-rich-by-investing-in-a-startup-how-to-do-it--and-the-pros-and-cons-of-crowdfunding.html

World Development Indicators. *World Bank* [online]. [accessed 2018-11-19]. Available at: http://databank.worldbank.org/data/reports.aspx?source=2&series=NY.GDP.MKTP.CD&country

World FinTech Report 2018. *Capgemini* [online]. 2018 [accessed 2018-12-03]. Available at: https://www.capgemini.com/wp-content/uploads/2018/02/world-fintech-report-wftr-2018.pdf

ZAVERI, Paayal. Facebook Messenger users can now send money to each other with PayPal. *CNBC* [online]. 2017-10-20 [accessed 2018-10-30]. Available at: https://www.cnbc.com/2017/10/20/facebook-messenger-send-money-with-paypal.html

Zonky Ceník. *Zonky* [online]. [accessed 2018-12-06]. Available at: https://zonky.cz/cenik/

Zonkyho záchranná vesta. *Zonky* [online]. [accessed 2018-12-06]. Available at: https://zonky.cz/pojisteni/

Appendix 1: Questionnaire (in Czech)

1. **Uvažoval/a jste v posledních 5 letech o změně vaší primární banky?**
    - Ano
    - Ne
2. **Změnil/a jste v posledních 5 letech vaši primární banku?**
    - Ano
    - Ne
3. **Pokud jste měnil/a banku, jaký byl váš primární důvod? (Vyberte 1-3 možnosti.)**
    - Banku jsem neměnil/a
    - Výše poplatků (za vedení účtu, výběry z bankomatů, transakce...)
    - Nedostatečná nabídka služeb
    - Nízké úročení vkladů
    - Jiné
    - Osobní důvody (např. změna bydliště či převedení účtu do banky, ve které má účet partner či rodina)
    - Výše úrokových sazeb úvěrů
4. **Využíváte možnosti internetového bankovnictví?**
    - **Ano**
    - **Ne**
5. **Jaký kanál komunikace s bankou preferujete?**
    - Internet (skrze PC či notebook)
    - Internet (skrze mobilní telefon)
    - Osobně na pobočce
    - Telefonicky
6. **Vyberte všechna tvrzení, se kterými SOUHLASÍTE:**

- Internetové bankovnictví v mobilu je pro mě uživatelsky jednoduché
- Internetové bankovnictví v mobilu mi bez problému umožňuje provést vše, co na denním pořádku potřebuji
- Ve svou banku mám plnou důvěru
- Banky jsou ve své činnosti efektivní
- Osobní kontakt s bankéřem je pro mne důležitý
- Návštěvy pobočky vnímám jako užitečné a potřebné
- Pravidelně vyhledávám informace o konkurenčních službách nabízených jinými bankami
- Český bankovní sektor považuji za inovativní

7. **Víte, co si představit pod pojmem FinTech?**
    - Ano
    - Ne
8. **FinTech společnosti se dají charakterizovat jako společnosti, které díky technologiím vstupují na trh finančních produktů. V ČR je to například Twisto (platby), Spendee (aplikace pro správu osobních financí), Zonky (půjčky), Startovač nebo HitHit (crowdfundingové společnosti). Využíváte služeb těchto nebo podobných společností?**
    - Ano
    - Ne
9. **Pokud ano, služeb které/kterých FinTech společností využíváte?**
10. **Z následujícího seznamu označte společnosti, o jejich činnosti máte povědomí:**
    - Zonky
    - Twisto
    - Startovač
    - HitHit

- ChytryHonza.cz
- PlnáPeněženka
- Spendee
- Fundlift
- Nakopni.me
- RoklenFx
- Trezor
- BudgetBakers
- První klubová
- Penězdroj
- Prestito
- Bankerat
- Půjčméfirmě
- SymCredit (4)

