



# **Financial Technology (FinTech) and the performance of commercial banks in Nordic countries**

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Abstract  <p>In the modern world, Financial Technology (or FinTech) is integrating into the operations of commercial banks. Nordic banks have also started to employ FinTech in their operations. However, as FinTech is a relatively new phenomenon, its impact on banking activity is not well-researched yet. Thus, the objective of the present study was to develop an understanding of FinTech as a phenomenon, study its functional mechanism and explore its impacts on the performance of Nordic commercial banks. Furthermore, the author aimed to study how the performance of commercial banks is measured. This resulted in questioning and researching the transformation of the FinTech's era performance measures in the banking sector in order to investigate whether FinTech makes an impact.</p> <p>A mixed-method research approach shaped the case study research strategy. The data collected utilized a qualitative approach in which four semi-structured interviews with bank employees and start-up developers were conducted. In addition to this, the quantitative approach included the collection of secondary data concerning three Nordic commercial banks for the period from 1999 to 2018. All the data were collected from the Helsinki stock exchange official databases and the banks' annual reports.</p> <p>By understanding FinTech as a phenomenon and studying its functional mechanism in the context of banking activity, the author has carefully explored its impacts on the performance of Nordic commercial banks. Furthermore, comprehension of how the performance of commercial banks can be measured, allowed the author to subsequently question the relevance of the conventional performance measures and provided insights into the transformation of the FinTech's era performance measures in the banking sector. Recommendations for the study's future direction were provided, along with suggestions for further research. These include using more reliable and extensive samples of data or narrowing the research down to certain financial components in a region or certain banking stakeholders and activities.</p>		
Keywords/tags ( <a href="#">subjects</a> ) Financial performance, non-financial performance, Financial Technology, FinTech, digitalization, commercial banks, banking sector, Nordea, Danske Bank, Handelsbanken, Nordic		
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# 1 Introduction

The purpose of the following chapter is to introduce the research topic of the thesis. This section would describe the background of the topic and the author's motivation to undertake the research. It also presents the research objective and questions. Finally, it will explain the structure of this paper.

## 1.1 Background and motivation

Nowadays the ways businesses operate and deliver their products to the customers are changed by the technology in almost all of the sectors. These changes of business operations have not passed by the financial sector, and especially the commercial banks. The financial and economic crisis of 2008, the enhanced regulation, changes in consumer behaviour and social outlook, new global economic and social trends are the main reasons for the considerable and consequential change in the financial segment. However, the most influential catalyst behind the technological development of the sector is digital transformation. (Nicoletti 2017, 4.)

Financial technology (hereafter FinTech) is a reasonably recent phenomenon and FinTech companies have not yet taken the solid positions in the financial services sector. However, still, the traditional banking industry is experiencing changes due to the rapid development and spreading of technology. (Nicoletti 2017, 4-6.) The new catchword 'FinTech' is integrating into the processes managed by the commercial banks with the progressing corporate and customer focus. It creates the need for the financial institutions to keep pace with both the technological advancements and upgraded user experience across the board. The FinTech companies, which are emerging and entering the market, are increasing the competitiveness within the sector. FinTech is changing the approach of performing the traditional financial operations such as payments, transactions, borrowing, lending and investing (Chishti, Barberis, Menat, Wendenburg, & Hatami 2016, 10). The development of FinTech affects the commercial banks both internally, because they are starting to integrate financial technologies into their operations, and externally, through the appearance of new FinTech companies, which provide services that traditional banks do less efficiently or do not do at all, as the competitors for traditional banks (Navaretti, Calzolari, & Pozzolo 2017, 9-10). The focus of this thesis is on the internal impact of

FinTech on the performance of the commercial banks. The reason for that is the assumption that FinTech companies will not replace banks in most of their key functions. In most cases, banks are well placed to adopt technological innovations and do the old things in the new way themselves.

According to the PwC (2017, 2) report, up to 77% of financial institutions will intensify internal efforts to innovate, with a lot of businesses adopting the disruptive nature of FinTech (How Technology is impacting the finance and banking sector 2018). In a longer perspective, the scarcity of a digital strategy is seen as a factor that may Diminish the banks' performance in the provision of assorted financial services (Grym, Koskinen, & Manninen 2018). FinTech has beyond reasonable doubt affected the financial performance of banks by increasing their efficiency and effectiveness (Kemboi 2018, 1). Commercial banks employ different types of FinTech to improve their performance, these types are described in chapter 2.1.

Although it is widely accepted that FinTech resources contribute to performance and future growth potential of the commercial banks, there is a relative shortage of the research on that topic. The impact of FinTech on the performance of commercial banks remains rather unclear. Furthermore, emergence of FinTech raises the question of the transformation of performance measurement in this new era of operations.

Measuring the performance of banks is hard and the performance indicators differ strongly in quality (Bikker 2010, 141). For the firms, the choice of the right measurements is a demanding and challenging task during the performance measurement systems development process. During the definition of the performance dimension and selection of performance measures, a sufficient number of affecting factors should be taken into account. These factors include the responsibilities to different interest groups like stakeholders, customers, employees, suppliers, and society or technological development. Additionally, the organization has to pick out the things they want to emphasize in its performance measurement system. (Merchant, & Van der Stede 2012, 89-90.) A choice of the right combination of appropriate indicators is crucial for the banks in improving their understanding of the variables which have an impact on the performance, as they contain sufficient information on the correlation of these variables with the performance.



In the era of FinTech, it becomes rather unclear how we should measure banks' performance. Traditional performance measures can give misleading signals for continuous improvement and innovation—activities today's competitive environment demands (Norton, & Kaplan 1992).

As was mentioned above, the question of the relevance of conventional performance measures and their ability to capture and reflect the impact of FinTech on banks' performance arises. Thus, there is an assumption that the performance measures applied by banks are transforming in the light of FinTech. In this thesis, the author aims to review the role and relevance of FinTech in the banking sector and explore its impact on the performance of commercial banks. Furthermore, this thesis studies how the banks' performance can be measured and questions the transformation of the performance measures applied by banks in the FinTech era.

The author was highly interested to study this topic on the sample of Nordic banks. The choice of research area was advocated by the reasons described in the following paragraph. First of all, the research has shown that the past and future investments in digital business models within the Nordic banking sector characterize the Nordic countries as the most digital societies in Europe. In comparison to the Nordic countries, the banking sector as a whole elsewhere in Europe is not as digitally advanced. Nordic banks' strategy to keep up with digitalisation helps these banks to respond to the competition posed by new FinTech actors. (Grym, Koskinen, & Manninen 2018.) Secondly, Nordic banks seem to be the first ones to capture the change in the competitive landscape. According to the survey responses, the percentage of bank revenues perceived to be at risk due to the FinTech interference in the next five years has soared 12 points to 38% in 2018, what is 7% more than among European banking peers (Hardie, Gee, & Hannestad 2018, 9). Furthermore, the number of FinTech companies in Nordic countries is significantly increasing. For example, in Finland only the number of FinTech has grown by approximately 70% (see Figure 1).

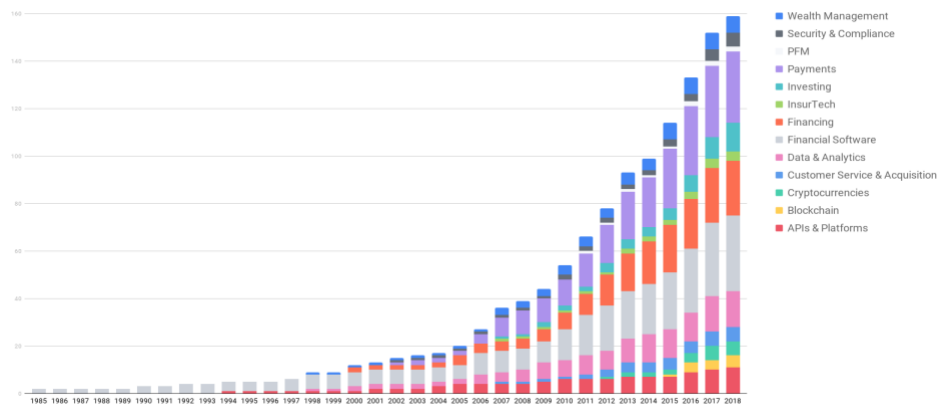


Figure 1. FinTech companies in Finland (Adapted from FinTech Landscape 2018.)

Due to the factors mentioned above, the author considers the Nordic region to be the most relevant research area for this thesis. The level of digitalization and number of FinTech companies in Nordic countries allow for an extensive research in this sphere. Moreover, due to the rapidity of technological innovation in this region Nordic banks are predisposed to be among the first ones to notice the disruption of FinTech and the impacts which it brings.

## 1.2 Research objective and questions

The purpose of this bachelor's thesis is to develop an understanding of FinTech as a phenomenon, study its functional mechanism and explore its impacts on the performance of Nordic commercial banks. Furthermore, the author aimed to study how the performance of commercial banks can be measured, subsequently questioning and researching the transformation of the performance measures in the banking sector in the FinTech era. Accordingly, the reason why the researcher is seeking answers to these questions is to investigate if FinTech makes an impact on the performance measures in the banking sector.

The study is built upon the three main research questions.

1. What is the role and relevance of FinTech in the commercial banking sector?
2. How is the performance of the banks measured?
3. Are the performance measures applied by banks transforming in the light of FinTech era?

These research questions help to get an understanding of the research topic from the multiple perspectives, extensively reviewing both the role and relevance of FinTech in banking sector with its impacts on the performance of commercial banks and the measurement of the performance. To answer the research questions the author was motivated to conduct the research that would include both qualitative and quantitative data. Mixed-method research allows the researcher to get a wider perspective on the research topic. The research contains three parts or stages: exploring the nature and the level of impact of FinTech on different stakeholders and activities of commercial banks through interviews, assessing the performance of commercial banks both by calculating the market-based performance indicators and accounting-based performance indicators as well as studying the qualitative data from the banks' annual reports, and, finally, questioning the transformation of the performance measures through testing and comparing performance indicators, studied in the literature review and obtained from quantitative and qualitative data collected.

### 1.3 Structure of the thesis

The introduction introduces the reader to the topic of the thesis, provides an outlook on the statistics proving the significance of the topic and briefly describes the conducted research. The "Literature Review" chapter familiarizes the reader with the theoretical background of the research covering the topics of FinTech, its components and their usage, banks as business units, performance, its types and ways of measurement and regulation. In the next chapter, based on the review of the academic literature the research framework was formed. In the "Research Framework" chapter the research methods, the data analysis techniques and data collection methods are described. This chapter also presents the key variables used during the data collection. The "Results" chapter reveals the analysis of findings and their interpretation. In the "Conclusion" the findings are summarised and their answer to the research questions is discussed. This chapter also proposes the practical implications of the results., as well as stipulates the limitations and recommendations for future research.

## 2 Literature review

The following chapter presents a comprehensive summary of previous research on the subjects covered in the thesis.

### 2.1 Definition of FinTech

FinTech is defined differently in various sources and the number of elements included in the definition of FinTech diverges depending on the author. Vasiljeva and Lukanova (2016, 25), have condensed the definitions of FinTech from the multiple sources and proposed the definition of the term as follows:

*FinTech is an industry-oriented toward arranging financial services for private individuals and industries with the aim of providing customer-oriented solutions in the most efficient way and at the lowest cost possible, ensuring this via innovation and technology.*

The researchers have utilized the definition of Lee and Teo (2015, 2), which outlines that FinTech is *“innovative financial services or products delivered via technology”*. Vasiljeva and Lukanova (2016, 25) have also mentioned the Oxford Dictionary (2015), which defines FinTech as *“computer programs and other technology used to support or enable banking and financial services”*.

It is important to note that some of the sources define FinTechs as companies and not as a phenomenon. For example, one of the sources defines FinTech as companies which are *“offering technologies for banking and corporate finance, capital markets, financial data analytics, payments, and personal financial management”* (Wesley-James, Ingram, Källstrand, & Teigland 2015, 12). FinTech also includes companies that use technology in lending, personal finance, payments, retail investments, institutional investments, equity financing, remittances, consumer banking, financial research, and banking infrastructure (Skan, Lumb, Masood, & Conway 2014, 15). Some of the definitions consider e-commerce and cybersecurity as aspects of FinTech (Wesley-James, Ingram, Källstrand, & Teigland 2015, 12). Freedman (2006, 1) claims that FinTech combines mathematical, statistical, computing and economic models with news and analytical systems, adding message, transaction, order processing, and payment systems on the second stage of development.

FinTech comprises of multiple elements that can be divided into four main categories: financing, asset management, payments, and other FinTechs. In turn, these four categories include different types of technology. Figure 2 demonstrates this categorization and presents a detailed illustration of the sub-divisions of the FinTech industry. (Dortfleitner, Hornuf, Schmitt, & Weber 2016, 4)

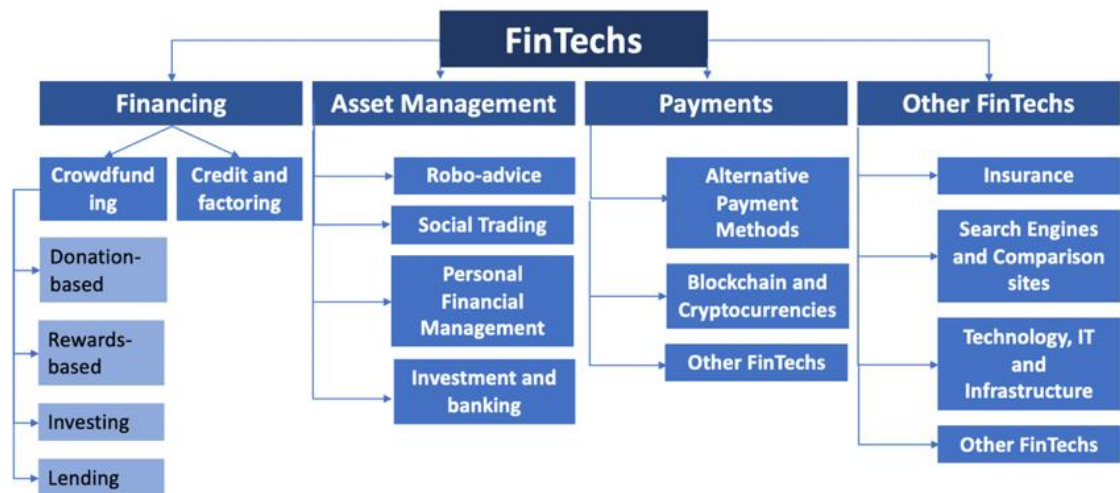


Figure 2. Elements of the FinTech Industry (Adapted from Dortfleitner et al. 2016, 10).

However, there are some other variations of FinTech divisions. For example, Vasiljeva and Lukanova (2016) suggest service-oriented, data-oriented and process-oriented division of activities in the FinTech area. Service-oriented activities refer to the development of technologies related to services traditionally provided by financial institutions, e.g. fund transfers or card payments, lending and investment, peer-to-peer<sup>1</sup> lending, crowdfunding, or foreign exchange. Data-oriented activities consider solutions and technologies devoted to collecting, processing and analysing information. Process-oriented activities include cost caps and processes that are aimed at increasing efficiency and process automation, which have started to develop after the financial crisis of 2008 when banks all over the world re-defined their operating models. (26.)

Nowadays, FinTech is quickly transforming and impacting the financial services industry, in terms of operations, regulation, customer experience and a lot of other activities (KPMG International 2019). The graph below (see Figure 3) demonstrates

<sup>1</sup>A process which allows individuals to acquire loans directly from other individuals, eliminating the financial institution as the intermediary (Kagan 2019).

total investment activity (VC, PE and M&A) in FinTech. The graph displays the exponential augmentation in both volume and aggregate value of dollars invested across all private investment transactions in FinTech in the past six years on a global level. It is remarkable just how rapidly the sector grew. Figure 3 underlines a global significance and potential of FinTech development.

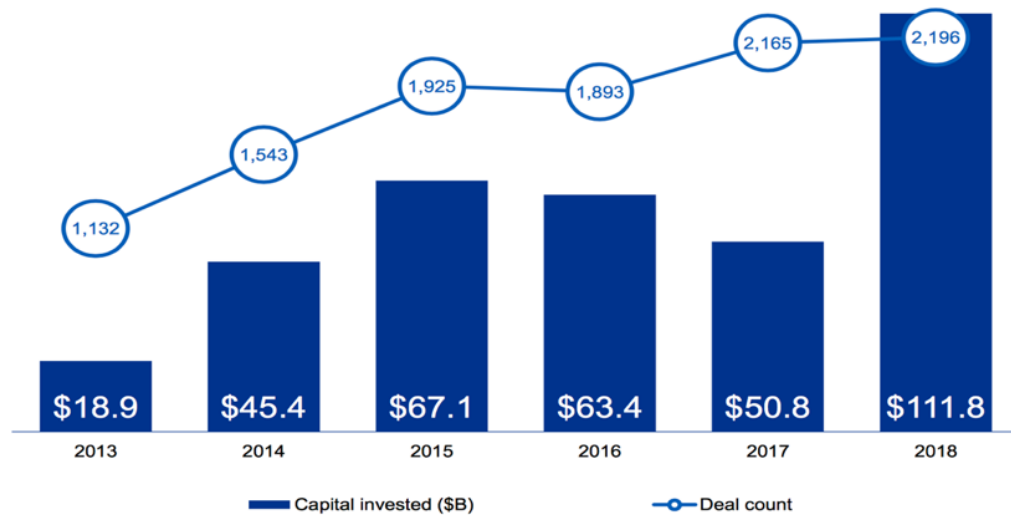


Figure 3. Global FinTech Financing Activity 2010-2017 (Adapted from KPMG International 2019).

## 2.2 FinTech in commercial banking

In the banking industry, FinTech as an innovation primarily focuses on the advancement of banking services and products, which will contribute to the enhancement of customer satisfaction (Reuben 2012,10). In each industry, the players need to address the changing needs and expectations of the customers to stay profitable and competitive. This is a reality of the commercial banks as well. At present, convenience, personalisation, accessibility, ease of use and transparency (PwC 2016b); safety, quickness and affordability (Reuben 2012,3) have become a priority for the customer. The modern consumers expect the integration of their financial partner with their daily life. Moreover, their demands also include easy access to their financial partner, which means a convenient interface which has all the necessary features from the handy design of online and mobile banking apps to the digitalization of documentation (PwC 2016a). Consumers want real-time advice based on transactions and behaviour, enhanced custody and protection of their personal data and responsible data sharing (Accenture 2016). From the perspective

of the commercial banks, customer needs are the ones which are influenced and changed the most since the emergence of FinTech companies in the banking industry FinTech companies (PwC 2016b).

Within the banking industry, the competitive edge is created by the delivery of superior services that meet the needs and expectations of both private and corporate customers. The creation and maintenance of good customer relationships are largely dependent on banks' ability to make a quality service available to their customers. According to the research, a high level of product quality leads to a high level of customer satisfaction and increases loyalty. (Ennew, & Waite 2007, 311.) However, it is a challenge for banks to correspond to the growing consumer demands and successfully implement innovative technology in large organizations based on IT from the 1970s. And FinTech has an outstanding potential to transform banking businesses. (EY Global 2017, 3.)

Nowadays, FinTech is still in its infant stage. In order to compete with traditional, rich and politically influential financial institutions, FinTech start-ups need considerably higher investment. Nonetheless, the global traditional financial services providers have to pay attention to the development of FinTech. They should also endeavour to update and improve their products, services and strategies to protect themselves from losing market share to FinTech companies. (Bugrov, Dietz and Poppensieker 2017, 2-3.) It is also important to understand the FinTech growth in the light of start-ups, as FinTech is a very favourable field for the new companies.

However, the biggest threat to most banks originates not from FinTechs but from traditional competitors better leveraging those FinTechs (EY Global 2017, 3). Thus, traditional institutions start to prefer another option of their interaction with FinTech start-ups collaboration. Successful partnerships and co-operation between banks and FinTech start-ups would result in the mutual enhancement of the partners' strengths. For example, start-ups might focus on product design and development, while banks will help the agile players with distribution and infrastructure capabilities. According to FinTech Survey 2016, 42% of banks are involved in allied partnerships with FinTech companies and established venture funds to fund their mutual undertakings. (PwC 2016c.) Traditional institutions are starting to apply technological solutions

developed and provided by FinTech firms in their operations, aiming to benefit from deploying FinTech across their organizations (PwC 2016a).

Collaboration with FinTech firms, industry utilities and an array of other service providers could help banks to reduce structural costs, enable enhanced regulatory compliance and better serve customers (EY Global 2017, 4). Nowadays, the top priority of FinTech start-ups is the end-user and these companies aim to deliver their end-product directly to the customer, while traditional banks do not have that much of a customer-oriented strategy and are still in the early stages of customer-oriented solutions (PwC 2016c). FinTech companies have a potential to turn banks' strategy into customer direction and help banks integrate solutions connecting all aspects of a customer's interactions with a bank – making it easy for customers to access services, both in-person and online (Miller, & Wong 2016). Nowadays, institutions remain principally focused on applications of FinTech in payments. Nevertheless, they are progressively looking to use FinTech across the entire value chain, from gamification of compliance training to surveillance software that can identify employees who pose the greatest organizational risk, and from using artificial intelligence to improve customer service to drive greater workforce productivity. (EY Global 2017, 5.)

At the moment, banks have adopted new technologies to varying degrees. Applications of these technologies are enhancing the customer service, increasing access, providing enriched insights both from a risk management and customer service perspective, increasing market speed and agility, strengthening operations and controls, and transforming institutional cost structures. (The digital bank: tech innovations driving change at US banks 2016, 2.)

Currently, the most applied technologies within the commercial banking sector include digital technology, electronic banking, alternative payment methods, distributed ledger technology, blockchain and cryptocurrencies, artificial intelligence and machine learning, internet of things, open banking APIs and etc.

As both the financial services sector and Fintech as a segment are rather complex subjects and the author's access to the research resources is limited, the focus of this thesis is only on the following elements of Fintech: alternative payment methods, online and mobile banking as elements of digital technology, artificial intelligence as



a part of automation process, distributed ledger technology and blockchain as a part of it, Internet of Things and open banking APIs. The classification of financial technologies is provided in Figure 4 to make the structure of the thesis more visible and coherent. In the following sub-sections, all of the Fintech elements included in the thesis will be defined, described and reviewed.

