

**INNOVATION IN THE FINANCIAL SECTOR,  
INDUSTRY ASSESSMENT FROM THE CONSUMERS'  
PERSPECTIVE**

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School of Business and Economics**

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**ABSTRACT**

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| <p><b>Abstract</b></p> <p>The financial industry is currently adapting to a regulative shock caused by the Revised Payment Services Directive that disturbs the conventional practices within the sector. Recognition of the present opportunities and challenges requires the industry ecosystem to employ vision and forethought into their approaches in order to adapt to the changing environment. Adaptation to the opened market is vital for keeping up with the consumer value chain, and also to firm survival. Consumer perceptions concerning the innovation values, alliance-based co-creational processes and coevolutionary reciprocities give clear indications on how the reforms have been received and adjusted to.</p> <p>This thesis builds on the empirical industry context and discusses the innovations in terms of their value, pinpoint as well as ecosystem architecture and competitive dynamics. The research itself is done from the consumers' perspective within Finland, giving an in-depth overlook of their perceptions. For the purpose of the study, a collective consumer survey was constructed and circulated for data collection. The results were analyzed thoroughly, taking into account the underlying demographic differences in the perceptions of the sample.</p> <p>The results show how the overall outlook concerning the amounts of innovations and incremental innovations is positive, but also deliver insights on how unevenly the different demographical groups view and benefit from the industry reforms. Consumers had noticed positive effects in most of the competitiveness metrics, enjoying the profits of having more service providers to choose from. The perceptions concerning consumption preferences provided information on consumers choosing better experience over minding a cyber security threat. The industry is perceived to coevolve as conjoint development and continuous re-shaping were recognized as industry components. The fact that third party provided products are largely consumed as downstream functions to support the main means of handling one's finances gives important indications for future developments. The complexity of catering to various consumer needs raises the question for more collaboration within the sector, something that even the consumers viewed to bring more solutions into the market and wished to see more of.</p> |  |
| <b>Keywords</b><br>Innovation, financial industry, PSD2, regulative shock, industry coevolution   |  |
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## TIIVISTELMÄ

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| <p><b>Tiivistelmä</b></p> <p>Finanssiala on parhaillaan sopeutumassa alan perinteisiä käytäntöjä hajottavaan regulaatiiviseen shokkiin uudistetun maksupalveludirektiivin takia. Nykyisten mahdollisuuksien ja haasteiden tunnistaminen vaatii koko ekosysteemiltä soveltuvaa näkemystä ja ennakoivaa lähestymistapaa, jotta mukautuminen uuteen toimintaympäristöön onnistuu parhaalla mahdollisella tavalla. Avoimempaan markkina-alueeseen sopeutuminen on elintärkeää niin kuluttajien arvoketjun säilyttämisen kuten myös yritysten selviämisen kannalta. Kuluttajien näkemykset innovaatioarvoista, allianssipohjaisista yhteistoimintaprosesseista ja yhteisevoluutionallisesta vastavuoroisuudesta antavat selkeän kuvan siitä, kuinka uudistukset on otettu vastaan.</p> <p>Tämä pro gradu -työ rakentuu empiirisen toimialakontekstin pohjalle ja käsittelee innovaatioita niiden arvon, kohteen sekä ekosysteemiarkkitehtuurin ja kilpailudynamiikan suhteen. Itse tutkimus on tehty suomalaisten kuluttajien näkökulmasta, antaen syvällisen kuvan heidän käsityksistään. Kollektiivinen kuluttajakysely rakennettiin tutkimusdatan keruuta varten. Tulokset analysoitiin perusteellisesti ottaen huomioon taustalla olevat demografiset erot tutkimusotoksen käsityksissä.</p> <p>Tulokset osoittavat, kuinka yleiset käsitykset kaikkien innovaatioiden ja inkrementaalisten innovaatioiden kasvusta ovat myönteiset, mutta tarjoavat myös käsityksen siitä, kuinka epätasaisesti erilaiset väestöryhmät näkevät ja hyötyvät toimialan uudistuksista. Kuluttajat ovat huomanneet positiiviset vaikutukset useimmissa kilpailukykykymittareissa nauttien eduista, jotka syntyvät useampien palvelutarjoajien mahdollistamana. Kuluttajattumuksia koskevat käsitykset antoivat tietoa, kuinka kuluttajat valitsevat paremman kokemuksen kyberturvallisuushan yli. Kollektiivinen kehitys sekä jatkuva uudelleenmuotoilu tunnustettiin toimialan komponenteiksi, viitaten alan yhteisevoluutionaliseen kasvuun. Kolmansien osapuolien tuotteita ja palveluita kulutetaan valtaosin tukitoimintoina pääasiallisille taloudenhoitokanavoille, antaen tärkeitä viitteitä kulutussuunnan tulevaisuudesta. Erilaisten asiakasryhmien tarpeiden monimuotoisuus herättää kysymyksen lisääntyvästä yhteistyön tarpeesta toimialalla - asia, jonka jopa kuluttajat näkivät tuovan markkinoille enemmän innovaatiota ja toivovat kasvavan tulevaisuudessa.</p> |                               |
| <b>Asiasanat</b><br>Innovaatio, finanssiala, PSD2, regulatiivinen shokki, toimialan yhteisevoluutio   |                               |
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## GLOSSARY

|         |   |
|---------|---|
| API     | Application programming interface         |
| EBA     | European Banking Authority                |
| ESA     | European Supervisory Authorities          |
| EU      | European Union                            |
| FIN-FSA | Finnish Financial Supervisory Authority   |
| Fintech | Financial Technology                      |
| GAFA    | Google, Amazon, Facebook and Apple        |
| ICT     | Information and communications technology |
| PSD     | Payment Services Directive                |
| PSD2    | Revised Payment Services Directive        |
| RTS     | Regulatory technical standards            |
| SCA     | Strong customer authentication            |

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## 1 INTRODUCTION

Industry ecosystems change due to several reasons, many of the most recent ones arising from expected or unexpected technological developments (Malerba, 2006). The financial industry has been one of the most regulated, yet high entry low competition industries existing (Hardy, 2006). Heterogeneity and competition of the financial sector are found to enhance stability and the international competitiveness of countries as a whole, which is why so many governmental entities pay close attention to the functions of the sector (Schaeck, Cihak & Wolfe, 2009). The financial crisis of 2008 was the starting point for the current reforms, as the decision-makers wanted to make the industry environment more stable. The regulatory structures to follow have had a global influence on the entire banking sector. (Arner, Barberis & Buckley, 2015).

The European financial industry is currently under a business ecosystem reconstruction as a regulatory change opened the industry to third party providers, interrupting the conventional industry and requiring a lot of technological developments. The regulatory shock, known as the Revised Payment Services Directive, is intended to bring opportunities and security into the industry, through solutions that have been disregarded earlier. (Jackson, 2018). The anticipated outlook will change the dynamics towards increased competition, better transparency and lower costs for users (Rousseau, 2019).

Even though the directive is identified as a regulatory shock, it will cause a technological shock in the industry as even meeting the compliance measures of the directive increases the amount of technological reforms significantly (Frame, Larry & White, 2018). The technological novelties, more often referred to as innovations, affect the performance of the companies in many ways, including company-level rate of entry and survival as well as industry- and company-level growth and transformation (Malerba, 2006). After compliance to a new regulation, firms must evaluate their strategic alternatives, which affect the competitive landscape of the entire industry. Two industry groups also emerge at this point, the incumbents and new market entrants. Both face their own obstacles, as the incumbents must be able to adjust their practices, whereas new market entrants must build their proficiency from the ground in order to fulfil the consumers' needs and wants. (MacGregor & Madsen, 2018). Companies that are capable of adapting to the environmental changes have empirically proven to have a better chance of survival and enhanced performance due to internal improvements, increased usage, or both (Cingöz & Akdogan, 2013). This thesis focuses on the adaptation outcomes to the changes from the perception of the consumers, giving an in-depth view on their industry opinions.

Former industry studies indicate that Finnish and international consumers are optimistic concerning the new opportunities in the sector, but do see cyber security as a risk. At the moment, the incumbents have been found to have a head-start due to security, but Fintechs and the growing number of

tech savvy consumers are not far behind. (Accenture Global Financial Services Consumer Study, 2019; Helsinki Fintech Farm, 2019). Currently, there is a market need for more personified services that require more radical innovations, though these drastic innovations are most commonly considered risky in terms of possible profitability and data breaches. Due to this, the market is experiencing more open business models and alliances, which enable product as well as service development on a wider scale. (Románova, Grima, Spiteri & Kudinska, 2018; Gozman, Liebenau & Mangan, 2018).

The current financial industry ecosystem disturbance and transformation is quite often referred to as “the Fintech Revolution” (Gomber, Kauffman, Parker & Weber, 2018) representing how big of an impact these financial technology companies have on the entire business landscape. The term Fintech is used when indicating at technological solutions in the financial industry including to name a few: conventional banking services, insurances, education, investments, cryptocurrencies and blockchain. These newer market entrants have brought hi-tech innovations, interrupted traditional processes as well as transformed the existing services. (Gomber et al., 2018). It has been presented that the industry environment is a continuously evolving ecosystem in which products, processes and managerial performance are constantly improved. This creates a rapid innovation cycle that facilitates business model evolutions and extinctions depending on their current relevance. (Gozman et al., 2018). The perception of the consumers is very relevant as they are in control when it comes to the needs and wants of the entire industry offerings, and thus affects in which direction the developments should focus on.

Scientific literature on the consumers’ perception mainly focuses on the service satisfaction and preferred service provider, leaving works on innovation creation processes scarce. It has been systematically analysed that the regulative shock brings disruptive innovations into the financial sector, but the difference of producing incremental or radical innovations has not previously been properly addressed. Also the perceived extend and value of coevolution has been overlooked so far. These gaps in the current literature make this type of an industry ecosystem research an important study topic. The coevolutionary theory is used to fill in the industry perceptions, including the views of proactive adaptation, differences and support amongst the ecosystem players and whether the consumers see the ecosystem as an enabler for service improvements.

This thesis aims to address how the consumers perceive the changes in a business ecosystem after an industry disturbance in a high-technology sector in Finland. The European Supervisory Authorities (ESA) overlooks and encourages the developments of the innovative technologies within the EU and their Finnish sub-organization FIN-FSA has included an exceptionally engaging dialogue between all the parties on top their supervisory responsibilities in the financial sector (Helsinki Fintech Farm, 2019, 26). This open and encouraging site makes Finland a specifically propitious setting for this study.

The focus will be on both innovation output and degree after the enforcement of the PSD2, including the generation process of new innovations

through alliances and coevolution of the entire sector. This view will shed a light towards the attributes and creation of innovations from an end user perception. By building on the perceptions concerning innovations and collaborations, this thesis has the potential to be used in literature concerning the financial sector in Finland as well as on strategic management of innovation creation and technological changes. It is also relevant to investigate whether the consumers perceive the industry in an agreement with the previously identified impacts by regulators and other industry experts (Románova et al., 2018) as well as address any changes in the perceptions of different kinds of subgroups of the population. In its simplicity, the research objective is to examine what types of perceptions there are and to test underlying demographic differences within the sample.

This thesis is built on analysing 99 survey results to offer the industry perceptions of Finnish consumers. The theoretical framework is constructed mainly of strategic management literature and industry shocks, combining the evolution of the financial innovations in Finland, the vital industry metrics, description of the industry disturbance as well as theories on the industry ecosystem. All these aspects are important when portraying a full picture of the functions affecting the industry. Literature on industry metrics is used in creating an overall view of the innovation and competitiveness models applied throughout the literature to follow. Literature on innovation development and industry ecosystems can be used in understanding how the entire business sector develops, including all of the factors affecting the progress. Literature on regulatory shocks discourses the reasons, goals and likely outlooks of disruptive measures in high-technology industries.

## 2 EMPIRICAL CONTEXT

### 2.1 Evolvement of the financial services in Finland

In order to understand the perceived need for an industry reform, we need to look at the development and importance of the entire financial sector. Most of the traditional banking in Finland concentrates around retail banking, in which individuals as well as small and medium sized companies utilize local branches of larger banks (Gardener, Howcroft & Williams, 1999). Banks also offer many large companies corporate banking fit for their retail and tailored needs (Vesala, 1995, 34). Service offerings include usual services such as current and savings accounts, housing mortgages, personal loans as well as debit and credit cards. The service offerings are very similar between the competitors in the conventional banking, taking deposits from customers whom have extra money and offering long and short-term loans to those whom have shortcomings. (DeYoung & Hunter, 2001).

Liberation of the banking services took place in the 1980s (Vesala, 1995, 34) after which many of the banks found themselves in a more competitive environment (Holstius & Kaynak, 1995). Segmented acquisition of customers started in the UK already in the early 1980s (Gardener et al., 1999). Finnish banks came a bit behind and started looking into customer needs by doing market research in the 1990s. The studies showed that brand visibility and recognition, efficiency, politeness, accessibility, services and innovation increased customer satisfaction amongst customers. (Holstius & Kaynak, 1995). By changing their view from the offerings to the customers, the banks clearly changed their strategies from that of supply-based view to a demand-based view and started focusing on their customer needs for the first time.

Holstius and Kaynak (1995) recognized the spectrum range of Finnish banking customers already 25 years ago and according to a very recent Accenture Global Financial Services Consumer Study (2019), the archetypes have not changed during the years. Traditionally Finnish customers are rather securitarian when it comes to their finances, especially in sparsely populated areas. Securing them as customers requires a conventional and well-established provider, referring to recognized banks in the financial sector. The other extreme is the younger metropolitan who require fast access, transaction speed, precision and proficiency. It has been pointed out already in the 1990s that banks might need to take part in mergers and alliances to satisfy this wide spectrum of customer needs - particularly since urbanization is growing the share of metropolitan customer base (Vesala, 1995, 39; Holstius & Kaynak, 1995). This signifies how the need to offer new versified value propositions has existed for decades in the financial industry.

The financial crisis forced banks to look at their extensive branches and services at the beginning of 1990s. This led to cutting costs, downsizing of the branch networks and the encouragement to use electronic money handling in-

stead of the over-the-counter service. (Snellman, 2000, 29). The biggest inter-bank alliance-based development in the 1990s was the foundation of Automatia Pankkiautomaatit Ltd. in 1994, most commonly known for establishing Otto.network. Leading banks in Finland founded the joint venture in order to unify the ATM networks nationwide and all banks were using Otto ATMs by 2004. (Snellman, 2006, 10). The unification of the ATMs was not a groundbreaking invention as the service had been operational for some years but a rather unification of part of the supply chain to cut costs. The example of the 1990s crisis is worthwhile mentioning as the financial industry faced similar structural difficulties as today.

The conventional consumption of material goods started to experience deterioration in Finland already at the beginning of the new millennium, at the same time as the consumption of virtual services experienced growth (Snellman, 2000, 27-28). Finland enjoyed one of the highest rates of online banking adoptions in the world in early 2000 (Karjaluoto, Mattila & Pento, 2002a) increasing the use of the lower cost financial channels. At the time, non-electronic users were mostly worried of losing a personified service, but intrigued by the idea of saving time, money and not being location bound when handling their finances (Karjaluoto et al., 2002a). The biggest contributor towards the use of new financial service channels was the knowledge and education received on the matter (Karjaluoto, Mattila & Pento, 2002b). Personification and knowledge of the electronic services has been a request by the customers for 20 years; an issue that I believe has been neglected due to the oligopolistic competition in the overall market. Uncertainty arising from lack of knowledge of the new technology seems to add to the customers' feeling of discomfort and thus to the likelihood of using the channel.

The generality and spread of the Internet have had a massive impact on the online banking figures since the 2000s. In the age group of 25-54 year-olds 95% of Finns pay their bills online in web bank, mobile bank or e-bill. In the older segment of 75-79 year-olds the percentage is at 70. The majority of the payments are done while using a computer but the use of mobile phones has doubled between the years 2017 and 2019, from 12% to 24%. (Finanssiala, 2019, 6). The development of the ICT, along with the regulatory reforms following the 2008 financial crisis, led to the explosive growth and recognition of financial technologies in the industry (Arner et al., 2015; Tsai & Peng, 2017).

## 2.2 Emerging financial technology companies

The term financial technology, more commonly known as Fintech, is used to describe financial service solutions that are innovative and combine technology and finance. A Fintech company is a non-banking company that offers financial services. (Arner et al. 2015; Schueffel, 2016). As the definition of Fintech is so broad, some state that the first one emerged in 1866 when the transatlantic cable was laid (Arner et al., 2015; Teigland, Siri, Larsson, Puertas

& Bogusz, 2018, 169). Since technology and innovation are the key components of Fintechs, many start the countdown of the industry from the 1950s or 1960s when the first credit cards and ATMs were built (Desai, 2015; Beeson, 2018), though the term itself was mentioned as late as in 1972 (Schueffel, 2016). As a millennial, I see that the transatlantic cable was somewhat that of financial technology but a bit far-fetched, as the technologies did exist prior to the construction of the line.

| Years                    | 1866-1967                       | 1967-2008          | 2008 - Present                    |                       |
|--------------------------|---------------------------------|--------------------|-----------------------------------|-----------------------|
| Period                   | Fintech 1.0                     | Fintech 2.0        | Fintech 3.0                       | Fintech 3.5           |
| Geographical location    | Global / Developed              | Global / Developed | Developed                         | Third World Countries |
| Key factors              | Infrastructure, computerization | Services, Internet | Mobility, Start-ups, new entrants |                       |
| Origin of transformation | Connections                     | Digitalization     | Financial crisis, smartphones     | Last mover advantage  |

TABLE 1. Different Fintech time periods (adapted from Arner et al., 2015).

Table 1 introduces the different Fintech eras, as presented by Arner et al. (2015). The periods, their geographical locations, key causes and origins are easily compared next to one another. The first era took place in mainly first world countries to improve connections by developing infrastructure and getting computers to do part of the work themselves. The second era sprinted from the introduction of the first ATM, again mainly experienced in the developed countries. The origin of the transformation was caused by increasing digitalization that shifted the focus from supply and product towards those of demand and experience. The present era spur off from the offset of the financial crisis in 2008. The period can be seen in two separate parts, as the changes have mostly taken place in the developed countries, and moving rapidly towards serving the third world countries as we speak. What I find interesting is that the periods are all prominently important but that Fintechs rose into attraction of the masses only after 2008, when Fintechs started to be more visible to the consumers through their mobile phones.

Most of the solutions in the current Fintech 3.0 and 3.5 periods are finance based thus competing directly with banks, i.e. they deal with payments, lending, international money transfers, personal finance, insurance, equity financing etc. Millennials and urban citizens have less reservation against these newer market entrants, where as older generations as well as rural citizens tend to be more reserved with technology, especially from a non-banking institution. (Accenture Global Financial Services Consumer Study, 2019; Svensson, Udesen & Webb, 2019). A recent study in Sweden states that Swedish Fintechs see speed and the ability to adapt as their biggest competitive edges. When it comes to the legitimacy of the company, at least some of the Fintechs see that acquiring well-known members of board and/or executive team would be the best option to increase their perceived credibility (Svensson et al.,

2019). According to many researchers, the best legitimacy option would be a strategic alliance with a market incumbent (Baum & Oliver, 1991; Stuart, Hoang & Hybels, 1999; Svensson et al., 2019). I follow the market research done on the matter and see that strategic alliances would be good for this time and day, in order to gain legitimacy, networks and databases. The ecosystem is going to change rapidly in the coming years as the technology savvy generation z is aging and emerging as new liberal minded customers.

Impacts of the digital transformation of the entire financial industry have had a massive influence on the traditional banking and banks are adapting to the changes in the best of their abilities (Nicholls, 2019). This has been seen as cuts on personnel, closing branch offices and restructure of corporate models. The rate of reduction of the branch offices has been swifter than the reduction of personnel; between the years 2017 and 2018 there were 300 employees and 116 offices less in the banking sector. At the moment, the biggest banks in Finland are OP Financial Group (37%), Nordea (26%) and Danske Bank (14,3%) in terms of market share. After the three major banks are accounted for, the market shares are scattered and any other smaller bank holds a maximum of 5% of the market. (Finance Finland, 2018). Although the banks are downscaling their personnel and service reach, the market shares show well how concentrated banking is in Finland, the older trusted incumbents rule leaving many smaller providers far behind.

The financial crisis and regulatory reforms to follow stimulated Fintechs' service offering opportunities and as a result, Fintechs are the quickest growing start-up branch in the Nordic countries. Banks are also investing in digital channel innovations and Fintech companies in order to keep up. The most investment driven services at the moment are payments and personal financing, which is becoming an increasingly growing area of interest for customers. (Deloitte, 2019, 18-20). On top of this, some traditional banks are shifting towards open banking, in which third party developers have wide access to their programming interfaces and can more freely build applications and new services around the conventional institutions (Nicholls, 2019). Even though banking is still very concentrated in Finland, the urge to innovate independently and in conjunction indicates how even the biggest of incumbents acknowledge the need for substantial service reforms.

Even with the positive outlooks, there are many whom see the industry changes in a skeptical manner. Some argue that the start-up like Fintechs are not capable of challenging the bigger institutions and that the real threats to banks are the competitor banks that might maliciously acquire customers with introductions of new appealing solutions (Jackson, 2018).

### 2.3 Future direction of financial services

Sustainability has become a worldwide topical issue, receiving a lot of attention in the EU. There are initiatives to encourage sustainable development safeguarding that the healthy economic growth does not endanger, but rather positively supports, the natural ecologies, cultural variety as well as social security. (European Commission, Green Finance, n.d). The trend is also seen in the financing issues in Finland. All stakeholders from investors to end users are becoming more conscious of sustainable finance, in which the service takes also into account environmental, social or governance factors. (Helsinki Fintech Farm, 2019, 27). I think that the consciousness level of the global warming is making consumers to reflect their consumption habits in every area of their lives and by doing so, forcing all companies to start taking responsibility of their impacts around the globe. It is very important that the EU and the central banks support and enforce the greener development by offering information, incentives and by the use of regulations.