11. **Vyberte všechna tvrzení, se kterými SOUHLASÍTE:**

- FinTech společnosti považuji za zdravou konkurenci bank
- Byl/a bych ochoten/ochotna využívat finančních služeb zprostředkovaných velkými technologickými společnostmi (Google, Apple, Facebook, Amazon, Microsoft)
- Byl/a bych ochoten/ochotna využívat finančních služeb zprostředkovaných FinTech společnostmi
- Byl/a bych ochoten/ochotna využívat platební řešení FinTech společnosti
- Využívám či věřím, že v horizontu 5 let začnu využívat služeb FinTech společností
- Byl/a bych ochoten/ochotna investovat skrze FinTech společnost
- Byl/a bych ochoten/ochotna si půjčit peníze skrze FinTech společnost

- Pravidelně vyhledávám informace o konkurenčních službách nabízených nebankovními subjekty

12. **Jaký je váš věk?**

13. **Jaké je vaše nejvyšší dosažené vzdělání?**

- Středoškolské
- Vysokoškolské II. a vyššího stupně
- Vysokoškolské I. stupně
- Základní

14. **Kraj vašeho bydliště:**

- Hlavní město Praha
- Pardubický kraj
- Jihomoravský kraj
- Středočeský kraj
- Královéhradecký kraj
- Jihočeský kraj
- Plzeňský kraj
- Moravskoslezský kraj
- Olomoucký kraj
- Karlovarský kraj
- Ústecký kraj
- Kraj Vysočina
- Liberecký kraj
- Zlínský kraj

Appendix 2: Questionnaire (translated to English)

15. Have you considered changing your primary bank within the last 5 years?

- Yes
- No

16. Have you changed your primary bank within the last 5 years?

- Yes
- No

17. If you changed your primary bank, what was your main reason? (Choose 1-3 options.)

- I have not changed my bank
- Fees (account maintenance, ATM withdrawals, transactions…)
- Insufficient offer of services
- Low interest rates on deposits
- Others
- Personal reasons (for example change of residence or switching the account to the bank of partner or family)
- High interest rates on loans

18. **Do you use Internet banking?**

- **Yes**
- **No**

19. **How do you prefer to communicate with a bank?**

- On the Internet (through PC or laptop)
- On the Internet (through smart phone)
- In person at the bank's branch
- Telephonically

20. **Choose all the statements you AGREE with:**

- Internet banking though my smart phone is easy to use
- Internet banking through my smartphone lets me perform everything I need on a daily basis
- I have full trust in my bank
- Banks are effective in their activities
- Personal contact with a banker is important for me
- I believe personally visiting a bank's branch is useful and necessary
- I look up information about the services provided by the competition on a regular basis
- I consider the Czech banking sector innovative

21. **Do you know what the term "FinTech" means?**
    - Yes
    - No
22. **The FinTech companies could be characterized as companies that penetrate the financial market with technological solution. In the Czech Republic, it is for example Twisto (payments), Spendee (application for management of personal finance), Zonky (lending), Startovač or HitHit (crowdfunding). Do you the services of these or similar companies?**
    - Yes
    - No
23. **If so, the services of which FinTech company/companies do you use?**
24. **Select the companies you have recognition of from the following list:**
    - Zonky
    - Twisto
    - Startovač
    - HitHit
    - ChytryHonza.cz

- PlnáPeněženka
- Spendee
- Fundlift
- Nakopni.me
- RoklenFx
- Trezor
- BudgetBakers
- První klubová
- Penězdroj
- Prestito
- Bankerat
- Půjčméfirmě
- SymCredit (4)

25. **Choose all the statements you AGREE with:**

- I consider the FinTech companies to be a healthy competition for the traditional banks
- I would be willing to use the financial services of big tech companies (Google, Apple, Facebook, Amazon, Microsoft)
- I would be willing to use the financial services of FinTech companies
- I would be willing to use payment solutions of FinTech companies
- I currently use the services of FinTech companies or believe I will within 5 years
- I would be willing to invest through FinTech companies
- I would be willing to borrow money through FinTech companies
- I regularly seek out the information on financial services provided by non-banking subjects

26. **How old are you?**

27. **What is you highest achieved level of education?**

- High school
- University (Master or higher)
- University (Bachelor)
- Primary school

28. **Region of residency:**

- Prague
- Pardubice region
- South Moravian region
- Central Bohemian region
- Hradec Králové region
- South Bohemian region
- Plzeň region
- Moravian-Silesian region
- Olomouc region
- Karlovy Vary region
- Ústí and Labem region
- Vysočina region
- Liberec region
- Zlín region

Appendix 3: Chi-square testing

A.