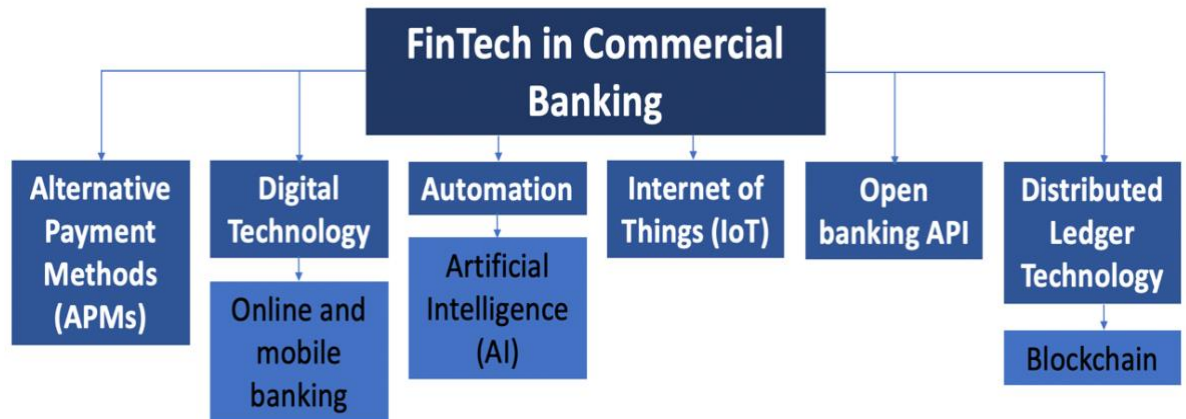


Figure 4. FinTech in Commercial Banking. (Compiled by the author.)

### 2.2.1 Alternative Payment Methods

Alternative Payment Methods (hereafter APMs) refer to the cashless payment methods (Kagan 2018). These means include payments made using a credit or debit card, loyalty program points, bank transfers, direct debits, e-wallets, mobile, local card schemes, pre-pay, post-pay, e-invoices or cryptocurrencies (Discover the world's payments. How Alternative Payment Methods can help you to grow your business globally 2018). In some of the cases, such as credit or debit card usage, banks serve as financial intermediaries, and in some cases, such as payments via e-wallet or in cryptocurrencies, there is no need for a third party between payer and receiver. The transactions are usually conducted in real-time. APMs offer customers a more streamlined, user-friendly and cost-effective experience, making the payment execution better, faster and cheaper. (Dortfleitner et al. 2017, 46-47.)

The emergence of the APMs is affecting the behaviour of consumers, because they start to give their preference to the digital channels over the visiting of financial intermediaries physically when dealing with money transactions. Consumer payments are shifting from physical locations to digital channels, creating a threat for established players FinTech companies will steal their market share. (Canaday 2016,

15-17.) According to World Payments Report (2018), global non-cash transaction volumes increased to 10.1% in 2016 reaching 482.6 billion and are estimated to accelerate at a compound annual growth rate (CAGR) of 12.7% globally, including emerging markets growing at 21.6%, from 2016–2021.

The statistics signalise that there is an urgent need for the banks to anticipate the change. The rapid technology development puts pressure on the traditional financial services providers forcing them to transform their corporate strategies and invest more capital into the development of both their IT and human resources departments. These changes are a way for the banks to hold their competitive advantage in the payments business and make incremental changes to their systems, processes and business models in order to reduce operational cycle times and improve their consumer digital experience across channels. (Canaday 2016, 17.)

Some traditional financial institutions have found a solution to be part of the digital revolution in collaborating with FinTech firms. Nowadays, there is a number of enhancements in the existing payments ecosystem that have the potential to improve the effectiveness and efficiency of the environment. They represent real opportunities to lower costs and minimize risks with minimal disruption to current operations. Faster Payment Service<sup>2</sup> and Popmoney<sup>3</sup> are among these solutions. These services are being offered by many banks to reduce the customer expectation gap of real-time payment experiences. Firms like PayPal<sup>4</sup> are creating innovative user

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<sup>2</sup> A UK banking initiative aimed at the reduction of payment times between different banks' customer accounts to typically a few seconds (Faster Payments Service 2019).

<sup>3</sup> A person-to-person payments service developed by CashEdge, enabling individuals to send and receive payments electronically (Popmoney 2018).

<sup>4</sup> An American company, which operates a worldwide online payments system that supports online money transfers and serves as an electronic alternative to traditional paper methods like checks and money orders. The company operates as a payment processor for online vendors, auction sites, and many other commercial users, for which it charges a fee in exchange for benefits such as one-click transactions and password memory. (PayPal 2019.)

interfaces to facilitate instant and faster payments, improving the customer experience. (Canaday 2016, 19.)

However, such partnerships and experiments with FinTech products and services require careful and attentive management to maintain safety and soundness. The collaborations of financial institutions and FinTech firms demand responsible innovation research and development and third-party risk management practices. Both partners should use the risk-aware approach, to maintain and control speed and agility. Moreover, cybersecurity is another important condition for partnership, because the sensitive data sharing within the distributed network poses new questions around ownership of data, customers and liability. Finally, in the collaborations for the performance of the key business functions for a payment institution such as funds transfer or cross-border payments, elements of fourth-party business continuity risk exposure need to be identified and managed, as FinTech companies often leverage other third parties to support their business. (ibid., 17.)

### 2.2.2 Digital technology

Digital technology is an umbrella term for computer-based products and solutions (Digital technology N.d.). The term refers to all categories of electronic equipment and applications that use information in the form of numeric code, which is usually binary and presented in two numeric characters - 0 and 1 (Harmon 2018).

Nowadays, digital technologies are expected to change a business model and provide new revenue and value-producing opportunities (Gartner 2018c). The rapid growth of innovations, shorter product life cycles, ever-changing customer needs, and growing internationalization of businesses, have made customer service performance crucial for the survival of an organization. Thus, nowadays, technology plays a key transformational role in customer-centric organizations such as commercial banks. (Setia, Venkatesh, & Joglekar 2013, 565.) Firms are increasingly adopting various digital technologies in the customer-side operations, as they endeavour to serve customers with “what they want, the way they want it, and when they want it” (Walsh 2007).

In the commercial banking sector, digitalization has improved banks’ capability of reaching potential customers and helped them to improve their services. In the

modern world, the biggest channel of reaching customers is the Internet and mobile banking. (Forest, & Rose 2015, 5.)

### **Online and mobile banking**

Online banking refers to any banking transaction that can be managed through the internet, generally via a bank's website under a private profile, using a desktop or laptop computer. While mobile banking allows a user to carry out many of the same activities using a mobile app on a smartphone or tablet, instead of using a desktop computer. As a rule, the transactions which can be performed through the Internet or mobile banking are the ones which include services traditionally offered at local branches. These financial transactions include paying bills or transferring money from one account to another, viewing account balances, viewing or printing statements, viewing images of checks and applying for loans or credit cards. (Differences Between Mobile and Online Banking | Discover Bank 2016.)

The main advantages of digital banking include low fees, time savings and freedom from time and place (Karjaluoto, Mattila, & Pento 2002, 248), easiness-to-use of the service, speed of service delivery (Karjaluoto 2002, 335), convenience and compatibility with life-style (Black, Lockett, Ennew, Winklhofer, & McKechnie 2002, 166; Gerrard, & Cunningham 2003, 18). While complexity of a service, perceived financial cost of a product or service (Black et al. 2002, 168), ignorance of electronic services (Sathye 1999, 330) and security risk (Sathye 1999, 329-330; Black et al. 2002, 169) are limiting the scope and potential of the service usage. (Laukkanen 2007, 789.)

Mobile banking is considered to be more competitive than other forms of electronic banking. The high penetration of mobile phones has an influence on all social levels, also expanding the advantages of mobile banking over the other types of electronic banking since mobile applications can be used anytime-anywhere removing the limitations of electronic banking. Furthermore, the level of subjective and objective security of the mobile phone or tablet is higher than the one of the personal computers. (Turowski, & Pousttchi 2003, 14.)

As online and mobile banking provides an outstanding convenience to customers, allowing them to manage their finances and conduct business operations from

outside a banking facility, it is, nowadays, one of the biggest technological advances influencing the current banking industry. Electronic banking has considerably changed the business of retail banks, instantaneously reducing costs through replacing a high-cost channel (bank clerks) with a low-cost channel (a central webserver) for simple transactions, eliminating the necessity for a media conversion and increasing convenience for the customer. Therefore, it is defined to be the most successful business-to-consumer applications in electronic commerce. (Pousttchi, & Schurig 2004.)

### 2.2.3 Automation

Automation is defined as the conversion of a work process, a procedure, or equipment to the automatic operation or control. Automation does not simply transfer human functions to machines, but also involves a deep reorganization of the work process, redefining both the human and the machine functions. (Gerovitch 2003, 122.)

McKinsey Global Institute (2017) predicts that half of the manual work activities, executed today, could be automated by the time period from 2035 to 2075, depending on the various factors and other wider economic conditions. Moreover, they estimate that could raise productivity growth globally by 0.8 to 1.4 per cent annually. For businesses in general automation has such benefits as performance improvement, by reducing errors and improving quality and speed, productivity enhancement, labour cost reductions, increased throughput, higher quality, and decreased downtime, enhanced safety, minimized variability, waste reduction, and improved customer satisfaction. Automation also has the potential to achieve outcomes that go beyond human capabilities. (18.)

In finance specifically, automation is redefining the function of the finance department. Cloud-based platforms that make reporting, planning, forecasting and analytics processes significantly easier increase the productivity and thus, decrease the time spent on the data collection and ensuring. Moreover, self-service dashboards allow different departments to access the necessary data instantly without consuming the time and resources of the finance department. Finally, artificial intelligence, which will be reviewed in detail later in this chapter, can

analyse complex data sets and find links and patterns across the information. (How Automaton Is Changing the Function of Finance N.d.) Accenture's Finance 2020 report predicts automation to eliminate up to 40% of the transactional accounting work of the finance department (Axson 2015, 2).

Among the threats are the complexity of this phenomenon from the legal perspective and the risk of rising unemployment. Policymakers should anticipate the change and embrace the opportunity for the economies to advance from the productivity growth potential. They should set policies that would encourage investment, market incentives, sustainable progress and innovation. Simultaneously, there is a need for evolved and innovative solutions in the human resources sector. The sector would benefit from policies which will help workers and institutions to adapt to the impact on employment, which will possibly include changes in education and training, as there will be a need for the new skills, income support and safety nets, along with transition support for those dislocated. (McKinsey 2017, 3.)

### **Artificial Intelligence**

Artificial Intelligence (hereafter AI) is one of the newest fields in science and engineering. The work in this field started in earnest soon after World War II, and the name itself was invented in 1956. Generally, there are four approaches to AI, which have been followed, each by different people with different methods. (Russell, & Norvig 2009, 1.) Thus, definitions of AI vary greatly, depending on the approach and method which were followed by the person giving the definition.

Russell and Norvig (2009, 2) have created a table (see Table 1), where all four approaches to AI and the definitions born from these approaches are displayed. These definitions vary along two main dimensions. The definitions on top are related to thought process, while bottom ones address the behaviour, or actions. Moreover, the definitions on the left are linked to human performance, whereas the right ones are connected with rationality.

Table 1. Some definitions of AI (Adapted from Russell, &amp; Norvig 2009, 2)

<p><b>Thinking Humanly</b></p> <p>“The exciting new effort to make computers think . . . <i>machines with minds</i>, in the full and literal sense.” (Haugeland, 1985)</p> <p>“[The automation of] activities that we associate with human thinking, activities such as decision-making, problem solving, learning . . .” (Bellman, 1978)</p>	<p><b>Thinking Rationally</b></p> <p>“The study of mental faculties through the use of computational models.” (Charniak and McDermott, 1985)</p> <p>“The study of the computations that make it possible to perceive, reason, and act.” (Winston, 1992)</p>
<p><b>Acting Humanly</b></p> <p>“The art of creating machines that perform functions that require intelligence when performed by people.” (Kurzweil, 1990)</p> <p>“The study of how to make computers do things at which, at the moment, people are better.” (Rich and Knight, 1991)</p>	<p><b>Acting Rationally</b></p> <p>“Computational Intelligence is the study of the design of intelligent agents.” (Poole <i>et al.</i>, 1998)</p> <p>“AI . . . is concerned with intelligent behavior in artifacts.” (Nilsson, 1998)</p>

In general, AI can be referred to as adaptive and/or autonomous machines, particularly computer systems, which simulate the human intelligence processes, such as learning (the acquisition of information and rules for using the information), reasoning (using rules to reach approximate or definite conclusions) and self-correction (Rouse 2018).

AI is important because it automates repetitive learning and discovery through data. It is capable of implementing frequent, high-volume, computerized tasks consistently and without fatigue. However, still, this type of automation requires a human inquiry to set up the system and ask the right questions. Secondly, AI improves existing products by adding intelligence to them. In most cases, AI is not sold as an individual application but is added to the products which are used already. Automation, conversational platforms, bots and smart machines are compatible with large amounts of data resulting in the technology improvements. The applications of AI vary from security intelligence to investment analysis. AI is also adaptable through progressive learning algorithms, thus, enabling data to do the programming. It is able to find structure and regularities in data so that the algorithm acquires a skill, becoming a classifier or a predictor. So, the models adapt to the new data inputs. This AI technique is called backpropagation and represents an AI ability to adjust,

through training and added data, in case of a mistake. (Artificial Intelligence. What it is and why it matters N.d.)

Furthermore, AI is able to analyse huge amounts of data, the amounts which are impossible for a human brain to process, using neural networks with many hidden layers. Additionally, AI achieves incredible accuracy through these deep neural networks. Finally, the importance of AI is in its ability to capitalize on data. Nowadays, as the data itself can become intellectual property, the ability to acquire the data and get the most out of it can create a competitive advantage. All of the above-mentioned characteristics of AI create the following opportunities:

- bringing analytics to industries and domains where it is currently underutilized,
- improving the performance of existing analytic technologies,
- breaking down economic, language and translation barriers,
- augmenting existing abilities and improving human performance,
- giving humanity better vision, understanding and memory. (ibid.)

Nowadays, the range of AI applications is limitless. Moreover, it constantly widens: AI is integrated into different spheres and industries, such as medicine, logistics, education, human resource management and etc. Global AI business value is estimated at \$3.9 trillion in 2022, increased by better customer experience, new revenue creation with new products or services, costs reduction, ease of the operations and increased operational efficiency (Gartner 2018b).

AI is also integrating into the financial industry. According to Joyce, analysts estimate that AI will save the banking industry more than \$1 trillion and reduce costs in financial institutions' operating expenses by 22%, with most of the savings coming from the front office (2018).

Changing customers' demands, increasing competition and a need of an increase of IT processing cost-efficiency encourage commercial banks to apply the power of AI and machine learning to deliver a better customer experience in a more profitable way. (Charley 2018.) Thus, nowadays most of the banks focus the AI application on the improvement of the consumer experience.



However, Autonomous Research LLP (2018) predicts that the real transformative power of AI will be into product development areas and banks will be able to apply qualitative and quantitative data to manufacture new financial products.

Furthermore, AI will be used both in the front and middle offices. In the front office, financial data and account actions will be combined with software agents that can perform customer service and support staff. In the middle office, AI will be beneficial in real-time, artificially intelligent oversight, risk-management and Know your customer (KYC)<sup>5</sup> systems, which are now required due to the increasing complexity of regulations and processes. AI will be also used in product development to determine credit risk using new types of data, take insurance underwriting risk and assess claims damage using machine vision, and select investments based on alternative data combined with human judgment. (30-31.)

#### 2.2.4 Internet of Things

The Internet of Things (or IoT) represents a network comprised of physical objects, which gather and share electronic information. This network includes a wide range of “smart” devices, which often use internet protocol (IP), which identifies computers over the world wide web and allows them to intercommunicate. The main idea behind the Internet of Things is to have devices that self-report in real time to improve efficiency and bring important information to the surface more quickly than a system, which depends on human intervention. (Kenton 2018.)

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<sup>5</sup> The process of a business verifying the identity of its clients and assessing their suitability, along with the potential risks of illegal intentions towards the business relationship. This term is also used to denote the bank regulations and anti-money laundering regulations which govern these activities. Furthermore, know your customer processes are employed by companies for the purpose of ensuring their proposed customers, agents, consultants, or distributors are anti-bribery compliant. Banks, insurers, export creditors and other financial institutions are progressively demanding that customers provide comprehensive due diligence information. (Wikipedia contributors 2019.)

This smart system of systems has the power to change the way businesses are conducted. The commercial banking can also capture value from this innovation, retaining the customers through developing their services with the help of the Internet of Things. IoT can become a very effective facilitator to increase customer loyalty and bring in more business to banks. (Infosys Limited 2018, 5.)

IoT helps the banking sector in providing rewarding, easy-to-access services to both credit and debit card customers. Banks are able to kiosks in specific areas and increase or decrease the installation of ATMs (Automated Teller Machines)<sup>6</sup> depending on usage volumes. IoT also allows banks to bring on-demand services closer to customers and increase the accessibility of services to customers, by providing kiosks in the locations, which are more convenient and easy-to-access for the customers. (ibid., 5-6.)

Furthermore, IoT also enables banks to access customer data and thus, identify their customers' business needs, their value chain – like suppliers, retailers, distributors – and also gain customer insights. Customer information also helps banks in providing value-added services, financial assistance, and customized products to ensure a win-win situation for both parties. Moreover, nowadays banks are able to provide a complete view of customer finances in real time because customers' smart devices are interconnected and used for accessing data. This gives banks an opportunity to anticipate customer needs through the collected data, offering them solutions and advice on the sound and smart financial decisions. IoT can also help banks to predict fraud in debit or credit card transactions, confidently approving or declining the transaction accordingly, when a customer swipes his / her card, by verifying account holders' device location and the transaction location. Furthermore, one more feature that banks can leverage by using IoT is tracking raw materials and inventory stocks by using IoT from sensor devices installed at the borrower's warehouse. This tracked data can help banks to banks deduce the account balance and ensure that a loan is paid when inventory is sold. This way banks can reduce the overhead costs of tracking and prevent indulging in fraudulent practices of the borrowers. (ibid., 5-7.)

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<sup>6</sup> An electronic banking outlet that allows customers to complete simple transactions without the aid of a branch representative or teller (Kagan 2019).

The Internet of Things features help the banking industry to develop their marketing strategy and offer more tailored solutions, as it enables access to the necessary information about customers' buying behaviour, current economic condition and their individual needs. It also allows banks to keep track of all activities of their individual customers and then come up with an exclusive solution to their desires and needs. Furthermore, IoT makes banking services proactive, as it allows them to handle any upcoming product changes or service faults quite easily. Additionally, banking representatives now can access the past activities, and other relevant information of the customer and this allows them to provide better solutions. IoT also helps banks to ensure the most important thing in the financial intermediary – security, as it enables banks to introduce a strong identity verification and privacy protection system with the help of biometrics and geolocation abilities of mobile devices. Finally, wearable technologies are gaining popularity rapidly and banks all over the world have become determined to enable banking through these wearables to make banking services more accessible. (Sumichrast N.d.)

Nevertheless, there are also some risks related to the IoT, because the data collected can be very challenging to make proper decisions by banks. Banks have to track precisely data management and security to safeguard customer information along with maintaining privacy standards. Due to the availability of all transaction and location data, including the information sent through smart devices and smartwatches to banks and financial institutions, any data infringement and data hacking may cause massive damage to customers and fracture their relationship with their banks. Adhering to privacy standards while making good use of information is a major area of concern. Banks should incorporate the best and latest data security technologies and have to take preventive and corrective measures in order to ensure information and data security. (Infosys Limited 2018, 6.)

#### 2.2.5 Distributed ledger technology

Distributed ledger technology (hereafter DLT) is identified as an asset database that can be allocated across a network of multiple sites, geographies or institutions. The technology allows all participants within a network to have their own identical copy of the ledger. Any changes to the ledger are rejected in all copies within a short time

period, limited to minutes or, in some cases, seconds. The variety of assets represent financial, legal, physical or electronic data. The maintenance of security and accuracy of the assets stored in the ledger is organised cryptographically through the use of 'keys' and signatures to control the authority of participants within the shared ledger. The right to update the entries by one, some or all of the participants, is affirmed in the rules agreed by the network. (Government Office for Science 2016.)

Collomb and Sok (2016, 97) warn that, from a strategic point of view, ignoring the DLT is very risky for the financial institutions and key e-commerce players. Based on Porter's (1979) work on competitive forces, DLT can be considered as a threat to established situations, but also as an opportunity for greater efficiency.

DLT is seen to have a potential to disrupt the financial industry and change the roles that financial institutions and infrastructures currently play, by transforming payment, clearing, and settlement (PCS) processes, including the ways of funds transferring and securities, commodities, and derivatives clearing and settlement. The technology is expected to reduce or even eliminate operational and financial inefficiencies, or other frictions, that exist for current methods of storing, recording, and transferring digital assets throughout financial markets, improve end-to-end settlement speed, data auditability, resilience, and cost efficiency, and to help foster a more efficient and safe payments system. (Mills, Wang, Malone, Ravi, Marquardt, Chen, Badev, Brezinski, Fahy, Liao, Kargenian, Ellithorpe, Ng, & Baird, 2016.)

Moreover, due to a high degree of transparency, as many parties have a copy of the ledger, and many parties can verify every record DLT is seen to facilitate regulatory reporting and fraud prevention of the businesses such as banks. Additionally, the nature of DLT enhances data security, eliminating the need for the large legacy IT systems located within a single institution traditionally used for the storage of the information. IT systems may be vulnerable to cyber-attack and the data is often out of sync, out of date or simply inaccurate. Distributed ledgers, in turn, are inherently harder to attack because, instead of the single database, there are multiple shared copies, all of which have to be attacked simultaneously for a cyber-attack to be successful. The technology also allows the participants in the network to immediately spot a change to one part of the ledger, making it resistant to unauthorised change or malicious tampering. Furthermore, the methods of securing and updating the

information in the distributed ledger ensure the copy identity. (Government Office for Science 2016.)

### **Blockchain**

A blockchain is a distributed ledger technique represented by distributed database of records, or public ledger of all transactions or digital events that have been executed and shared among participating parties (Crosby, Nachiappan, Pattanayak, Verma, & Kalyanaraman 2016,7). This database maintains a constantly growing list of data records and consists of sequentially connected blocks storing information. The transaction information is collectively recorded, verified and stored by all network participants so that they can secure the reliability of transaction records without notifications from a “trusted third party” (TTP) such as a central bank or an administrative agency. (Yoo 2017, 313.) Each transaction in the public ledger is verified by consensus of a majority of the participants in the system and the information, once entered, can never be deleted. Thus, the blockchain contains a certain and verifiable record of every single transaction ever made. (Crosby, Nachiappan, Pattanayak, Verma, & Kalyanaraman 2016,7.) An update of all the ledgers kept by each member every time a new transaction occurs also makes it a very secure technology. The blockchain is counterfeit only when more than 51 per cent of the participants are synchronized by recording transaction details on the dispersal ledger, therefore, it cannot be hacked or counterfeited. (Yoo 2017, 313.)