The geographical advancement is taking the rapid development of the financial services towards developing markets as shown in Table 1 (Arner et al., 2015; Guild, 2017). This development is very important in terms of financial inclusion, as the Fintechs are able to offer financial solutions to hundreds of millions of people outside of the banking institutions. Most of the segments are looking for simple SMS modules and mobile apps, and reside in the rural areas. (Guild, 2017). Finnish Fintechs do not see such a high potential in the developing markets for them, as the majority are focusing on domestic, Nordic and the EU markets during the next 12 and 36-month periods. (Helsinki Fintech Farm, 2019, 10). This might be due to the geographical and demographical distance between Finland and third world countries or because the products are seen as too complex to fit the market needs.

Cryptocurrencies and their spinoff, the blockchain technology, are remaining as trends in the industry. A cryptocurrency is an asset in a digital form and this functionality explains its popularity by large; the currency is beyond restriction and confiscation because it is independent from any central bank. The currency uses heavy-duty cryptography to make secure financial transactions and the best-known example of this is called the Bitcoin. The first blockchain is considered to be the list of records of Bitcoin, and the future possibilities of its use are endless as the technology can be applied in multiple supply chain functions. A blockchain is therefore a growing list of ledgers that are linked together by cryptography, containing information of the previous block, a timestamp, and transaction data. Therefore blockchain is argued to be impossible to falsify. (Lee & Deng, 2018, 16-18; Swan, 2015, 1-7). Cryptocurrency and blockchain forerunners think that conventional banks do not take the opportunity of digital funds as seriously as they should, and are currently waiting to see what lies ahead. The modern institutions of Central Bank of Sweden and the Bank of England have looked into the opportunity of issuing cryptocurrency, hinting at the possibility of at least some banks introducing

their own digital mediums of exchange within the next couple of years. (Teigland et al., 2018, 200-203). For a consumer such as myself, I do not necessarily see a need for a digital currency but I do see a need for the blockchain technology. I would be good to be able to trace back the origin of my purchases especially since there have been so many greenwashing scandals recently. The technology would give customers a better control of what kind of products they spend their money on.

The financial ecosystem is predicted to become even more competitive if and when non-financial multinational corporations fully enter the industry. These companies include at least Google, Amazon, Facebook and Apple, or more commonly referred to as the GAFA companies (Svensson et al., 2019; Gormley, 2019). All of these companies are bigger than some nations in terms of revenue, which shows how big of an impact they already have in the world (Rodionova, 2016; Babic, Heemskerk & Fichtner, 2018; Belinchón & Moynihan, 2018). There are a couple of worrying factors to consider here. Firstly, as the companies are run for profit, their success has been linked to sustainability issues such as inequality as well as global warming (Rodionova, 2016). And secondly, these multinational corporations have a big user base and they are not easily controlled, like the smaller start-up Fintechs (Gormley, 2019; Barry, 2019). When comparing the influence of for example Apple and its 1.3 billion users to that of the Industrial and Commercial Bank of China and its 567 million customer (Gormley, 2019), we can see that the true impact volume of all of these corporations is going to be huge when penetrating the financial industry. According to one article, roughly 72% of millennials see mobile apps as the preferred way to handle their finances, but only one third of them were truly happy with the experiences (Roy, 2019). Unless these experience expectations are fulfilled, the financial sector is most likely to face tough times and an even larger industry disruption in the future.

## 3 THEORETICAL FRAMEWORK

### 3.1 Important industry metrics

#### 3.1.1 Innovation after a regulatory shock

The definition of “innovation” is very broad and there is no singular consensus of its meaning. What has been agreed upon is that innovation refers to the introduction of something new, whether being an idea, a product, a service, a process or an experience. The introduced innovation can be completely unprecedented or better an existing solution by meeting new requirements, market needs and/or adding customer value. (Bantel & Jackson, 1989; Shan, Walker & Kogut, 1994; Li & Atuahene-Gima, 2001; Casadesus-Masanell & Zhu, 2013). At their best, innovations enable a better allocation of resources that lead to an increased level of capital productivity and economic growth, though the effects of innovations are still somewhat disputed (Talay, Calantone & Voorhees, 2014). But in today’s fast changing world, many have empirically proven the link between innovation and firm survival, competitive advantage as well as performance (Shan et al., 1994; Rohrbeck, Hölzle & Gemünden, 2009).

Due to rapid technological improvements and automation, regulations and the companies’ ability to change are necessary, not only in protecting the economy and customer rights, but also for new innovative solutions to emerge (Garcia-Murillo, 2011; Jacobides, 2019). Cortet, Rijks and Nijland (2016) argued that technological industry incumbents have four ways to adhere to regulatory changes that require new innovations: comply, compete, expand or transform. By complying the incumbent only adheres to the bare minimum set by the regulation, by competing the incumbent would offer products similar to that of the new market entrants, by expanding offering products and services beyond the requirements of the regulation and by transforming reshaping their business model and enabling other third-parties to build on their digital platforms to capture the most of customer value. Xue, Hitt and Chen (2011) found that customer adaptation to new services, such as Internet banking, means they are less likely to leave their existing service provider. If reflecting this to the financial services industry at the moment, banks should expand or transform their service offerings beyond the regulatory measures in order to remain as the preferred financial institution. This could be reached by alliances or opening the industry for third party providers more than is required in order to provide top of the edge customer experiences.

The innovations introduced in the market after a regulatory change can provide to be dud solutions due to compliance burden or groundbreaking solutions due to compliance innovation (Stewart, 2011). The groundbreaking solutions can be further divided into two sub-categories, incremental innovations and radical innovations, according to the level of impact they project into

the industry. Incremental innovations indicate gradual development and smaller changes, whereas radical innovations change the solutions altogether. (Stewart, 2011; Talay et al., 2014). Under unstable and risky market conditions, companies are not likely to introduce risky innovations into the market but tend to focus on the safer incremental ones (Garcia-Murillo, 2011). At the moment, cyber security threats are seen as the biggest bottleneck to innovation in the financial industry (Meager, 2017). Some argue that regulations in IT focused economies are linked to demand for information security, which in turn is connected with innovation, proving an indirect connection with regulatory compliance and innovation (Khansa & Liginlal, 2007). Whether being direct or indirect, all of the studies did find a connection between regulations and innovations showing that even doing the bare minimum to comply, a company must produce something new i.e. innovate.

### 3.1.2 Competitiveness in the financial sector

Competitiveness is commonly defined as an indicator of productivity, an efficiency measure for market share use (Martin & Stiefelmeyer, 2001) or a measure of how firms or nations are performing compared to others (Waheeduzzaman & Ryans, 1996). The competitive abilities of the financial sector are deemed extremely important as they have a big impact on the entire nation. This is because the financial sector delivers many services that are essential for other sectors in the economy, including facilitation of payments, investments and loans. (Románova et al, 2018). Thus it is no surprise that regulations have always had an effect on the financial industry, becoming even more influential after the global financial crisis. The crisis gave birth to more intensified regulation set by the authorities in order to make the market stable and secure. (Schaeck et al., 2009; Grosse, 2012).

The micro (firm-level) and macro (nation-level) layout makes competitiveness an important measure in finance and show the widespread effects of the financial industry (Waheeduzzaman & Ryans, 1996; Fonseka, Tian & Li, 2014). In the more traditional micro-level terms, the influences affecting competitiveness are considered to be customer service, pricing, accessibility, product range as well as additional services provided. In more recent years, technological developments, management quality, creativity and innovative marketing solutions are becoming more and more influential in terms of competitiveness. (Kasasbeh, Harada & Noor, 2017).

The payment services directive 2 is interesting in its way because unlike many other financial regulations, it opens up the industry rather than restricts it. When the market is opened to more providers, it increases the competitiveness of the entire marketplace and thus makes customers' position better in terms of innovative solution development, functionality and pricing (Románova et al, 2018). Even without any new market entrants, the adjustment period following a regulatory shock always creates stronger competition due to compulsory strategic tuning (Winston, 1998). Financial competitiveness has other national and international benefits as well, as Schaeck et al. (2009)

investigated the banking crises and their findings show that competition amongst the financial companies promotes stability and possibly functions as one major barrier in preventing further financial crises. Competitiveness in the financial sector not only benefits the customers, but also nations and their economical unions as a whole, which is why the measure is so important.

## **3.2 Industry disturbance – Payment Services Directive 2**

### **3.2.1 Purpose and background**

The first Payment Services Directive (PSD) was set in 2007 (Directive 2007/64/EC) by the European Commission. It was seen that even though the majority of the European Union shared a common currency, the union did not have a fully unified payment methods. Thus the purposefulness of the directive was to unitize the payment service industry within the European Union and the European Economic Area, enhance competition, better involve non-banking companies and to standardize the protections, rights and obligations of the entire industry. The directive took into account all electric payments including credit transfers, direct withdrawals, card, mobile and online payments. (Mavromati, 2008, 11-15). As the technologies developed, the first PSD was found to leave the users a bit unprotected and allowed heterogeneity to form in the merchant charging options. Thus in order to fill the gaps and encourage new technologies to emerge in the industry, the European Parliament accepted the revised directive PSD2 (Directive 2015/2366/EU) in 2015. (Możdżyński, 2017, 50-51).

The purpose of the PSD2 is to improve consumer rights and to promote competition in the payment service sector, thereby increasing the range of services offered to customers. The European Banking Authority (EBA) drew a 12-point instruction on measures such as payment security, authorization, passporting and supervision based on the aims of the directive; this set of instructions is referred to as the Regulatory Technical Standards and Guidelines. (European Banking Authority, 2017). Achieving this would bring more innovations in the payment service industry and also improve the market efficiency. The aim of the PSD2 is to create a single market for payment services by equalizing the industry for banks and new payment service providers entering the market. (Románova et al, 2018). The directive will enable consumers to use electric providers other than their own bank to manage their accounts and make payments as securely as possible. In practice this means that payment account holders, majority of which are banks, have to open their payment and customer interfaces to third party providers. These interfaces are more commonly referred to as application programming interfaces or, in short, APIs. Alongside this, the directive requires payments to be backed by strong customer identification in almost all electronic payments. (Nicholls, 2019).

In a nutshell, the directive will break the oligopolistic position banks have been holding in the industry by allowing other companies to access the customer account data – with permission and authentication. Adaptation to these new standards will require new inventions from the entire industry, changing the entire setting of financial services while allowing increased competition as well as increasing risks in the traditional banking sector. (Románova et al, 2018). The changes brought by the PSD2 will bring technical struggles and strategic opportunities, including collaborations and mergers with Fintech companies (European Banking Authority, 2017).

### 3.2.2 Consumer protection and security

The PSD2 includes various sections concerning consumer protection and security. Firstly, a common and secure communication rule was set to protect interaction between the different electronic financial service providers. Overall this gives payment service providers clear rules on the requirements, rights, obligations and accountability of providing financial payment services under the PSD2. The responsibilities should, in practice, be fully secure and protect the consumer data but there is a concern that the directive might grow probabilities of data breaches, which are quite heavily penalized under the EU. (Jackson, 2018). Románova et al. (2018) have also raised the question on the grey areas of responsibilities concerning data breaches and security reputation of corporations under the PSD2. It seems that in case a data breach were to happen, it would be rather difficult to point out which party – the bank or the third party provider – is to blame causing an expensive reputational fracture to the brand of both parties.

A more visible rule for the consumers lies in user safety measures. Strong authentication is required as a measure of user protection when making online purchases. This can be noticed from the increased amount of required user identification requests when shopping online. Another directly consumer based element of the directive allows third parties to offer a credit card like arrangement in which the payments come off an already existing current account or bank service provider. Though the credit card arrangement is neither yet fully developed nor operational. (Jackson, 2018).

The PSD2 also takes into account international payments by requiring transparent pricing methods to the charges. Prior to the directive, payment providers were able to hide the costs of transactions into, for example, poor exchange rate offerings that were far from the market average or left the offered exchange rate out of the mentioned costs altogether. Consumers will now enjoy a better understanding of the actual total costs and charges of international money transfer. (Románova et al, 2018). Rousseau (2019) summarized the consumers' perspective on PSD2 well; the directive will give users a full and more secure autonomy of their financial affairs, with a cheaper pricing.

### 3.2.3 Timeline

The Council of the European Union passed the PSD2 in November 2015. The EU gave their member states two years to integrate the directive into their nationwide laws and regulations as the PSD2 had to be nationally effective in January 2018. There was, however, an addition to the directive in November 2017, when the demand for strong authentication was added to the existing commandment. Due to the addition, the Regulatory Technical Standards (RTS) were set to be implemented within 18 months of the PSD2, making the full weight of the directive effectual as late as 2019. (European Banking Authority, 2017). As there were several stages along the way, the matter has remained topical for years and the full effects of the directive are just beginning to show.

Leading Fintech and bank industry online presses started questioning the timeframe of the PSD2 already prior to the final deadline of the full implementation reaching a rather anonymous result of a needed extension period. In addition, roughly 20 of the 28 EU countries had already recognized or proclaimed that the market was not ready for the full implementation of the PSD2 in September 2019 (Nandikotkur, 2019a). The overall industry fear evolves around the security of the strong customer authentication (SCA) if the development is rushed prematurely - especially in terms of card payments (Nandikotkur, 2019a; Ohlhausen, 2019). Major parts of the delay are due the vague instructions of the RTS leaving room for a variety of interpretations as well as delays in the sharing of APIs, but every party is still supporting the aims of the PSD2 as the regulation offers a base for future innovations, development as well as fruitful co-operations (Ohlhausen, 2019).

The European Banking Authority (EBA) has been overlooking the PSD2 preparedness of Fintechs, banks and third parties and gave an extension for the SCA requirements of e-commerce card-based payment transactions until the end of year 2020 in October 2019 (Congiu, 2019). The extension of the SCA was a huge relief for many as the industry is expected to smoothly migrate and grow into the expected value proposition without forgetting safety and security of the transactions (Nandikotkur, 2019b).



FIGURE 1. Timeline of the PSD2 (Adopted from European Banking Authority, 2017; Congiu, 2019).

### 3.2.4 Overall assessment of the impacts

The changes brought by the directive are having tremendous effects on the payment services industry, changing the industry landscape and architecture permanently. PSD2 has been cited of being the most disruptive reform that has hit the financial industry in decades (Deloitte, 2019, 39). The desired outlook will enrich the industry innovations, competition and collaboration, although the feared cost of these are increased levels of data breach risks. When thinking of the Fintechs, the PSD2 gives them possibilities to compete in the overall financial industry, not limiting their offerings to that of solely online payments. Most of the incumbents, or banks, in the industry want to diversify their offerings in a way that enables their customers better, faster and more personified financial services. (Jackson, 2018). Given that companies simply comply with the regulation, there will be at least an increase in the level of incremental innovations.

Industry disturbances are likely to affect the performance of most, if not all, companies in the environment. Performance is most commonly used to describe how well a company is functioning in terms of results and operation. The most important performance and firm survival metrics are product development and innovation, which have positive effects (Brown & Eisenhardt, 1997; Rothaermel, 2001) and network effect, for which the effects have been somewhat divergent (Koka & Prescott, 2008; van Fenema, 2018). Product development and innovation usually lower the operational costs, improve the product and/or service quality or increase sales, which all have positive effects on the overall performance and customer satisfaction (Rothaermel, 2001).

The transition of the industry is putting the biggest toll on the conventional banking sector in terms of lost margins, higher IT investments and the evolution of customers' preferred way of handling their finances. The digitalization of more and more services combined with open banking is estimated to create a loss of 24% in banking business between the years 2017 and 2022. (Románova et al, 2018). Although given this, Accenture Global Financial Services Consumer Study (2019) found that all consumer classes: pioneers, pragmatists, skeptics as well as traditionalists are strongly inclined to trust a bank rather than a Fintech in handling their financial matters. This proves that the consumer trust in banks is very high, but at the same time, the consumers place a very heavy importance on the personalization and access of their financial services. This shows how the consumers are demanding a trusted substantial financial institute with fast innovative solutions, an environment only to be created when combining the competences of the traditional banks and agile Fintechs. Partnerships have been linked to providing legitimacy and status (Baum & Oliver, 1991; Stuart et al., 1999) thus having an effect on the perceived capabilities and reliability of the other company.

The outlook on financial services as experiences is driving the industry into a cooperative competition and banks are joining forces with Fintech companies in order to utilize the full potential of the open banking service offerings. Banks are seen as secure and trustworthy whereas they need outside

help to deliver a better up-to-date service. Having said so, collaborations between banks and Fintechs bring the most out of the PSD2, creating a jointly beneficial ecosystem due to the possibilities of more cost-effective and scalable services. This is also seen in the mindsets of the dominant banks and Fintechs in Finland, as a recent study found out that the prevailing thought is to build a coexisting, co-beneficiary and coevolutionary environment where new innovations would benefit the entire industry. (Helsinki Fintech Farm, 2019, 12-24). This would also enable banks to expand their offerings beyond the requirements of the PSD2 and thus capture new revenue streams or transform their business models and function as digital platforms enabling Fintechs to build their applications fit for the banks' offerings to grow customer value and relevance (Cortet et al., 2016).

New innovations have been empirically proven to grow a company's performance and survival, specifically in high-technology industries (Brown & Eisenhardt, 1997; Rothaermel, 2001). As banks have also established networks, trust of the customers (Dhar & Stein, 2017; Accenture Global Financial Services Consumer Study, 2019), access to decades of customer data (Brodsky & Oakes, 2017) and market experience (Zalan & Toufaily, 2017), there is a high strategic incentive for companies to look beyond the regulatory compliance to reach the best outcomes.

### **3.3 Industry architecture and competitive dynamics**

#### **3.3.1 Alliance-based competitive dynamics**

By definition, competitive dynamics is a term used to describe a set of company actions and responses in an environment where two or more companies compete with one another. The dynamics vary across industries and the strategies are always a reflection of competitive measures. The aim of companies is to gain a competitive advantage, meaning a position that is more favorable or better than that of the competitors'. (Silverman & Baum, 2002; Iyer, 2002; Jacobides & Billinger, 2006). In alliance-based competitive dynamics, companies seek out competitive advantage by forming strategic alliances in order to draw interorganizational resources (Silverman & Baum, 2002; Iyer, 2002).

Alliance-based competitive dynamics has been studied already from the late 80s when collaborations between companies were done to gain efficient and timely access to scarce resources (Kogut, 1988; Williamson, 1991). Previously companies were more inclined to make or buy resources, but nowadays more commonly take part in alliances for acquiring a resource depending on the efficiency and profitability of the transactions. As an example, a partially open and elastic supply chain enables a more efficient depletion of resources, better capability-market fit and a better reference base for future efficiency improvements. These improvements arise from captivating more of the entire value chain of the industry. (Jacobides & Billinger, 2006). Later it has

been argued that no company can be its own entity any longer and that all companies need collaboration or alliances in order to fulfill all customer needs (Jacobides, 2019).

There still remain several views concerning the effects an alliance has on the competitive landscape. One logical argument states that the amount of potential alliance partners is limited, thus forming an alliance diminishes the same possibility from rivaling companies reducing their access to desired assets (Gomes-Casseres, 1994). Controversially some argue that the alliances inside and outside the industry grow the resources for all industry stakeholders, though the effects are more beneficial for the alliance-forming firm than its competitors (Baum and Oliver, 1992). In terms of the consumers, knowledge of any type of an alliance is left in the dark without good cross-marketing as well as out external communication.

Baum et al. (2000) found a connection between the types of alliances and their functionality, defining three different types of affiliations formed in technology-based companies: downstream, upstream and horizontal. Silverman and Baum (2002) later continued researching the likelihood of increased or decreased competitive intensity arising from alliances in technology-based industries. The outcome was that different types of partners in the alliances dictate the competitive intensity properties and the alliance type matters significantly. The consumer benefits also depend highly on the type of an alliance in question. The three types of alliances are presented in table 2.

|                   | Alliance description   | Firm-level effects  | Industry-level effects   |
|-------------------|--|---|--|
| <b>Downstream</b> | <ul style="list-style-type: none"> <li>Links a technology company with a company of complementary assets</li> <li>Usually formed for marketing or supply chain purposes</li> </ul> | <ul style="list-style-type: none"> <li>Likely to increase viability and competitiveness</li> <li>Directly and indirectly increase resources available for all participants – including competitors</li> <li>Attracts attention and capital if the alliance is between a young tech company and a well established downstream company</li> </ul> | <ul style="list-style-type: none"> <li>Commonly does not exclude competitors from forming same, or similar alliances</li> <li>One such an alliance usually has the competitors following suit</li> </ul> |

|                   |   |   |  |
|-------------------|---|---|--|
| <b>Upstream</b>   | <ul style="list-style-type: none"> <li>• Links a technology company with research knowledge</li> <li>• Usually formed to produce new innovations</li> </ul> | <ul style="list-style-type: none"> <li>• Access for latest technology expertise and research</li> <li>• Usually forecloses others from exploring the same alliance and/or innovation</li> </ul> | <ul style="list-style-type: none"> <li>• Increases the scientific inputs in the entire industry</li> </ul>   |
| <b>Horizontal</b> | <ul style="list-style-type: none"> <li>• Links a technology company with another company in the same industry</li> </ul>                                    |   | <ul style="list-style-type: none"> <li>• Difficult to manage</li> <li>• Might spark learning races</li> <li>• No beneficial effect on the resource base</li> </ul> |

TABLE 2. Different types of alliances in technology-based industries (Silverman & Baum, 2002)

Horizontal and governmental upstream alliances did not lower the companies' exit rates, indicating that the alliances were not nearly as fruitful as downstream alliances and upstream alliances with privately owned entities (Silverman & Baum, 2006). Other empirical findings also support the theory, as according to them the horizontal alliances with industry incumbents tend to weaken the performance of an entering company depending on largely on the partner in question (Baum et al., 2000). The only support for fruitful horizontal alliances has been that the similarity of the companies increases the interorganizational learning (Lane & Lubatkin, 1998; van Fenema, 2018), thus it could be said that a horizontal alliance has a positive effect on sharing of know-how between the parties.