Actual			
	Considered changing and did change the bank	Considered changing and did not change the bank	
Millennials	95	91	**186**
Non-Millennials	8	14	**22**
	103	**105**	**208**

Expected			
	Considered changing and did change the bank	Considered changing and did not change the bank	
Millennials	92.106	93.894	**186**
Non-Millennials	10.894	11.106	**22**
	103	**105**	**208**

χ^2	**0.353782092**

B.

Actual					
	PC/laptop	Smartphone	In person	Telephone	
Millennials	156	110	41	10	**317**
Non-Millennials	34	7	3	0	**44**
	190	**117**	**44**	**10**	**361**

Expected					
	PC/laptop	Smartphone	In person	Telephone	
Millennials	166.842	102.740	38.637	8.781	**317**
Non-Millennials	23.158	14.260	5.363	1.219	**44**
	190	**117**	**44**	**10**	**361**

χ^2	**0.005681476**

C.

Actual			
	PC/laptop	Smartphone	
Millennials	156	110	**266**
Non-Millennials	34	7	**41**
	190	**117**	**307**

Expected			
	PC/laptop	Smartphone	
Millennials	164.625	101.375	**266**
Non-Millennials	25.375	15.625	**41**
	190	**117**	**307**

χ^2	**0.065836299**

D.

Actual			
	Internet banking through smartphone is easy to use	Internet banking through smartphone is not easy to use	
Millennials	240	77	**317**
Non-Millennials	15	29	**44**
	255	**106**	**361**

Expected			
	Internet banking through smartphone is easy to use	Internet banking through smartphone is not easy to use	
Millennials	223.920	93.080	**317**
Non-Millennials	31.080	12.920	**44**
	255	**106**	**361**

χ^2	**0.002083575**

E.

Actual			
	Internet banking through smartphone lets me do all I need on a daily basis	Internet banking through smartphone does not let me do all I need on a daily basis	
Millennials	202	115	**317**
Non-Millennials	14	30	**44**
	216	**145**	**361**

Expected			
	Internet banking through smartphone lets me do all I need on a daily basis	Internet banking through smartphone does not let me do all I need on a daily basis	
Millennials	189.673	127.327	**317**
Non-Millennials	26.327	17.673	**44**
	216	**145**	**361**

χ^2	**0.010354547**

F.

Actual			
	Have used FinTech	Have not used FinTech	
Millennials	102	215	**317**
Non-Millennials	4	40	**44**
	106	**255**	**361**

Expected			
	Have used FinTech	Have not used FinTech	
Millennials	93.080	223.920	**317**
Non-Millennials	12.920	31.080	**44**
	106	**255**	**361**

χ^2	**0.00809272**

G.

Actual			
	Have used FinTech	Have not used FinTech	
Prague	54	96	**150**
Other regions	52	159	**211**
	106	**255**	**361**

Expected			
	Have used FinTech	Have not used FinTech	
Prague	44.044	105.956	**150**
Other regions	61.956	149.044	**211**
	106	**255**	**361**

χ^2	**0.049741827**

H.

Actual			
	Have used FinTech	Have not used FinTech	
Have changed their bank	51	55	**106**
Have not changed their bank	75	180	**255**
	126	**235**	**361**

Expected			
	Have used FinTech	Have not used FinTech	
Have changed their bank	36.997	69.003	**106**
Have not changed their bank	89.003	165.997	**255**
	126	**235**	**361**

χ^2	**0.006160175**

I.

Actual			
	Have used FinTech	Have not used FinTech	
Have changed their bank	50	52	**102**
Have not changed their bank	66	149	**215**
	116	**201**	**317**

Expected			
	Have used FinTech	Have not used FinTech	
Have changed their bank	37.325	64.675	**102**
Have not changed their bank	78.675	136.325	**215**
	116	**201**	**317**

χ^2	**0.011762381**

J.

Actual			
	Willing to use GAFAM	Not willing to use GAFAM	
Generation X	11	18	**29**
Generation Y	126	118	**244**
Generation Z	33	51	**84**
	170	**187**	**357**

Expected			
	Willing to use GAFAM	Not willing to use GAFAM	
Generation X	13.810	15.190	**29**
Generation Y	116.190	127.810	**244**
Generation Z	40.000	44.000	**84**
	170	**187**	**357**

χ^2	**0.081637548**

K.