The blockchain establishes a system of creating a distributed consensus in the digital online world, assuring participating entities that a digital event happened by creating an irrefutable record in a public ledger. This technique encourages the development of a democratic open and scalable digital economy from a centralized one.

Blockchain technology has tremendous opportunities, and the revolution in this space has just begun. (Crosby, Nachiappan, Pattanayak, Verma, & Kalyanaraman 2016,7.) Nowadays, blockchain technology is being used by many firms for secure document transfer and to reduce settlement costs (PwC 2016c).

Large banks are now increasingly integrating blockchain in their operations. They start to conduct tests of decentralized asset technology and implement blockchain in

business processes. Banks are also continuing to invest in a variety of projects and start-ups that are developing blockchain-based solutions. (Blockchain is Reshaping the Banking Sector 2018.)

The primary reason for that rapid blockchain integration into the financial institutions, and commercial banks, in particular, is the enormous size of global financial system. Therefore, transferring money process can take days or even weeks to arrive at its destination. Financial intermediaries are required to transfer any sum of money, taking a service charge, becoming the victims of fraud more often than the rest of the economy. That results in greater regulation and higher costs for all parties involved. Blockchain reduces the number of financial intermediaries while increasing security, resulting in the cost reduction. Blockchain will increase the speed of financial transactions, which, in turn, will increase cash flow and capital investments. (Iskandar 2017.)

#### 2.2.6 Open banking API

Application Programming Interface (hereafter API) is a code that allows two software programs to communicate with each other, defining the correct way for a developer to write a program that requests services from an operating system (OS) or other application (Rouse 2017). To put it simply, an API is *“a way for two computer applications to talk to each other over a network using a common language that they both understand”* (Jacobson, Brall, & Woods 2011, 5). Open API's are a critical component in boosting the speed of innovation because payment companies can publish APIs to expose source code and allow the online ecosystem of developers and FinTech companies externally to enhance product and services or create net new ones (Canaday 2016, 16).

Internal use of API integrates diverse systems and allows for the exchange of data across different departments of a firm by performing API “calls” or sending queries to an API server. It provides internal teams with better collaboration and allows them to access information when and how they need it, thus helping to interconnect services and business processes across the organisation, improving employee productivity and creating better omnichannel experiences for customers (Nijim, & Pagano, 2014). External APIs can also be used to expose business assets such as

information, a service, or a product to external audiences, hence, reaching beyond the boundaries of the firm, providing further integration with company partners and allowing third parties to consume organisational data and lead to cross-selling and upselling opportunities down the line. (Zachariadis, & Ozcan 2016, 7.)

API allows open banking, a concept in financial services, which is based on the use of open APIs allowing third-party developers to build applications and services around financial institutions, increased financial transparency options for account holders, and the use of open source technology. Open Banking aims at giving consumers better and more personalized information for making sound financial decisions. APIs enable the availability of banking in real-time, providing consumers with improved ways to conduct transactions, save, and invest their money. APIs also allow lenders to look at historical transactional data to determine a borrower's risk level, therefore, consumers may also have access to better loan terms. (What is open banking? N.d.)

Nowadays Open Banking is redefining the global financial landscape in a number of ways, specifically by helping financial services firms improve their service offerings, increase overall customer engagement, and raise revenue from new channels. Traditional banks understand that to retain their competitive advantage in the industry, they have to develop their digital capabilities to avoid being dis-intermediated by new players with superior offerings and services. Therefore, many financial services firms are embracing Open Banking initiatives, which are gradually becoming the norm in Europe, especially because from 2018, banks will be legally obliged to facilitate access to account information through APIs, per the Revised Payment Services Directive (PSD2). (How Financial Service Firms Can Benefit from Open Banking APIs N.d.)

### 2.3 Banks as business units

A bank is a financial entity licensed to receive deposits and make loans. Other financial services that banks may also provide are wealth management, currency exchange, and safe deposit boxes. There are several different kinds of banks including retail banks, commercial or corporate banks, and investment banks. In

most countries, banks are regulated by the national government or central bank. (Barone 2020.)

Banks' profits are usually derived from the differences in interest rates and fees that are paid and charged to people who keep money in the bank and who borrow the money (Sanderson 2013). However, not only rates of interests determine banks profitability, though they may make then half of the total (Kohlsheen, Murcia, & Contreras 2018, 686). Banks also receive revenues from commissions charged from non-credit operations and earnings from services with securities or foreign currencies as well as earnings from other sources like penalties (Zaripova, & Saubanova 2016, 208). Generally, it leads to a process of financial intermediation where banks play one of the most important roles. Basically, this process means that fund accepted from one party will be used to give loans and make investments to others (Dilley 2008, 4). In accordance with Sloman, Hinde and Garatt (2010, 619) financial intermediation is the process of providing people with four important services (see Table 2).

Table 2. Services of financial intermediation (Adapted from Sloman, Hinde, & Garatt 2010)

<b>Expert advice</b>	<b>Maturity transformation</b>	<b>Risk transformation</b>	<b>Transmitting payments</b>
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<p>Customers are advised on the matter where they should invest their funds, on other ways to get funding, on direct funds with the highest return. Also, experts ensure that the savings will earn a good interest of rate.</p> <p>Service helps to stimulate savings flow and efficiently use savings.</p>	<p>Banks may provide its customers with long period loans like mortgages for buying a house (usually the period may be more than 20 years) because of taking a huge number of small deposits that are unlikely to be withdrawn simultaneously.</p>	<p>Since a great number of people get loans, the banks may take risks from a certain number of customers because the losses will be covered by earning on other loans.</p>	<p>Bank transfers funds from one party to another (payer and receiver) with not relying on cash.</p>
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However, the modern banks do not only play the role of intermediary and issue deposits, but also create money. Needless to say, they do not print banknotes but by having deposit and loan transactions, banks expand the money supply. (Dilley 2008, 5.) In other words, McLeay, Radia and Thomas (2014) explain that whenever a loan has been made, at the same time bank matches a deposit that leads to creating new money. Important to mention that this activity may be done by commercial banks and, obviously, this commercial bank created money cannot be considered the same as money from central banks. The money by commercial banks are limited in supply and may be used only in transactions among other banks. This created money are not as effective as from central banks because when a customer comes to take away their money from the bank, the bank needs central bank reserves – the cash. (Botos 2016).

Commercial banks may be considered as companies because the balance sheet reflects their financial position (Somashekar 2009, 10). Banks balance sheet consists of assets and liabilities that allows the bank to have a stable financial condition as well as to ensure monetary stability (Cross, Fisher and Weeken 2010, 34).

Somashekar (2009, 12) explains assets of banks as “what others owe the bank” and banks’ liabilities as “what the bank owes others”.

## 2.4 Changing role of banks

Nowadays, the traditional role of banks as business units is changing and evolving, because of the entry of new players, the introduction of new business models and participation of innovative start-ups (PwC 2016b). The banking industry is being redefined and banks are at the forefront of digital transformation, involving in a highly competitive environment both internally, within the financial sector, and externally, with FinTech companies, venture capital corporations and non-financial players making more ambitious attempts to capture financial services’ market share. Considering this tense competition, digitalization and FinTech anticipation is a key for the survival and growth of current and future business models on the banking market. (Kotarba 2017, 134.)

FinTech plays a vital role in the banking industry transformation and impacts the entire ecosystem by redefining the mode of interactions (PwC 2016b). Accenture (2014) sees openness, collaboration and investment as the most essential themes that emerge for existing banking players, which are willing to benefit from the improvement driven by new services and productivity. There are also two other fundamental steps, which banks have to recognise to crate a competitive advantage from digital disruption: successfully handling the issue of obsolete technologies and talent management. (3.)

Open innovation is at the core of the digital revolution. For large organisations, openness means the engagement with external technology solutions, knowledge capital and resources during the first steps of an innovation process. It usually involves opening up the organisation’s own intellectual property (IP), assets and expertise to a third party, bringing outside innovators, which can help to generate

new ideas, change organisational culture, identify and attract new skills, and discover new areas for improvement. (ibid., 8)

Collaboration is also becoming a crucial element of FinTech era within the financial services and technology industries. The importance of collaboration is confirmed by the survey, which reveals that six out of ten respondents support the “Digitally Reimagined” future scenario, successful alliances between different players benefit the growth of the addressable market. Moreover, collaboration should go beyond financial industry and established players should seek to collaborate more closely with the companies in different industries and with different outlooks. In that way, the traditional players will be able to maintain and grow value in these times of change. Cross-industry collaboration is vital for future value generation as well. Digital technologies flourish by enabling interesting products and services to be created when combining the assets of two industries. Still, it remains to be the biggest challenge for established players is to adapt their organisational culture’s ability for partnerships with new innovators and start-ups. (ibid., 9)

The start-up innovation model has always included venture investing in its core. However, nowadays established financial services firms are also taking this route to try and generate innovation for their business. (ibid., 10.) Based on the above discussion, the reader can study which technologies, highlighted in Figure 5, ensure openness, collaboration and investment in banks.

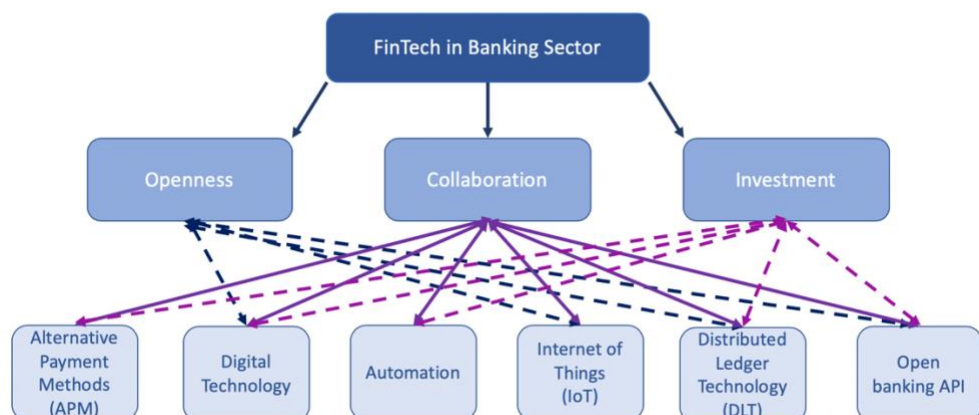


Figure 5. Openness, Collaboration and Investment. (Compiled by the author.)

## 2.5 Performance measurement

The selection of performance measurements is one of the most critical challenges for organizations. Performance measurement systems play a vital role in the improvement of strategic plans, the achievement of organizational targets estimation and compensation. The final choice of performance measurement system mostly depends on the perception of the most essential factors of successful performance. Fitzgerald and colleagues (1991) argue that performance is a key factor in ensuring the successful implementation of a company's strategy and proficiency in pursuit of its goals, and in ensuring the success of a stage business organization in both the short- and the long term. In the banking sector, the quality of administration data, installation of modern technologies, the innovation of banking products and services, competitive cost structure, risk management, extensive information system, prominence of strategic planning and equity endowment are the most critical determinants for productive and successful performance. (Ittner, & Lacker 1998, 205-206; Zéman, Lukács, & Hajós 2013, 15.)

Performance measurement and accounting systems are used to understand past behaviour, as well as for accurate decision-making regarding current issues and planning and forecasting the future. Both the metrics design and the use of performance measurement must be executed carefully to be beneficial. Since banks are for-profit organizations, their performance measured mostly with financial indicators. To enhance the internal processes, to conduct the decided strategy and to achieve the mission and vision statement companies need to see a big picture and have a complete understanding of the whole performance of the company. It is also worth noting that in the modern world, with the technology development enabling a collection of all sort of data, the quality and relevance of the performance metrics play a more important role than the quantity of them. (Palosaari, Pakarinen, Kostamo, & Takkunen, N.d.)

### 2.5.1 Financial performance measures

Financial ratio analysis is considered as a decent method to obtain the description of a company's overall financial condition. For the company's management, the financial ratio analysis is beneficial as an internal analysis in order to check the

obtained financial achievement that it can be used for the forthcoming company planning. (Husna, & Desiyanti 2016, 106.) Orajaka (2017, 717) generally argues that the financial performance of a firm provides an insight into the asset utilization and the company's ability to generate revenue from its operations. In other words, financial performance is a determination of the degree of the financial health of an organization over a certain period of time.

Operating performance for a concrete time period is measured by profitability ratios. Profitability ratios are used to determine an organization's capability in gaining profits.

### **Profitability**

Positive profitability is one of the principal financial aims for the banks, as for all other for-profit organizations. Meniccuci and Paolucci (2016, 87) define profitability to be the one of key indicators in attracting investors because it shows the degree of the bank's management success and demonstrates the level of potential profitability over years.

### **Gross Profit Margin (GPM)**

The GPM ratio is an indicator of how a company's productions are controlled, as opposed to costs on distribution and costs on administration (Watson, & Head 2010, 49). The key factors affecting change in GPM percentage include volume of sales, costs and prices because they constitute gross profit that is an indicator used in the formula of GPM (Khan, & Jain 2008). According to Berk and DeMarzo (2013, 35) GPM is calculated the following way:

$$GPM = \frac{\text{Gross profit}}{\text{Sales}}$$

However, in accordance with Jagelavicius (2013, 8), a company may plan its GPM because the price, various promotions, offers are planned by itself and the costs are known.

### **Net Profit Margin (NPM)**

NPM is an efficiency indicator, which reveals the proficiency level of cost control when revenue is generated from sales (Watson, & Head 2010, 48). A high NPM allows a company to sustain and provide owners with sufficient return in case of rising costs in production, fall in product or service demand or decline of price, (Khan, & Jain 2008). To put it simply, the ratio shows the reflection of the profitability of the company in the form of net sales percentage. Berk and DeMarzo (2013, 36) use the following formula for ratio calculation:

$$NPM = \frac{\text{Net income}}{\text{Sales}}$$

### **Return on Assets (ROA)**

ROA displays the overall profitability of total assets of a company (Khan, & Jain 2008). This metric is one of the most efficient tools of company's performance measurement, as it broadly and holistically assesses key indicators (Hagel, Brown, Samoylova, Lui, Damani, & Grames 2013, 7). ROA reflects the results of the decision-making process as it increases only when it is used in value-bringing activities meaning that any artificial improvement of net profit will not lead to considerable changes because net profit is only a proportion of assets (ibid., 16). Khan and Jain (2010) claim that ROA is calculated as follows:

$$ROA = \frac{\text{Net profit after taxes}}{\text{Average total assets}}$$

### **Return on Equity (ROE)**

ROE is used to measure earnings from past investments (Berk, & DeMarzo 2013, 42). It is an important indicator for shareholders as it makes the profitability of their investments more transparent (Hagel et al., 16). Similarly, the ratio reflects a company's ability to find profitable opportunities to invest in (Berk, & DeMarzo 2013, 42). According to Damodaran (2007), the formula for ROE calculation is the following:

$$ROE = \frac{\text{Net income}}{\text{Book value of equity}}$$

### **Earnings per Share (EPS)**

Earnings per share (hereafter EPS) is a market prospect ratio that is used to measure the amount of net income earned per share of stock outstanding. To put it simply, this is the amount of money each share of stock would receive if all of the profits were allocated to the outstanding shares at the end of the year. The calculation of EPS shows how profitable a company is on a shareholder basis. According to Earnings Per Share Guide (2019), EPS is calculated by subtracting preferred dividends from profit and dividing by the weighted average common shares outstanding:

$$EPS = \frac{\textit{Profit} - \textit{Preferred dividends}}{\textit{Weighted average common shares}}$$

### **Asset Utilization Ratio**

Asset utilization ratio determines the total revenue earned for every dollar of assets a company owns (Asset utilization N.d.). It shows the loss in revenue per unit of investment that may be attributable to inefficient use of assets in companies (Aydin, & Kulali 2018). This ratio is frequently used to compare a company's efficiency over time (Asset utilization N.d.). The Glossary (N.d.), which provides the ratio formulas proposes the following way of Asset utilization ratio calculation:

$$\textit{Asset utilization ratio} = \frac{\textit{Net revenue}}{\textit{Total assets}}$$

### **Liquidity**

Liquidity ratios measure the ability of a company to reimburse its expenses and meet short term obligations (Hundal 2019, 22). Liquidity ratios also play the role of metrics of the company's ability to meet cash needs appearing unexpectedly and in a short period of time (Ho 2008,2).

### **Current ratio**

The current ratio measures how liquid the company is, also demonstrating the financial stability of the company (Mayilmurugan, & Krishnan 2013, 119). The ratio reveals a company's ability to pay its obligations on time or not (Berk, & DeMarzo 2013, 37). Usually, the higher ratio is preferred, although, it should not exceed the proportion of 2:1. The ratio which exceeds 2:1 proportion discloses inefficient use of

funds (Mayilmurugan, & Krishnan 2013, 119). According to Damodaran (2007), the current ratio is calculated by dividing current assets by current liabilities:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

### **Acid-test ratio (Quick ratio)**

It demonstrates the relationship between quick (liquid) assets and short-term liabilities (Mayilmurugan, & Krishnan 2013, 120). Liquid assets are the ones which can be easily and quickly converted into cash. Therefore, in the case of the bank, liquid assets are composed of cash, money on short notice and receivables (Weil, Schipper, & Francis 2012, 233). As a rule of thumb, the acid-test ratio that is no less than 1 is considered to be decent (Hundal 2019, 27). Khan and Jain (2010) propose the following formula for the acid-test ratio calculation:

$$\text{Acid – test ratio} = \frac{\text{Quick assets}}{\text{Current liabilities}}$$

### **Solvency**

Solvency ratios measure a company's ability to repay its debts, revealing the overall financial health and stability of a company (Hundal 2019, 29). Ho (2008, 2) interprets solvency as a company's "ability to survive over a long period of time".

### **Total debt ratio**

Total debt ratio shows the amount of debt used to finance the assets, therefore, showing solvency of the company over a long-term. A high ratio discloses that the company uses more borrowing in comparison to equity in financing the assets. (Scatizzi 2010.) Ward (2018) mentions the following total debt ratio formula:

$$\text{Total debt ratio} = \frac{\text{Total debt}}{\text{Total assets}}$$

### **Debt/equity ratio**

Debt/equity ratio is a metric of the amount of debt used in conducting the business (Gallo, 2015). A high ratio may cause a company's inability to pay the debts, what, in turn, may lead to bankruptcy. A low ratio reveals that the relies too much on its equity, which may consequently lead to the costs increment. (ibid., 2015). This ratio



is considered to be an important indicator of the company's solvency as it reflects the creditors' and owner's contribution to the financing business (Khan, & Jain 2010). The financial analysis source, WallStreetMojo (N.d.), claims that to calculate the ratio, total debt needs to be divided by total equity:

$$\text{Debt to equity ratio} = \frac{\text{Total liabilities}}{\text{Shareholders' Equity}}$$

### **Market measures**

Market performance is the effectiveness of suppliers in a market or industry in utilizing economic resource to their greatest efficiency and to the ultimate benefit of consumers. Key elements of market performance include:

- productive efficiency, which is the cost-effectiveness of firms in producing their outputs. Ideally, outputs should be produced in plants of optimal scale, that is, plant sizes which fully exploit available economies of scale so that minimum cost levels are attained;
- distributive efficiency, which is the utilization of cost-effective channels of distribution and marketing techniques so as to minimize distribution costs;
- the setting of adequate prices to consumers, that is, prices which are consistent with the real economic costs of supplying the product, including a reasonable (i.e. non-monopolistic) profit return to suppliers;
- product performance, which determines the satisfaction of consumer demands for product variety and sophistication, that is, the maximization of consumer choice and value-for-money attributes;
- technological progressiveness, which means the introduction of process and product innovations which enable supply costs and prices to be reduced in real terms and which provide consumers with technically superior products.

Market performance is determined mainly by market structure and market conduct. For instance, in markets where economies of scale are significant, a high level of market concentration may be essential to minimize supply costs. In conduct terms, price competition between firms is likely to benefit consumers whereas collusion is likely to have an adverse effect on consumer welfare. These and some other

elements of market structure and conduct are a major concern of a government's competition policy and industrial policy. (Pass, Lowes, Pendleton, Chadwick, O'Reilly, & Afferson 2005.)

Investors can assess a company's ability to sustain performance over the long run by examining its past performance and its health (Dobbs, & Koller 2005, 1.).

### **Total Shareholder Return (TSR)**

In an ideal world, to see how well the company was doing there is only a need to examine a company's stock market performance, which can be measured through calculation of its total shareholder return (hereafter TSR) over time. The formula to calculate TSR is the following:

$$TSR = \frac{(Price_{end} - Price_{begin} + Dividends)}{Price_{begin}}$$

However, this approach has severe limitations. TSR represents changes in expectations about a company's future performance more than the actual underlying performance and health itself. Therefore, companies that consistently meet high-performance standards can find it difficult to deliver high TSR, because the market may think that management is doing an outstanding job, but this belief has already been factored into share prices. Nevertheless, other measures of stock market performance can help companies can compensate for the limitations of TSR. (Dobbs, & Koller 2005, 2.)

Other formulas to evaluate a bank's market performance include Price-to-Book Ratio and Tobin's Q ratio.

### **Price-to-Book Ratio**

The price to book ratio (hereafter P/B ratio) is a financial valuation tool used to evaluate whether the stock a company is over or undervalued by assessing the price of all outstanding shares in comparison to the net assets of the company. To put it simply, it is a calculation that measures the difference between the book value and the total share price of the company. The formula for the P/B calculation can be discovered below:

$$P/B = \frac{\text{Share price}}{\text{Book value per share}}$$

Investors use this formula to help determine whether a company is overpriced or under-priced. (Price-to-Book Ratio N.d.)

### **Tobin's Q ratio**

Tobin's Q ratio or the Q Ratio expresses the relationship between market valuation and intrinsic value. To put it simply, it is a method to estimate whether a given business or market is overvalued or undervalued. The Tobin's Q ratio equals the market value of a company divided by its assets' replacement cost:

$$\text{Tobin's } Q = \frac{\text{Total market value of firm}}{\text{Total asset value of firm}}$$

Therefore, equilibrium is achieved when market value equals replacement cost. (Hayes 2019.)