Timing of the network connections is highlighted in many empirical studies, as incumbents and startup companies thrive on different kind of networks (Rothaermel, 2001; Lee, Lee & Pennings, 2001; Laursen & Salter, 2006). Incumbents are found to perform better when utilizing complementary assets, such as formation of alliances, than by investigating the new technology in times of radical adjustments (Rothaermel, 2001). The network ties to financial institutions and venture capital companies have a significant effect on the performance of the startups especially in the early years (Shan et al., 1994; Lee et al., 2001). These findings support the theory that downstream alliances are fruitful as the results revolved around complementary assets and companies. Downstream alliances are also to increase the competitiveness, benefitting the consumers in various terms.

In both, incumbents and startups, the degree to which companies were willing to open their development channels to outside resources, had a direct effect on the yield of performance. This kind of open innovation is found to boost the creational processes of the companies. (Laursen & Salter, 2006). This pools the information and knowledge from possibly all three of the alliance types. The innovations, or newer solutions, are also mainly visible to the con-

sumers. Alliances should thus boost the innovation of the companies, and have an effect on the customer value and satisfaction.

If there is a radical change within an industry, the alliance networks have been found to negatively impact firm performance. The negative performance effects arise from lack of momentum, knowledge and management of the unknown. (Koka and Prescott, 2008). Other findings indicate that the formation of alliances between dissimilar companies lowers the performance of the companies in question, and homogeneous alliances enhance the performance. These are due to the difficulty of knowledge management of the networks, leading to failures in dissimilar alliances as well as under crisis or severe stress – summing industry timing and management as significant contributors in the unsuccessful networks. (Goerzen & Beamish, 2005; Koka & Prescott, 2008).

As can be seen, there is no question about alliances having an effect, but the causes of the outcomes are still disputed. Some argue that the formation of alliances does not directly increase performance but acts as an enabler for doing so. Therefore that an alliance creates a competitive advantage, which in turn lead to indirect opportunities and the possible increased performance. (Ramdani, Primiana, Kaltum & Azis, 2018). Another study shows how access to more capabilities through upstream and downstream alliances usually increases initial performance. As the increased performance was not a guarantee but a generalization, the use of the newly accessed resources matters at least to some degree. (Baum et al., 2000).

When thinking of high-technology industries, collaborations have also been studied in terms of group dynamics. It has been found that collaborations are most commonly dysfunctional due to expectations and overlapping roles leading to fewer innovations. Groups that were able to cycle their combined competences dynamically avoided such dysfunctionalities. This kind of group dynamics demanded good managerial skills, communication and trust between the parties. (Davis, 2016). Another way to avoid such difficulties is to better the interorganizational management (Van Fenema, 2018) and to make sure the management team is educated as well as diverse (Bantel & Jackson, 1989). Alliances do take place even when these fundamental properties are not in place as the incumbents struggle the most when needing to adapt to new fundamental changes. Studies also clearly support the alliance formation as an incumbent's alliance with a new entrant has been found to lead to innovation and also better performance. (Rothaermel, 2001). Thus when the alliances work, consumers should be seeing more innovations in the entire sector.

All in all, the network effects brought by the alliances are quite difficult to assess in terms of performance and have thus become more and more topical in today's research. According to the network theory, a company performs better and becomes more valuable as its customer or alliance network grows (Goerzen & Beamish, 2005; Koka & Prescott, 2008). There is a belief that alliance networks create a "locus of innovation" in high-technology industries because no firm is able to produce all the necessary capabilities internally in times of swift technological development (Powell, Koput & Smith-Doerr, 1996).

The term network is most commonly used in order to describe the interfirm relationships, joined together forming connections with one another. In the approach, the value of the alliance or alliances is the sum of the networks they belong to. Thus by making one prosperous alliance, one can gain a bundle of valuable networks in order to create new innovations. (Gulati, 1998; Dhanasai & Parkhe, 2006; Goerzen, 2007).

A recent a study conducted in the EU by a legal firm Simmons & Simmons revealed that 71% of financial institutions see cyber security as a major issue if thinking of collaborating with Fintechs and 31% believe to acquire a Fintech in the next 18 months – rather than cooperate with one. Strategic partnership agreements do take place despite the threats as ideas and new technologies are seen as leverage in the industry. (Meager, 2017). Alliances should increase the amount of radical innovations but if the threats are seen too high, the focus will remain on the safer incremental innovations (Garcia-Murillo, 2011). Alliances between Fintechs and banks should therefore increase the number of radical innovations in the payment services industry if cyber security is not seen as an issue.

Without change, the alliances would degenerate and loose their purpose. Rothaermel and Deeds (2004) claim that alliances evolve with time, as they begin as explorational looking for new knowledge then proceed to exploitative alliances that lead to new products or services in the market. As the integrated venture grows, it is more inclined to leave this type of a product development and partake in upstream integrations. Numerous other research supports this as alliances are described as ever-changing evolutionary processes, in which the participants grow, learn, shape and coevolve together (Hamel, 1991; Powell et al., 1996; Iyer, 2002).

### 3.3.2 Coevolutionary ecosystems

Moore (1993) was the first one to introduce the terminology “business ecosystem”, further studied by for example Gossain and Kandiah (1998) as well as Iansiti and Levien (2004). The underlying ecosystems have since been studied in various context including transportation (Talay et al, 2014), ICT (Liu & Rong, 2015) and music industries (Vincenzo, 2018). The focus has mostly laid in organizational ecology taking into account the adaption processes and competitive dynamics of the ecosystem in question, making “business ecosystems” a more recognized term in both management and organizational literatures (Talay et al., 2014).

The core of the ecosystem is that innovative and successful companies must be able to change quickly and efficiently, combining resources and competences from various networks. The concept of business ecosystem takes into account the entire environment network not only including the companies, but also their various stakeholders, value creation, know-how involved in the supply of a product or a service while competing and cooperating at the same time. (Gossain & Kandiah, 1998; Iansiti & Levien, 2004; Jacobides, 2019). Figure 3 presents the different evolutionary stages of business ecosystems introduced by

Moore (1993), later modernized to fit the high-technology industries by Harraf, Soltwisch, and Salazar (2018):

|                     | <b>Co-operative Challenge</b>  | <b>Competitive Challenge</b>  |
|---------------------|--|---|
| <b>Birth</b>        | <ul style="list-style-type: none"> <li>Engage other ecosystem affiliates</li> <li>Define new value proposition around a seed innovation</li> </ul> | <ul style="list-style-type: none"> <li>Protect intellectual property from competitors who might be working toward similar solutions</li> </ul>  |
| <b>Expansion</b>    | <ul style="list-style-type: none"> <li>Maintain the ecosystem affiliates to achieve maximum market coverage.</li> </ul>                            | <ul style="list-style-type: none"> <li>To defeat alternative solutions from competing ecosystems</li> <li>Making your solution as the market standard</li> </ul>                                  |
| <b>Leadership</b>   | <ul style="list-style-type: none"> <li>Keep the compelling vision and to continue improving the complete offer.</li> </ul>                         | <ul style="list-style-type: none"> <li>Retain strong bargaining power in relation to other players in the ecosystem</li> <li>Retain overall innovation and relevance towards customers</li> </ul> |
| <b>Self-Renewal</b> | <ul style="list-style-type: none"> <li>Renew offerings with innovative solutions and bring new solutions to the ecosystem</li> </ul>               | <ul style="list-style-type: none"> <li>Establish barriers to entry</li> <li>Survive in the competitive landscape</li> <li>Anticipate future threats</li> </ul>                                    |

TABLE 3. Stages of business ecosystems (adapted from Moore, 1993; Harraf et al., 2018)

Jacobides (2019) argues that no firm can be considered as an individual strategy creator any longer, but needs to be evaluated as one entity in an ecosystem and that the success of the firm rests on the collaboration network it has built. There are three structural changes behind this approach: regulatory changes, demand for experiences – rather than simple products or services, and rapidly improving technologies. These factors have changed the competitive landscapes towards that of ecosystems, as the value proposition of the ecosystems is more important than the individual firm offerings. The transformation has also highlighted the importance of policies and regulations as integrators might get too much market power in various ecosystems. (Jacobides, 2019). This was one of the aims of the PSD2 as well, as the EU wanted to keep the industry balanced and healthy (European Banking Authority, 2017).

Peltoniemi and Vuori (2008) summed the description of the business ecosystem progress as a joint effort of self-organization, emergence, coevolution and adaptation. In the self-organization phase, the companies start working together without a set leader and goals arising from interactions. There might be a governmental, or other, incentive but the companies are free to shape their formation as they see fit. Emergence refers to the fact that the ecosystem will produce new resources, innovations or structures due to the fact that the interactions within an ecosystem are greater the production of the companies individually. Coevolution is simply defined as the evolutionary development of one company affecting the evolution of another or others. Finally, the ecosystem adapts to its external environment outside of the ecosystem's influence including regulations, tariffs, taxes, laws and so forth. As the formation of a business ecosystem is the sum of these elements, every ecosys-

tem forms out to be uniquely complex. Peltoniemi and Vuori enlightened the business ecosystem process and continued the ideas constructed previously.

When thinking of the payment services industry, it is fruitful to mention that Iansiti and Levien (2004) as well as Moore (1993) brought also into attention that there might be a keystone leader or leaders within the ecosystem moving the entire community towards mutual benefits and vision. In a reflection with Peltoniemi and Vuori's (2008) portray, the industry should be in its adaptation phase, as the new directive has been out in the open for a while. The industry ecosystem might also include a keystone leader or leaders due deeply rooted banking industry as well as acquisitions made by the bigger players.

There are several theories on the properties and processes of a co-evolutional ecosystem. In a more in-depth business contexts, coevolution refers to the evolution of two or more interdependent companies that have an effect on each other. Most commonly the term is used in a context of innovative fast-changing industries, where new technologies are introduced rather quickly by many companies competing from the same market shares. (Liu & Rong, 2015; Talay et al., 2014). According to McKelvey (2002, 3-4), an ecosystem needs to possess five components in order for coevolution to truly take place: heterogeneous companies, the ability to learn and adapt, interaction and enjoy an equal influence one another, a process which needs adaptation and thus inspires coevolution, as well as an inducting incident. Talay et al. (2014) bring also into focus the fact that despite coevolution taking place within an industry, the companies may also demonstrate differencing patterns, opposing directions and unequal paces without diminishing the coevolutional effects. Drawing from the formerly introduced McKelvey's (2002) description of a coevolutionary ecosystem, and also taking into account the financial industry, I reason that there is a coevolutionary ecosystem in the financial services industry. The industry is heterogeneous, adaptive, interactive, and experienced an inducting incident by the introduction of the PSD2 - but the ecosystem most likely experiences differentiating patterns and unequal spacing as Talay et al (2014) described.

Another theory on coevolutionary ecosystems states that rapidly changing, innovation indulgent industries evolve in so called coevolutionary cycles working together in three domain activities of co-visioning, co-designing and co-creating (Liu & Rong, 2015) eventually creating another series of innovations (Moore, 1993). In the co-vision phase the ecosystem community creates communication networks in order to define their mutual innovation related goals and objectives. In the next phase of co-design, the companies within the ecosystem create a development strategy and work together towards fulfilling the market or customer needs. In the final phase the ecosystem promotes their solutions to outside stakeholders, such as complimentary companies and manufacturers, in order to optimize the offering chain and create extra value for the ecosystem and their customers. (Liu & Rong, 2015). The theory of coevolutionary cycles also fit into the evolutionary models of business ecosystems introduced by Moore (1993), as the birth stage constructs of

co-visioning, expansion of co-designing, leadership of co-creating and self-renewal creates a new round of innovations completing the ecosystem loop.

Later on Talay et al. (2014) categorized business coevolution into three classifications: mutualistic, exploitative, and competitive coevolution. More usually such terminology can be found in long rooted biological contexts, in which the relationship of cause and effect have been widely studied within forever changing ecosystems (Ferriere, Bronstein, Rinaldi, Law & Gauduchon, 2002; Thompson, 1982, 6-7, 37-40, 59-69; Nuismer & Doebeli, 2004). The ideas are the same, whether discussing businesses or living species. In mutualistic coevolution all the companies in the ecosystem improve simultaneously through interdependency. In exploitative coevolution the evolution of some companies (most commonly the larger players in the ecosystem) creates a disadvantageous evolution in other (usually smaller) companies. And finally, in the competitive coevolution the innovation of one firm hinders the capabilities of others, whom will either all exit the industry or create their own corresponding innovation. Talay et al. use the descriptions to clarify the underlying links between the types industry dynamics with innovation and further to firm performance.

As the principle of coevolutionary ecosystems lie on the basis of the development of one affecting the development of another (or others) in the ecosystem, a such industry structure benefits the end users tremendously. The benefits arise from increases in innovation, competition, as well enhanced as product or service compatibility. Many of the financial services companies are interdependent, coevolve together and collaborate, the abductive prediction would be a mutualistic or a competitive coevolutionary ecosystem. Mutualistic coevolution fits most of the industry developments, but companies somewhat "steal" and develop similar services to their direct and indirect competitors as in competitive coevolution. This is done in order to supplement the existing service offerings, not in order to exit the industry altogether. A great example of this would be "Siirto" service by Osuuspankki, where registered people can transfer money to one another by using phone numbers. The service is somewhat a direct copy of MobilePay, which was first to introduce this kind of payment.

### **3.4 Concluding notes on theoretical framework**

The important industry metrics of innovation and competitiveness are used for the determination of the direction of change in the consumer's perspective. Innovation is an essential part for the development of products, services and industries as a whole. Competitiveness within industries promotes efficiency and productivity. The metric of competitiveness is seen fundamental for all financial sector participants and customers, as it affects the stability of entire markets, boosts innovation and keeps the costs down.

For this ecosystem study, innovation holds also an important implication in an alliance-based co-creational process and as an element of a creation-al flow of a high-technology coevolutionary industry. It is thought that alliances bring more innovations in high-technology industries because they grant access to diverse knowledge and capabilities, especially in times of rapid industry change. The type of innovation depends on the industry risks, and whether the risks are deemed too high. Innovations and technologies are seen as leverage in the high-technology industries, pressuring alliance formations despite the threats.

Almost all of the previous studies are made from the perspective of the companies, leaving the customers' perceptions of the alliance dimensions in a void. This is somewhat perplexing as the customers are vital for the success and survival of the companies. One main objective of this study is to fill the literature void by investigating the industry alliance perceptions and knowledge of the consumers.

The coevolutionary theory is used to describe the type of overall inter-dependent ecosystem high-technology industries are most likely enjoying, including the different types of possible coevolution as well as the probable convolitional cycles. The adaptation to the industry changes is just taking place, making the early industry perceptions of key importance when thinking of the future ecosystem developments.

The theories introduced in this paper, effect of technological shocks on company's service offerings, alliance-based competitive dynamics, and coevolutionary ecosystems, all relate to the scope and creational processes of industry innovations.

## 4 DATA AND RESEARCH METHOD

### 4.1 Research approach and methods

This thesis aims to address how consumers perceive the financial sector after the enforcement of the PSD2 in Finland. The study includes perception concerning the impacts of the regulatory and technological shocks on incumbents' offerings, as well as the generation process of new innovations through alliances and coevolution of the entire sector. The theories and concepts are gathered from many environments, thus abductive reasoning is applied throughout the thesis. Abductive reasoning is a method of logical interpretation by forming the best and simplest explanations out of a set of observations (Thagard & Shelley, 1997).

The research includes Finnish consumers, covering many age and regional demographics. As the topic is quite new, there is a lack of existing quantitative data from the industry. Despite this, the goal is to present broader consumer perceptions so a quantitative online survey was chosen as the data collection method. Abductive reasoning was used to form statements concerning the effect of PSD2 on the individual company service offerings, the effect of alliances on innovation formation as well as the industry landscape in terms of coevolutionary ecosystem – thus combining the empirical world, framework and theory. The goal of the survey was to gain insights concerning the general industry perceptions of the consumers. Most of the questions were assigned multiple proclamations concerning the same statement as well as statistical values in order to make proper cross-examinations in the data assessment phase.

The survey was made up of 14 questions, 1-2 related to basic background information, 3-10 of the effect of the PSD2 on individual performance of a company and customer demands, 11-12 of the cyber security and alliances, and 13-14 of the industry landscape in terms of coevolution. Questions 9-13 had multiple statements under the same heading, itemized by the bigger context. Statements on the effect of the PSD2 on service offerings were drawn from innovations and competitiveness; statements on cyber security and alliances on the causes behind such threats and alliances as well as the effects they have on the industry innovations; and finally, statements on industry coevolution were drawn from the theory that an innovation creation of one benefits the entire competitive field and affects performance of all participants, given that such an industry is likely to enjoy from a mutualistic coevolutionary ecosystem. The survey questions can be found from Appendix 1.

The survey was circulated through various discussion columns, in order to gain data from consumers with various backgrounds. The data collection took place from March 9, 2020 to March 23, 2020. All in all 116 responses were gathered, out of which 99 could be used in the analysis after initial screening due to severe response breakoffs.

In addition, this thesis includes descriptive parts in the narratives of the empirical context as well as the PSD2. These parts were added as a crucial part in order to gain the full comprehension of the entire operational sector under study.

## 4.2 Method of analysis

The top research problem is to address if the industry ecosystem has changed in accordance to the aims of the PSD2 according to the service and product end users. The main analyzing methods are the uses of weighted average and cross-tabulations when the tabulations have offered further insights into the data. The weighted average allows the determination of the overall data trends taking into account the wavering degrees of importance (Elvik, 1998) where as cross-tabulations are used to further filter the results into smaller subgroups. Cross-tabulations were chosen because they acknowledge the grouping of different variables in order to see the correlations between them. The method also demonstrates correlation differences between the variable groupings, presenting patterns, developments and probabilities within statistical values. Cross-tabulations are especially useful when developing innumerable interpretations from data. (Sage Publications inc & Lavrakas, 2008, 143-144).

Using the combination of these analyzing methods allows an overall examination as well as an in-depth interrogation of the data. The methods also function as foundations for both broader as well as more comprehensive analyses of trends amongst the sample. The relative frequencies are not presented in the cross-tabulations, as the sample is just short of a hundred, thus the response rate is corresponding to that of relative frequency. The percentages represented in the tables show the quantity of the chosen option within each demographic group on the left row, demonstrating the significance of the choice amongst its subgroup. Conclusions were drawn from the results, and presented accordingly.

The survey statements for the research were formed from the theoretical framework by using abductive reasoning. Abductive reasoning was chosen, as it would enable the merger of the descriptive parts with the theoretical context, allowing the creation of the themes with the fullest set of information available. The statement themes covered the possible changes caused by the industry disturbance, alliance-based competitive dynamics and a coevolutionary ecosystem. These principal themes were broken down into smaller sub-themes that represented the different parts of the principal themes and could thus be tested more in-depth.

After the data was collected, the first step in the analysis was to get familiar with the data and also to transcribe the questionnaire from Finnish to English. Collected responses were screened and those not fit for the analysis

were excluded from the data set. These were mainly responses leaving too many of the questions empty.

The next step was to conduct an initial data analysis, considering any clear themes. To be followed by grouping the variables in order for the cross-tabulation analyses to take place. Conclusions were drawn after crunching the analyzed numbers. The final step was to write open the analyzed discoveries in the research finding section.

### 4.3 Reliability and validity

Reliability in research refers to the extent to which the methods provide unchanging and coherent results. A measure is considered reliable if the same results can be obtained by repetition. Validity, on the other hand, refers to the soundness of the research in terms of design and approaches used. In such a quantitative data research, validity reflects whether or not the research findings mirror the studied phenomenon. (Wiliam & Bridgmon, 2012, 55-61).

In quantitative research, reliability reflects the extent to which the research is error free. The amount of error is impossible to completely remove, due to the existence of random and measurement error. Random error occurs in all research and is unpredictable in nature. In quantitative research, it occurs mostly due to sampling thus in order to minimize its effects, a bigger and a more representative sample was chosen for this research. (Wiliam & Bridgmon, 2012, 55-56). The survey was also available for thousands of consumers, increasing the random sampling of the respondents. Measurement error indicates the accuracy of the survey instrument and how well it performs in its given population – as no tool is perfect, some measurement error will always exist (Wiliam & Bridgmon, 2012, 56-57), which is also the case in this study. For the validity of the research, the survey statements were gathered from various theories and frameworks in order to develop the themes and allow readers to fully understand and follow the entire process. This will also strengthen the construct as well as convergent validity of the research.

Even with the mentioned reliability and validity issues, surveys are deemed as one of the best ways of collecting data concerning the characteristics and/or perceptions of populations. Nowadays, the Internet offers increasing, interactive and efficient survey platforms that improve the traditional survey collection methods. A quantitative online survey research allows the collection of data in a cost effective, anonymous, speedy and media rich way, making it one of most popular ways of collecting data. Online surveys also allow a rather fast collection of data that is relatively easy to analyze. (Balch, 2010, 3, 23; Simsek & Veiga, 2001).