Actual			
	Willing to use FinTech	Not willing to use FinTech	
Generation X	7	22	**29**
Generation Y	109	135	**244**
Generation Z	38	46	**84**
	154	**203**	**357**

Expected			
	Willing to use FinTech	Not willing to use FinTech	
Generation X	12.510	16.490	**29**
Generation Y	105.255	138.745	**244**
Generation Z	36.235	47.765	**84**
	154	**203**	**357**

χ^2	**0.097627699**

L.

Actual			
	Willing to use GAFAM	Not willing to use GAFAM	
Prague	86	64	**150**
Other regions	84	127	**211**
	170	**191**	**361**

Expected			
	Willing to use GAFAM	Not willing to use GAFAM	
Prague	70.637	79.363	**150**
Other regions	99.363	111.637	**211**
	170	**191**	**361**

χ^2	**0.001012452**

M.

Actual			
	Willing to use FinTech	Not willing to use FinTech	
Prague	79	71	**150**
Other regions	75	136	**211**
	154	**207**	**361**
Expected			
	Willing to use FinTech	Not willing to use FinTech	
Prague	63.989	86.011	**150**
Other regions	90.011	120.989	**211**
	154	**207**	**361**

χ^2	**0.001189201**

N.

Actual			
	Willing to use FinTechs' payment solutions	Not willing to use FinTechs' payment solutions	
Generation X	9	20	**29**
Generation Y	106	138	**244**
Generation Z	30	54	**84**
	145	**212**	**357**
Expected			
	Willing to use FinTechs' payment solutions	Not willing to use FinTechs' payment solutions	
Generation X	11.779	17.221	**29**
Generation Y	99.104	144.896	**244**
Generation Z	34.118	49.882	**84**
	145	**212**	**357**

χ^2	**0.25298265**

O.

Actual			
	Willing to invest through FinTech	Not willing to invest through FinTech	
Generation X	5	24	**29**
Generation Y	97	147	**244**
Generation Z	30	54	**84**
	132	**225**	**357**
Expected			
	Willing to invest through FinTech	Not willing to invest through FinTech	
Generation X	10.723	18.277	**29**
Generation Y	90.218	153.782	**244**
Generation Z	31.059	52.941	**84**
	132	**225**	**357**

χ^2	**0.057496448**

P.

Actual			
	Willing to borrow through FinTech	Not willing to borrow through FinTech	
Generation X	2	27	**29**
Generation Y	62	182	**244**
Generation Z	11	73	**84**
	75	**282**	**357**
Expected			
	Willing to borrow through FinTech	Not willing to borrow through FinTech	
Generation X	6.092	22.908	**29**
Generation Y	51.261	192.739	**244**
Generation Z	17.647	66.353	**84**
	75	**282**	**357**

χ^2	**0.008659777**

Q.

Actual			
	Willing to invest through FinTech	Not willing to invest through FinTech	
Prague	77	73	**150**
Other regions	68	143	**211**
	145	**216**	**361**
Expected			
	Willing to invest through FinTech	Not willing to invest through FinTech	
Prague	60.249	89.751	**150**
Other regions	84.751	126.249	**211**
	145	**216**	**361**

χ^2	**0.000263074**

R.

Actual			
	Willing to invest through FinTech	Not willing to invest through FinTech	
Prague	68	82	**150**
Other regions	64	147	**211**
	132	**229**	**361**
Expected			
	Willing to invest through FinTech	Not willing to invest through FinTech	
Prague	54.848	95.152	**150**
Other regions	77.152	133.848	**211**
	132	**229**	**361**

χ^2	**0.003539007**

S.

Actual			
	Willing to borrow	Not willing to borrow	
Prague	39	111	**150**
Other regions	36	175	**211**
	75	**286**	**361**

Expected			
	Willing to borrow	Not willing to borrow	
Prague	31.163	118.837	**150**
Other regions	43.837	167.163	**211**
	75	**286**	**361**

χ^2	**0.039118579**