### 2.5.2 Non-financial performance measures

Financial performance measures are effective in short-term performance measurement. However, they do not reveal the whole picture. Information based on financial activities may interfere with the development of products and services, strategically important goals, competitive advantage. (Zhelyuk, & Popa 2009.) Nonetheless, the intangible factors affecting a bank's performance should be taken into consideration as the ones of the utmost importance (Hussain, Gunasekaran, & Islam 2002, 452).

Intangible factors drive a firm's performance in the long run. On the whole, there are 5 key indicators for non-financial performance:

- customer loyalty,
- competitive advantage,
- attracting new customers,
- perceived image,
- reputation (Chen, Tsou, & Huang 2009, 50).

Other non-financial performance factors include market share, customer satisfaction, efficiency and productivity, product quality, and employee satisfaction (Lynch, & Cross 1991; Kaplan, & Norton 1996; Otley 1997).

Employees' motivation and commitment plays a significant role in a positive change in performance. Motivated and committed employees are more likely to build relationships with customers where trust, and/or satisfaction prevail, increasing a company's revenue. The stronger relationship makes more revenues from customers because the clients either come for the company's services again or use more services offered. (Mohamed, Kader, & Anisa 2012, 1.) Marie, Ibrahim and Al Nasser (2014, 203) refer to the study of Banker and Mashruwala (2007, 764) which demonstrates that having satisfied both internal stakeholders and clients allows increasing profitability. Customer-centricity and care of employees lead to a better future financial position (Kotane, & Kuzmina-Merlino 2011, 216). Although the effect of non-financial performance determinants is not immediate, it may display long term improvements (Hussain, Gunasekaran, & Islam 2002, 456).

Customer satisfaction is partly determined by the quality of services provided to them. The quality may be expressed in the bank employees' ability to maintain services carefully, accurately and as promised and, moreover, to have needed knowledge about the service (loans, mortgages). Willingness to help customers when needed also plays an important role in affecting the levels of customer satisfaction (Marie, Ibrahim, & Al Nasser 2014, 203.) In general, the overall competence of bank employees (expressed in behaviour and education) influences the non-financial performance of the bank (Namukali 2010, 45). Additionally, the number of services enhances a customer perception regarding the service quality as it enhances the interaction between the bank and customer (Chen et al. 2009, 50).

The usage of non-financial performance measures is reported to have such consequences as:

- positive effect on long-term profit,
- development of a wider product mix,
- increased capital expenditure,

- acquisition of more advanced technology, and
- more effective management decision-making (Enizi, Innes, Kouhy, & Zufairi 2006).

Competition in any industry encourages companies to improve their services, reduce costs and come up with new solutions (Porter, 1990). Therefore, it encourages banks to implement the measuring of their non-financial performance (Hussain, Gunasekaran, & Islam 2002, 460). Nowadays, technological integration affects a lot in the banking industry by reshaping existing services, enhancing customer experience and diversifying banks' service set (Aliyu, & Tasmin 2012, 81).

## 2.6 New performance measures

Nowadays, the competitive landscape of banks is changing, because of numerous different macro-economic and industry-based factors. Due to the emergence of new technologies and constantly changing and evolving role of banks, a question of the relevance of traditional performance measures is rising. Kaplan and Norton (1992, 71) claimed that "what you measure is what you get". Bank executives are beginning to understand that traditional performance measures can give misleading signals for continuous development and innovation in the modern competitive and changing environment (ibid., 71). Another problem in traditional performance measurement and management is the focus on past performance instead of looking forward (PwC 2011). Furthermore, another common problem of financial institutions in performance evaluation is disregard of intangible assets and changes in the environment (BSC Designer Team 2015). Presecan (2015) also claims that traditional financial indicators do not make the company more adaptable to the constant changes in business environment. Thus, there is a need to come up with an understanding of what we should measure in the age of FinTech. The design of performance measurements for the banking industry needs to be lined up with the changing business environment to serve the demand of precise and relevant information (Palosaari, Pakarinen, Kostamo, & Takkunen N.d.). Organizations, operating in this changing industry and involved in digitalization face multiple challenges related to the understanding the true value of digital and driving measurable results and clarity of business cases (Fernández-Olano, Castedo,

González, Opitz, & Pfirsching 2016; Gottlieb, & Willmott 2014). Therefore, new performance measurement systems are created.

The first way to measure the performance of an organisation was purposed by Kaplan and Norton (1992) and is called “balanced scorecard” (Figure 6). It is a set of measures that provides a fast and comprehensive view on the business, which includes financial measures that tell the results of actions already taken and complements them with operational measures on customer satisfaction, internal processes, and the organization’s innovation and improvement activities – operational measures that are the drivers of future financial performance. (ibid., 72.)

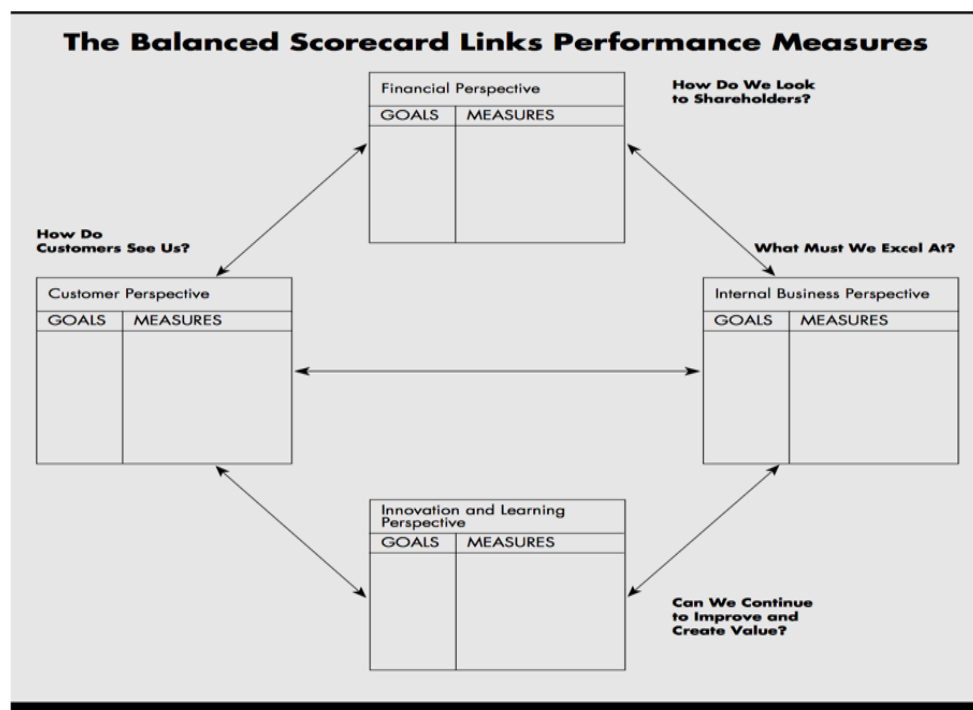


Figure 6. The balanced scorecard (Adapted from Norton, & Kaplan 1992)

Organization for Economic Co-operation and Development (OECD) is providing a new measurement agenda and a call for new statistical and reporting tools. OECD’s view is directed into achieving the following goals:

- improvement of the measurement of investments in ICT and its link to macroeconomic performance,
- definition and measurement of skills needed for the digital economy,
- development of metrics to monitor issues of security, privacy, and consumer protection,

- promotion of the measurement of ICT for social goals and the impact of the digital economy on the society,
- investment in comprehensive, high-quality data infrastructure for measuring impacts,
- the building of a statistical quality framework suited to exploiting the Internet as a data source. (OECD Publishing, 2014.)

New digitalization dimensions and their primary metrics can be seen in Figure 7.

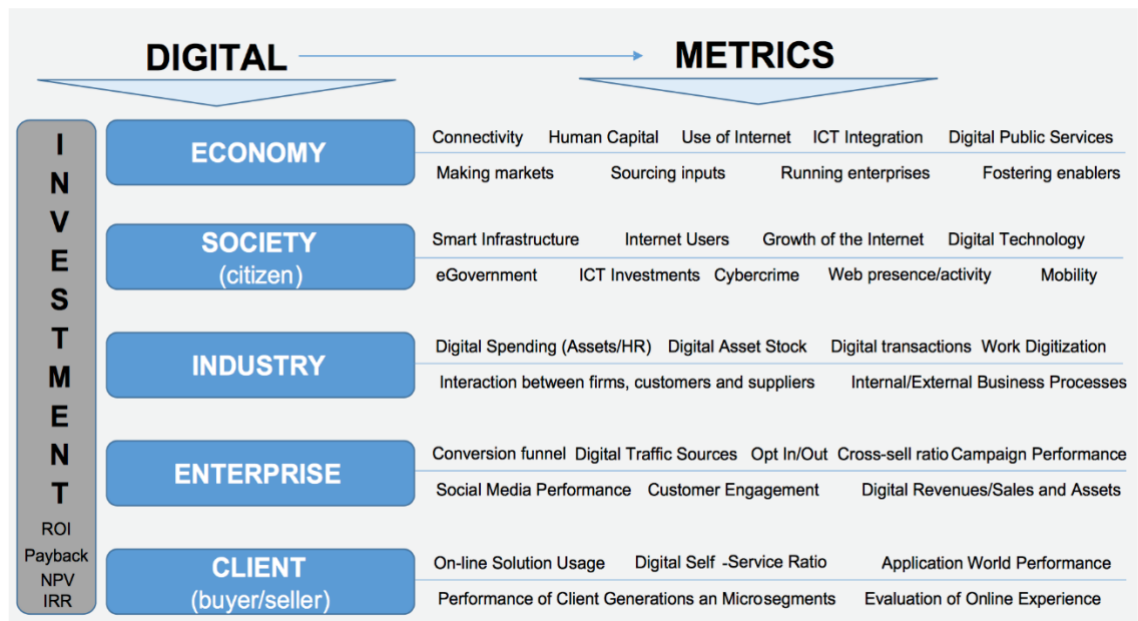


Figure 7. Digitalization dimensions and their primary metrics (Adapted from Kotarba 2017)

As a measurement of digital economy<sup>7</sup>, Oxford Economics and Accenture developed jointly a Digital Density Index (DDI), which measures how digital technologies impact the economic growth and aims to guide further investments of both the public and business community in order to stimulate economic development (Macchi, Berthon,

<sup>7</sup>an economic system where the usage of ICTs is widely spread, embracing the: base infrastructure (e.g., high-speed Internet access, computing power, security services), e-business (business models with high utilization of ICT for front- and back-office functions), and e-commerce (usage of the ICT in business-to-business (B2B), business-to-consumer (B2C), and consumer-to-consumer (C2C) transactions. (Tapscott, 1997.)

& Robinson 2015, 15). Another metrics of the digital economy is Digital Economy and Society<sup>8</sup> Index (DESI), which summarises relevant indicators on Europe's digital performance and tracks the evolution of EU member states in digital competitiveness (European Commission 2019). DDI and DESI attempt to capture factors of high impact on the competitiveness of local economies in the global context (Kotarba 2017, 127).

As the digital industry metrics<sup>9</sup>, the Industry Digitization Index was purposed by McKinsey Global Institute. The aim of the index is to provide a wide-ranging picture of where and how companies are building digital assets, expanding digital usage, and creating a more digital workforce (Manyika, Ramaswamy, Khana, Sarrazin, Pinkus, Sethupathy, & Yaffe 2015). Process digitalization is measured in combination with the ICT system infrastructure (Kotarba 2017, 131).

Digitalization level of a single organization can be measured with IDI. However, there is a large additional measurement area, which describes the status and performance of e-commerce and digital customer dialogue in an enterprise. Core Key Performance Indicators of this type include conversion funnel and cost, traffic sources (organic, paid search/affiliate networks/referrals, direct, e-mail, social media), opt-in/out level and dynamics, email/SMS performance (bounce/delivery rate, sharing, open rate, click-through-rate (CTR), cost per lead (CPL), lead quality (LQ), and name to marketing qualified lead (MQL) conversion), public and e-commerce Web sites (bounce/drop-off rate, page views per visit/total, advertisement capture/impressions, CTR, cost-per-impression (CPI), cost-per-click (CPC), new sessions, time on (sub)-site, CPL, LQ), and etc. However, the presence of these

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<sup>8</sup> A society in which the usage of ICT is common across demographic parameters of the population. Digital citizens function in the digital economy using the available digital public and commercial infrastructure for conducting life activities. (Kotarba 2017.)

<sup>9</sup> The application of digitalization in any type of industry, which covers all manufacturing or service delivery where such digital solutions are used (Kotarba 2017).



indicators in the economy/society and industrial measurement systems is limited, despite their purely digital nature. (Kotarba 2017, 133-134.)

On the other hand, some experts have an opinion that the new performance measures indicators have to be combined with the traditional measurements to understand if the expected benefits are being delivered. Moreover, the uncertainty of business case development needs to be addressed via standard business case methods equipped with more sophisticated methods of evaluating current and future cash flows from digital processes (Kotarba 2017, 135).

The relevance of the traditional performance measures and practical applications of the new performance metrics and indicators will be research in this thesis.

## 2.7 FinTech and performance of banking

FinTech improves the health of traditional banking institutions by developing performance and increasing profits. Collaboration between banks and FinTech start-ups can benefit both parties. FinTech helps the formal banking sector to improve customer retention, as FinTech firms have a lot of experience in crunching data and extrapolating outcomes that banking sector did not have before. From such an analysis of data, a bank can better understand how to better serve its customers. FinTech also provides the ability to provide each customer with tailor-made products. FinTechs' granular micro-level approach to each customer will enable a bank to offer better products to its customers. (Global Banking & Finance Review 2018.)

Cooperation with FinTech can provide banks with processes such as the secure processing of card transactions or quicker processing of loans. Banks can leverage the technological innovations that FinTech industry offers to transform its framework into a quicker and more malleable one. Data available from FinTech can provide very accurate information about customers' spending behaviour, making FinTech a natural ally of the banking industry. (ibid.)

According to the research of Li, Spigt and Swinkels (2017), which examined the impact of the funding of FinTech start-ups on the stock returns of 47 incumbent US retail banks for 2010 to 2016 with the aim to clarify the role of FinTech digital banking start-ups in the financial industry, the funding of digital banking start-ups is

more likely to have a positive effect on the incumbents' stock returns than a negative effect. This proves, that the collaboration of FinTech start-ups and traditional banks should be rather seen as positive. During the literature review, the author has found that there is no decent research on the impact of integration of FinTech on performance on banking. Thus, this research can bring significant value to the business field.

### **3 Research framework**

The research framework chapter guides the reader through the whole research process, revealing both the theory lying behind the research and methods used for data collection and data analysis. This chapter describes the research methodology, on which all the research methods were chosen and discloses the whole process of data collection and analysis. It also considers the ethical and data quality issues concerning the research.

#### **3.1 Methodology**

The research methodology is the science and philosophy behind all research and the methods or techniques that were used for conduction of research (Adams, Khan, Raeside, & White 2007, 25). It provides the researcher with a way to systematically solve the research problem (Kothari 2004, 8) and creates knowledge, which satisfies the research objectives and answers the research questions (Adams, Khan, Raeside, & White 2007, 25). The methodology considers the logic behind the choice of research design and creates the criteria for choosing the research methods and techniques. A clear research methodology is especially important in adopting a critical and analytical view of the information gathered during the research and allows the researcher to generate trustworthy results. (Kothari 2004, 8.) To define the research methodology the research philosophy and approach should be chosen.

Research philosophy relates to the development of knowledge and the nature of that knowledge. The adopted research philosophy contains important assumptions about the way in which the researcher views the world, which will underpin the research strategy and the methods chosen as part of that strategy. (Saunders, Lewis, & Thornhill 2009, 108-109.)

The research philosophy, which was chosen to support this study, is pragmatism. Pragmatism is assumed to best satisfy the objectives of this research as it provides an external and multiple perspectives, which perfectly enables answering of the research question (Saunders, Lewis, & Thornhill 2009, 199). It also supports the practical relevance of the concepts. Pragmatism recognizes that there are a lot of different ways to interpret the world and undertake research, that a single point of view can never give a complete picture and that there may be multiple realities (ibid., 109). Tashakkori and Teddlie (1998, 30) argue that pragmatism is intuitively appealing because it allows the author to study the topic of value and interest in the different ways and use the results in ways that can generate positive consequences within author's value system.

There are two main research approaches: deductive and inductive. With deduction a theory and the hypothesis are developed, and a research strategy is designed to test the hypothesis. With induction, data are collected, and a theory is developed as a result of the data analysis. There is no rigid division between these two research approaches and it is perfectly possible to combine them within the same piece of research. (Saunders, Lewis, & Thornhill 2009, 124-127.) In this research paper, it is necessary to use both for the research approaches to complement each other and help the researcher to create a research design which would best satisfy the research objectives.

### 3.2 Research design

The research design is a general outline of how the researcher is going to answer the research questions. It informs the choice of research strategy, data collection techniques and data analysis procedures, and the time horizon over which the research project is undertaken. (Saunders, Lewis, & Thornhill 2009, 136.) The purpose of the research dictates the choice of research design.

The purpose of this research is to explore the impact of FinTech, when it is integrated into the banks' operations, on the performance of Nordic commercial banks, study how the performance of commercial banks can be measured and question if the performance measures in the banking sector are transforming in the light of FinTech. Thus, this research is both exploratory and explanatory, as it aims to find out what is

happening, seek new insights and assess phenomena (performance measurement in commercial banks and FinTech) in a new light (FinTech), as well as to explain causal relationships between variables (Nordic commercial banks).

To support the research purpose a proper research strategy should be adopted to help the researcher to find an answer to the research question under consideration. A research strategy is an overall plan for conducting a research study, which guides a researcher in planning, executing, and monitoring the study. (Johannesson, & Perjons 2014, 39-40.) To support the purpose of this research the author has decided to choose a case study strategy. A case study is a research strategy which involves an empirical investigation of a particular contemporary phenomenon within its real-life context using multiple sources of evidence (Robson 2002, 178). It focuses on one instance of a phenomenon to be investigated and offers a rich, in-depth description and insight of that instance (Johannesson, & Perjons 2014, 44). This strategy enables the researcher to gain a rich understanding of the research context and the processes being enacted.

### 3.3 Data collection

While the research strategy gives the researcher guidance on a high level, it needs to be complemented with research methods that can direct the research work on a more detailed level, telling the researcher how to collect and analyse data (Johannesson, & Perjons 2014, 39).

There are two types of data: qualitative and quantitative. One way to distinguish them is the focus on numeric or non-numeric data. Qualitative data are numerically non-measurable, while quantitative data can be measured numerically. (Adams, Khan, Raeside, & White 2007, 70.) Data collection techniques and data analysis procedures are accordingly termed as qualitative and quantitative. Quantitative is predominantly used as a synonym for any data collection technique or data analysis procedure that generates or uses numerical data. In contrast, qualitative is used predominantly as a synonym for any data collection technique or data analysis procedure that generates or use non-numerical data. It is worth noticing that these techniques and procedures do not exist in isolation. It is perfectly possible to combine them in a multiple methods design. (Saunders, Lewis, & Thornhill 2009, 151-

153.) The choice of multiple methods is increasingly advocated within business and management research (Curran, & Blackburn 2001, 72), where a single research study may combine quantitative and qualitative techniques and procedures as well as using primary and secondary data (Saunders, Lewis, & Thornhill 2009, 151). Multiple methods can provide better opportunities to answer the research questions and enable a better evaluation of the extent to which the research findings can be trusted (Tashakkori, & Teddlie 1998, 17-18).

In this study, the researcher uses multiple data collection techniques and analysis procedures to answer the research question. However, they are not combined i.e. quantitative data are analysed quantitatively and qualitative data are analysed qualitatively. Thus, according to Saunders and colleagues (2009, 151-152), this study is termed as mixed method research. This method was chosen in order to aid research using more than one data collection method or research strategy within a study to corroborate research findings within a study. Moreover, quantitative and qualitative data collection methods complement each other and make the findings more reliable. Finally, the qualitative data was gathered to help explain relationships between quantitative variables. The visual representation of data collection for this study can be discovered in Figure 8. The detailed process of data collection and data analysis of both qualitative and quantitative data is described in the following chapters.

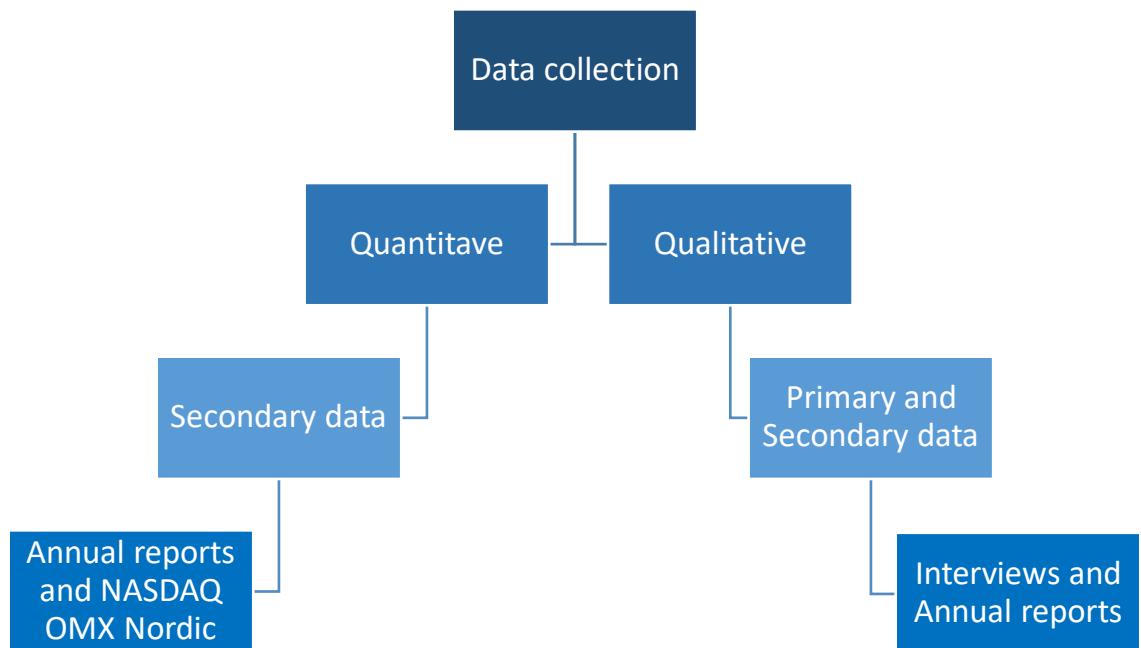


Figure 8. Structure of the research data.

This research is cross-sectional in terms of the time frame, as it represents a study of a particular phenomenon at a particular time (Saunders, Lewis, & Thornhill 2009, 155).