As the research looks into the perceptions of the consumers at the time of the study, the perceptions and views on the matters may and most likely will change with time. The results concerning innovations, alliances as well as the business ecosystem are all tied to this time and day. This temporal factor

makes the generalization of the results under jeopardy as time passes. Despite this, the short-run reliability of the results can be expected, especially since the primary data was sampled from so many different demographics.

This research portrays responses and perceptions of the consumers; covering many different age groups as well as areas of Finland. It is possible that not all the respondents knew or understood all of the asked questions concerning their banks and/or service usage, but the goal was to get the overall interpretation in how the consumers see the business landscape at the moment. Therefore it can be argued that the interpretations reflect the consumers' views, including their hesitancy on the matters, and also affect into the overall industry perceptions. On the other hand, it might be that due to this, not all relevant issues rose into light.

Validity and truthfulness of the collected perceptions can be considered high, mainly due to having responses from many different demographics and backgrounds. The respondents took part in the study voluntarily, with an interest in the matter, increasing the likelihood of valid and truthful responses. Despite this, some attention should be used when considering the findings, as perceptions might not reflect the full industry landscape due to taking into account the personal insights of subjective people.

The findings of the survey support and give further insights into former studies as well as theories, providing an additional support for the results.

## 5 RESEARCH FINDINGS

### 5.1 General information

This chapter is organized according to the predominant theoretical context studied in the form of a survey. The areas cover consumers' perceptions concerning the overall industry, collaborations and coevolution in terms of innovations. The overall perceptions were kept rather general, but the consumer segmentation gives a better overview of the underlying perceptions. The data gathered addressed relevant demographical background information, as well as perceptions on the whole industry, customer value through innovations, industry collaborations and coevolutionary approaches. The discovered themes will be presented in the following sections in order to illustrate the consumers' thoughts on the financial services at the moment. An outline of the themes and sub-themes drawn from the theory and applied in the study can be found in Appendix 2.

The research findings are based on the survey data collected, and the resulting statements are drawn directly from the data. The demographical background information only included the upmost relevant metrics in order to test the existing theories on demographical perception differences, but certify full confidentiality of all respondents at the same time. The data includes 99 responses from all seven categorized age groups, from below 20 year-olds to plus 71 year-olds. From the Finnish provinces, the responses covered 14 of the 19 existing ones. A detailed list of the demographics can be found from Appendix 3. The language used in the survey was Finnish, as the survey was meant for Finnish consumers. An outline of the translated questions can be found from Appendix 1.

As explained in section 3.2, the PSD2 concerned almost all of the financial services, including some that have only recently been effective. Due to this, the survey wordings were explained a bit further prior to responding to the questions. This was done in order to help the respondents understand the extent of the considered payment services and thus accumulate more accurate perceptions.

### 5.2 General industry perceptions

The result data indicates numerous important trends. The vast majority of the respondents were that of the younger user base, 49% belonged to the age group of 21 to 30 year-olds. The next largest group was that of 31 to 40 year-olds representing 17% of the population, followed by 51 to 60 year-olds with 16%. This could have been due to the spreading of the survey through the Internet by using different social media channels, not reaching too many of the

youngest or oldest sections of the population. The age division of the sample is presented in Figure 2 below.

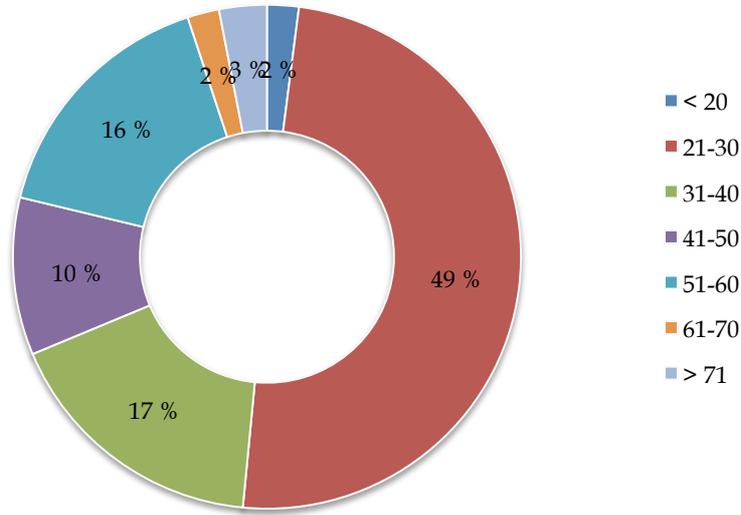


FIGURE 2. Age division of the responses

Secondly, even though there were many of the provinces represented in the sampling, 28% were from Uusimaa, 19% from Pohjois-Savo and 17% from Pirkanmaa. These three represent altogether 64% of the entire sample, leaving a minority of 36% for the other 11 provinces represented. The spread of provincial demographics is presented in Figure 3. These large regional differences can partly be explained by the size of the provinces, other probable explanations being the demographics of the respondents in the various online channels and the influence of social connections when it comes to responding and sharing of surveys. The limitations of the study are further discussed in section 7.3.

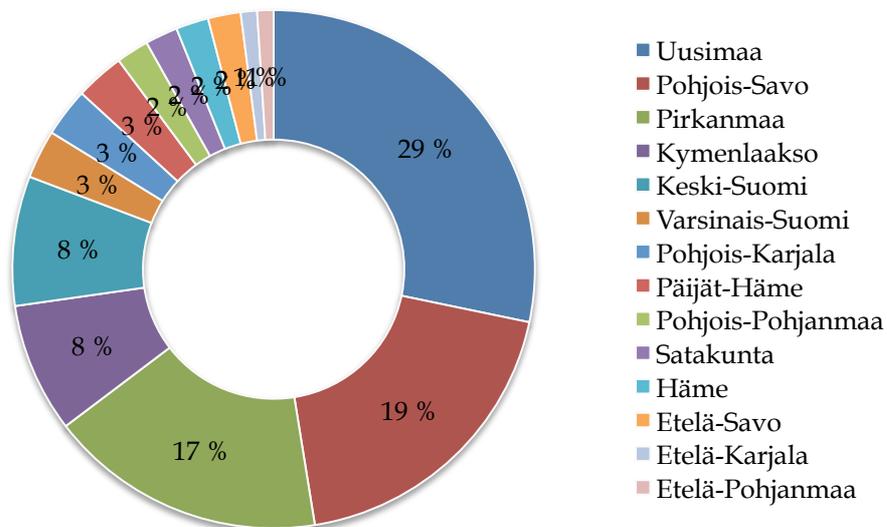


FIGURE 3. Provincial demographics of the responses

The predominant industry perceptions have been divided into three sub-categories including *familiarity of the products and services*, *value of innovations* and *development of competitiveness*. These three topics were formed on the basis of the theory and survey formulation – they all affect the way consumers see the industry changes after the onset of the industry disturbance. These sub-categories reflect the importance and worth of the reforms, any changes in the competitiveness as well as the familiarity and understanding of the industry.

#### *Familiarity of the products and services*

The degree of use of different services gives a direction to the consumers' surface knowledge of the industry. The vast majority of 66% of the consumers used multiple kinds of financial services, including the services provided by their own bank, online payment options provided by other companies as well as third party provided apps. Consumers that used their banks services and other online payment options equaled 15% and consumers using only their own banks' service options equaled 19%. Thus all in all 81% of the consumers do utilize at least some products and services outside of the offerings of their own bank. The results are presented in Figure 4.

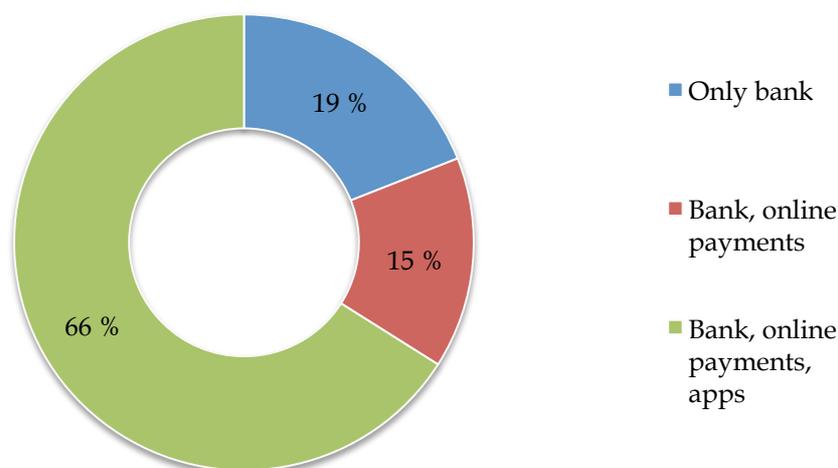


FIGURE 4. Utilization of financial services

Table 4 demonstrates the spread of the utilization of financial services according to the age segment. The table shows well how the use of all channels of financial services are 50% or above until the age of 60, and decline rapidly after that. The use of only banking services is at its highest also after the age of 60.

| Use of financial solutions |                             |                       |             |       |
|----------------------------|-----------------------------|-----------------------|-------------|-------|
|                            | Bank, online payments, apps | Bank, online payments | Only bank   | Total |
| <20                        | 2<br>(100%)                 | 0<br>(0%)             | 0<br>(0%)   | 2     |
| 21-30                      | 37<br>(76%)                 | 3<br>(6%)             | 9<br>(18%)  | 49    |
| 31-40                      | 11<br>(65%)                 | 3<br>(18%)            | 3<br>(18%)  | 17    |
| 41-50                      | 6<br>(60%)                  | 3<br>(30%)            | 1<br>(10%)  | 10    |
| 51-60                      | 8<br>(50%)                  | 5<br>(31%)            | 3<br>(19%)  | 16    |
| 61-70                      | 0<br>(0%)                   | 0<br>(0%)             | 2<br>(100%) | 2     |
| >71                        | 1<br>(33%)                  | 1<br>(33%)            | 1<br>(33%)  | 3     |
| <b>Total</b>               | 65                          | 15                    | 19          | 99    |

TABLE 4 Utilization of financial service according to each age segment

### *Value of innovations*

Innovation as a term is rather broad and most likely hard for many people to place in different contexts. The term is also foreign-derived in Finnish, making its comprehension more complex. Thus when talking about innovations, the terms “new service providers”, “product and/or service reforms” as well as “product and/or service developments” were used to make it easier for the common consumers to evaluate and think of the novelties and improvements in the industry. The full tables of results can be found from Appendix 3.

Questions from 4 to 7 measured the perceptions concerning the types of innovations in the industry as well as the growth of innovations within the past two years – due to the implementation period of the PSD2. Perceptions concerning the industry having dud innovations were towards that of disagreement, with the weighted average of 2.33 out of 5, incremental innovations slightly above neutral towards agreement with the average of 3.19, radical innovations being neutral with an average of 3 and the growth of visible innovations after the onset of PSD2 being close to agreement with an average of 3.75. This shows how the uppermost perceptions are that the consumers disagree the industry having dud innovations, slightly agree there being incremental innovations, feel neutral of having radical innovations and agree there being a growth in visible innovations after the disruption of PSD2. The overall aver-

age of these was 3.07, making the overall innovation perceptions rather neutral. Standard deviations of the results varied between 12.33 and 17.29, reflecting that the results were quite scattered around the averages. If looking at the values that got the majority of votes; perceptions concerning dud innovations (41% of replies) and the amount of incremental innovations (50% of replies) were neutral, whereas the visibility of radical innovations (33% of replies) and growth of amounts of innovations (36% of replies) were in agreement.

There was a significant change in the averages and standard deviations when the data got divided in accordance to the age demographics. Figure 5 illustrates these differences in a graphical form and full tables can be found from Appendix 3.

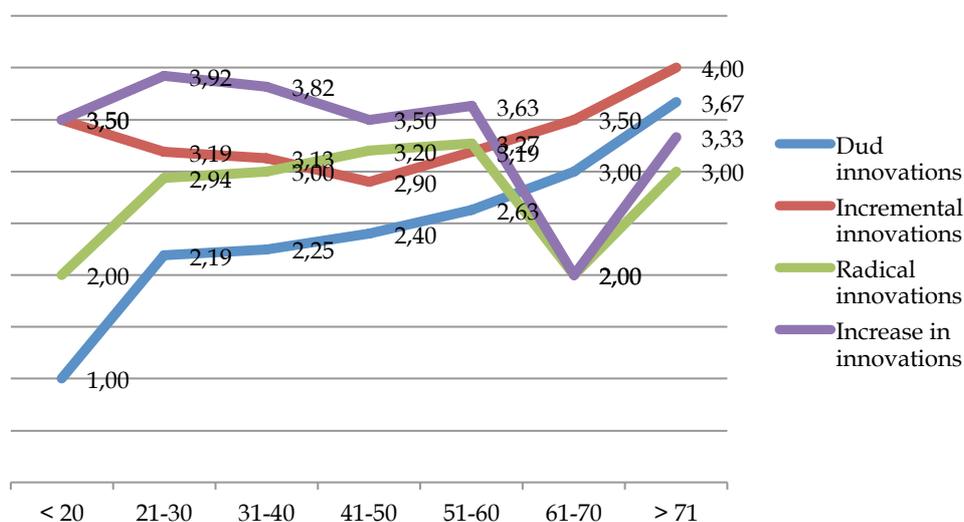


FIGURE 5. Innovation value in accordance to age group

For the perception concerning dud innovations, the average was highly correlating with the age as the older the sample group got, the more they thought there being dud innovations in the market. The underlying perceptions were in disagreement until 60 years of age, neutral until 70 years of age and in agreement after that. This might be due to the facts that learning to use new technologies and actively acquiring new solutions decreases with age, thus making the industry seem like having invaluable innovations. The averages were, however, below neutral up until 60 years of age showing that the majority of the age demographics do not see the industry having too many dud innovations.

Perceptions concerning incremental innovations formed a soft upward parabola when different age groups were measured; the highest scores were at each end of the age groups. The result might be due to the fact that these are the first age groups to notice changes, the younger actively looking for new solutions and the older wishing to remain to use their products as they were before. The younger population might also consider some radical innovations as incremental as they adapt and learn faster.

When looking at the perceptions on whether or not the innovations are seen as radical, the ages between 21 to 50 see a bit more radicalism, where as the younger and older do not – their perceptions varying from disagreement (below 3) to neutral (3). Again the trend might be due to user behaviors of used services and adaptation to newer technologies. The results are represented more in detail in Table 5.

| Amount of radical innovations |                     |             |             |             |                  |       |
|-------------------------------|---------------------|-------------|-------------|-------------|------------------|-------|
|                               | Completely disagree | Disagree    | Neutral     | Agree       | Completely agree | Total |
| <20                           | 0<br>(0%)           | 2<br>(100%) | 0<br>(0%)   | 0<br>(0%)   | 0<br>(0%)        | 2     |
| 21-30                         | 3<br>(6%)           | 14<br>(30%) | 13<br>(28%) | 17<br>(36%) | 0<br>(0%)        | 47    |
| 31-40                         | 1<br>(6%)           | 4<br>(24%)  | 6<br>(35%)  | 6<br>(35%)  | 0<br>(0%)        | 17    |
| 41-50                         | 0<br>(0%)           | 3<br>(30%)  | 2<br>(20%)  | 5<br>(50%)  | 0<br>(0%)        | 10    |
| 51-60                         | 0<br>(0%)           | 2<br>(13%)  | 10<br>(63%) | 3<br>(19%)  | 1<br>(6%)        | 16    |
| 61-70                         | 0<br>(0%)           | 1<br>(100%) | 0<br>(0%)   | 0<br>(0%)   | 0<br>(0%)        | 1     |
| >71                           | 0<br>(0%)           | 2<br>(67%)  | 0<br>(0%)   | 0<br>(0%)   | 1<br>(33%)       | 3     |
| <b>Total</b>                  | 4                   | 28          | 31          | 31          | 2                | 96    |

TABLE 5 Distribution of perceptions concerning radical innovations according to age group

When looking at the averages in Figure 5, all age groups perceived there being a growth in visible innovations during the past couple of years, except for 61-70 year-olds, which might be due to lower sample volume. Table 6 demonstrates the perception distribution according to age, again the younger demographics perceive there being more increases in the amounts, whereas the older ones were mainly on the neutral side – overall 60% of consumers do agree or completely agree there being an increase in the amount of innovations within the past two years.

| Increase in the amount of innovations |                     |            |             |             |                  |       |
|---------------------------------------|---------------------|------------|-------------|-------------|------------------|-------|
|                                       | Completely disagree | Disagree   | Neutral     | Agree       | Completely agree | Total |
| <20                                   | 0<br>(0%)           | 0<br>(0%)  | 1<br>(50%)  | 1<br>(50%)  | 0<br>(0%)        | 2     |
| 21-30                                 | 1<br>(2%)           | 1<br>(2%)  | 14<br>(29%) | 18<br>(37%) | 15<br>(31%)      | 49    |
| 31-40                                 | 2<br>(12%)          | 0<br>(0%)  | 3<br>(18%)  | 6<br>(35%)  | 6<br>(35%)       | 17    |
| 41-50                                 | 1<br>(10%)          | 1<br>(10%) | 1<br>(10%)  | 6<br>(60%)  | 1<br>(10%)       | 10    |
| 51-60                                 | 1<br>(7%)           | 1<br>(7%)  | 8<br>(53%)  | 3<br>(20%)  | 2<br>(13%)       | 15    |
| 61-70                                 | 1<br>(50%)          | 0<br>(0%)  | 1<br>(50%)  | 0<br>(0%)   | 0<br>(0%)        | 2     |
| >71                                   | 0<br>(0%)           | 1<br>(33%) | 1<br>(33%)  | 0<br>(0%)   | 1<br>(33%)       | 3     |
| <b>Total</b>                          | 6                   | 4          | 29          | 34          | 25               | 98    |

TABLE 6 Distribution of perceptions concerning increases in innovations according to age group

When tabulating the results in accordance with their utilization of financial services, there were some differences amongst the way the consumers viewed the types and amounts of innovations. The weighted averages are presented in Figure 6.

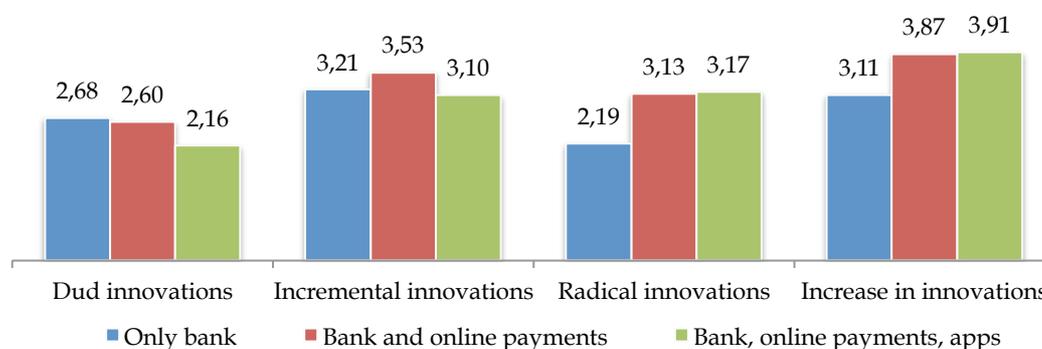


FIGURE 6. Perceptions concerning financial innovations according to different user groups

People only using services and products offered by their banks thought there are not many dud innovations in the industry, as the rate is below neutral, but the score is still the highest out of the three groups. Their views on incremental innovations were slightly above neutral, radical solutions were that of disagreement and perceptions concerning the increases in the amounts of innovations only a bit above neutral, clearly lower than when comparing with the other two groups. The second group, consumers using their banks' ser-

vices as well as third party provided online payment solutions perceived the amount of incremental innovations the highest. This is most likely due to the fact that they tend to use more of the “traditional” services and do not engage in the usage of the newest solutions in the sector. The group of people, who used the most services, was also the one thinking there are less dud innovations, more radical innovations and most increase in the overall innovations in the industry within the past two years. The underlying idea here would be that consumers, who use only their banks’ solutions, do not see as much radical innovations or as high increases in the amounts of innovations. The same can be seen in Tables 7 and 8 below.

| <b>Amount of radical innovations</b> |                             |                 |                |              |                          |              |
|--------------------------------------|-----------------------------|-----------------|----------------|--------------|--------------------------|--------------|
|                                      | <b>Complete-ly disagree</b> | <b>Disagree</b> | <b>Neutral</b> | <b>Agree</b> | <b>Complete-ly agree</b> | <b>Total</b> |
| <b>Bank, online payments, apps</b>   | 2<br>(3%)                   | 15<br>(23%)     | 20<br>(31%)    | 24<br>(38%)  | 3<br>(5%)                | 64           |
| <b>Bank, online payments</b>         | 0<br>(0%)                   | 4<br>(27%)      | 5<br>(33%)     | 6<br>(40%)   | 0<br>(0%)                | 15           |
| <b>Only bank</b>                     | 3<br>(19%)                  | 8<br>(50%)      | 4<br>(25%)     | 1<br>(6%)    | 0<br>(0%)                | 16           |
| <b>Total</b>                         | 5                           | 27              | 29             | 31           | 3                        | 95           |

TABLE 7 Distribution of perceptions concerning radical innovations according to user group

| <b>Increase in the amount of innovations</b> |                             |                 |                |              |                          |              |
|--|-----------------------------|-----------------|----------------|--------------|--------------------------|--------------|
|  | <b>Complete-ly disagree</b> | <b>Disagree</b> | <b>Neutral</b> | <b>Agree</b> | <b>Complete-ly agree</b> | <b>Total</b> |
| <b>Bank, online payments, apps</b>           | 3<br>(5%)                   | 3<br>(5%)       | 13<br>(20%)    | 24<br>(37%)  | 22<br>(34%)              | 65           |
| <b>Bank, online payments</b>                 | 1<br>(7%)                   | 0<br>(0%)       | 2<br>(13%)     | 9<br>(60%)   | 3<br>(20%)               | 15           |
| <b>Only bank</b>                             | 3<br>(16%)                  | 1<br>(5%)       | 9<br>(47%)     | 3<br>(16%)   | 3<br>(16%)               | 19           |
| <b>Total</b>                                 | 7                           | 4               | 24             | 36           | 28                       | 99           |

TABLE 8 Distribution of perceptions concerning radical innovations according to user group

Perceptions concerning the innovation centralization were rather even, the highest being that most of the new innovations are done to better the quality of an existing product or a service. Second most selected option was that

the reforms are done on stronger authentication and security, which has been more and more visible in everyday online banking recently. Third highest option was that the innovations have been on the amounts of products and services available for consumers, which have been growing in numbers after the PSD2 was set. The option that got the least amount of responses was that the innovations had concentrated on bettering the customer experience, which should be a number one concern if there are many competitors offering substitute goods and services available. The results are represented in Figure 7 below.