### 3.3.1 Qualitative data

The qualitative data used in the research is primary and was obtained from the semi-structured interviews. An interview is a purposeful discussion between two or more people (Kahn, & Cannell 1957), which can help the researcher to gather valid and reliable data that are relevant to the research questions and objectives (Saunders, Lewis, & Thornhill 2009, 318). A semi-structured interview is a qualitative data collection method where the interviewer and interviewee are discussing some specific topics in depth. In-depth interviewing contains a semi-structured interview, which enables to create a trustful relationship between the interviewer and interviewee, to ask questions in an open and empathic way and to motivate the interviewees to share their stories. (Hennink, Hutter, & Bailey 2011, 109.)

In semi-structured interviews the researcher has a list of themes and questions to be covered, however, these questions may vary from interview to interview. The order of questions may also vary depending on the flow of the conversation. Furthermore,

additional questions may be required to explore the research question more deeply. (Saunders, Lewis, & Thornhill 2009, 320-321.)

Before the interviews the researcher had an original list of questions to be covered, which can be discovered in the Appendices (see Appendix 1).

The author believed that it is highly important to create the questions that are clear, focused and properly defined, but still leave room for new perspectives to emerge from the primary data collection through the interviews. The first question was designed to understand the time point to start the FinTech impact evaluation. The answers to the second questions provide a general understanding of the use of FinTech tools in banks' activities. The answers to the rest of the questions are to give an understanding of the impact of FinTech on the banks' stakeholders and processes and evaluate the importance of this impact. The author thinks that the answers to these questions could provide new insight into the variables which should be considered while measuring performance in FinTech era.

In total, four interviews were conducted. The interviewees included both bank employees and start-up developers (or people engaged in start-up setting), as the author believes that this interview candidate selection will help to obtain the data necessary for this research, due to the professional background and expertise of the participants.

Interviews were conducted either by telephone or via Skype for the business platform and the data were recorded both by audio-recording the conversation using Voice Memos app on the mobile phone and screen audio recording on the laptop.

### **Ethics**

An ethical approach is crucial throughout the whole research process. However, the rise of ethical issues is the most visible and tangible during the primary data collection, especially during the interviews. Thus, the author has decided to discuss ethical issues at this stage of the research.

Ethics is the norms or standards of behaviour that guide moral choices about the behaviour and the relationships between different people (Cooper, & Schindler 2008, 34). Research ethics refers to the appropriateness of the behaviour in relation to the

rights of those who become the subject of the work or are affected by it. It includes such aspects as formulation and clarification of research topic, design of the research, processes of gaining access and data collection, data processing and storage, data analysis and presentation of the research findings in a moral and responsible way. The researcher has to ensure that the research design is both methodologically sound and morally defensible to all those who are involved.

The key ethical issues arising across the stages and duration of a research project related to the:

- privacy of possible and actual participants;
- voluntary nature of participation, including the right to withdraw partially or completely from the process;
- consent and possible deception of participants;
- maintenance of the confidentiality of data provided by individuals or identifiable participants and their anonymity;
- reactions of participants to the way of data collection, including embarrassment, stress, discomfort, pain and harm;
- effects on participants of the way of data usage, analysis and reporting, in particular, the avoidance of embarrassment, stress, discomfort, pain and harm;
- behaviour and objectivity of the researcher. (Saunders, Lewis, & Thornhill 2009, 183-186.)

The researcher has carefully addressed all the above-mentioned issues. Before starting the research process of the thesis, all of the interview candidates were contacted via email with the interview request. The emails presented the researcher, research objective, research questions and research motivation, as well as included the reasons for including the person in the list of interview candidates. The emails also included the list of questions to be covered during the interview, in order to give the interviewees time to familiarize themselves with these questions and prepare answers for the interview. All the contacted people gave their consent to an interview; thus, their involvement was voluntary. After the contacted persons gave their consent to an interview, the future interviewees were asked the permission for recording the interview. All the interviewees gave their permission for the recording.



The interviews were also made anonymous, meaning that the names of the participants were not disclosed at any point of the research.

### **Data quality issues in qualitative research**

A number of data quality issues can be identified in relation to the use of semi-structured interviews. These issues relate to:

- reliability;
- forms of bias;
- validity and generalizability. (Saunders, Lewis, & Thornhill 2009, 357.)

Validity and reliability are key aspects of all research, making the difference between good research and poor research and helping to assure that fellow scientists accept findings as credible and trustworthy. These aspects are particularly vital in qualitative work, as where the question of researcher's subjectivity arises and where research findings are often questioned or viewed with scepticism by the scientific community. (Brink 1993.)

Reliability refers to the extent to which results are consistent over time and an accurate representation of the total population under study (Joppe 2000, 1). The lack of standardisation in such interviews or issues of bias may lead to concerns about reliability. The types of bias to consider include interviewer and interviewee or response biases. Interviewer bias relates to the cases where the comments, tone or non-verbal behaviour of the interviewer create bias in interviewees responses to the questions being asked. Interviewee bias may be caused by perceptions about the interviewer, or in relation to perceived interviewer bias. Other affecting factors include a sensitive perception of the interviewee to the unstructured exploration of certain themes, unwillingness to reveal and discuss certain aspects of the topic or reduction in willingness to take part due to the time issues. The outcome of this may be incomplete or biased information. (Saunders, Lewis, & Thornhill 2009, 357-358.) In this research, one more threat to reliability was that the interviewer and interviewees did not share the same cultural background, what could lead to the bias due to cultural differences. Moreover, the interviews were conducted in English, which is not the native language for both of the parties, possibly causing misunderstanding.

Validity in qualitative research indicates if the research tools, processes, and data are appropriate for this particular research. This means that the research question should be valid for the desired outcome, the choice of methodology should be appropriate for answering the research question, the design should be valid for the methodology, the sampling and data analysis should be appropriate, and finally, the results and conclusions should be valid for the sample and context. (Leung 2015, 324.)

Generalizability addresses the degree to which the findings can be generalized from the study sample to the entire population (Polit, & Hungler 1991, 645).

In response to reliability issue, the author also wants to disclaim that this research was not intended to be repeatable, as it reflects reality at the particular moment in time and as the research findings may be subject to change. The topic of the thesis itself underlines the instability of the circumstances around the research subject. However, to best avoid the reliability issues of the research, the research design, the reasons underpinning the choice of strategy and methods are clearly explained in the thesis. The researcher has also ensured to promote validity and reliability of the research by planning the interviews in advance and carefully preparing for them. The researcher has carefully studied the research topic and the organizational or situational context beforehand. Furthermore, the interviewees were provided with the list of the interview questions before the event, so that the participants had the time to prepare themselves for the interview. The interviewer has also ensured to minimize the bias effect by choosing an appropriate location and appearance for the interview. The nature of the opening comments to be made when the interview commences, approach to questioning, nature and impact of the interviewer's behavior during the course of the interview and demonstration of attentive listening skills were also taken in the account and were performed in a way that, from the researchers point of view, would minimize the bias effect in the provided circumstances. To avoid biased or incomplete interpretation of the data obtained during the interview and ensure the reliability and validity of the findings, in case of the threat of misunderstanding, the interviewer was always clarifying the interviewees' responses by asking additional questions.

To overcome a concern surrounding the generalizability of findings from qualitative research, the researcher tried to address a wide range of different perspectives within a single case study. Finally, the qualitative data in this research is complemented with the quantitative data, making the study more valid and reliable and helping the researcher to overcome data quality issues.

### 3.3.2 Quantitative data

The quantitative data used in this research are documentary secondary data. These data are often used in research projects that also use primary data collection methods (Saunders, Lewis, & Thornhill 2009, 258).

The quantitative data needed for the accounting and financial variables calculations represent the financial data of three Nordic commercial banks (Nordea, Danske Bank and Handelsbanken). The data were collected from the 1 January 1999 to 31 December 2018, what in total accounts twenty years of observations. The secondary data was taken from such secondary data sources as the annual reports of the mentioned companies and NASDAQ OMX Nordic stock market database. Both of these data sources are official providers of the actual corporate numerical financial information of the Nordic companies. The companies' annual reports were used to retrieve the data from the financial statements from the company, while NASDAQ OMX Nordic stock market database was considered to be the best source to extract the data about the companies' market performance.

The quantitative data in this research is numerical, therefore, there is no need to quantify it additionally. Almost all the data needed for the research are ratios. These ratios were either directly taken or preliminarily calculated out of the data retrieved from the financial statements of the companies (income statement and balance sheet) and the data from the NASDAQ OMX Nordic stock market. The only non-ratio variable in this research is the indicator of IT investment, which was used as a proxy of investment in FinTech due to the absence of this indicator in the companies' annual reports. This variable is used in this research to find and calculate the correlation of the amount of investment in FinTech and the banks' performance.

The ratios used in the research were structured in the following way (Figure 9).

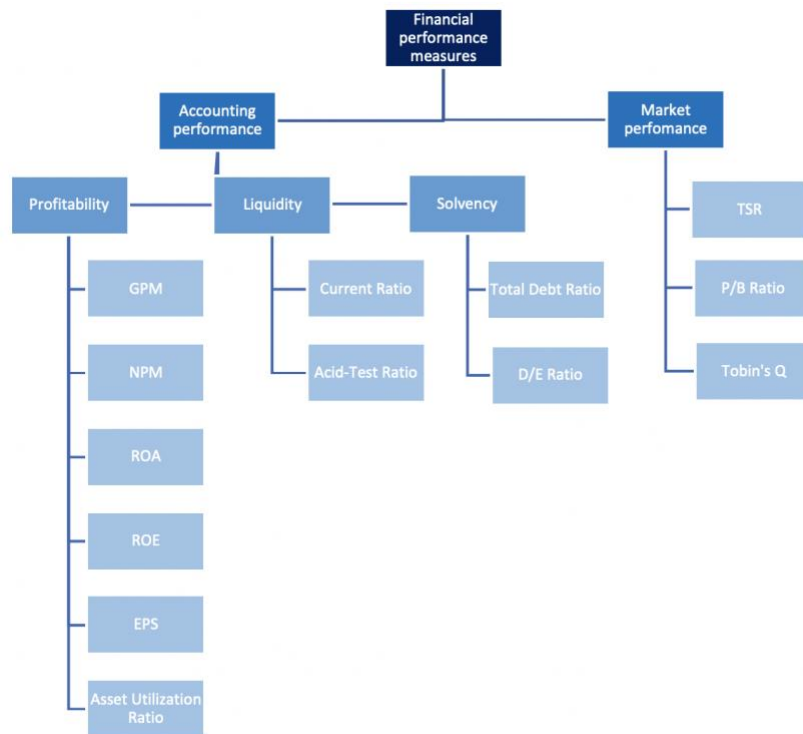


Figure 9. Structure of the ratios used in the research.

For the further data analysis and results representation, the performance indicators used in the thesis, their formulas and sources, from which these indicators or the data for their calculations were extracted, are represented in the Table 3. An example of the calculations of these ratios for the thesis is displayed in the Appendix 2. These indicators are described in chapter 2.5 of the literature review.

Table 3. Description of the ratios.

Financial performance ratios			
Name	Abbreviation	Formula	Source
Accounting performance			
Profitability			
Gross Profit Margin	GPM	Gross profit/Sales	Annual Reports
Net Profit Margin	NPM	Net income/Sales	Annual Reports
Return on Assets	ROA	Profit before taxes/Total assets	Annual Reports
Return on Equity	ROE	Net Income/Book value of equity	Annual Reports

Earnings per Share	EPS	(Net income – Dividends on Preferred Stock)/ Average outstanding shares	Annual Reports
Asset Utilization Ratio	-	Net revenue/Total Assets	Annual Reports
Liquidity			
Current Ratio	-	Current Assets/Current Liabilities	Annual Reports
Acid-test Ratio	-	Quick Assets/Current Liabilities	Annual Reports
Solvency			
Total Debt Ratio	-	Total Debt/Total Assets	Annual Reports
Debt/Equity Ratio	-	Total Liabilities/Shareholders' Equity	Annual Reports
Market Performance			
Total Shareholder Return	TSR	$(\text{Price}_{\text{end}} - \text{Price}_{\text{begin}} + \text{Dividends}) / \text{Price}_{\text{begin}}$	Annual Reports & NASDAQ OMX Nordic
Price-To-Book Ratio	P/B	Market price per share/Book value per share	Annual Reports & NASDAQ OMX Nordic
Tobin's Q Proxy	TobinQ	$(\text{Market value} + \text{Shareholders' Equity} + \text{Book value of debt}) / \text{Book value of assets}$	Annual Reports & NASDAQ OMX Nordic
Other indicators			
IT investment	-	-	Annual Reports

### Data quality issues in quantitative research

For the results of quantitative research to be considered useful and trustworthy, there are several key issues that must be considered and addressed as part of the

experimental design and analysis, such as validity, reliability and generalizability. In this study, the most important was to evaluate the reliability of sources, ensure external and internal validity of the research. One of the factors which could threaten the validity of this research and, consequently, reliability and generalizability is measurement bias.

Measurement bias can occur for two reasons:

- deliberate or intentional distortion of data;
- changes in the way data are collected (Kervin 1999).

In this research, the author has accurately chosen the study sample to ensure internal validity and avoid statistical errors. The documentary secondary data was collected only from the official sources such as companies' published annual reports, which state the actual financial data of the firm on a yearly basis, and NASDAQ OMX Nordic database. The timeline was also accurately chosen and represented 20 years. To avoid measurement, bias all the financial data were taken without the overlapping dates. The measurements instruments and sample were also ensured to be unchanged during the whole research.

To prove the external validity of the results the author has prepared the sample of 3 companies from the commercial banking industry, on which the research is focused on. This study is focused on the Nordic banking sector, thus, the fact that all of the sample companies are from the Nordic region, cannot be considered as a threat to external validity.

All the variables used in the research were extracted in accordance with the previous researches on the topic or in the finance field, to ensure the external validity and avoid the ambiguous notation of variables.

The quantitative part of the research was conducted based on the numerical data received from the annual reports and stock market database in order to avoid the participant error and bias. For the same reason, the variables used in this research were chosen by the principle of the frequency of them occurring in the previous researches of that kind.

The interpretations of collected data were accurately made based on the data, which were stated in this paper. Therefore, for the reader, it is clear how the conclusions were drawn up. Hence, the paper can be considered reliable.

### 3.4 Data analysis

The aim of data analysis was to find out which performance indicators should be taken into account while measuring the performance of banks in the era of FinTech and examine the transformation of performance measures. The researcher intended to compare quantitative data derived from the financial statements and NASDAQ Nordic stock database with qualitative data obtained during the same research from the interviews.

All the interviews were audio-recorded and subsequently transcribed verbatim, that is reproduced as a written word-processed account (Saunders, Lewis, & Thornhill 2009, 485). The interviews were transcribed as soon as possible after they are undertaken in order to avoid a build-up of audio-recordings and associated transcription work. In the transcription, not only was recorded what was said and by whom, but also an indication of the tone in which it was said, and the participants' non-verbal communications was identified.

After the transcription, the key points of the impact description on the banks' stakeholders and activities and the evaluation of the extent of the impact on the scale from 0 to 5 were put into the tables, one table per interview, to recognize relationships between the data and make further data analysis structured and consistent. The outline of these tables can be discovered in Appendices (see Appendix 3).

The quantitative data derived from the financial statements of annual reports and NASDAQ OMX Nordic database were put into the Excel spreadsheets. After that, the ratios needed for this research were calculated either with the help of Excel tools or by hand, based on the formulas described in chapters 2.5 and 3.3.2. For the visual representations, the calculated ratios were put into graphs.

After analysing and interpreting all the qualitative and quantitative data separately, the author moved to the comparison of and relationship establishment between all

the data collected during the research. The research findings, conclusions and further discussion are presented in the following chapters.

## 4 Research Results

In the following chapter, the results of the data analysis will be presented and interpreted. The information will be presented in three following subchapters. The first one will represent the findings of the role and relevance of FinTech in the commercial bank. This chapter will also define the start point of FinTech adoption. The second one will describe the impact of FinTech on banks' performance, illustrating its impact on different stakeholders, processes and operations within the bank. The third one will discuss the transformation of performance measurement in the light of FinTech.

### 4.1 FinTech in the Nordic banking sector

The following section is intended to introduce the reader to the research results on the start points and triggers of FinTech adoption. It also discusses the role and relevance of FinTech.

#### 4.1.1 Start point and triggers of FinTech adoption

The opinions on the beginning of FinTech adoption divided into two categories according to the respondents' perception of FinTech. The first category of respondents perceived FinTech as any technology used in the financial sector, including IT systems. Thus, they have chosen the late 1970s or the beginning of 1980s to be the beginning of FinTech adoption. Respondent 2 explained that, within the banking sector, IT systems are very old and the oldest ones date back to the 1980s. They also mentioned that even before 1980s ICT was used to some degree. While Respondent 3 commented on the start point of FinTech adoption in the following way:

*The late of 1970s, I remember the Finish banks then introduced what we now know as the bank card, so that was quite early, but of course we didn't have the word FinTech yet and it was all in a bank card and they also introduced the tellers where you control money at the same time. But, of course, those were the first steps, towards FinTech or what we now know as FinTech, and of course, now it seems very little, but it was the first time.*



However, these respondents understood that the late 1970s or the beginning of 1980s was just the very beginning of FinTech emergence. Therefore, further, they describe subsequent stages of the development of this phenomenon.

One of the respondents highlighted the role of the 1990s' recession and claimed that it had forced the banks to seek new measures of survival on the market, as at that time a lot of banks have not survived, and they have disappeared or have been merged with other banks. They explained that it had been one of the biggest financial crises in Nordic countries. They underlined the negative effect of that crisis on the economy of Nordic countries, and especially, the Finnish economy.

Respondent 3 highlighted the importance of the recession of 1990s:

*I think very meaningful for the banking sector was the big recession in the 1990s because it forced the banks to seek new measures on how to survive on the market. Because in 1990s many of the banks didn't survive and they disappeared, or they were merged into other banks. And that was one of the biggest financial crises that we have ever seen in Nordic countries. And Finland was the one who was suffering the most. But I think those happenings in history have been very important.*

Another stage of FinTech adoption, mentioned during the interviews, is the years 2008 or 2009. One of the respondents explained that ten years ago – in 2008 or 2009 there had been just a couple of very small start-ups trying to establish financial services. Those start-ups were not receiving a huge investment.

From that point, the opinions of the first category of the respondents matched with the opinions of the second category, which claims that the latest change and the FinTech phenomenon had actually started from five to ten years ago. The interviewees agreed that in 2015 FinTech phenomenon, as we know it now, had started to gather pace and more FinTech start-ups had started to emerge.

However, they highpoint different triggers of FinTech development. One of the respondents saw the venture capital investments and start-ups to be the FinTech triggers. Others highlighted the importance of the European Payment Service Directive (PSD2)<sup>10</sup>. Respondent 2 explained that PSD2 is about payments and,

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<sup>10</sup> The main purposes of the PSD2 are (i) to contribute to a more integrated and efficient European payments market; (ii) to further level the playing field for payment service providers by involving new players; (iii) to make payments safer and more secure; and (iv) to improve protection for European consumers and businesses.

especially, the cross-border payments. Respondent 3 considered PSD2 as the fundamental of open banking adoption and explains that from the moment the PSD2 have come into effect banks must reveal their information to the payments transferring companies. Though, while Respondent 2 defined this directive as the FinTech starting point, Respondent 3 saw this direction as only one of the triggers of change in the banking sector. Furthermore, Respondent 3 highlighted the overall role of regulation in the process of FinTech adoption:

*Then, I would say what has been important lately is the amount of regulation in the field of banking. It's not only national regulation as it used to be, but now it's regulation on the EU level and all these RegTech solutions, I think, are very important for banks.*

Another contributing factor to FinTech adoption, which was mentioned during the interviews is White Label Banking. Respondent 3 stated that it had changed the whole banking sector quite a lot. As in the past, the companies always needed a banking license to operate in the banking sector, while nowadays there are hundreds of companies that operate without a license because they are just those companies which are transferring payments and making applications. New ways of financing, including crowdsourcing, crowdfunding and peer-to-peer financing were also considered to be the triggers of change in the banking sector.

Another stage of FinTech development, which was mentioned during the interview by Respondent 2, is the year 2017. The respondent claimed that there has already been a huge number of start-ups and the number had been continuing to rise. Moreover, the respondent declared that 2018 had been the peak of FinTech growth and the world had seen a lot of initiatives in this field. Finally, all of the respondents agreed, that at the present moment the number of FinTech start-ups continues to rise.

It is also important to highlight a comment of Respondent 3, who told that *"whenever there is something new coming on the field of IT, then, of course, there will also be something new coming in the field of FinTech"*.

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In other words, the PSD2 supports innovation and competition in retail payments and enhances the security of payment transactions and the protection of consumer data. (European Central Bank 2018.)

Without a doubt, changing customers' demands and behaviours have also facilitated FinTech adoption. Banks have recognized these changes and are trying to integrate Financial services to serve their customers decently. For example, Danske bank claimed that customers should experience their bank as serving them efficiently and this requires the bank to strengthen the way they operate. Thus, they strive to keep up with the latest customer needs and frequently offer new and innovative solutions. The bank is focused on upgrading key branches in order to increase the level of digital interaction and improve the customer experience. Alongside this initiative, Danske Bank has closed several branches in response to the ongoing changes in customer behaviour. (Danske Bank A/S 2019, 17.)

Danske Bank also reported that digital innovation continued at a pace, and it was expected to accelerate further in 2019 due to both increasing customer expectations and the launch of open banking. In 2018, the bank has seen further adoption of the digital channels, with more than four million digital logins per month and a rise of the amount of digital transactions year-on-year by 35%. (ibid., 60.)

Nordea also reported on the rapidly changing customer behaviours and demand patterns. To meet these changes Nordea has employed digital innovations. Furthermore, the bank has the vision to deliver products and services that go beyond traditional banking, *Business Beyond Banking*. (Nordea Bank Abp 2019, 18.) Business Beyond Banking is not only one of Nordea's initiatives, but also the best definition of what banks are striving to be in the future.

#### 4.1.2 Role and relevance

Nowadays, in the banks, there are different technologies, which are used in different activities and to a different extent. All of the respondents mentioned the following technologies, which are currently employed within the banks:

- AI tools
- Robo-advisors
- Online and mobile banking.

Some of the interviewees also added RegTech, blockchain and cryptocurrencies to this list. In addition to the mentioned technologies, bank reports mention Open Banking, DLT and cloud-computing.

According to Respondent 1, currently, the employed FinTech is directly customer oriented.

AI is applied in mobile applications to improve customers' daily banking experience, while robots are used in customer service. Answers of Respondents 2 and 3 prove this point of view. Respondent 3 explained that all kinds of robo-advising tools are nowadays in use already and when clients contact the bank, they will always be advised by robo-advisors. Respondent 2 added that robo-advisors are increasingly employed in wealth management. However, the speed of that process is relatively slow. Another mentioned application of robo-advisory is insurance services.

Indeed, some of the banks are moving towards FinTech integration into insurance services. For example, Danske Bank has entered into a new Nordic partnership with Tryg Insurance<sup>11</sup>, through which they aim to guarantee access for their customers to superior and innovative insurance offerings on the best terms available in the competitive marketplace (Danske Bank A/S 2019, 18).

Respondent 3 highlighted the importance of AI in payments, explaining that mobile banking becomes a new strategy for some Nordic banks:

*What is also important is mobile payments. And I think most banks actually have a strategy which could be described as Nordea describes today its strategy. It's something like mobile is the new bank branch. That's very important.*

Indeed, Nordea has a digital strategy, which has resulted in a significant number of new digital offerings to their customers. From 2016 to 2018 Nordea has invested more than 200 million euros in digital solutions, as their customers are expecting smart tools and easy digital ways of handling their everyday banking. One of Nordea's latest solutions is a digital savings robot called Nora which has been introduced in all Nordic countries in 2018 and has conducted more than 115 000 advisory meetings. Moreover, Nordea has expanded its digital payment offering by

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<sup>11</sup> Tryg is one of the largest non-life insurance companies in the Nordic region with activities in Denmark, Norway and Sweden (Tryg Forsikring A/S 2019.).

adding Google Pay, a mobile payment solution for Android phones. (Nordea Bank Abp 2019, 4.)

Overall, Nordea strives to improve customer experience through different initiatives. For instance, they have the simplification project, a part of which was a significant investment in building modern platforms that would enable end-to-end digital solutions for customers and future development. This development involves the replacement of the legacy banking systems, where over 400 systems are being united into a new core banking platform, a payment platform, a customer and counterparty master solution and a common data warehouse. Nordea has made significant progress towards these ambitions. Since early 2018, household customers in Finland have been able to open new savings accounts and fixed-term deposits on the new Core Banking Platform. Besides, all Single Euro Payments Area (SEPA) payments are now running on the new Payment Platform and Nordea has a completely new Group Common Data Platform. (ibid., 4.)

Respondent 2 also underlined the scope of FinTech application in payment and payment-related services and describes the fields of activities in that realm. These fields include the retail and corporate sectors. In the retail sector, there are Finance Planning Services and payment services provided to retail clients, while in corporate sector FinTech start-ups can use the opportunities of PSD2 and use the access to clients' accounts to connect business administration and accounting activities and connecting those with payment services. Respondent 2 commented on the FinTech application in the following way:

*I would say the payments and related services are the most important ones and the most extensive at the moment. And there you can see two true fields of activities: the one in the retail sector, where you have services provided like Finance Planning Services and payment services provided to retail clients. And then, of course, the corporate sector. It has a lot of potentials. So, there you can use the opportunities provided by PSD2, where the incumbent banks should provide interfaces and allow other service providers to access clients' accounts if clients allowed them to do that. And corporate clients could use that extensively since they have this business administration and accounting activities and connecting those with payment services is where we have huge opportunities. And several start-ups providing services in that segment as well.*

Concerning their corporate clients, Danske bank has launched the financial platform District to benefit its customers in that sector. This innovation aims to give customers

the main place to handle all of their day-to-day finances alongside major financial decision-making. Furthermore, the bank is a part of the Nordic KYC Utility sector collaboration<sup>12</sup>. The main goal of this initiative is to simplify the compliance for new customers through the reduction of the processing time for onboarding. Danske strives to serve its customers swiftly and meet their needs as they emerge to make customers' lives easier. (Danske Bank A/S 2019, 17.)

Nordea also has various initiatives dedicated to the service of corporate clients. Nordea brings easy banking services from the bank and partners to the corporate clients through a mix of physical and digital channels. The bank provides value and contributes to society by offering the eco-system to entrepreneurs and scale-ups to make people and businesses succeed with their Nordic ideas and to make a sustainable impact. Transaction Banking is constituted by Cards, Trade Finance, Cash Management and Mobile- & E-Commerce & co-Innovation and serve all Nordea's customer segments, providing payment and transaction services in addition to driving Open Banking, and Blockchain/DLT initiatives across all platforms in the bank. Transaction Banking is an integral part of the Nordea ecosystem as a provider of the latest digital innovations to enable Business Beyond Banking. (Nordea Bank Abp 2019, 18.)

Furthermore, Respondent 1 mentioned the application of robotics in the internal processes to reduce time consumption:

*But, of course, in the internal services we are adopting more of these robots to cut these unnecessary routes in the internal processes, like, to make everything quicker, quicker in the time to answer the consumers and the services.*

In general, banks are moving towards automation of all processes in the financial sector. To support delivering customer-centric products and services Nordea has

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<sup>12</sup> A joint venture company to develop a platform for handling KYC (Know Your Customer) data established as a result of collaboration of Danske Bank A/S, DNB Bank ASA, Nordea Bank Abp, Skandinaviska Enskilda Banken AB, Svenska Handelsbanken AB and Swedbank AB. The banks' top priority in collaborating has been to develop a Nordic platform with standardised processes for handling KYC data. The objective is to improve customer experience by simplifying the KYC processes for corporate customers while strengthening financial crime prevention in the Nordics. (SEB 2019.)

established Group-wide architecture services a unified architecture capability. This ensures optimal use of technology, and that the values of data strategy, security, risk and compliance and other functions were realized, and allows for faster and better decision making. (Nordea Bank Abp 2019, 3.)

Moreover, to improve resilience, scalability, and cost-efficiency, the usage of cloud computing has increased. Through advancing in cloud compliance and making software as a service, unnecessary complexity, low agility and potential compliance breaches have been reduced. (ibid., 33.)

Some banks have chosen to benefit from the collaboration with FinTech start-ups. For instance, Danske Bank has launched a dedicated FinTech co-creation space, the Catalyst Belfast FinTech Hub. To complement this, they have also introduced thehub.io, an online portal to help the start-up businesses to connect with investors, peers and potential recruits across Europe. The main task of the Hub is to help start-ups recruit the desirable and decent specialists, access the most efficient tools and raise capital. The Hub also provides access to Danske Bank Growth, a network of advisors specializing in start-ups. There are more than 3,000 registered companies in total for Finland, Sweden and Norway registered on the Hub. Therefore, this platform is becoming one of the leading digital platforms for start-ups in the Nordic countries. (Danske Bank A/S 2019, 65.)

Finally, nowadays the strategic focus areas of big banks include initiatives which require FinTech for the implementation. In the Strategy chapter, it becomes clear that digital innovation through FinTech is an integral part of banks' initiatives to implement their transformation.

## 4.2 FinTech and its impact on the performance of Nordic banks

In the following chapter, the research results on the impact of FinTech on different stakeholders and activities of banks are presented and examined.

### 4.2.1 Customers

There is no doubt that with the integration of FinTech into banks' activities will significantly change the customer experience. FinTech adoption already has some impact on the relationship of customers with their banks. The respondents'

evaluation of the FinTech impact on customer experience on the scale from zero to five ranged from three to five. Respondent 2, for example, evaluated the short-term impact at level three while considering the long-term impact to be at the top of the scale. The respondent also claimed that the change in customers experience has not stopped at that point and the commercial banking industry will see the even greater transformation.

Interviewees considered this transformation of financial services to be mostly positive and describe numerous effects of FinTech on customers' banking experience. The first impact of FinTech on banks' customers that the interviewees underlined was the simplification and acceleration of the financial services. With this improvement of the services, consumers have the possibility to do most of the operations by themselves. Moreover, due to mobile and online banking, the need to visit the physical bank's office is almost eliminated. Additionally, nowadays customers have access to their bank accounts around the clock and doing any transaction. Therefore, bank clients save their time in dealing with their banking duties. Respondent 1 commented on this matter in the following way:

*I think from the customers point of view it will be shown as that the services and to use our service at some products will be more easy and faster, since everything is going and going more and more to the internet and online and apps, so they, the customers, can feel that they can do everything by themselves.*

While Respondent 2 had the following opinion on this matter:

*The first one is that it has huge potential, so the customer experience will change. It's digital, it is making financial services much more effective from the customer point of view since you don't have to go to the branch office to take care of your financial services. You can access your finance... your accounts and your bank through your mobile phone or online whenever you want to. So, it's a 24/7 banking service at your use... whenever you are doing any transaction, the financial services can be present there immediately. That's very good for all kinds ... Let's say, all kinds of activities. When you do your grocery shopping, to the other end where you are buying a house, for instance. You have all the financial services present there. That's a huge change. And that's very positive.*

Indeed, banks aim to deliver easy banking for the customers anywhere – anytime, digital and in-person, providing high availability of efficient daily banking services accessible through multiple channels and high-value advisory services. For example, as was mentioned in the previous chapter, Nordea's initiatives to make its



customers' lives easier include a significant investment in building modern platforms that will enable end-to-end digital solutions for the customers. This initiative has undeniably simplified the customers' lives, making a loan application via Nordea Mobile straightforward. Now, this process involves just a few easy steps, with instant access to funds for eligible customers in Finland. Furthermore, Nordea has leveraged scale and quality of their solutions, making customer experiences seamless and fully digitalized with the help of new Core Banking Platform. The bank has also augmented its advisory services with the new digital advisor Nora in all markets, allowing customers to receive investment advice whenever they want. Finally, the bank has developed digital and automated solutions to simplify personal finance management process for the customers, for instance with a new finance calculator that allows a quick overview of the financial situation. (Nordea Bank Abp 2019, 14.)

Danske Bank also aims to get closer to the customers' everyday activities and provide them with effective solutions designed to make their working day easier. For example, the bank continued to develop District, a platform which aims to enable corporate customers to gain a more comprehensive, real-time overview of their financial position, hence allowing improved financial decision-making. Similarly, the bank began to extensively develop and digitalize the financial markets platform, which is aimed at improving the speed of execution and increasing accuracy. Moreover, Danske bank has launched new FastPay wearable solution. This solution enables customers to easily pay with a sim-card-format Mastercard. In addition, Danske bank understands that accessibility is key to the customers. Thus, the bank has established a new online meeting-booking solution, where retail customers can book a meeting with the desired adviser at the preferred time. This option provides customers with the opportunity to have a meeting outside normal working hours. (Danske Bank A/S 2019, 40.)

Handelsbanken is a great example of constant service availability. In the majority of the Bank's home markets, the bank offers its customers personal technical support 24 hours a day. Furthermore, in Sweden, for example, when the physical branches are closed, customers can also receive personal service by phone in any of 20 different languages. Personal service by phone is also offered outside of office hours in other markets. (Handelsbanken AB 2019, 10.)

Moreover, Handelsbanken has already experienced the quantitative impact of FinTech on customers. In Sweden, for example, 50% of the customers chose to increase their mutual fund savings after an advisory meeting during the year 2018. This digital advisory tool that facilitated this increase illustrates how the bank invests in technology to improve efficiency, creating time for the bank to provide better customer service and do more business. Handelsbanken is continuing to enhance this tool, preparing to launch it in other home markets. Other examples of FinTech applications include harnessing AI to review financial advice and digitalizing the mortgage loan process. (ibid., 4.)

Respondent 3 added that nowadays mobile banking is the first point in the banks' agenda:

*I think, it's probably if I think of customers, I would say that let's say five to ten years ago people were very worried about the availability of banking services on the countryside or the availability for elderly people. But you will hear that less and less now. I think, it takes maybe a change of generations and new generations are not really interested in going to a banks' branch office somewhere, but they like to use the bank services through mobile, which from banks' point of view is the strategy number one. And then maybe through the computer, which is not their first strategy.*

Indeed, Nordea, for instance, considers that the importance of digital mobile services is increasing. Thus, the development of mobile will continue to be a key item in the bank's transformation roadmap. During 2018, they have launched a range of new services and solutions for the customers, in addition to improving availability and accessibility. For example, they had launched the completely redesigned mobile banking app in both Finland and Sweden to improve the digital daily banking experience for the customers. Via this new app, the bank is available anywhere at any time and personalized to the preferences of the customer. (Nordea Bank Abp 2019, 4-6.)

For Danske Bank, MobilePay also remains a cornerstone of the digital payment offering to both commercial and retail customers. The bank continuously develops the mobile offering and introduces upgrades such as MobilePay Box and a MobilePay. Additionally, new ways of executing payments are emerging. For example, with Google Pay, the customers can pay contactless with their Android

smartphone or smartwatch by adding their Danske Bank Mastercard to the app. (Danske Bank A/S 2019, 40.)

However, Respondent 1 reminded that the physical bank branches were still present and if customers had any issues that they could not solve via an online or mobile application, they could contact the bank directly.

Handelsbanken example proves that point of view. The bank declared that their task was to simplify the access to the services, and to offer careful and detailed advice and assistance. That is why Handelsbanken payed close attention to the needs of the individual customer while finding effective solutions to everyday matters.

Danske Bank strives to be available for its customers, ensuring the bank's local presence, and the customers appreciate that fact. The bank explained that usually, the customer relationships start at the local branch, but afterwards, meetings often move to the digital sphere. Handelsbanken is complementing their local presence with digital solutions, thus, aiming to always offer personal customer meetings – regardless of whether the customer meets the bank at one of the local branches or seeks assistance via a digital channel. The bank is constantly developing and improving the bank's technical solutions, for the customer to be able to do the same type of business regardless of whether the meeting takes place physically or digitally. (Handelsbanken AB 2019, 10-11.)

Respondent 2 continued the list of FinTech impacts with the reminder that nowadays there are more companies are coming to the field of banking. So, nowadays, not only banks provide financial services, but also other companies, which are mostly FinTech start-ups. These start-ups provide their services for various banking activities, such as investments, loan borrowing and, especially, payment transferring.

Danske bank has noticed this change in the competitive landscape and follows the partnership strategy to retain its competitive advantage. They see partnerships as a way to benefit their customers through new skills and techniques that can be used to improve banking experience. Partnerships are seen as a key driver of growth, either as a means of reaching new customer groups or as a source of new competencies, ideas or technologies to benefit their customers. With some of their partnerships, they target new customer groups to benefit from their products and services. For

instance, during 2018, they expanded their partnership with Akava<sup>13</sup> and Frank<sup>14</sup> in Finland, renewed the partnership with Akademikerne<sup>15</sup> in Norway and entered into a new limited partnership with Tekna<sup>16</sup>, which is Norway's largest union. The bank also participates in sector collaborations that aim at the increment of customer satisfaction levels through improvements to the financial infrastructure. For example, to give customers the benefit of faster payments processing, they became a part of the pan-Nordic 'P27' payments sector initiative<sup>17</sup>, which seeks to modernize and standardize the payments infrastructure in the Nordic countries. (Danske Bank A/S 2019, 17.)

Moreover, in the response to the growing number of FinTech start-ups Danske bank continued to expand the use of automated credit decision tools so that customers pursuing home finance, or a consumer loan are now able to get loan approval on the spot (ibid., 18).

Overall, customer satisfaction is a top priority for Danske. The bank focuses on delivering the best customer experience by creating and then providing easy customer journeys and customer-centric solutions. To drive customer satisfaction improvement and raise the bar for the value the bank wants to provide to the customers, Danske has launched several new initiatives. These initiatives include partnerships with a number of unions as well as FinTech companies. These

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<sup>13</sup> The Confederation of Unions for Professional and Managerial Staff in Finland (Akava) is a trade union confederation in Finland, which represents employees with university-level, professional or other high-level training. Akava is a central organization i.e. the individual members are not personally members of Akava but of a trade union which is a member of Akava. (Wikipedia contributors 2018.)

<sup>14</sup> A utility service that offers student identification and benefits in Finland. For companies, Frank also offers a platform to reach students and provide them with targeted services. Frank is trusted by largest Nordic companies like Danske Bank, Telia and VR. (Frank Students 2019.)

<sup>15</sup> The Federation of Norwegian Professional Associations (Norwegian: Akademikerne) is a national trade union center in Norway. It was formed in 1997 as a break-away union from the Academic and Professional Unions. (Wikipedia contributors 2018.)

<sup>16</sup> Teknisk-naturvitenskapelig forening (Norwegian Society of Graduate Technical and Scientific Professionals) is a union for graduate technical and scientific professionals in Norway (Wikipedia contributors 2019).

<sup>17</sup> A joint initiative created by Danske Bank, Handelsbanken, Nordea, OP Financial Group, SEB and Swedbank that aims to link the Nordic payments region, as well as enable cross-border real-time payments (PYMNTS 2019).

partnerships allow the bank to give personal customers a full overview of their accounts, the expand their Future Finance offering that allows customers to apply for and be granted a new loan within seconds. Moreover, these partnerships empower Danske Bank to use advanced analytics, which allow the bank to identify emerging customer needs and concerns and adjust the bank's interactions accordingly. The bank's Investor Services offering, designed to help institutional customers outsource their back and middle office services, thereby optimizing administration in connection with their post-trade activities and regulatory compliance requirements, continued to see strong growth and many new customers were obtained in 2018.

Danske's goal for customer satisfaction is to be in the top two on satisfaction among customers in the prioritized segments in all of the Nordic markets. In the chart below (see Figure 10) it can be seen that in Norway and Finland satisfaction targets were met. FinTech was one of the most crucial factors in increasing customer satisfaction. However, the bank has faced customer satisfaction challenges in Sweden due to the Estonia case, which has impacted the bank's image negatively, resulting in customer satisfaction challenges in Sweden. The chart below shows the current average ranking over a full set of reports for all Prospera surveys to which Corporates & Institutions subscribes in comparison with the key competitors in each geographical area. A number one ranking in a market indicates the best average ranking in that market.



Figure 10. Danske bank customer satisfaction rates. (Adapted from Danske Bank A/S 2019, 51)

Nordea also encourages the partnerships by the development of Nordea's Open Banking platform, where approximately 2,500 external developers are forming part of the digital ecosystem, creating ideas and solutions for the bank's customers. (Nordea Bank Abp 2019, 5.)

Despite all the positive aspects mentioned, of course, there are also negative issues caused by FinTech adoption. Nowadays, paperless processes are not running smoothly when it comes to legal issues. Respondent 2 described that in case of a process failure, it is very difficult to correct the error without visiting the physical branch office. Because if something goes wrong the client's account gets blocked and customers have to visit the branch office to get identified and open the accounts to return account access. Respondent 2 identified the innovation in the banking sector as a mutual learning process for both the clients and the banks. Obviously, failures in financial services can negatively adjust clients against the banks. However, Respondent 3 reported that according to the statistics loyalty in Nordic countries towards traditional banking is slightly higher than in the rest of Europe. Loyalty of the clients can facilitate the process of FinTech adoption by the Nordic banks.

To sum it up, although there are some malfunctions in the banks' working process caused by FinTech adoption, innovations in the banking sector significantly improve customer experience. Respondent 4 claimed that nowadays the reason for choosing the serving company may be that this company is using FinTech in the operations.

#### 4.2.2 Investors

The interviewees evaluated the impact of FinTech on the investors to be very considerable. Three out of four respondents evaluated it to be at level four out of five, while the last respondent evaluated it to at the maximum. Opinions of the interviewees on that questions were almost unanimous. In general, they claimed that the traditional way of operations and competitive landscape had changed completely. Nowadays FinTech is the key to remain a stable and profitable company and keep up with the competition. Thus, FinTech adoption is one of the main focus areas for investors. More specifically, the opinion of Respondent 1 was the following:

*I think, of course, for them it's, in my opinion, it's their priority also that their company will remain in the competition, so there are a lot more companies coming*

*to the field that we have, the traditional banks have to keep up with the competition. And, of course, it's the investors' priority to make money, that the company survives in the competition, so I think it's one of the main areas for them too.*

While Respondent 3 commented on this matter in the following way:

*The traditional business has changed totally because the whole nature of the business and money pouring in the company has changed. The old business does not really exist... the margin business does not really exist anymore. But, I think investors might be interested in the possibilities that the FinTech is creating for the business, because I have seen some estimations that actually it would be possible for the banking sector to earn something like five billion extra by next year if they were able to adapt their strategies and um, take advantage of all this new FinTech.*

Respondent 4, who evaluated the impact of FinTech on the investors to be at its highest, stated that FinTech if it was used in the operations, might serve as a reason to invest in the company.

Respondent 2 added that the risk of bankruptcy for large banks was very low, while small banks were luckily to disappear in the future. However, the impact of that on foreign investors remains to be seen. Respondent 2 also added that the increasing level of automation had a reverse impact on the banks' profitability – while the level of automation was rising, the overall profitability was decreasing. Finally, investors should keep in mind that nowadays a lot of companies, especially big companies like Facebook, Apple and Alibaba, are providing the payment services and that after five years we are lucky to see considerable trade from these companies.

#### 4.2.3 Operations

All of the respondents unanimously rated the impact of FinTech on the banks' operations to be the highest on the scale from zero to five. They stated that with the integration of FinTech the banks' principal activities were remaining to be the same, but the way of implementing these activities had changed totally.

First of all, the need for traditional offices is disappearing. Banks' operations, especially customer service is moving online. Banks' internal operations, including administrative activities, are also becoming automated to a certain degree.

Respondent 2 predicted that in the future the world would move from the "physical world" thinking, and thus the banking services would change even further:

*But in the bank, there will be huge, when the automation will continue and there will be fully automated and, like, ICT-based processes in the future and that will mean that we are getting rid of the physical world thinking when it comes to processing banking services... I think there we will see huge changes if we can think totally differently. The process is how our clients are served in the future and that impact will be huge.*

The words of Respondent 1 also support this point of view:

*Well, of course, it changes from the traditional banks' operations in a huge matter if we look in time back like 10 years, 20 years, because, like I mentioned before that maybe their traditional offices, there is no use for them anymore, or maybe a couple of offices are needed, but because everything is changing more and more to the online, I think that the operations will have to shift their main point to this FinTech and everything. And the traditional way of working will have to have some changes also like in the internal operations and what is seen as the customer service.*

At the same time, Handelsbanken claimed that the digitalization of the banking services could not eliminate the need for personal contact. The bank perceives the need to meet with a real live representative whether at a branch, by phone or a remote meeting to be irreplaceable even by the best digital services. Handelsbanken always wants to be close to the communities, thus, they believe in a decentralized business model where the local branch is the hub of the customer relationship, based on personal meetings combined with digital services and solutions.