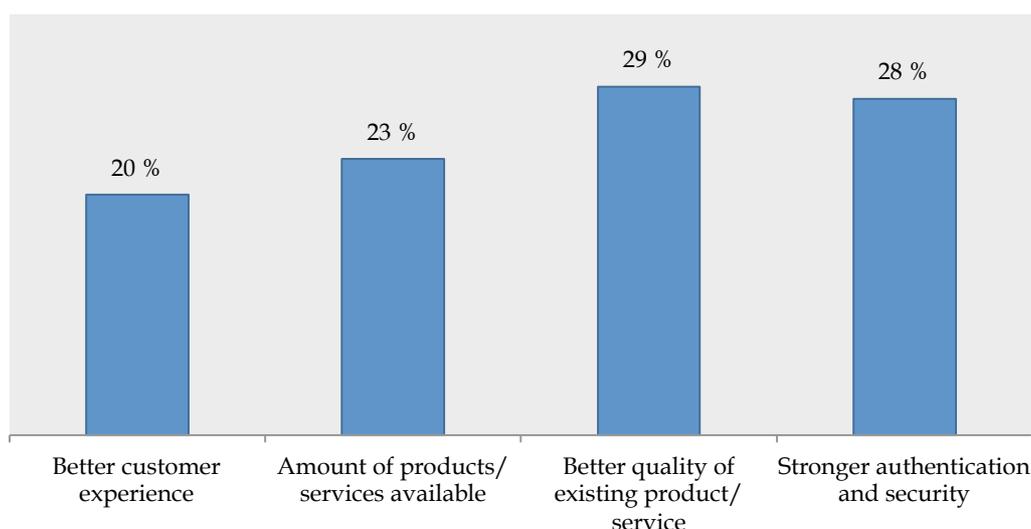


FIGURE 7. Spread of the perceptions concerning the innovation pinpoint of the industry

### *Development of competitiveness*

The second section of the survey was composed of different measures of competitiveness. These metrics are all parts of the theory part where an increased competition in the market should affect these factors favorably. The underlying idea was to measure what do consumers value and how their main service provides have developed these measures after the PSD2 in order to stay competitive. The areas of competitiveness in question were price, customer service, availability of products and services, user-friendliness of products and services, availability and quality of additional services, technological development and speed, customization of services according to personal needs, as well as amount and quality of communication.

For measuring of the consumer values of the different metrics, scaling of 1 (none) to 5 (very much) was used. The three highest rated measures were user-friendliness of products and services (4.44), availability of products and services (4.12) and customer service (3.64). All of the measures were perceived to be at least somewhat important, the lowest measure being availability and quality of additional services (2.85).

For the changes in offerings of one's bank within the past few years, a scaling of 1 (negative) to 5 (positive) was used. The biggest changes had been in user-friendliness of products and services (3.79), availability of products and services (3.63), as well as technological development and speed (3.45). The lowest average was for customization of services according to personal needs (3.01), which was almost neutral showing how there are no changes for the better or for worse.

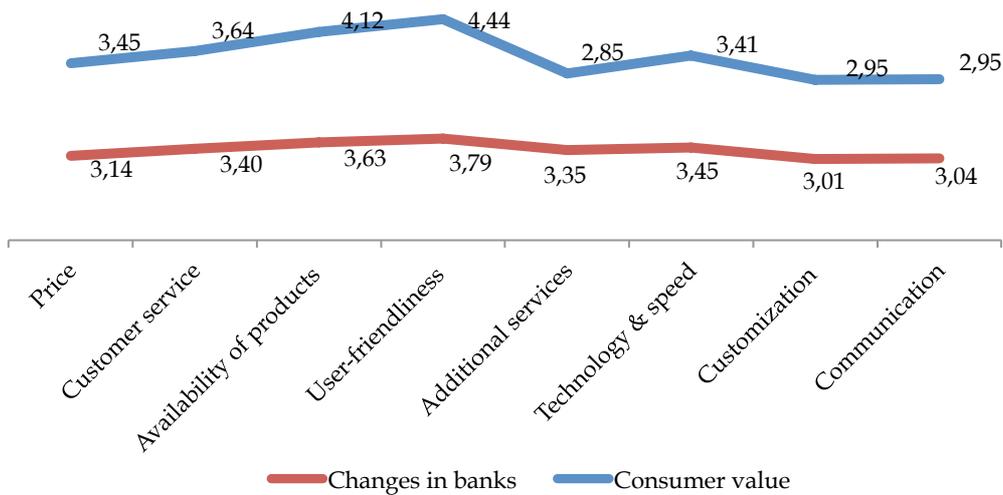


FIGURE 8. Development of competitiveness, consumer value vs. incumbent development

Figure 8 illustrates the averages of the competitiveness metrics that consumers first evaluated according to their significance in the usage of financial services and products, then evaluated how the same metrics have changed, or rather developed, at their banks after the competitive landscape was opened for more companies. The values are not directly proportional as the scaling of the measurements was different. For the consumer value number 1 means none and anything above that has at least somewhat significance; for the changes at the banks 1 means negative, 3 means neutral. The comparison does, however, indicate that the changes and developments in the main channel products and services have revolved almost proportionally with the same metrics the consumers deem significant in the industry. The unchanged areas of customization of services according to personal needs as well as communication are valued somewhat important and should be the next focus area, as there seem to be no changes at all.

When comparing the different age groups in terms of value, the importance of customer service and communication rose with age, whereas the importance of technological development and speed decreased. Other than these, the value perceptions were rather varied with no clear patterns. When looking at the bank's development in the given metrics, the biggest amount of

low values was given by the plus 71 year-olds, as they see customer service (2.67), availability of products and services (2.67), as well as amount and availability of communication (2.50) on the negative development scale of the spectrum. The fall in the perception of the 71 year-olds can be explained by the change in the industry and cutting down of over the counter services, which to them is the main service channel. Full tables of results can be found from the Appendix 3.

When looking at the consumer value ratings of different metrics according to their user groups, there are a few noticeable things in the data. All values were at least somewhat meaningful as the scaling was from none (value 1) to very much (value 5). All consumer groups value availability of services and products, as well as user-friendliness of the consumer experiences. On top of these, the consumers who use only their bank's services, clearly valued customer service more than the other two user groups. In contrast to this, there were some differences in the least valued metric. Consumers that only utilize the services offered by their banks gave the lowest rating for the availability of additional services. For consumers who utilize solutions provided by their banks as well as online payments provided by third parties, least valued the customization of solutions according to personal needs. For the third group, consumers who use services from a bank, online payments and apps, least valued the amount and quality of communication. The data shows how the banking customers value a personal high quality services where as the more comprehensive users value more of a varied and speedy, yet comfortable user experience. The full results are presented in Figure 9.

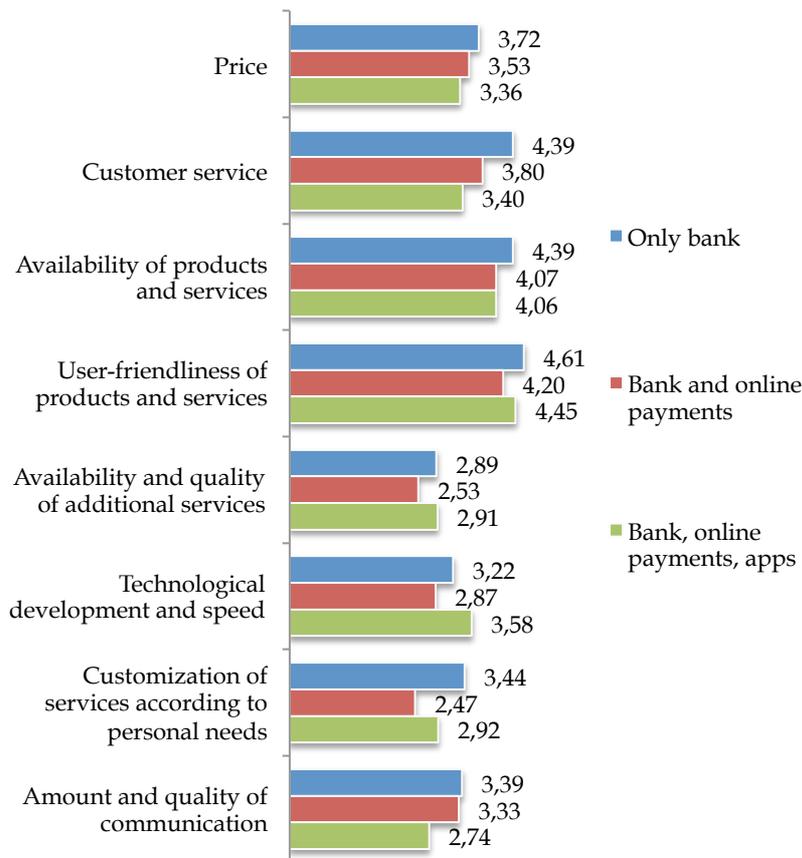


FIGURE 9. Consumer values according to user group

Figure 10 represents the perceived changes in the banking services according to the different user groups. The value 3 represents neutral, anything below it is towards that of a negative change. The user group using the most solutions had noticed the largest amount of positive changes – especially in availability of products and services and user-friendliness of the offered solutions. They were also the only group not rating any metrical aspects as having negative developments. Correspondingly, the group using banking services and other online payment options were second in rating positive changes, only rating one metric – customization of products – as having negative changes. Consumers using only banking services rated the least amount of positive changes and two metrics as having negative changes. The data indicates that the more options and solutions the consumer uses, the more they perceive positive developments in their banking solutions.

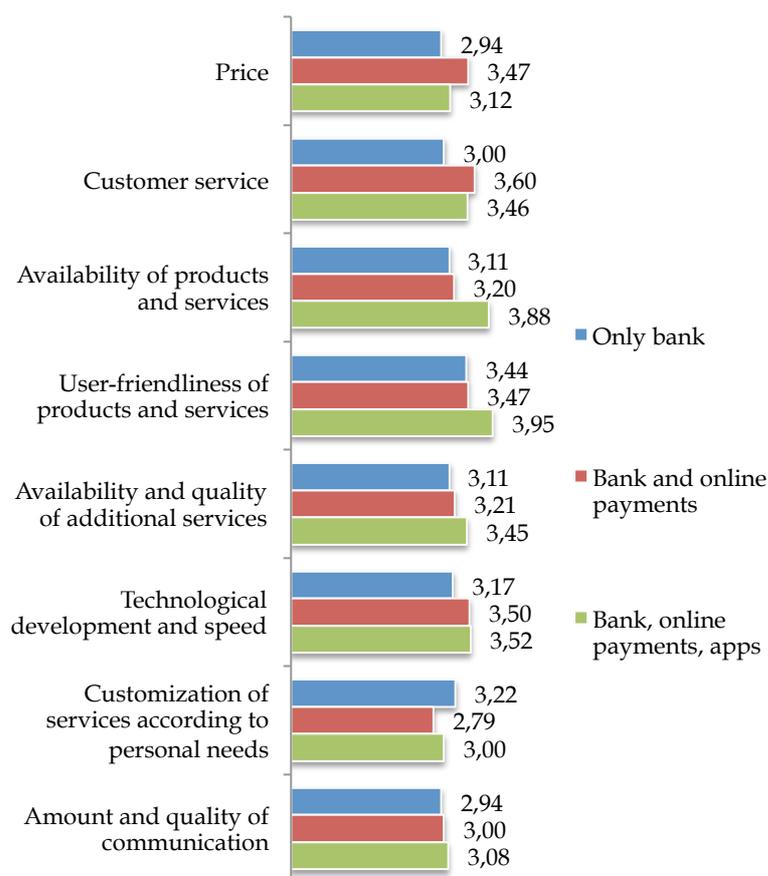


FIGURE 10. Changes in banking services according to user group

### 5.3 Attitudes towards collaboration and coevolution

Section 2 of the survey measured the perceptions concerning the industry threat, cyber security, on consumer consumption behavior as well as views on industry collaborations and coevolution. The results are presented accordingly, the overall tables of results can be found from Appendix 3.

#### *Perceptions on cyber security*

The section measures the effect of threats on the consumers' perceptions and thus usage of different solutions. Perceptions concerning the industry threats were in unison with similar research results conducted earlier. Scaling of the different statements was from completely disagree (value 1) to completely agree (value 5). A large majority of the respondents agree to using services outside of their own bank, the average being 3,27 and 43% agreeing with the statement. Cyber security is seen as a somewhat threat in the industry, with a 3,43 average and 46% of the replies agreeing with the statement. Even though

appearing as an issue, cyber security does not limit the amount of solutions consumers use, the average being 2,60 and 47% of respondents disagreeing with the statement.

Banks are seen as the safer option than third party providers, 42% of respondents agreeing to see them as more secure and the overall being 3,41. Despite this, cyber security threat does not affect the consumers' choice of products and services used, if there is an option available that speeds up and offers more user comfort - 41% disagreed with the statement and the overall average was at 2,76. When asked if sharing one's financial information easily to third party providers, given that it speeds up the transaction or improves the user comfort, most respondents agreed, but the average was still 2,99 - just below neutral.

The results indicate that majority of people are willing to grant third party providers an access to their information, but do not hastily do so. Banks are still seen as the industry market leaders when it comes to security, a somewhat big share of the consumers being skeptical to solutions provided by other than their banks, thus the following sections will analyze the results according to the age and user groups. All of the industry averages can be seen in Figure 11 and 12.

Giving support to previous research done on the matter, there are differences in the perceptions of consumers of different age groups. Cyber security does not limit the number of financial solutions used for younger generations, up until the age of 50 in this case. The older the user, the more the threat affects their usage. This is even though the same age groups did list cyber security as a threat. The most obvious results indicate that the use of financial services outside of one's bank is higher until the age of 40, and decreases after that. Five of the seven age groups perceive banks as a safer option than third party providers, but unexpectedly only one age group of 51-60 year-olds clearly think that the threat of cybersecurity affects their consumption habits more than speed and user comfort. The younger generations are also quite linearly more prone to easily sharing their information with third party providers in case it affects favorably to the transaction speed and/or user comfort, as above 40 year-olds disagree with the statements, exception being the 61-70 year-olds. The weighted averages are presented in Figure 11.

The results indicate that consumers are aware of the industry threat, but use third party services judiciously when choosing between the perceived banks' security versus speed and user comfort.

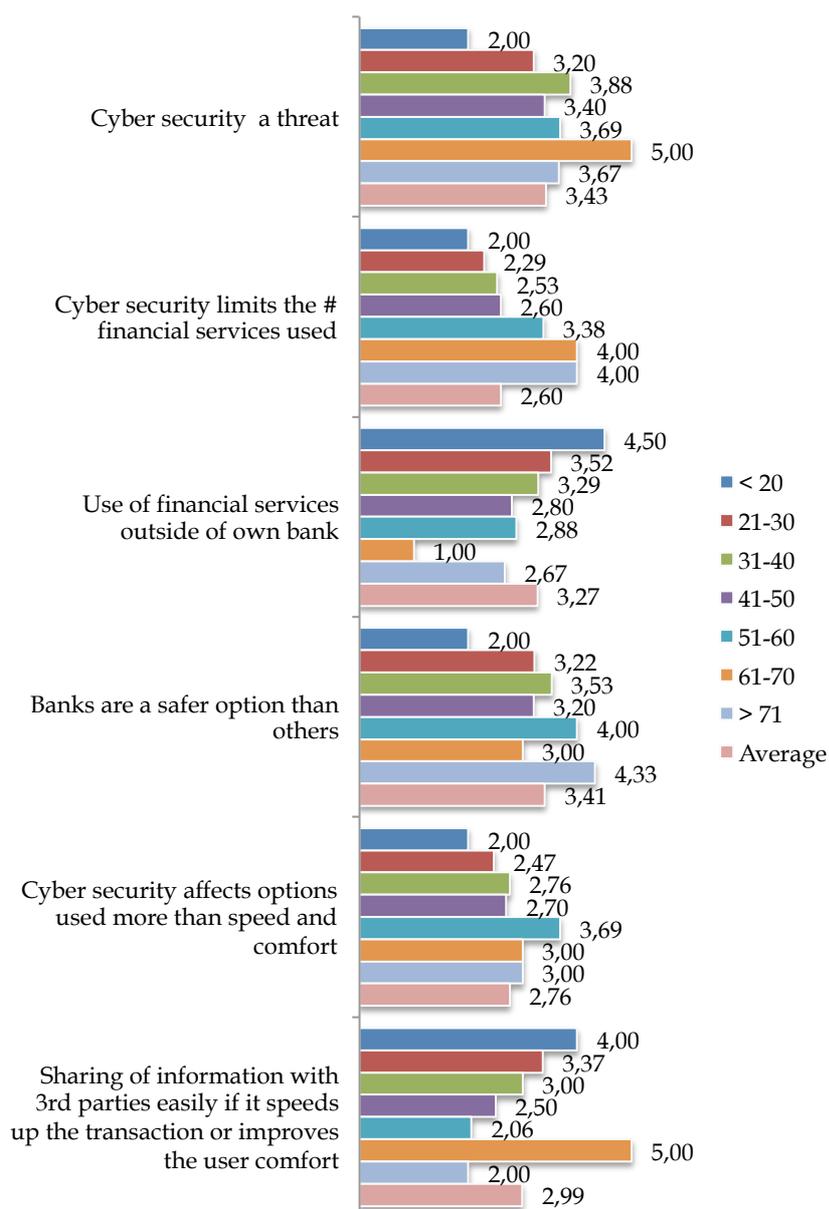


FIGURE 11. Perceptions on cyber security according to age

The trends amongst the user groups are clearer than when compared with the age groups. The less the consumers have solutions in use, the more they perceive cyber security as a threat. Consumers using banking and online payment options think that the threat limits the number of financial services used as well as that cyber security affects more to their used options than speed and/or comfort, indicating they would be willing to try a larger variety of options if they were perceived safer. Surprisingly the consumers using only their bank's products and services would be more inclined to easily sharing their information with third party providers, than consumers using also online payments. The results received on the last two statements, as well as the limit-

ing affect cyber security has on the number of solutions used, indicate that banking consumers would be more inclined to share their information if they perceived there would be improved speed and user comfort than banking and online payment consumers whom seem to value the security issue more. The results are presented in Figure 12.