(Handelsbanken AB 2019, 4.)

Nordea Bank stated that with such transformation of the bank there were appearing new ways of working. The bank is creating a flatter organisation, which will result in increased empowerment for employees. This will also ensure a quicker decision making and more agile ways of working. (Nordea Bank Abp 2019, 4.)

Secondly, Respondent 2 stated that the things which was mostly influenced by FinTech were payments and especially cross-border payments. These processes are becoming fully automated. Furthermore, the loan giving process is changing with the advent of AI and cloud-based storage. Nowadays the process still requires human thinking. However, it might change in the future and lending will become fully automated. If this will be the case, the banks' cost structure will be significantly impacted: there will be more and more FinTech and ICT costs, and fewer personnel



costs. Additionally, now banks have become a part of round-the-clock society – their services are available all the time.

Moreover, Nordea reported that Life & Pensions units had scaled up the integration of robots across the Group, automating processes and tasks in the back office, increasing efficiency. Additionally, Life & Pensions has also taken the first steps in the field of AI by presenting a chatbot in customer interaction. (Nordea Bank Abp 2019, 5.)

The changes brought to the banks by FinTech provide increased employee satisfaction, development efficiency and shorter lead times to new services, ensured by an agile development operating model (Nordea Bank Abp 2019, 14). This fact highlights the importance of FinTech in modern banking.

#### 4.2.4 Competitiveness

The respondents evaluated the impact of FinTech on banks' competitiveness to be at its highest. Therefore, on the scale from zero to five, it is five. Respondent 1 told that PSD2 had opened the competition in the financial industry. Thus, nowadays more and more companies are coming to the field creating fierce competition and a need for traditional banks to keep up with the competition. Respondent 2 added that there were two kinds of competitiveness: within the banking industry and with other technology firms. They said that in the competition within the industry large banks would have an advantage in the automation and digitalization, as they had more resources to invest in FinTech. He claimed that in the future we might see the layering of the industry, meaning that some of the banks would specialize in customer service and mobile banking, and some of the banks would specialize in loan processing and so on. Respondent 2 further explained that in the intersectoral competition technology firms posed a threat for the traditional banks. For instance, large technology companies like Facebook, Apple or Alibaba can provide very effective payment services, because of their technological strength, their ability to develop code and provide the cloud computing power. He finalized his answer with the conclusion that it remained unclear if large banks could compete with these large technology companies. However, it remains to be seen in the near future. The

answer to the question about the impact of FinTech on banks' competitiveness of Respondent 3 is almost identical:

*Basically, if you are in the banking sector, it's very hard to get new clients unless you get them from somebody else. And it's funny that if you look at banks' strategies, different banks have different strategies, but they are more or less the same. The strategies are the same. If you compare traditional banks, there might be some differences between those that are ahead in FinTech and those that are a little bit behind... But they have to change their strategies. I think the competitors come from outside the banking sector and banking sector actually has to start collaborating among themselves to manage in the competition because the competitors come from somewhere else. They come from these payment branches for companies and they might come from companies who have access to a lot of customer data like Amazon or Google or some of these huge companies who can use customer data effectively and who own a lot of customer data.*

Respondent 4 supported the opinion of their colleagues in the financial industry and said that FinTech was creating a competitive advantage for the banks and also other firms integrating FinTech into their operations.

Nordea's annual report reflects the words of the interviewees. The bank reported that they had noticed the change in the competitive climate and the competition was becoming tenser.

Nordea strives to retain its competitive advantage through Business Partner concept, digital innovation, utilization and integration of existing solutions. The bank continuously improves existing solutions as well as develops innovations to stay on top of a market in constant change. To differentiate Nordea in the market, they have identified six capabilities that Nordea wants to excel at customer experience, analytics, IT management, partnerships, risk management and people management. The bank believes that these capabilities will support its strategic business priorities and ensure that the bank will stay competitive also in the future. (Nordea Bank Abp 2019, 35.)

With expertise in the ways of how banks improve these capabilities, the author can conclude that FinTech is an integral part of Nordea's initiatives to retain a competitive advantage. Danske Bank is also integrating FinTech solutions in its operations to remain competitive in the financial sphere (Danske Bank A/S 2019, 16).

#### 4.2.5 Strategy

The opinions of the respondents about the impact of FinTech on the banks' strategy differ. Some of the respondents evaluated this impact to be very significant: five on the scale. They evaluated this impact to be at its highest, because FinTech created new opportunities and provided different paths for innovation. Traditionally banks have developed everything in-house. However, nowadays they have the choice to develop technologies in-house or to collaborate with FinTech firms and purchase new solutions from them. Additionally, banks are creating venture capital funds to finance FinTech activities. That is one more change in the banks' strategy.

For example, Danske bank claimed that start-ups and growing businesses were key to ensuring innovation, and, thus, the bank's ambition was to help them develop effectively towards goal achievement. With that purpose, in 2018, Danske bank launched +impact, a digital platform aimed at the promotion of start-ups' positive impact on society. The final goal of this initiative is the creation of an eco-system for the start-ups to meet experts, potential employees and investors. Furthermore, the bank introduced the Accelerator programme, which offers selected start-ups to help to adjust their business plan and boost the commercial potential of their products designed to help solve environmental and social issues. Moreover, Danske has another initiative, which was already mentioned before, the Hub – which also helps start-up companies to get in contact with potential investors and employees as well as advisers to share best practice. (Danske Bank A/S 2019, 41.)

However, now these changes are not that considerable, as they might be in the future. Respondent 1 and Respondent 3 stayed with the opinion that FinTech was becoming a more considerable part of the strategy, but the impact was not at its highest yet. Furthermore, banks have much more other factors which define the overall strategy. Thus, in the common picture FinTech does not have the most significant impact.

Respondent 4 told that FinTech was included in the strategy but was not defining it on a high level:

*Well, in fact, if we think that how it's included in the strategy, it's, of course, very important, because our strategy is to use financial technology to find the trades. We don't have any other strategy at least for the time being. So, for the time*

*being, we're relying on those computers that make better trade decisions than humans. So, that's our strategy. But if we think about it in the way that we're listening to these computers' ideas about the strategy - no. We don't have any tools that would define the strategy for us. So, we're using it [FinTech] but it's not defining our strategy on the high level.*

Indeed, if we look at the strategy part of the banks' annual reports, we will see that FinTech is an integral part of the strategical decisions, but it is not defining it. Nordea described digitalisation as one of the main drivers for change in banking. This trend has developed due to the changing customer preferences and expectations on accessibility, ease and personalisation.

Overall, Nordea has its change strategy and the Core Banking Programme is the priority in Nordea's change portfolio, as it is the most essential enabler of Nordea's ambition to transform into a scalable, resilient, efficient and digital relationship bank by 2021. Nordea aims at simplifying its core to be able to leverage the full scale of digital opportunities, build an efficient operating model and achieve the customer vision. The strategy includes:

- true digital end-to-end customer experiences,
- improved access to data analytics,
- improved product development and maintenance – at a lower cost,
- replacing multiple country-specific legacy systems with one Nordic banking platform. (Nordea Bank Abp 2019, 10.)

Furthermore, Nordea has designed four main business areas to support the relationship strategy for each specific customer segment. These business areas include Personal Banking, Commercial & Business Banking, Wholesale Banking and Asset & Wealth Management. Nordea ensures optimal delivery, increasing the time spent on customer service and reducing the time of bringing new products and services to market by having one operating model and an end-to-end value chain. (ibid., 10.)

In Personal Banking Nordea aims to deliver easy banking for our customers, showing that in high availability of efficient daily banking services accessible through multiple channels and high-value advisory services. Nordea's vision is to be known as a safe and trusted bank both by the customers and also by the partners and society. (ibid.,

16.) All of the key strategic focus areas for executing the transformation of the bank are listed in Figure 11.

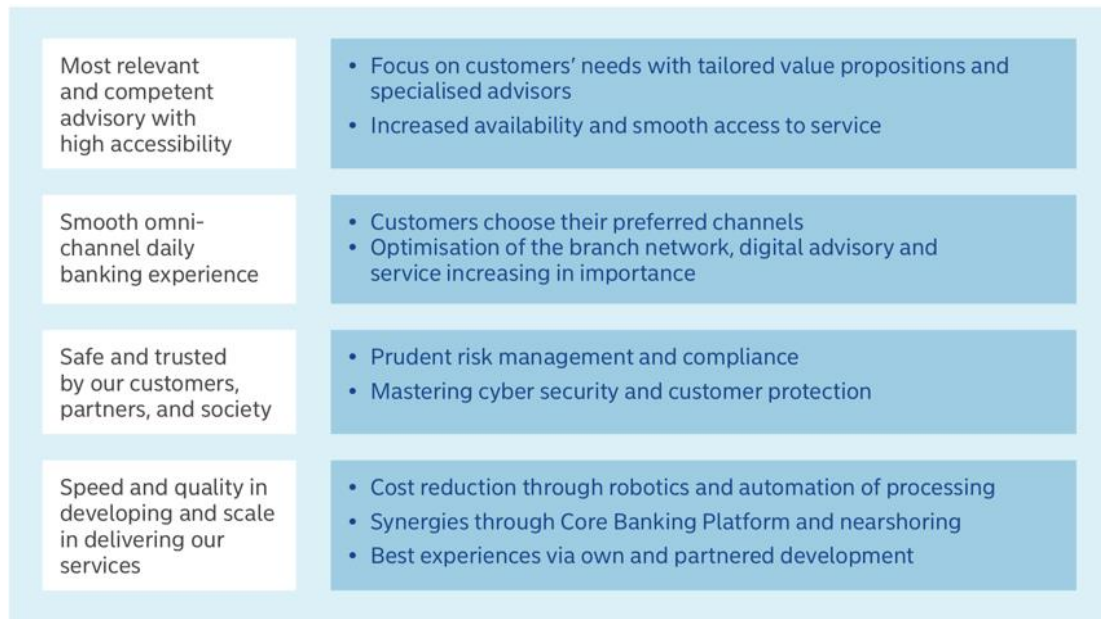


Figure 11. Strategic focus areas for executing the transformation in Personal Banking (Adapted from Nordea Bank Abp 2019, 16)

In Commercial & Business Banking Nordea's primary objective is to maintain its leading position in corporate banking in the Nordics, to be the most relevant business partner to the customers and to have the most engaged employees.

Nordea's strategy drivers are:

- to be the most satisfied customers in the segments, where the bank chooses to compete,
- better profitability than peers,
- the most engaged employees in the industry. (ibid., 20.)

To reach these objectives Nordea strategically focuses on the areas listed in Figure 12.

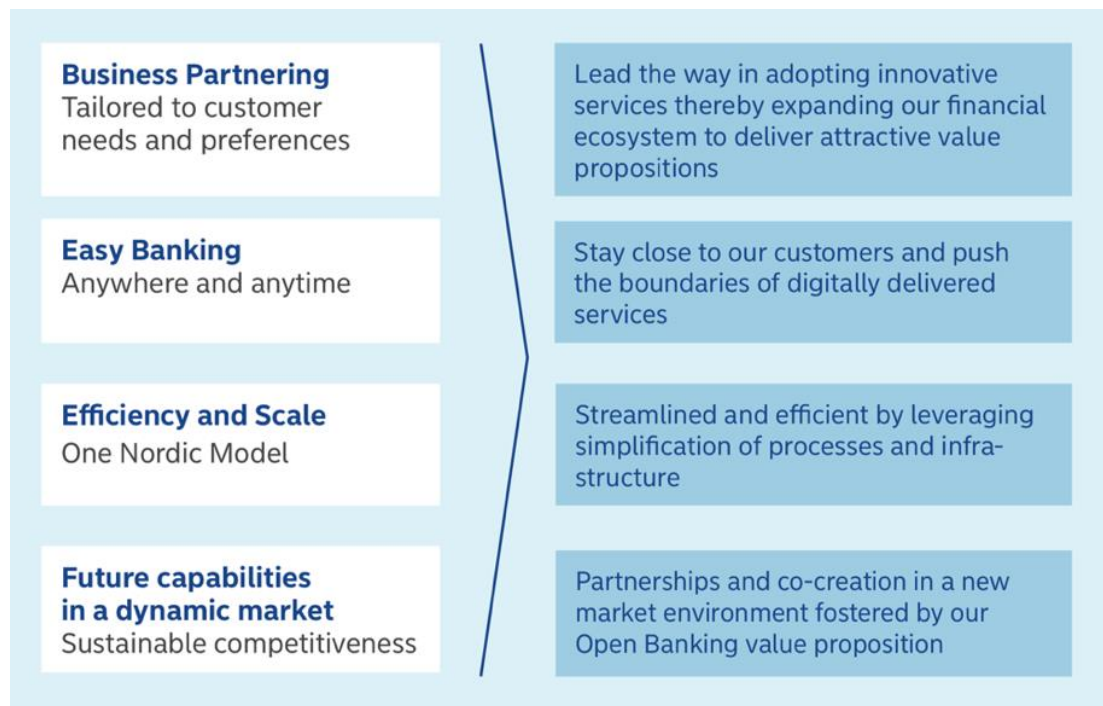


Figure 12. Strategic focus areas for executing the transformation in Commercial & Business Banking (Adapted Nordea Bank Abp 2019, 20)

In Wholesale Banking Nordea strives to attain market-leading customer satisfaction through a high degree of cross-selling in a combination with a continued focus to retain and attract the best talents in the industry. Business optimisation in the bank is driven by leveraging the digital and automation opportunities and relevant use of the balance sheet to drive structural cost efficiency. Moreover, Wholesale Banking has a focus on social engagement to be the Nordic leader in sustainable finance. (ibid., 24.) All of the key strategic focus areas are shown in the illustration below (Figure 13).



Figure 13. Strategic focus areas for executing the transformation in Wholesale Banking (Adapted from Nordea Bank Abp 2019, 24)

In Asset & Wealth Management Nordea prioritises strategic investments in:

- Further developing leading digital offerings to enhance value propositions and improve advisor efficiency;
- New product offerings to satisfy client demands within sustainable savings;
- Developing a strong and resilient operational platform meeting current regulations and adjustable to future regulatory demands;
- Establishing the leading sustainable pensions offering, targeting growth in occupational pensions, by developing new advisory, product capabilities and partnerships;
- Developing Asset Management distribution footprint in select new markets;
- Increasing the speed of growth in the high net worth segment.

Nordea's strategy is to build strong client relationships, based on the superior quality of advice and solutions, delivered effectively through an integrated value chain. The bank aims to take advantage of digitalisation and operational streamlining to enhance efficiency across the organisation. For 2019 the bank continues on the cultural, digital and business transformation, strengthening the customer value. (ibid., 28.) The key strategic focus areas of Nordea's Asset & Wealth Management are shown in the illustration below (Figure 14).

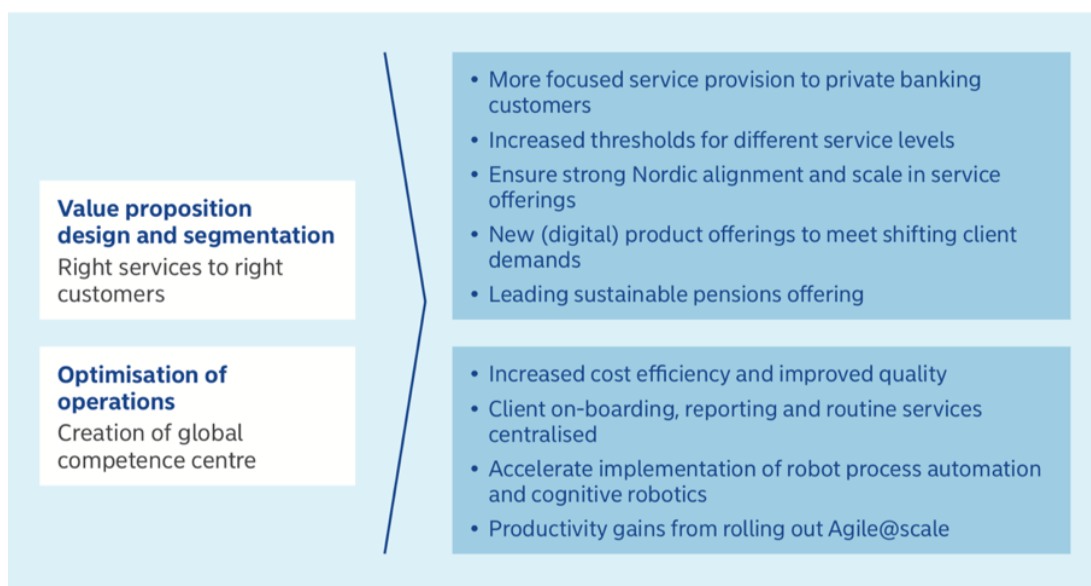


Figure 14. Strategic focus areas for executing the transformation in Asset & Wealth Management (Adapted from Nordea Bank Abp 2019, 28)

Finally, Nordea has its technology strategy, which is focused on consolidation, simplification and IT management across the Group to deliver consistency and to harness process synergies and efficiencies. Moreover, infrastructure stability and IT operations were designed to support the resilience and efficient delivery of product offerings. Information security and data leakage prevention initiatives have been organized to meet increasing regulatory demands. From 1 January 2019, to enable delivering higher value to customers One Technology has been established where Banking Technology and Trading Technology have been transferred to Group Corporate Centre (hereafter GCC) and consolidated with Group Technology. GCC has continued to ensure the digital transformation across the Group. Furthermore, various digital awareness sessions have been established and shared to all employees like Digital Talks on topics like digitalization, technological developments and disruption and Digital pop-up sessions held to influence, provoke and expose a digital mindset to the employees. Nordea positioned itself as a thought leader through industry-wide digital engagements. In Nordea digital capabilities have been included in the leadership development training for 4000+ leaders.

During 2018 Nordea has been implementing extensive work to embed a culture supporting new ways of working. Capability driven organizations have been implemented for capabilities like Architecture and Project/Programme Support which support the new ways of working. This has impacted many employees and



leaders, hence personal development, training of competencies and skills have been in focus. (ibid., 33.)

From this strategy description, it is possible to conclude that the words of Respondent 4 are the closest ones to the banks' perception of FinTech in their strategy. However, for sure, the words of other respondents also do not contradict the banks' strategical thinking.

Danske banks' strategy also confirms this point of view. The bank stated that the financial services sector was undergoing significant changes and identified six drivers of change, that were likely to affect the financial services landscape over the coming years:

- a challenging macroeconomic environment characterised by persistently low-interest-rate levels,
- intensified competition and the emergence of new market entrants,
- dramatically changing customer expectations and behaviour,
- continued digitalisation and emergence of new technologies,
- increasing regulatory requirements,
- increased expectations from society and external stakeholders.

To remain competitive and relevant for customers and all other stakeholders in the future, the Bank strives to adapt to these changes. FinTech is a large part of Danske adaptation strategy. For example, the bank entered into partnerships with several FinTech companies such as Spiir<sup>18</sup>, Minna Technologies<sup>19</sup> and TomorrowTech<sup>20</sup> to give customers an overview of not only their Danske Bank products but all their accounts across various banks. (Danske Bank A/S 2019, 41.)

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<sup>18</sup> Danish-based FinTech company founded in 2011 by Rune Mai and Gudmundur Hreidarsson with the aim of making personal budgets both fun and easy to understand (Danske Bank A/S 2018).

<sup>19</sup> Swedish FinTech start-up on a mission to make it easy for people to manage subscription services in their online bank (Minna Technologies 2019).

<sup>20</sup> Finnish start-up technology company which represents a digital product studio with multiple products (Tomorrow Tech 2019).

#### 4.2.6 Risk Management

According to the respondents, there are a lot of innovations that are coming out in the financial industry. However, all of the interviewees had different points of view on these innovations, the ways for the banks to keep pace with them and FinTech role in risk management.

For example, Respondent 4 evaluated the impact of FinTech on level two and claimed that risk management was strongly regulated by authorities. Thus, risk management practices are also defined by the authorities. In the companies, management plays the most important role in deciding risk management strategies, while FinTech can only assist in these processes. In other words, computer-based tools can be used to handle the risks, but they are not creating risk management strategies.

Indeed, Handelsbanken (2018, 114), for example, reported that while the Bank's operations depended on the availability and security of its IT services, the CEO established guidelines relating to the overall goal and strategy of IT operations in the Handelsbanken Group. Thus, management plays the most crucial role in risk management, while FinTech is just a part of the whole process.

Respondent 2 also evaluated the impact of FinTech on level two. However, in the Respondent's 2 interpretation of the question about FinTech impact, FinTech was meant by start-ups working in the FinTech field, not the financial technology itself. And the impact of the financial technology, especially of the AI and computing power, Respondent 2 evaluated to be on a high level. The interviewee justified their low grade for the impact of FinTech start-ups on risk management by the explanation that since risk management was one of the core activities of large banks, they had to do it by themselves. Certainly, FinTech start-ups could provide solutions for risk management, but they would have to compete with the large technology companies providing their services in that sphere.

On the other hand, Respondent 1 and Respondent 3 evaluated the impact of FinTech to be four out of five. Respondent 1 agreed with Respondent 2 and claimed that banks had to do the risk management by themselves because the regulations on the governmental level could not keep the pace with all the financial innovation.

However, the respondent evaluated the role of FinTech in the risk management process to be higher. On the contrary, Respondent 3 was convinced that there was a lot of regulation coming all the time and it was impossible for any party to handle all this regulation. Thus, there were so many RegTech companies taking care of this.

Furthermore, Respondent 3 told that there was a lot of innovations emerging in the financial industry, making risk management very hard. Risk management is becoming very complicated in the future, because now it is possible to combine FinTech like robo-advising, for example, with human evaluation. And it is crucial to find the balance between FinTech and human intelligence in the risk handling process. Moreover, FinTech also creates new risks within the bank, such as the risks in IT and information security. Thus, the risk management process becomes even more complicated.

#### 4.2.7 Financial performance

FinTech's impact on the financial performance of the banks is the toughest one to evaluate. Without a doubt, FinTech has an impact on banks' financial performance. However, there are a lot of other affecting factors. Respondent 3 mentioned such factors as the national economy, European economy and politics. The respondent explained that it was very hard to separate the impact of FinTech and the impact of other factors to see whether there would be a direct combination. Thus, it was difficult to indicate the exact impact of FinTech. Indeed, among the factors which affect banks' financial performance banks' reports mentioned market conditions, competition, partnerships, investments, costs for compliance and combating financial crime, operating expenses, impairment reversals, regulatory requirements, acquisitions, currency effects, bank's strategy, number of customers, level of customers' satisfaction and customer activity.