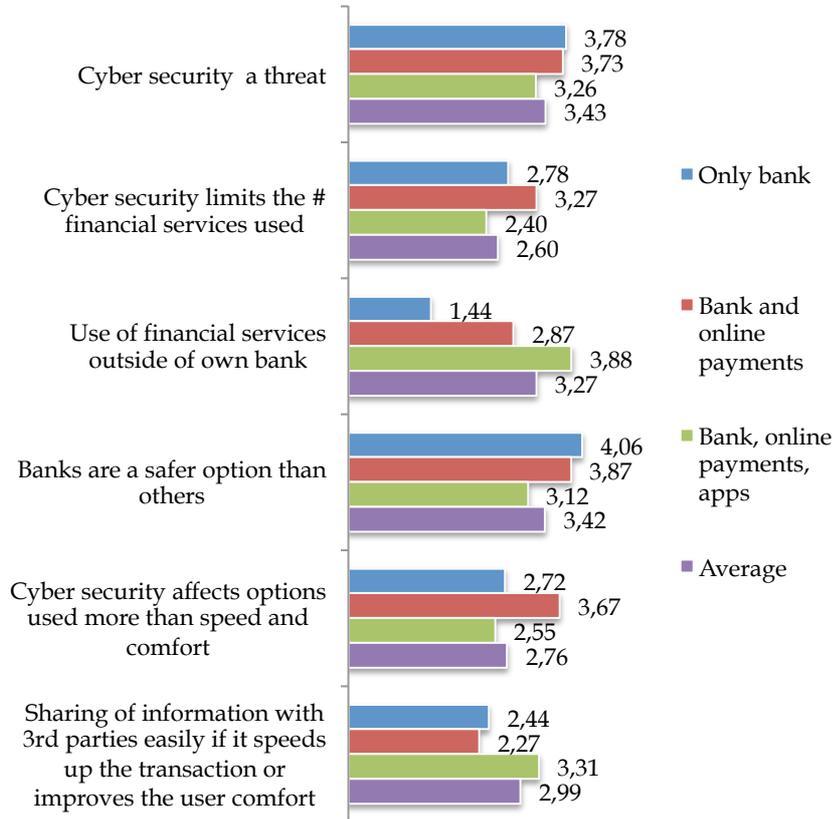


FIGURE 12. Perceptions on cyber security according to user group

Table 9 below further demonstrates the differences in which the user groups see cyber security limiting the use of financial services at their disposal. The user group using the most solutions, do not see cyber security affecting their usage to a large degree - only 15% of them have chosen a value above neutral. For consumers using only their bank's offerings, the corresponding rate is 28%. As mentioned before, the unexpected result was that the consumers using offerings of their bank as well as online payment options, the corresponding rate is a lot higher at 60%. One reason behind such a result could be that broadening the usage of solutions from bank's solutions into online payments is not seen as big of a security issue as moving from bank's solutions and third party provided online payments onto using third party provided apps. Online payments require a lot less information and are almost invariably guaranteed by different credit card companies.

| Cyber security limits the amount of financial services used |                      |             |             |             |                   |       |
|---|----------------------|-------------|-------------|-------------|-------------------|-------|
|   | Complete-ly disagree | Disagree    | Neutral     | Agree       | Complete-ly agree | Total |
| <b>Bank, online payments, apps</b>                          | 5<br>(8%)            | 39<br>(60%) | 11<br>(17%) | 10<br>(15%) | 0<br>(0%)         | 65    |
| <b>Bank, online payments</b>                                | 1<br>(7%)            | 4<br>(27%)  | 1<br>(7%)   | 8<br>(53%)  | 1<br>(7%)         | 15    |
| <b>Only bank</b>  | 3<br>(17%)           | 3<br>(17%)  | 7<br>(39%)  | 5<br>(28%)  | 0<br>(0%)         | 18    |
| <b>Total</b>  | 9                    | 46          | 19          | 23          | 1                 | 98    |

TABLE 9 Distribution of perceptions concerning cyber security as a limiting factor according to user group

The results shown in Table 10 clearly demonstrate how all groups tend to lean towards seeing banks as the safer option than third party providers but for the consumers using all solution categories the rate is significantly lower than for the other two groups.

| Banks are a safer option than other companies offering financial services |                      |             |             |             |                   |       |
|---|----------------------|-------------|-------------|-------------|-------------------|-------|
|   | Complete-ly disagree | Disagree    | Neutral     | Agree       | Complete-ly agree | Total |
| <b>Bank, online payments, apps</b>  | 0<br>(0%)            | 14<br>(22%) | 31<br>(48%) | 18<br>(28%) | 2<br>(3%)         | 65    |
| <b>Bank, online payments</b>  | 0<br>(0%)            | 0<br>(0%)   | 3<br>(20%)  | 11<br>(73%) | 1<br>(7%)         | 15    |
| <b>Only bank</b>  | 0<br>(0%)            | 1<br>(6%)   | 1<br>(6%)   | 12<br>(67%) | 4<br>(22%)        | 18    |
| <b>Total</b>  | 0                    | 15          | 35          | 41          | 7                 | 98    |

TABLE 10 Distribution of perceptions concerning banks being the safer option according to user group

### *Perceptions on industry collaborations*

The general perceptions concerning collaborations were rather moderate, with an overall average of 3,09 by using scaling of 1 (none) to 5 (very much). The highest rates were given to collaboration bringing more products and services into the industry as well as wishing more of it in order to enjoy more innovations. Consumers perceived their own bank collaborating with other industry service providers to some extent with an average of 2,75 and 54% of the responses hitting the mid range value of 3. Collaborations were perceived to

bring more products and services into the industry, 40% of the responses going for both values 3 and 4, the average being 3,32. The perceptions on collaborations improving the security of products and services was 2,90, the 38% majority of respondents scaling it to 3.

Even though collaborations were only recognized to somewhat enable a larger amount of radical reforms, having an average of 3,06 and 42% of the people responding a 3, consumers do seem to like more collaborations in the industry to gain more versatile solutions and development. The statement on wanting more collaboration into the industry had the highest average of the section, 3,43 and the 28% majority of replies were given to value 4. Despite the averages being moderate on many parts, the overall perception was that alliances have positive effect on all of the metrics, especially on the amount of solutions available. The averages are presented in Figure 13.

Perceptions having the largest amount of responses at either end of the scale were on collaborations improving the security of the financial solutions as well as wishing to have more collaboration for versified and enhanced solutions. Not surprisingly, 12% of the respondents perceived that collaborations in the industry do nothing for the security of the products and services, whereas 23% of the respondents wished for more collaboration to versify and better the current banking services. The result shows how there are concerns towards security issues, but a bigger request towards development of the solutions.

When tabulating the results in accordance to the age groups, the changes amongst the groups are quite clear. The results show rather invariably how the younger the users, the more they perceive there to be collaboration, benefits arising from collaboration as well as more encouragement to increase the amounts of collaboration. The only exception being the 61-70 year-olds, in which the sample size was small and the generalizability of the results are not as solid as for the other age groups. Figure 13 presents the average differences of the groups.

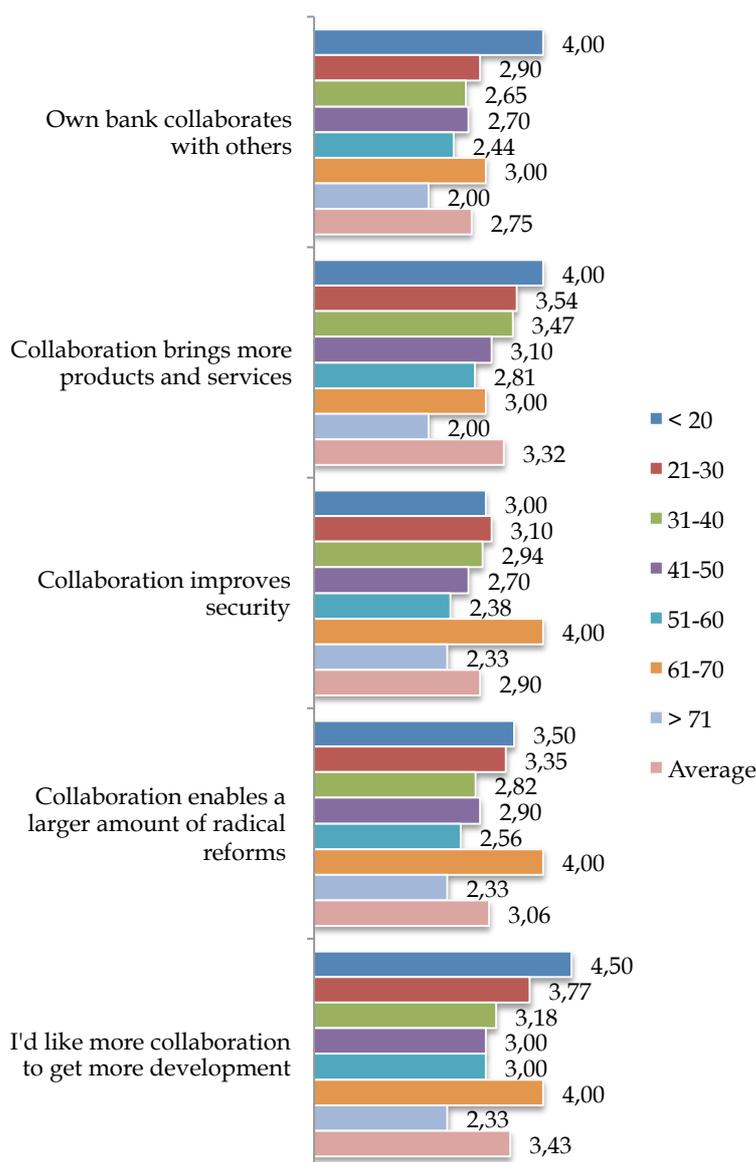


FIGURE 13. Perceptions on collaborations according to age group

After arranging the results in line with the user groups, the results are somewhat unexpected. This is because consumers who only use their bank's products and solutions perceive the collaboration in a more positive way than the consumers who use third party provided online payment methods in additions, except for the amount of collaboration in the future. The result does, however, give support to the interpretation made earlier that consumers that use banking and online payment options would be inclined to use other options, were they perceived more secure. Unremarkably, consumers using the most options available perceive collaboration in the industry in the most positive way on all metrics. The results are presented in Figure 14.

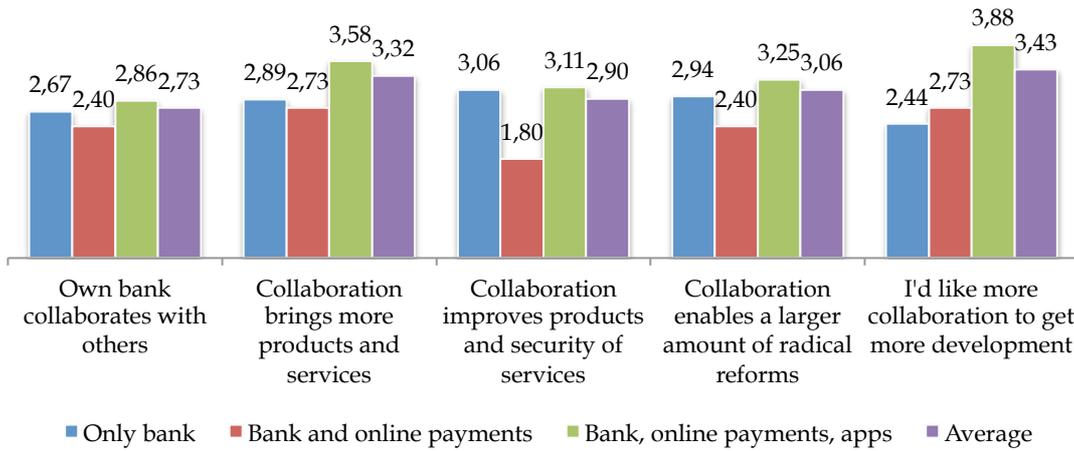


FIGURE 14. Perceptions on collaborations according to user group

The following Tables 11-13 further represent the perceptions concerning collaboration according to the user group. Table 11 shows how banking, online payment and app users see collaboration in the most utilizing way in terms of getting more products and services in the industry, followed by banking consumers, and lastly by banking and online payment consumers. The same order continues when looking at perceptions concerning whether or not collaboration is seen to improve the products and the security of services within the industry represented in Table 12. A 53% majority of the consumers who use banking and online payment solutions do not see collaboration benefitting the industry at all. Even given this, the majority of the entire population falls into perceiving collaboration improving the solutions and security to some extent with 37 responses – corresponding to 37%, followed by the category a lot with 30 responses – corresponding to 30%.

| Collaboration in the industry brings more products and services for consumers |            |            |                |             |           |       |
|---|------------|------------|----------------|-------------|-----------|-------|
|   | Not at all | Slightly   | To some extent | A lot       | Very much | Total |
| <b>Bank, online payments, apps</b>  | 0<br>(0%)  | 4<br>(6%)  | 23<br>(36%)    | 33<br>(52%) | 4<br>(6%) | 64    |
| <b>Bank, online payments</b>  | 0<br>(0%)  | 6<br>(40%) | 7<br>(47%)     | 2<br>(13%)  | 0<br>(0%) | 15    |
| <b>Only bank</b>  | 1<br>(6%)  | 4<br>(22%) | 9<br>(50%)     | 4<br>(22%)  | 0<br>(0%) | 18    |
| <b>Total</b>  | 1          | 14         | 39             | 39          | 4         | 97    |

TABLE 11 Distribution of perceptions concerning collaboration bringing more solutions in the industry according to user group

| <b>Collaboration in the industry improves products and security of services</b> |                   |                 |                       |              |                  |              |
|---|-------------------|-----------------|-----------------------|--------------|------------------|--------------|
|   | <b>Not at all</b> | <b>Slightly</b> | <b>To some extend</b> | <b>A lot</b> | <b>Very much</b> | <b>Total</b> |
| <b>Bank, online payments, apps</b>  | 1<br>(2%)         | 14<br>(22%)     | 28<br>(43%)           | 21<br>(32%)  | 1<br>(2%)        | 65           |
| <b>Bank, online payments</b>  | 8<br>(53%)        | 3<br>(20%)      | 3<br>(20%)            | 1<br>(7%)    | 0<br>(0%)        | 15           |
| <b>Only bank</b>  | 3<br>(17%)        | 1<br>(6%)       | 6<br>(33%)            | 8<br>(28%)   | 0<br>(0%)        | 18           |
| <b>Total</b>  | 12                | 18              | 37                    | 30           | 1                | 98           |

TABLE 12 Distribution of perceptions concerning collaboration improving products and increasing security of services according to user group

As mentioned earlier, there is a wish for more collaboration in the market as presented in Table 13. Not surprisingly, the ones wishing most collaboration also use the most services. Half of the entire sample wish to see a lot or very much of collaboration in the future (51%) and the rate is increasing to 76% of the population when the option “to some extend” is included. Surprisingly, but in line with the earlier results, majority of consumers who use the services offered by their bank and other online payment options only wish to see a slight increase in the amount of collaboration within the industry. 33% of consumers who only use their banking services do not wish to see any increases in the industry collaboration, but as an overall they only represent 6% of the consumers.

| <b>Wish for more collaboration</b> |                   |                 |                       |              |                  |              |
|------------------------------------|-------------------|-----------------|-----------------------|--------------|------------------|--------------|
|                                    | <b>Not at all</b> | <b>Slightly</b> | <b>To some extend</b> | <b>A lot</b> | <b>Very much</b> | <b>Total</b> |
| <b>Bank, online payments, apps</b> | 0<br>(0%)         | 7<br>(11%)      | 15<br>(23%)           | 21<br>(33%)  | 21<br>(33%)      | 64           |
| <b>Bank, online payments</b>       | 0<br>(0%)         | 8<br>(53%)      | 3<br>(20%)            | 4<br>(27%)   | 0<br>(0%)        | 15           |
| <b>Only bank</b>                   | 6<br>(33%)        | 2<br>(11%)      | 7<br>(39%)            | 2<br>(11%)   | 1<br>(6%)        | 18           |
| <b>Total</b>                       | 6                 | 17              | 25                    | 27           | 22               | 97           |

TABLE 13 Distribution of perceptions concerning wish for more collaboration in the industry according to user group

*Perceptions on industry coevolution*

Perceptions concerning the coevolution of the industry focused on the conjoint development of the industry, continuous co-shaping of the industry, the reciprocity of the ecosystem and to test the existence of an active market leader. Scaling of the responses was from 1 (none) to 5 (very much).

The perceptions on the dissimilarities on the companies' offerings as well as the positive effect of competition on the reforms indicate a couple of things for the conjoint development of the industry. Firstly competitors' solutions are seen rather similar, and secondly, the ecosystem has an effect on the own financial service provider's innovations. This indicates that the development of the products and services is rather even and simultaneous for all participants. The industry average was 2,16, with a 41% majority choosing none, concerning any noticeable differences between own bank and its' competitors; and an average of 3,22 - with a 40% majority choosing a lot - for the perception on increased competition on own banks' reforms.

When looking at the shaping of the industry, the consumers had noticed a trend of constant change and diversifying as well as the active creation of new services and products in the industry indicating that many ecosystem participants innovate simultaneously. The highest average of 3,31 was given to the active creation of new services and products, with a 45% majority of respondents choosing a lot as their answer. A considerable value of 93% of people use third party provided solutions in order to support their main financial functions at least to some degree, indicating how a lot of the solutions are used as downstream functions. The development of on such solution helps in developing the entire downstream chain, as well as supports the use of other links down the value chain. Averages are presented in Figure 15, tables of the results can be found from Appendix 3.

One of the questions was aimed at testing a theory of there being a cornerstone company the consumers view as a market leader. The question had only 8 replies, with 2 Fintech companies, one investment company and four banks mentioned. The two Fintechs mentioned were MobilePay and Revolut, one of which offers easy money transfers and payments, the other almost full banking services. Nordnet was the only investment company mentioned, and the company has been operational for more than 20 years. Out of the traditional banking industry, Nordea (x3), OP (x3), Norwegian Bank and Danske Bank were mentioned. The two biggest banks in Finland got both three mentions, but proclaiming them as market leaders in the financial services industry would be rather hasty with such a small sample size.

When comparing the perceptions according to the consumer ages, the middle groups tend to think there is less conjointment and that there are differences in the offerings of own financial provider and its competitors the most - again this might be due to mortgages and having tighter relations towards their banking institutions. For the continuous re-shaping of the entire industry, the results were rather even, generally the younger perceiving a bit more of the changes. Younger users also tend to do more of the downstream

usage of the products than the older, fits well with the use of financial services outside of own bank result - the more solutions are in use, the more they support and are used to support one another.

Figure 15 presents the perception metrics towards coevolution according to the user groups. Not surprisingly, the user group using the most solutions perceives the most continuous development and re-shaping of the industry. Respectively, the consumer group that uses the least amount of solutions perceives the most differences in the industry offerings, while having no experiences of the other market options. Even when a bit unlikely, the consumers who only use banking services did rate a higher level of continuous development and re-shaping of the industry than the consumers also using online payment options. The difference could be explained by better knowledge or noticeability due to concentrated use only to one channel.

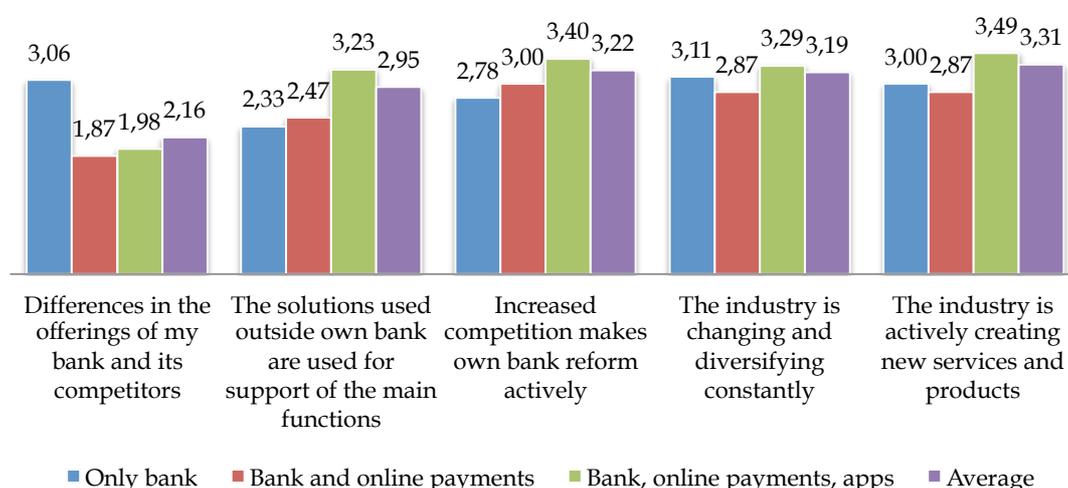


FIGURE 15. Perceptions on coevolution according to user group

## 5.4 Research summary

This section presents a summary of the significant research findings. Firstly, the results were tabulated as an overall average - then according to age, usage and geographies. The geographic differences did not result in any significant differences in the data, age having an effect in the majority of perceptions. The first major finding of the research was that the extent to which consumer's use the products and services is the most significant congruent factor when comparing different sample groups against one another.

*Perceived development of the industry*

The overall familiarity of the available solutions was on a very good level. Consumers recognized to having more incremental innovations and a generally growing number of innovations in the industry. Almost the same factors that were rated high in the customer value spectrum were perceived to experience positive developments within the past two years after the PSD2 had been set.

Familiarity of the products and services was high. Consumers are very familiar with the market products and services, 81% of users use at least online payment options outside of their bank.

There were various findings to the value of innovations from the consumers' perspective. Overall, consumers' perceive to have incremental innovations and growth of visible innovations. When dividing the sample into smaller demographics, there were some clear differences amongst the populations. Perception of dud innovations correlates highly with age, the higher the consumer's age, the more they perceive there being dud innovations. Usage has a big significance in the perception of innovation value: the more solutions used, the lower the perception on dud innovations, the higher the perception on radical innovations and on increase in the amount of innovations. The same idea works for the opposite user group too, as consumers using only their bank's solutions do not perceive there being radical innovations. Generally most innovations are perceived to better the quality of existing products and services, least on bettering the customer experience.

Development of competitiveness was perceived to positively affect the incumbents' offerings; the biggest positive changes in banks had been in user-friendliness of products and services, availability of products and services, technological development and speed. The importance of customer service and communication rose with age, whereas the importance of technological development and speed decreased. The oldest age group, >71 year-olds, perceived by far the most negative changes in their service offerings. When looking at the segmentation by use, the banking customers value personal high quality services where as the more comprehensive users value more of a varied and speedy, yet comfortable user experience. The more options and solutions the consumer uses, the more they perceive positive developments in their banking solutions.

*Consumption preferences and perceived alliance value*

The general perceptions indicate that there is a high awareness of industry threats, the preference being to use the safer options in the market. But, in case there is a solution that offers better consumer experience, the threat becomes secondary. Collaboration is viewed to bring more solutions into the market and there is a request for its increase.

The effect of threats somewhat affects the usage of different solutions. Banks are seen as the safer option than third party providers, but the consumers choose an option available that speeds up and offers more user comfort. When looking at the demographics conserving age, the older the user, the more the threat affects their usage. The younger generations are also more prone to easily sharing their information with third party providers. The user segmentation results were rather predictable, as the less the consumer has solutions in use, the bigger the perceived cyber security threat. But given this, it was surprising that according to the data, banking consumers would be more inclined to share their information if they perceived there would be improved speed and user comfort where as banking and online payment consumers would be more inclined to share their information if they perceived its security. Banking and online payment solutions user group let the threat affect their consumption behaviour more than only consumers utilising their bank's products and services.

The effect of alliances on industry innovations was mostly positive. Consumers perceive collaboration bringing more products and services into the industry and wish more of it in order to enjoy more innovations. Demographical segmentation supports the earlier research results as the younger the users, the more they perceive there to be collaboration, benefits arising from collaboration as well as more encouragement to increase the amounts of collaboration. Consumers using the most options available perceive collaboration in the industry in the most positive way on all metrics.

### *Coevolution of the industry*

There is a perception of having a rather even and simultaneous development in the industry, with similar product offerings being on the market at the same time. This indicates that many ecosystem participants innovate in unison i.e. coevolve. Many consumers also use various providers' solutions as downstream functions, as to support one another.

Conjoint development of the industry is fairly obvious to most consumers. Competitors' solutions are seen rather similar and the ecosystem is seen to having an effect on the own financial service provider's innovations. A bit surprisingly, the age groups in the middle think there is less conjointment and that there are differences in the offerings of own financial provider and its competitors the most. The consumer group that uses the least amount of solutions perceives the most differences in the industry offerings.

Continuous re-shaping of the entire industry has been a visible activity. Consumers have noticed a trend of constant change and diversifying, as well as the active creation of new services and products in the industry. Quite expectedly, the user group using the most solutions perceives the most continuous development and re-shaping of the sector.

Use of one supports the use of another product or a service in the industry, as 93% of people think to use third party provided solutions in order to support their main financial functions at least to some degree. This supports

the theory that the development of one benefits and affects positively to the development of another as the solutions are used together. Demographically speaking, younger users tend to do more of the downstream usage of the products than the older.

Existence of an active market leader remains indecisive as banks are seen as somewhat market leaders, but there were no clear active one.

## 6 DISCUSSION

### 6.1 Overview

The objective of this thesis was to offer an outline of the consumer perceptions concerning the changes and developments in the financial sector after the onset of the PSD2. At large, the results show that the developments in the industry have been perceived as positive in all measured areas of innovation, competitiveness, collaborations and coevolution. The findings enable not only an industry overlook, but also progress considerations concerning many functions of the financial sector.

While the overall perceptions were positive, the demographical differences amongst the population are noticeable. The findings indicate that there are various considerations that affect the consumer perception, the biggest ones being the extent of use and age. Although there have been some clear indications on the needs and wants of different age and geographical groups, the extent of use has been vastly overlooked so far. Not being able to cater the needs of these different demographical groups shows how the industry is lacking in incorporating the necessary value propositions into their strategies. This is the main reason causing opportunities and threats for the operating companies, as well as causing a division in the consumer behaviors.

The presence of multiple terms and definitions, not to mention the industry knowledge on the consumers' side, cause complications for the discussions on the industry issues. The development of old and the creation of new solutions have already created processes that interact together, but the end users do not always understand the structures and relations. The perception differences indicate how unevenly the consumer groups view and enjoy from the innovations, comprehend the threats and development of the industry as well as wish from the future directions. It can be argued that the banks that have acquired or collaborate with downstream Fintechs have a better-equipped base for further increasing the consumer experience. The companies that have not incorporated joint- or open innovation processes are to experience a bigger disruption in the future when being left more behind. The same can be said about the consumers, it is undeniably likely that the user preferences will change in the future and that the cyber security issues will be a lesser of a threat, alluring more consumers to try innovative solutions. The ones actively looking for the best product and service options will be the ones benefitting from the reforms the most.

The results of this study both support and expand many findings considering consumer segmentation in the financial sector, innovation creation after technological shocks as well as adaptation to new technologies. The following sections present the relationship of the findings in terms of previous studies as well as the different contributions to literature.

## 6.2 Contributions to literature on innovation and competitiveness after an industry shock

This section discusses the main findings in terms of previous studies taking into account innovations and competitiveness after a technology shocks.

In reflection to the previously presented financial sector consumer segmentation by Holstius and Kaynak (1995) as well as Accenture Global Financial Services Consumer Study (2019) of age and geographies being the most significant factors, this study presents that the biggest factor in consumers' perception and preferences is the extent of use of the products. The earlier studies presented that age is a significant factor in perceptions, a result of which the findings of this study are in congruency. The geographical differences were not measured as in living in cities and urban areas as in the previous studies, but as provincial sectors. The findings suggest that there are no significant provincial differences in the perceptions, extending the earlier regional classifications.

Earlier research by Cortet et al. (2016) suggested there are four ways for incumbents to react to a regulatory change; comply, compete, expand or transform. According to the research findings on the amounts of radical changes, the incumbents have somewhat expanded and/or transformed their operations - though this not visible for the consumers who are not using all available services. There have been visible increases in the overall amount of innovations and in the amount of incremental innovations. This indicates that, the industry is still experiencing an adaptation period, and for the time being, the unstable and risky market conditions encourage to focus on the safer incremental innovations as Garcia-Murillo (2011) suggested.

The results on the value of innovation emphasizes that all participants need to be prepared to create new capabilities and modes of operation in order to fully exploit new technological advances. Consumers should use multiple products and services from different providers in order to enjoy the full benefits of the reforms. Companies need to take an active initiative to educate consumers on the use of different solutions, also the downstream functions, as consumer adaptation to new services increases the chances of them not leaving their existing service provider (Xue et al, 2011). Also Karjaluoto et al. (2002b) summed up how knowledge and education are the biggest factors affecting the use of a financial service channel in the 2000s, which further emphasizes the necessity of informative marketing and communication in order to reach a higher rate of consumer adaptation.

The demographical results indicate how the available technological solutions, even though important, are not the most important influencer in consumption preferences in the industry. The third party technologies are used outside of one's service provider, but the problems arise in transferring the value to the uninformed consumers and making them understand the attainable technological values. This information gap is a clear sign for the management to start investing into education alongside the technology. By doing so,

one could possibly achieve a leadership position described by Harraf et al (2018) and retain overall innovation and relevance towards customers within the ecosystem.

Kasasbeh et al. (2017) identified the metrics affecting competitiveness in the modern times, most of which had been perceived to experience positive trends after the PSD2. The overall results indicate how the same factors that were rated higher in the customer value spectrum were perceived to experience positive developments in the industry within the past two years, though the developments had not been drastic. These improvements are in line with the statements by Románova et al. (2018) as well as Jackson (2018) of opening the market to more providers positively affecting innovative solution development, functionality and pricing for the consumers, which are all included in the competitiveness matrix. The European Banking Authority (2017) listed the main functions of the PSD2 to be improving consumer rights and promoting competition in the sector, thus affecting to the amounts of solutions offered to consumers. According to the results, competitiveness has increased and there are more innovations in the industry, which brings more options for all consumers, making the PSD2 fulfill its purpose.

The research results also expand the existing literature concerning the consumer-preferred focus by highlighting that the consumer value chains must take into account the factors of availability, transparency and safety, usability as well as speed. Additional products and services, customization and communication were not deemed as highly. These indicate that the preferred developments revolve around incremental and existing solution offerings.

### **6.3 Contributions to literature on threats, alliances and coevolution**

The results show how the consumer trust is notably leaning towards the banking sector, a result that supports the earlier Accenture Global Financial Services Consumer Study (2019). All consumer segments were in line with this, though their consumption behavior experienced divergent trends. This arose from the elements of having a high mindfulness of the industry threat but placing it differently in terms of consumption preferences. The younger the user or the more solutions the user uses, the likelier that they choose better consumer experience over service provider security.

The outcomes of this research also expanded the results received concerning perceptions on the industry threats as the data indicates that banking consumers would more willingly share their information if they perceived there would be improved speed and user comfort, where as banking and online payment consumers would more willingly share their information if they perceived its security. This signifies how there is a bigger security related threshold in jumping to third party app usage than third party online payments.

The overall perception was that collaboration brings more solutions into the market and consumers wish to have more of it. This supports the theories by Laursen and Salter (2006) as well as Powell et al. (1996), whom advocated collaboration and open innovation boosting creatational processes and enabling the creation of more solutions. The younger the users as well as the more options the user uses, the more the perceived amount of collaboration, benefits arising from collaboration as well as encouragement to increase the amounts of collaboration. The results do also support the earlier consumer segmentation results of Holstius and Kaynak (1995) as well as Accenture Global Financial Services Consumer Study (2019) of the metropolitan minded consumers of being more open to industry changes.

As introduced in the theory section, according to Liu and Rong (2015) as well as Talay et al. (2014), coevolution in the business world refers to the development of two or more interdependent companies that have an effect on each other. When reflecting this to the financial sector in Finland, there has been a notion of having one as a recent study conducted by Helsinki Fintech Farm (2019, 12-24) stated, there has been an idea to continuously build a locus of innovation into the financial sector in Finland by pooling advantages from an environment of coexisting, co-benefitting as well as coevolving. According to this study, the conjoint development and continuous re-shaping of the industry have been fairly obvious to most consumers. Direct competitors' offerings are seen as rather similar, the use of services and products enable and boost the use of others, and the ecosystem is seen to having an effect on the own financial service provider's innovations. The offerings are diversifying frequently and there is a clear notion of actively putting out new solutions in the entire industry. This adds to the previous research by indicating the industry is already coevolving together, and doing so rather mutually in reflection to Talay et al.'s classifications.

Jacobides (2019) stated that the value proposition of an ecosystem arises from being larger than any other company can offer individually also enabling a larger pool of capabilities and shared risks. This is especially visible in the use of downstream affiliations in the financial industry as the innovation of one benefits the entire chain (Silverman & Baum, 2002). The outcomes of this study show how 93% of consumers think to use third party provided solutions in order to support their main financial functions at least to some degree. The solutions are used, not to replace, but to enhance one's user experience. These indicate that the solutions are interdependent, and that downstream alliances would bring most value to the industry participants.

In contrast to the theory of having a keystone leader within an ecosystem by Iansiti and Levien (2004) as well as Moore (1993), the results of having one in the financial sector in Finland were indecisive. Banks were mentioned to somewhat move the entire community towards mutual benefits and vision but the sample of replies was considerably small for making claims to either direction.

## 7 CONCLUSIONS

### 7.1 Concluding remarks

Adapting to technological developments while maintaining a proactive approach to consumer consumption behavior plays a growing role in the future of financial industry offerings. The PSD2 provided a good example of a wider industry shock, which showed how regulations could be used to effectively impact the innovative landscape of an entire sector. The consideration of the entire ecosystem provides an overlook on the comprehensive reforms within the industry from the governmental bodies to consumers as well as from the incumbents to the newer market entrants. The extensive impact of the market reforms can be seen in the number of new technologies in the industry, quality improvements in the existing solutions as well as increased benefits of collaboration. Acquisitions, mergers and increases in capital investments are also a growing trend in the industry in order to provide the best user experiences (Meager, 2017).

This study enlightens the consumer perceptions in the Finnish environment and builds on literature concerning adaptation to industry shocks as well as alliance-based competitive dynamics by offering a viewpoint on how such technologies are perceived and responded to by the end users. The findings demonstrate how there are large differences in the perceptions of the different demographics and sheds light to their consumption preferences giving indication for future innovation pinpoints and managerial implications.

The results suggest a need for better organizational versification, increased education and spread of information, as well as higher collaboration. Earlier studies (cf. Helsinki Fintech Farm, 2019; Accenture Global Financial Services Consumer Study, 2019) indicate how the ecosystem companies have acknowledged the needs to make organizational changes in order to innovate more, but the consumer segments and the dissemination of information need to be kept in mind throughout the process. The indication that consumers mainly wish for the existing solutions to improve and use third party solutions as downstream functions, give a clear indication on the ecosystem needs to build on complementary solutions that function together. These solutions are most easily accessible by collaboration, mergers and acquisitions.

The underlying uncertainties and risks affect the development and use of the industry products and services by large. As a result, the adaptation process is hard for the companies, but also for the consumers. Incumbents need to provide innovations in fast cycles and Fintechs to build consumer trust quickly. The consumers, on the other hand, also need to build knowledge and competences to use various solutions in order to enjoy the most benefits. At the moment, the approaches to the newer innovations are with some precaution, making the provision and demand tilt towards incremental innovations, instead of radical ones.

This study indicated that finding a balance between the existing business models and the new opportunities as well as risks, while keeping the consumers informed, is extremely important. Consumers should get more educational guidance on the newer technologies and innovations, without feeling overwhelmed or confused. This approach would enable development, adaptation and readjustment to take place simultaneously. The recent changes in the financial sector show how disruptive technologies may result in a larger coevolutionary ecosystem where benefit of one benefits many.

## 7.2 Managerial implications

The disruption caused by the PSD2 has affected the industry functions broadly creating great amounts of opportunities and uncertainties. There were clear indications that the reforms and innovation fabrication do not meet the consumer needs and wants. The first takeout of the research findings indicate that need to jointly focus on the operational business value as well as consumer value when providing new innovations in the market. When considering the overall business operations, there should be clear strategic path on whether to innovate in-house or collaborate on one. This is how the industry would produce more valuable innovations and less dud innovations.

One indicator that the provision of reforms has not fully met the consumer needs is that the overall industry is seen to improve the quality of existing products and services, but not to better the consumer experience to the same degree. Bettering the customer experience for all segments should be a number one concern if there are many competitors offering substitute goods and services available.

One of the major findings of the study was how unevenly different demographical groups enjoy of the new solutions. Perception on dud innovations increases with age hinting at how, for them, the novelty solutions bring less value to. The oldest age group also perceived the biggest amount of negative changes in their service offerings as well. Consumers, who use only the solutions provided by their bank, did not perceive radical innovations leaving them out of the reach of the biggest industry reforms. Even though the older and more reserved users are the minority at the moment, their consumer experiences should not be overlooked signifying that the consumer segmentation and offerings based on age and product use need more than just fine-tuning.

When looking more in-depth of the consumer segmentation by use, the banking customers value personal high quality services where as the more comprehensive users value more of a varied and speedy, yet comfortable user experience. Cyber security is highly acknowledged but not seen as that big of an issue, as most consumers choose a consumer experience over the threat. Some segments need more information and reassurance on the matter. The data suggests that banking consumers would be more prone to share their information with third party providers if they perceived there would be im-

proved speed and user comfort where as banking and online payment consumers would be more inclined to share their information if they perceived its security. Both of these prejudices could be tacked with clear and informative communication.

There is a positive reception concerning increased collaboration. Consumers see industry collaboration in a positive light and wish to see more of it, which would be especially beneficial for the downstream usage of products and services and for further conjoint development of the ecosystem. Other recommendations for the industry decision makers would be to implement successful consumer adaptation schemes, including better segmentation with a continuous a loop of feedback, training and education specific for all demographic groups, as well as open communication channels on newer industry solutions and collaborations. These would ease the user adaptation and lessen the overall industry preconceptions resulting in more contented users whom enjoy the reforms to the fullest.

### 7.3 Limitations and future research

There are numerous limitations that need to be discussed concerning this research. The first major limitation is the size of the research sample, and thus the generalizability of the results. Even though the overall sample was comprehensive enough, some demographical areas were small. The age groups of <20, 61-70 and >71 year-olds were small, representing only a tiny fraction of the responses. The same goes for the regional differences, three provinces were comprehensively represented, two quite fairly and the rest nine too trivially. This is why precaution needs to be taken into account concerning the generalization of the perception of these demographics.

The large age and regional response rates can be largely explained by the spread of the survey on online channels only. The next discussed limitation is the spreading of the survey. The survey was shared on social media, in various discussion groups. The influence of social connections when it comes to responding and sharing of the survey cannot be overlooked as the majority of the respondents are somehow acquainted directly with me or my friends and family. Though given this, taking part in the study was completely voluntary, the respondents are from various backgrounds and belong to the average consumers making the representativeness of the sample comprehensive.

The standard deviations were a bit on the higher side for the overall results, indicating how scattered the responses were. The deviation of the demographical samples was a lot smaller countersigning the more coherent answers. Also the knowledge of the consumers could be questioned concerning their usage of the solutions. The amount of consumers using only their own banks' services was rather high, something that might be due to lack of knowledge of the service providers. The complexity of the issues, as well as the accuracy of the replies, could have been fined down with qualitative inter-

views. These more in-depth results would have given more accuracy as well as reliability for the perceptions under study.

Perceptions concerning the coevolution of the industry were a bit hard to intergrade in a way that it would be easy to understand, reply and apply to the theory from the consumers' side. The original plan was to engage the perceptions of the market entrants, who could have offered valid views and knowledge on the amounts of true coevolution. This is because they have fresh yet profound first-hand experiences on the industry structures, collaboration as well as development. Further research on their perceptions as well as the incumbents would be necessary in order to paint the full industry picture and layout of the coevolutionary process.

On top of this, there are several opportunities for future studies on the matter. When thinking of the consumer perceptions of the Finnish customers, this research offers a fairly general outline concerning the initial industry perceptions and how well the reforms have been received. The literature on the financial sector and its various regulations has been well studied, but the diffusion of the Fintechs and banking sector is still rather scarce. This leaves wide gaps in the research of innovation creation in the sector from all perspectives, whether it being singularly or in collaboration.

This thesis provides information on the multiple factors that need to be considered in the industry and the initial perceptions towards the newer technologies. The findings also indicate some competences that need to be further refined by the ecosystem. The shifting of the focus from the consumers to the solution providers should enable a further outlook on the implementation and adaptation strategies of the entire industry in the future. This would also highlight the company specific strategic approaches and enable to look for the most successful implementation policies in times of industry disturbances, and also provide the possibility to study the various divergent decision-making policies within singular companies.

When thinking of the literature on industry shocks affecting the innovation and competitiveness of a sector, a more in-depth research is required. The existing literature explains the likely outcomes on a surface level, but more research is needed for the strategic management of such change as well as consumer adaptation processes. Hard data from the companies' side would also enable a profound examination on the actual amounts of changes in the metrics, not just the subjective perceptions.

Previous research on collaboration and coevolution builds largely on the company specific opportunities and threats, less on the perceived consumer value. Even though these are crucial per enterprise, the processes will eventually windup as unavailing if the end users see them as inadequate. This study shows how the notions and concepts are prominent in the industry, but their implementation as well as measurement of the provided value are still somewhat challenging. The question concerning the best strategic adaptation to industry shocks while creating processes that produce the most lucrative solutions remains as a relevant research topic.

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## APPENDIX 1 OUTLINE OF THE ONLINE SURVEY

### Preliminary information

1. Age:
  - a. < 20
  - b. 21 - 30
  - c. 31 - 40
  - d. 41 - 50
  - e. 51 - 60
  - f. 61 - 70
  - g. > 71
2. Province
  - a. Uusimaa
  - b. Varsinais-Suomi
  - c. Satakunta
  - d. Häme
  - e. Pirkanmaa
  - f. Päijät-Häme
  - g. Kymenlaakso
  - h. Etelä-Karjala
  - i. Etelä-Savo
  - j. Pohjois-Savo
  - k. Pohjois-Karjala
  - l. Keski-Suomi
  - m. Etelä-Pohjanmaa
  - n. Pohjanmaa
  - o. Keski-Pohjanmaa
  - p. Pohjois-Pohjanmaa
  - q. Kainuu
  - r. Lappi
  - s. Ahvenanmaa

### Part 1.

This section concerns your views about the payment services industry activities. "Other Service Providers" refers to the payment and financial management products and services that you use and are not provided by your bank (for example, various applications as well as online payment options).

3. Which of the following do you use to handle your monetary and financial matters
  - a. Only services offered by your bank
  - b. The services of your own bank and other online payment options
  - c. The services of your own bank, other online payment options as well as third provider apps

4. There are many failed reforms in the payment and financial services (so - called dud products/services)
  - A scale from 1 (completely disagree) to 5 (completely agree)
5. The payment and financial services reforms have emerged gradually and are relatively small changes
  - A scale from 1 (completely disagree) to 5 (completely agree)
6. The payment and financial services reforms have been vast in number and radical
  - A scale from 1 (completely disagree) to 5 (completely agree)
7. The overall amount of reforms have increased in the industry drastically within the past two years
  - A scale from 1 (completely disagree) to 5 (completely agree)
8. Payment services and financial management reforms have been most effective (you can choose two out of the four)
  - a. Enhanced customer experience
  - b. The amount of new products and services
  - c. Development of existing service or product
  - d. Stronger authentication and security
9. What features do you value in payment and financial management services. A matrix, all questions having options from 1 (none) to 5 (very much).
  - a. Price
  - b. Customer service
  - c. Availability of products and services
  - d. User-friendliness of products and services
  - e. Availability and quality of additional services
  - f. Technological development and speed
  - g. Customization of services according to personal needs
  - h. Amount and quality of communication
10. How do you see the changes in the service delivery areas of your bank over the last two years. A matrix, all questions having options from 1 (negative) to 5 (positive).
  - a. Service pricing
  - b. Quality of customer service
  - c. Availability of products and services
  - d. User-friendliness of products and services
  - e. Availability and quality of additional services
  - f. Technological development and speed
  - g. Customization of services according to personal needs
  - h. Amount and quality of communication

#### Part 2.

This section covers cyber security and user-friendliness. Financial services refer to all financial management services including for example online payments, wire transfers, money management, loans, and insurance.

11. Cyber security: Choose an option that describes your own opinion. A matrix, having a scale from 1 (completely disagree) to 5 (completely agree).
  - a. Cyber security is a threat in the financial sector
  - b. Cyber security threat limits the amount of financial services I use
  - c. I use financial services outside of my bank
  - d. Banks are a safer option than other companies offering financial services
  - e. The potential of a cyber security threat affects the financial services options I use more than speed and comfort
  - f. I easily share my account and payment information with other service providers if it speeds up the transaction or improves the user comfort
12. Collaboration: Choose an option that describes your own image of the industry. A matrix, all questions having options from 1 (none) to 5 (very much).
  - a. My bank collaborates with other service providers
  - b. Collaboration in the industry brings more products and services for consumers
  - c. Collaboration in the industry improves products and security of services
  - d. Collaboration in the industry enables the introduction of a larger amount of radical reforms
  - e. I'd like my bank to do more collaboration with other service providers in order to develop and enhance their services and products
13. Co-evolution: Please select an option that describes your own opinion. A matrix, all questions having options from 1 (none) to 5 (very much).
  - a. There are differences in the service offerings of my bank and its competitors
  - b. The other financial solutions that I use outside of my own bank support my banking activities
  - c. Increased competition in the industry makes my bank reform its services actively
  - d. The industry is changing and diversifying constantly
  - e. The industry is actively creating new services and products
14. Is there a cornerstone company in the industry that you see as a market leader? If yes, what company? Open-ended question.

## APPENDIX 2 THEMES AND SUB-THEMES OF THE SURVEY

| Component  | Sub-themes                               | Theme                                 |
|--|--|---------------------------------------|
| Use of different services  | Familiarity of the products and services | Perceived development of the industry |
| Amount of dud products and services  | Value of innovation                      |                                       |
| Amount of incremental products and services  |  |                                       |
| Amount of radical products and services  |  |                                       |
| Growth of visible innovations after the PSD2   |  |                                       |
| Innovation pinpoint; better customer experience, amount of products/services available, enhanced, better quality of existing product/service, stronger authentication and security |  |                                       |
| Price  | Development of competitiveness           |                                       |
| Customer service   |  |                                       |
| Availability of products and services  |  |                                       |
| User-friendliness of products and services   |  |                                       |
| Availability and quality of additional services  |  |                                       |
| Technological development and speed  |  |                                       |
| Customization of services according to personal needs  |  |                                       |

| Component   | Sub-themes                                      | Theme  |
|---|---|--|
| The extent cybersecurity is seen as a threat  | The effect of threats on usage                  | Consumption preferences and perceived alliance value |
| The extent third party solutions are used   |   |  |
| The degree to which threats and user-friendliness are valued                            |   |  |
| Amount of alliances in the industry   | The effect of alliances on industry innovations |  |
| Effect of alliances on the product/service output                                       |   |  |
| Effect of alliances on the product/service security                                     |   |  |
| Effect of alliances on the amount of radical product/service output                     |   |  |
| Personal inclination of wishing more alliances to develop and enhance services/products |   |  |

| Component   | Sub-themes                                     | Theme                       |
|---|--|-----------------------------|
| Offering heterogeneity of similar companies                               | Conjoint development of the industry           | Coevolution of the industry |
| Effect of the ecosystem on own financial service provider's innovations   |  |                             |
| The degree of constant change and diversifying in the industry            | Continuous re-shaping of the entire industry   |                             |
| The degree of actively creating new services and products in the industry |  |                             |
| Downstream usage of products/services                                     | Development of one supports the use of another |                             |
| An active keystone leader   | Existence of an active market leader           |                             |

## APPENDIX 3 SURVEY RESULTS, TABLES

| Age distribution |                   |            |
|------------------|-------------------|------------|
| Age group        | Number of replies | Percentage |
| < 20             | 2                 | 2 %        |
| 21-30            | 49                | 49 %       |
| 31-40            | 17                | 17 %       |
| 41-50            | 10                | 10 %       |
| 51-60            | 16                | 16 %       |
| 61-70            | 2                 | 2 %        |
| > 71             | 3                 | 3 %        |

| Province distribution |                   |            |
|-----------------------|-------------------|------------|
| Province              | Number of replies | Percentage |
| Uusimaa               | 28                | 28 %       |
| Pohjois-Savo          | 19                | 19 %       |
| Pirkanmaa             | 17                | 17 %       |
| Kymenlaakso           | 8                 | 8 %        |
| Keski-Suomi           | 8                 | 8 %        |
| Varsinais-Suomi       | 3                 | 3 %        |
| Pohjois-Karjala       | 3                 | 3 %        |
| Päijät-Häme           | 3                 | 3 %        |
| Pohjois-Pohjanmaa     | 2                 | 2 %        |
| Satakunta             | 2                 | 2 %        |
| Häme                  | 2                 | 2 %        |
| Etelä-Savo            | 2                 | 2 %        |
| Etelä-Karjala         | 1                 | 1 %        |
| Etelä-Pohjanmaa       | 1                 | 1 %        |

| Value of innovations    |             |             |                           |                           |           |                    |           |                  |
|-------------------------|-------------|-------------|---------------------------|---------------------------|-----------|--------------------|-----------|------------------|
|                         | 1           | 2           | 3                         | 4                         | 5         | Standard Deviation | Responses | Weighted Average |
| Dud innovations         | 16<br>(16%) | 38<br>(39%) | <b>40</b><br><b>(41%)</b> | 1<br>(1%)                 | 2<br>(2%) | 16.87              | 97        | 2.33 / 5         |
| Incremental innovations | 0<br>(0%)   | 17<br>(18%) | <b>48</b><br><b>(50%)</b> | 27<br>(28%)               | 4<br>(4%) | 17.29              | 96        | 3.19 / 5         |
| Radical innovations     | 5<br>(5%)   | 27<br>(28%) | 29<br>(31%)               | <b>31</b><br><b>(33%)</b> | 3<br>(3%) | 12.33              | 95        | 3 / 5            |

|  |           |           |             |                           |             |       |    |          |
|--|-----------|-----------|-------------|---------------------------|-------------|-------|----|----------|
| Growth of visible innovations after the PSD2 | 7<br>(7%) | 4<br>(4%) | 24<br>(24%) | <b>36</b><br><b>(36%)</b> | 28<br>(28%) | 12.34 | 99 | 3.75 / 5 |
|  |           |           |             |                           |             |       |    | 3.07 / 5 |

| Perceptions on dud innovations, according to age |                    |           |                  |
|--|--------------------|-----------|------------------|
| Age  | Standard Deviation | Responses | Weighted Average |
| <20  | 0.80               | 2         | 1.00 / 5         |
| 21-30  | 9.69               | 48        | 2.19 / 5         |
| 31-40  | 1.83               | 16        | 2.25 / 5         |
| 41-50  | 2.10               | 10        | 2.40 / 5         |
| 51-60  | 4.17               | 16        | 2.63 / 5         |
| 61-70  | 0.80               | 2         | 3.00 / 5         |
| >71  | 0.80               | 3         | 3.67 / 5         |

| Perceptions on incremental innovations, according to age |                    |           |                  |
|--|--------------------|-----------|------------------|
| Age  | Standard Deviation | Responses | Weighted Average |
| <20  | 0.49               | 2         | 3.50 / 5         |
| 21-30  | 9.00               | 48        | 3.19 / 5         |
| 31-40  | 2.76               | 15        | 3.13 / 5         |
| 41-50  | 1.67               | 10        | 2.90 / 5         |
| 51-60  | 3.54               | 16        | 3.19 / 5         |
| 61-70  | 0.49               | 2         | 3.50 / 5         |
| >71  | 0.49               | 3         | 4.00 / 5         |

| Perceptions on radical innovations, according to age |                    |           |                  |
|--|--------------------|-----------|------------------|
| Age  | Standard Deviation | Responses | Weighted Average |
| <20  | 0.80               | 2         | 2.00 / 5         |
| 21-30  | 6.65               | 47        | 2.94 / 5         |
| 31-40  | 2.50               | 17        | 3.00 / 5         |
| 41-50  | 1.90               | 10        | 3.20 / 5         |
| 51-60  | 2.61               | 15        | 3.27 / 5         |
| 61-70  | 0.40               | 2         | 2.00 / 5         |
| >71  | 0.80               | 3         | 3.00 / 5         |

| Perceptions on growth of innovations, according to age |                    |           |                  |
|--|--------------------|-----------|------------------|
| Age  | Standard Deviation | Responses | Weighted Average |
| <20  | 0.49               | 2         | 3.50 / 5         |
| 21-30  | 9.00               | 48        | 3.19 / 5         |
| 31-40  | 2.33               | 17        | 3.82 / 5         |
| 41-50  | 2.00               | 10        | 3.50 / 5         |

|       |      |    |          |
|-------|------|----|----------|
| 51-60 | 1.60 | 16 | 3.63 / 5 |
| 61-70 | 0.49 | 2  | 2.00 / 5 |
| >71   | 0.49 | 3  | 3.33 / 5 |

| Development of competitiveness, what do consumers value |           |                           |                           |                           |             |                    |            |                  |
|---|-----------|---------------------------|---------------------------|---------------------------|-------------|--------------------|------------|------------------|
|   | 1         | 2                         | 3                         | 4                         | 5           | Standard Deviation | Re-sponses | Weighted Average |
| Price   | 4<br>(4%) | 17<br>(18%)               | 23<br>(24%)               | <b>37</b><br><b>(38%)</b> | 16<br>(16%) | 10.74              | 97         | 3.45 / 5         |
| Customer service  | 0<br>(0%) | 14<br>(14%)               | 27<br>(28%)               | <b>37</b><br><b>(38%)</b> | 20<br>(20%) | 12.44              | 98         | 3.64 / 5         |
| Availability of products and services                   | 0<br>(0%) | 2<br>(2%)                 | 13<br>(13%)               | <b>54</b><br><b>(55%)</b> | 29<br>(30%) | 20.05              | 98         | 4.12 / 5         |
| User-friendliness of products and services              | 0<br>(0%) | 0<br>(0%)                 | 3<br>(3%)                 | <b>49</b><br><b>(50%)</b> | 46<br>(47%) | 22.83              | 98         | 4.44 / 5         |
| Availability and quality of additional services         | 6<br>(6%) | <b>37</b><br><b>(38%)</b> | 26<br>(27%)               | 24<br>(24%)               | 5<br>(5%)   | 12.34              | 98         | 2.85 / 5         |
| Technological development and speed                     | 3<br>(3%) | 16<br>(16%)               | <b>33</b><br><b>(34%)</b> | 30<br>(31%)               | 16<br>(16%) | 10.86              | 98         | 3.41 / 5         |
| Customization of services according to personal needs   | 5<br>(5%) | 29<br>(30%)               | <b>37</b><br><b>(38%)</b> | 20<br>(20%)               | 7<br>(7%)   | 12.35              | 98         | 2.95 / 5         |
| Amount and quality of communication                     | 0<br>(0%) | <b>40</b><br><b>(41%)</b> | 28<br>(29%)               | 25<br>(26%)               | 5<br>(5%)   | 14.92              | 98         | 2.95 / 5         |
|   |           |                           |                           |                           |             |                    |            | 3.48 / 5         |

| Development of competitiveness, how do consumers see the changes in their banks (i.e. incumbents) |           |             |                           |                           |             |                    |            |                  |
|---|-----------|-------------|---------------------------|---------------------------|-------------|--------------------|------------|------------------|
|   | 1         | 2           | 3                         | 4                         | 5           | Standard Deviation | Re-sponses | Weighted Average |
| Price   | 5<br>(5%) | 8<br>(8%)   | <b>60</b><br><b>(61%)</b> | 18<br>(18%)               | 7<br>(7%)   | 20.69              | 98         | 3.14 / 5         |
| Customer service  | 4<br>(4%) | 7<br>(7%)   | 38<br>(39%)               | <b>44</b><br><b>(45%)</b> | 5<br>(5%)   | 17.60              | 98         | 3.40 / 5         |
| Availability of products and services   | 2<br>(2%) | 13<br>(13%) | 21<br>(21%)               | <b>45</b><br><b>(46%)</b> | 17<br>(17%) | 14.19              | 98         | 3.63 / 5         |
| User-   | 2         | 11          | 18                        | <b>42</b>                 | 25          | 13.54              | 98         | 3.79 / 5         |

|   |           |             |                           |                           |           |       |    |          |
|---|-----------|-------------|---------------------------|---------------------------|-----------|-------|----|----------|
| friendliness of products and services                 | (2%)      | (11%)       | (18%)                     | <b>(43%)</b>              | (26%)     |       |    |          |
| Availability and quality of additional services       | 1<br>(1%) | 6<br>(6%)   | <b>53</b><br><b>(55%)</b> | 32<br>(33%)               | 5<br>(5%) | 20.07 | 97 | 3.35 / 5 |
| Technological development and speed                   | 2<br>(2%) | 9<br>(9%)   | 33<br>(34%)               | <b>49</b><br><b>(51%)</b> | 4<br>(4%) | 18.49 | 97 | 3.45 / 5 |
| Customization of services according to personal needs | 2<br>(2%) | 11<br>(11%) | <b>70</b><br><b>(73%)</b> | 10<br>(10%)               | 3<br>(3%) | 25.65 | 96 | 3.01 / 5 |
| Amount and quality of communication                   | 2<br>(2%) | 14<br>(14%) | <b>61</b><br><b>(63%)</b> | 18<br>(19%)               | 2<br>(2%) | 21.76 | 97 | 3.04 / 5 |
|   |           |             |                           |                           |           |       |    | 3.35 / 5 |

| Development of competitiveness, what do consumers value; according to age |      |       |       |       |       |       |      |
|---|------|-------|-------|-------|-------|-------|------|
|   | < 20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | > 71 |
| Price   | 3,00 | 3,38  | 3,82  | 3,20  | 3,50  | 2,00  | 4,00 |
| Customer service  | 2,00 | 3,63  | 3,59  | 3,40  | 4,06  | 5,00  | 3,33 |
| Availability of products and services                                     | 4,50 | 4,12  | 4,18  | 3,80  | 4,13  | 5,00  | 4,33 |
| User-friendliness of products and services                                | 4,50 | 4,49  | 4,41  | 4,30  | 4,44  | 5,00  | 4,00 |
| Availability and quality of additional services                           | 4,00 | 2,94  | 2,88  | 2,30  | 2,56  | 4,00  | 3,33 |
| Technological development and speed                                       | 4,00 | 3,71  | 3,53  | 3,20  | 2,44  | 3,00  | 3,33 |
| Customization of services according to personal needs                     | 4,00 | 3,04  | 2,88  | 2,50  | 2,88  | 3,00  | 3,00 |
| Amount and quality of communication                                       | 2,00 | 2,80  | 2,71  | 3,30  | 3,50  | 3,00  | 3,33 |

| Development of competitiveness, how do consumers see the changes in their banks; according to age |      |       |       |       |       |       |      |
|---|------|-------|-------|-------|-------|-------|------|
|   | < 20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | > 71 |
| Price   | 3,00 | 3,20  | 3,18  | 3,20  | 2,94  | 1,00  | 3,67 |
| Customer service  | 3,00 | 3,45  | 3,59  | 3,60  | 3,19  | 2,00  | 2,67 |
| Availability of products and services   | 4,00 | 3,73  | 3,76  | 3,70  | 3,38  | 2,00  | 2,67 |

|   |      |      |      |      |      |      |      |
|---|------|------|------|------|------|------|------|
| User-friendliness of products and services            | 4,50 | 4,02 | 3,71 | 4,10 | 3,00 | 3,00 | 3,33 |
| Availability and quality of additional services       | 4,00 | 3,39 | 3,35 | 3,50 | 3,13 | 3,00 | 3,00 |
| Technological development and speed                   | 4,00 | 3,45 | 3,41 | 3,70 | 3,31 | 3,00 | 3,50 |
| Customization of services according to personal needs | 3,50 | 3,04 | 2,94 | 2,80 | 3,06 | 3,00 | 3,00 |
| Amount and quality of communication                   | 3,00 | 3,04 | 2,76 | 3,40 | 3,25 | 2,00 | 2,50 |

| Perceptions on industry threats  |             |                           |             |                           |             |                    |           |                  |
|--|-------------|---------------------------|-------------|---------------------------|-------------|--------------------|-----------|------------------|
|  | 1           | 2                         | 3           | 4                         | 5           | Standard Deviation | Responses | Weighted Average |
| Cyber security seen as a threat  | 2<br>(2%)   | 11<br>(11%)               | 34<br>(35%) | <b>45</b><br><b>(46%)</b> | 6<br>(6%)   | 16.86              | 98        | 3.43 / 5         |
| Cyber security limits the amount of financial services used  | 9<br>(9%)   | <b>46</b><br><b>(47%)</b> | 19<br>(19%) | 23<br>(23%)               | 1<br>(1%)   | 15.28              | 98        | 2.60 / 5         |
| Use of financial services outside of own bank  | 17<br>(18%) | 14<br>(14%)               | 8<br>(8%)   | <b>42</b><br><b>(43%)</b> | 16<br>(16%) | 11.72              | 97        | 3.27 / 5         |
| Banks are a safer option than others   | 0<br>(0%)   | 15<br>(15%)               | 35<br>(36%) | <b>41</b><br><b>(42%)</b> | 7<br>(7%)   | 15.87              | 98        | 3.41 / 5         |
| Cyber security affects options used more than speed and comfort  | 8<br>(8%)   | <b>40</b><br><b>(41%)</b> | 19<br>(19%) | 30<br>(31%)               | 1<br>(1%)   | 14.18              | 98        | 2.76 / 5         |
| Sharing of information with 3 <sup>rd</sup> parties if it speeds up the transaction or improves the user comfort | 9<br>(9%)   | 34<br>(35%)               | 10<br>(10%) | <b>39</b><br><b>(40%)</b> | 6<br>(6%)   | 13.95              | 98        | 2.99 / 5         |
|  |             |                           |             |                           |             |                    |           | 3.07 / 5         |

| Perceptions on collaborations |   |   |   |   |   |                    |           |                  |
|-------------------------------|---|---|---|---|---|--------------------|-----------|------------------|
|                               | 1 | 2 | 3 | 4 | 5 | Standard Deviation | Responses | Weighted Average |

|  |             |             |                           |                           |             |       |    |          |
|--|-------------|-------------|---------------------------|---------------------------|-------------|-------|----|----------|
| Own bank collaborates with others                        | 3<br>(3%)   | 29<br>(30%) | <b>54</b><br><b>(56%)</b> | 11<br>(11%)               | 0<br>(0%)   | 20.03 | 97 | 2.75 / 5 |
| Collaboration brings more products and services          | 1<br>(1%)   | 14<br>(14%) | <b>39</b><br><b>(40%)</b> | <b>39</b><br><b>(40%)</b> | 4<br>(4%)   | 16.57 | 97 | 3.32 / 5 |
| Collaboration improves products and security of services | 12<br>(12%) | 18<br>(18%) | <b>37</b><br><b>(38%)</b> | 30<br>(31%)               | 1<br>(1%)   | 12.78 | 98 | 2.90 / 5 |
| Collaboration enables a larger amount of radical reforms | 2<br>(2%)   | 25<br>(26%) | <b>41</b><br><b>(42%)</b> | 23<br>(24%)               | 6<br>(6%)   | 14.09 | 97 | 3.06 / 5 |
| I'd like more collaboration to get more development      | 6<br>(6%)   | 17<br>(18%) | 25<br>(26%)               | <b>27</b><br><b>(28%)</b> | 22<br>(23%) | 7.50  | 97 | 3.43 / 5 |
|  |             |             |                           |                           |             |       |    | 3.09 / 5 |

| Perceptions on coevolution   |                           |             |                           |                           |           |                    |           |                  |
|--|---------------------------|-------------|---------------------------|---------------------------|-----------|--------------------|-----------|------------------|
|  | 1                         | 2           | 3                         | 4                         | 5         | Standard Deviation | Responses | Weighted Average |
| Differences in the offerings of my bank and its competitors                    | <b>40</b><br><b>(41%)</b> | 20<br>(20%) | 25<br>(26%)               | 8<br>(8%)                 | 5<br>(5%) | 12.60              | 98        | 2.16 / 5         |
| The solutions used outside own bank are used for support of the main functions | 7<br>(7%)                 | 21<br>(22%) | <b>41</b><br><b>(42%)</b> | 26<br>(27%)               | 2<br>(2%) | 13.92              | 97        | 2.95 / 5         |
| Increased competition makes own bank reform actively                           | 1<br>(1%)                 | 19<br>(19%) | 37<br>(38%)               | <b>39</b><br><b>(40%)</b> | 2<br>(2%) | 16.34              | 98        | 3.22 / 5         |
| The industry is changing and diversifying constantly                           | 1<br>(1%)                 | 23<br>(23%) | <b>35</b><br><b>(36%)</b> | 34<br>(35%)               | 5<br>(5%) | 14.25              | 98        | 3.19 / 5         |
| The industry is actively creating new services and products                    | 0<br>(0%)                 | 18<br>(18%) | 34<br>(35%)               | <b>44</b><br><b>(45%)</b> | 2<br>(2%) | 17.32              | 98        | 3.31 / 5         |
|  |                           |             |                           |                           |           |                    |           | 2.97 / 5         |

| <b>Perceptions on coevolution, according to age</b>                            |                |              |              |              |              |              |                |                |
|--|----------------|--------------|--------------|--------------|--------------|--------------|----------------|----------------|
|  | <b>&lt; 20</b> | <b>21-30</b> | <b>31-40</b> | <b>41-50</b> | <b>51-60</b> | <b>61-70</b> | <b>&gt; 71</b> | <b>Average</b> |
| Differences in the offerings of my bank and its competitors                    | 1,00           | 2,90         | 2,18         | 2,40         | 2,06         | 3,00         | 1,33           | 2,16           |
| The solutions used outside own bank are used for support of the main functions | 4,00           | 3,54         | 2,88         | 2,80         | 2,44         | 3,00         | 1,67           | 2,95           |
| Increased competition makes own bank reform actively                           | 3,50           | 3,10         | 3,29         | 3,30         | 2,81         | 3,00         | 2,33           | 3,22           |
| The industry is changing and diversifying constantly                           | 3,00           | 3,35         | 3,18         | 3,20         | 2,88         | 4,00         | 2,67           | 3,19           |
| The industry is actively creating new services and products                    | 4,00           | 3,77         | 3,35         | 3,20         | 3,06         | 4,00         | 2,67           | 3,31           |