Respondents' evaluation of the impact was around 3 and 4 on the scale from zero to five. Nevertheless, Respondent 2 considered FinTech's impact to become more significant in the future and reach level five on the scale.

The respondents claimed that FinTech has an impact on banks' financial performance, as it changed the traditional banking activities and changed the customers' attitude towards the way of doing their daily banking activities:

*I think that it will change, because when customers can do everything themselves, online, the traditional way of making money and how to measure the financial performance is changing because the customers are changing their way totally, so, I think, it has a huge impact.*

Respondent 3 also supported this point of view:

*Of course, it is clear that operations will become leaner through FinTech. This is clear. But it also may be that the impact of FinTech has deteriorated banks performance somehow because they have lost their traditional business through the innovation of FinTech. So, there might be some adverse effects on this.*

Respondent 4 also pointed out that FinTech had limited the time spent on operations' performance, thus, increasing banks' operational efficiency. Increased operational efficiency, in turn, positively affects financial performance.

In the annual reports, banks do not extensively discuss FinTech's impact on banks' financial performance. However, some commentary on this impact can be found in the financial performance overview. Furthermore, an indirect connection between investment in FinTech development and financial performance can be traced.

For example, Danske Bank ended 2018 with a net profit of DKK 15 billion versus DKK 20,9 billion the year before. The main factors which have negatively impacted Danske bank's financial performance include significant uncertainty of the financial markets and difficult market conditions affecting net trading income, intense competition, a rise in costs and the compliance activities. However, the bank's underlying business remained stable and saw good developments. Economic conditions remained favourable and despite all the factors negatively impacting financial performance, Danske strategy of pursuing profitable growth in the Nordic business led to good growth in lending activity with both new and existing customers. The bank experienced good demand for loans, especially from commercial customers and within home finance. The growth in lending was also influenced by partnership agreements and new mortgage products among other things. Impairments remained very low, with reversals of DKK 650 million. (Danske Bank A/S 2019, 9-10.)

At this point, an indirect connection with FinTech can be traced. FinTech, among other factors, could positively affect the growth in demand for loans and increased overall customer activity. Nowadays, due to the various bank's FinTech initiatives,

customers can obtain better financial advisory and more comfortable loan borrowing process and conditions. Furthermore, FinTech also eases the performance of other banking activities. According to Danske Bank annual report (2019), during the year 2018 Danske bank had an increase in operating expenses, which included investments in the initiatives to meet the bank's high ambitions within digital transformation. Operating expenses increased by 10% from the level in 2017 and amounted to DKK 25 billion. These initiatives enabled the bank to provide strategic advice at each stage of a business's lifecycle as well as the efficient digital service and delivery model. (10-11.)

The initiatives included the new Banking DK organisation, an important step towards integrating more closely with the customers. This platform for both retail and commercial customers, enabled the bank to further strengthen customer relations, develop targeted and integrated solutions, and generate synergies. For Danske business customers, the bank launched the District platform. The main goal of this initiative is to provide customers a comprehensive, real-time overview of their financial position, providing more transparency and thus allowing even better financial decision-making. Moreover, the bank took the first steps towards promoting even closer cooperation between advisors and specialists and developed internal adviser tools to improve customer service. A focus point was to streamline the ways of welcoming and serving customers who have both personal and business accounts. Furthermore, Danske continued to free up time for advising customers, for instance, through a new portal which simplifies the ordering process for business customers. The bank also introduced a new tool to help advisers plan meetings and recognize advisory and product opportunities. The credit application tool for small business customers reduces processing time and the time-to-money from weeks to hours. This application also contributed to freeing up time. In 2018, it was used to process around 40% of applications for new credit facilities in this segment.

Furthermore, Danske bank continued to devote substantial resources to further boosting their ability to transform information about its customers into advice timed and targeted to suit the individual customer. Overall, to meet increasing customer expectations, the bank has simplified both the customer service model and internal processes. Delivery processes have been harmonized and structured across all

markets, and to further support expectations of efficient and seamless services, the bank has digitalized customer agreements and introduced digital signing and item tracking service. As a result, the customer experience has improved and remains stable across markets and customer groups. Due to these FinTech developments the bank maintained good momentum with the business customers and attracted profitable business from new and existing customers. The year 2018 was characterized by an increasing customer activity across its markets. Additionally, in the small business segment, in particular, there was a good inflow of new customers. Increased demand for loans, improved customer activity, timesaving has contributed to the improvement of the bank's financial performance. (ibid., 41-45.)

Finally, as a part of the bank's response to the powerful structural changes that shape the financial services market, Danske launched new Nordic Integrator strategy in the second quarter of 2018. The strategy is supposed to help the bank to take an even more active role in making its customers financially confident and contributes to societal growth and stability. The bank strives to become integral to customers lives, integrated closer into Nordic societies and more integrated internally across the organization. Besides, the bank launched a new organizational structure to accelerate the execution of the strategy. (ibid., 10.) FinTech is an integral part of this strategy and the ways of strategy execution, thus, its impact should not be underestimated. FinTech is an integral part of the bank's operations nowadays, consequently, having an impact on all the outcomes of the bank's activity.

However, the impact is still rather indirect and quantitatively unmeasurable. Thus, the direct positive correlation was not found, and any correlation was not measured quantitatively. For Danske bank, the exact amount of FinTech investment or any proxies have not been found in the annual reports. And yet, Danske bank (2018) stated that the firm's continuous initiatives to meet the high ambitions within digital transformation also have caused the expense increment, the ratio line graphs display that there was a slight decline in the bank's financial performance in 2018, comparing to the continuous positive development within the previous 4 years of operations (see Figure 15 and Figure 16).

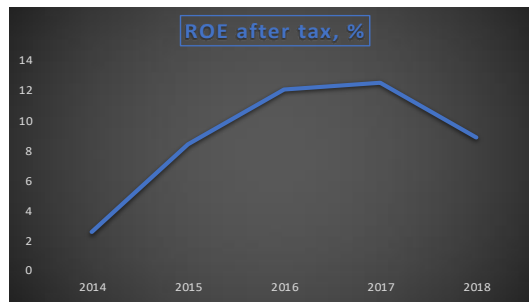


Figure 15. Danske's ROE

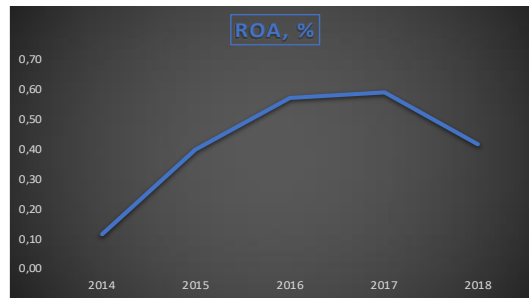


Figure 16. Danske's ROA

Thus, it can be concluded that conventional financial performance measures do not reveal a direct connection with the FinTech development.

For Nordea FinTech impact also seems to be hard to evaluate and, especially, measured in numbers. During the past years of operations, Nordea has made a significant investment in FinTech development. The bank's digital strategy has resulted in a significant number of new digital offerings to the customers. In 2016–2018 Nordea has invested above EUR 200 million in digital solutions. (Nordea Bank Abp 2019, 4.) The distribution of investment by the areas of development is provided below (see Figure 17).

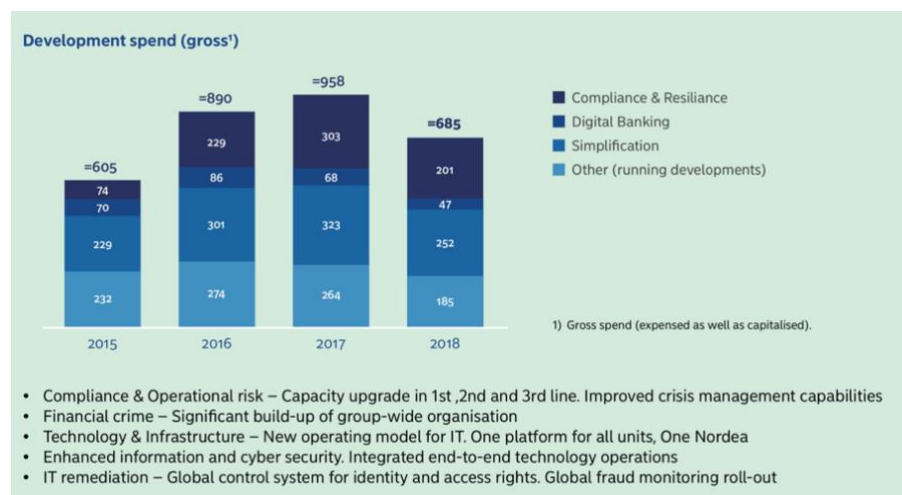


Figure 17. Nordea's digital investment (Adapted from Nordea Bank Abp 2019, 28)

However, these figures are impossible to match with the numerical impact of FinTech on the bank's financial performance due to the insufficient amount of data. In theory, with the closer look to different areas of Nordea operation and better knowledge of FinTech development in each particular area, approximate numbers defining the impact of FinTech could be calculated. However, these data are not published publicly.

Moreover, the clear correlation between the amount of investment in digital development and the boost in the bank's performance were not found either. For example, according to the conventional accounting performance measures such as ROA, EPS, ROE and Asset Utilization Ratio, the financial performance of Nordea was better in 2018 than in 2011, while the IT expenses in 2011 were higher (EUR 647 million) (Nordea Bank Abp 2012, 121) than in 2018 (EUR 484 million) (Nordea Bank Abp 2019, 131). To justify it, an easy-to-follow line graph of Nordea's ROE is provided in Figure 18. This graph offers an exceptional visual representation of how much value Nordea offered to its shareholders, which will translate to tangible long-term commercial success throughout the time.

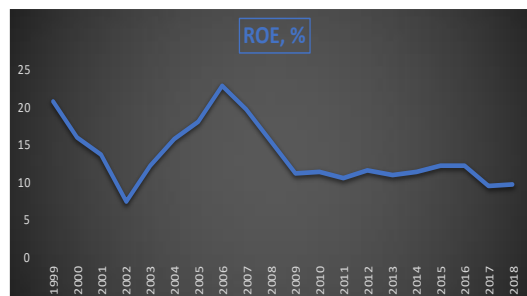


Figure 18. Nordea's ROE

Another justification is Nordea's EPS line graph, which serves as an indicator of the bank's profitability (see Figure 19).



Figure 19. Nordea's EPS



Figure 20 displays Nordea's IT expenses throughout 20 years of the bank's operations.

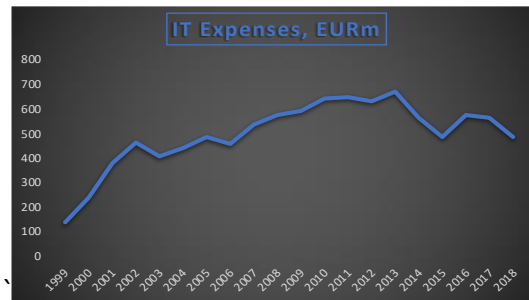


Figure 20. Nordea's IT expenses

The graphs prove that the correlation between It expenses and financial performance of the bank is not evident.

Moreover, according to Price-to-Book and Tobin's Q ratios (see Figure 21 and Figure 22), the market performance of the bank was also better in 2018 than in 2011.

However, the reverse correlation can be found as well. For instance, taking the subsequent years 2004 and 2005, we can notice that in 2005 the Nordea's IT expenses were higher, and accounting and market performance of the bank have significantly improved (Nordea Bank Abp 2019, 131).

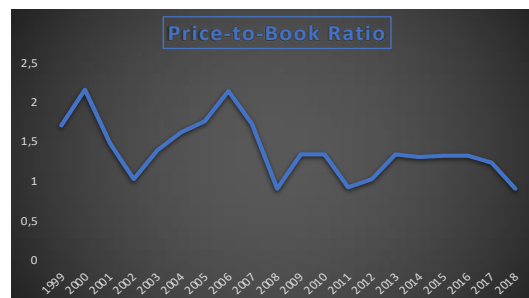


Figure 21. Nordea's Price-to-Book ratio



Figure 22. Nordea's Tobin's Q ratio

Handelsbanken reported that their goal to have higher profitability than the average of peer banks in its home markets has been mainly achieved by the bank having more satisfied customers and lower costs than its competitors (Handelsbanken AB 2019, 4). For Handelsbanken, FinTech is a huge contributor to the improvement of customer satisfaction and costs reduction. However, the same as in Danske and Nordea cases, the contribution of FinTech to the bank's financial performance is numerically unmeasurable.

#### 4.2.8 Planning

The role of FinTech in banks' planning was evaluated differently by the respondents. Some of them claim that it plays a very significant role and evaluate the impact on level four or even five. Respondent 1 stated the following opinion on the FinTech's impact on planning in the banking sector:

*I think it is very important to adapt to these FinTech technologies. Of course, we are all the time making innovations also, so it is the most important part of the planning and I would rate it to four or five because it has to be taken into consideration if we change our internal processes or if we want to change some services or products for the customers. So, it is the most important one when we plan or anything products or services, or personnel.*

Others considered the FinTech impact to be less significant and assessed the impact to be three out of five. Respondent 2 agreed that FinTech had a role in the strategic planning and the management had to take it into account and they are doing so. The respondent admitted that FinTech has a high impact on the planning, however, the evaluation was not on the highest level on the scale.

Respondent 3 gave three out of five for the FinTech impact on planning. However, for this respondent number three indicates that impact is not very high. Respondent 3 explained that the EU had given relatively straight forward standards for planning, such as Basel regulations, for example. According to the words of this interviewee, these regulations have a vital impact on banks' planning and FinTech can help banks to plan their strategies. However, on the other hand, Basel regulations can be handled even without FinTech solutions. Moreover, RegTech plays an even more important role in this process. Respondent 3 thought that while FinTech played a significant role in banks' external operations, RegTech better served the internal processes.

Respondent 4 gave the lowest grade out of all of the respondents – number two. The respondent claimed that planning on a high level was controlled by the management. Indeed, according to the reports of Nordic banks, such as Nordea, Danske Bank and Handelsbanken, planning is fully decided by the management and FinTech plays an insignificant role in the overall planning process.

#### 4.2.9 Future growth

The responses to the question were almost identical from all of the interviewees. All of them unanimously told that FinTech was an integral part of future growth and it was impossible to imagine the future of banking without FinTech. The numerical evaluation of the impact corresponds to this opinion: all of the respondents assessed it to be five out of five.

Respondent 1 and Respondent 2 justified this grade to be that high with the explanation that if the traditional banks wanted to remain in the competition, they had to integrate FinTech innovations into their operations either by developing them in-house or outsourcing from technology companies or FinTech start-ups. The respondents also added that it is a huge part of the future growth to adopt the new technologies because banks were not only competing among themselves but also with other companies which provided FinTech solutions:

*I would rate it to 5, because if you want to survive and remain in the competition, you have to have FinTech technology and adapt the innovations and, of course, you have to create them yourself very quickly. Like, I said, because customers change their behaviour so fast: if they don't like some of the innovations, they will change to someone else. And, I think, also for the future growth: we don't compete anymore within traditional banks, we compete with all the companies, because if people use some company's app related to non-financial industries, they will like it, like, "okay it's easy to use" and they will expect the same from the bank, even though it's just a mobile app. So, we have to look for our competitors not only in the financial industry, but, of course, in the whole area of FinTech and technology overall, so I would say it's a huge part of the future growth to adopt the new technologies and create them ourselves.*

Respondent 3 added that FinTech might offer banks enormous possibilities. The banks can grow and increase their profits by collaborating with the technology companies. The respondent has also noticed the change in the banks' perception of FinTech companies:

*As I said, it might offer enormous possibilities if banks can include FinTech in the operations. So, as I said, in one year they could earn like five billion more if they just were able to connect with the right companies. But, of course, it's very hard to know, which are the right companies, because they're so many, in the same field. At first, they [the banks] were concerning all these FinTech companies as competitors in a negative sense, but nowadays I think they have changed their mind a little bit and now they consider the FinTech companies, as the possible cooperating companies that will help them to grow in the future. So, I'd give five for this.*

Respondent 4 claimed that modern and future banking would not exist without FinTech. Thus, FinTech has a vital impact on the banks' future growth.

Indeed, as was mentioned in the Strategy chapter, Nordea bank reported that due to the changing customer preferences and expectations on accessibility, ease and personalisation digitalisation was one of the main drivers for change in banking and indeed in many other industries. Thus, the Core Banking Programme is the priority in Nordea's change portfolio, as it is the most significant enabler of Nordea's ambition to transform into a scalable, resilient, efficient and digital relationship bank in the future. The transition activities include the shift from physical to digital distribution and the establishment of e-branches, as well as the use of robotics and AI. Furthermore, Nordea is making a significant investment in building modern platforms that will enable end-to-end digital solutions for customers and future growth. (Nordea Bank Abp 2019, 10-11.) Moreover, in the Strategy chapter we can see that FinTech is a part of each focus area for executing the transformation of the bank. Therefore, FinTech's impact on the banks' future growth can be considered to be very crucial.

Danske bank also increasingly adopting FinTech to enable future growth. Digitalisation is an integral part of its development strategy. This means that the bank is constantly working towards becoming more efficient and agile in the way it works. As part of this, they established a central Innovation unit in 2018, tasked with exploring and learning about future unmet customer needs. (Danske Bank A/S 2019, 17-18.)

As a final proof of FinTech significance for the banks' future growth, Handelsbanken example can be provided. The bank reported that investment in IT development and digitalisation has been made to reinforce the bank's relevance to the customers in

the future. Furthermore, the bank is also making sure to safeguard customers' access to local and personal service by maintaining the comprehensive branch networks in the home markets. This gives Handelsbanken a clear competitive edge, exceptionally at a time when a lot of other banks are extremely reducing the number of physical meeting places they offer. Access to personal service is rapidly becoming scarce throughout the banking sector, putting Handelsbanken on a solid footing to compete for new customers. Finally, digitalisation and the automation of internal administrative processes allow the bank to spend more time on customer meetings and provision of advisory services. All of the above-mentioned activities give Handelsbanken the right conditions for further growth. (Handelsbanken AB 2019, 4.) Thus, it could be concluded that FinTech is not the ultimate solution for successful future growth, but it is a vital and integral part of it.

#### 4.3 Transformation of the performance measures

According to the information obtained during this research both from the interviews and annual reports, it can be concluded that for the moment the banks are mostly using the conventional performance measures to evaluate the efficiency of banking activities. The performance measures which are used in the annual reports for the year 2018 are the same as in the annual reports for the year 1999. However, some banks, for example, Danske bank use some alternative performance measures. The bank's management believes that the alternative performance measures used in the Management's report provide valuable information to readers of the financial statements. The alternative performance measures provide a more coherent basis for comparing the results of financial periods and for evaluating the performance of the Group and each business unit. They are also a crucial aspect of how Danske Bank's management defines operating targets and monitors performance. (Danske Bank A/S 2019, 65.) However, the alternative performance measures of Danske bank are hardly connected to the FinTech impact.

At present, the banks' evaluation of FinTech impact is more qualitative. The quantitative data, represented in the exact numbers or ratios, are impossible to obtain. The only quantitative indicators which could be perhaps interconnected are the levels of customer satisfaction, the number of new customers and the speed of customer base extension. However, these indicators are not purely impacted by

FinTech. There are other affecting factors such as bank's reliability and reputation, the quality of customer service on the personal level, service fees, etc., while FinTech has an impact on such factors affecting customer satisfaction as service processing times, customization, advisory services, etc. Therefore, FinTech is just one of the influencers on the factors which affect banks' customers. Thus, indicators representing the data about the customer base and the levels of customer satisfaction cannot be considered fully reliable to evaluate the impact of FinTech quantitatively.

Furthermore, the evaluation of impact cannot focus just on one affected aspect from the whole variety of the influenced components. Thereby, the FinTech impact cannot be measured solely by the indicators of its impact on the banks' customers. However, during this research other statistics to evaluate the FinTech of impact was not found and even though the positive direct correlation between some aspects of banks' non-financial performance and FinTech development was found, this impact is rather unmeasurable.

A direct correlation between the amount of investment in digital development and the indicators banks' financial performance was not found either. The evidence can be found in the Financial Performance chapter. These results lead to the conclusion that either conventional financial performance measures do not reveal a direct connection between banks' performance and the FinTech development, or FinTech does not have a direct impact on the banks' financial performance. However, as FinTech has an impact on the non-financial aspects of banking activity, it is, subsequently, supposed to have an impact on the banks' financial performance. Thus, it can be concluded that the conventional financial performance measures do not reveal a direct connection between banks' performance and the FinTech development, as they do not take into consideration the factors needed to evaluate this impact.

Nowadays, FinTech is one of the driving forces in the financial industry. To improve FinTech performance and enhance its positive impact on the industry and banking activities, first, this impact should be measured, as it is impossible to improve something without the measurement of the start point and consequent assessment

of its improvement. Therefore, there is a need for some alternative performance measures to measure the impact of FinTech.

## 5 Conclusion

This chapter of the thesis is aimed to summarize and clarify the results of the research findings as well as to answer the research questions and underline the interconnection of the research results obtained through different research methods. The goal of the chapter is also to discuss the limitations of the research and provide the recommendations for the further practical implication of this research in the business field, as well as for the following research possibilities.

### 5.1.1 Discussion about the findings

The purpose of this study was to research the impact of FinTech on the performance of Nordic commercial banks, study the performance measurement in the banking sector and question the transformation of the performance measurement. The goal of the research was to gather the relevant information by answering to the three research questions using the data collected from the semi-structured interviews and quantitative data analysis. The results of the analysis were able to answer all research questions stated in the thesis. An understanding of FinTech as a phenomenon was successfully developed. Furthermore, its functional mechanism was carefully studied in the literature review and its impacts on the performance of Nordic commercial banks was thoroughly explored during the research. Furthermore, the author studied how the performance of commercial banks can be measured and subsequently questioned and researched the transformation of the performance measures in the banking sector in the FinTech era.

During the research, the author has found that FinTech has an impact on all of the main stakeholders and activities in the bank. It was found that the highest impact FinTech has on the following constituents of the banking sector: customers, investors, operations, competitiveness and future growth. The respondents' opinions and quantitative data indicating the FinTech's impact on banks' strategy, risk management, financial performance and planning differed: some of the data indicated that FinTech has a significant influence on these factors, while other data

showed very little or no connection of FinTech with these banking processes. This controversy is explained with the impossibility to separate the impact of other affecting factors on these processes from the impact of FinTech. It is also justified with the absence, non-usage or ignorance of the performance measures which can better determine and quantify the FinTech's impact on these processes in the banking field. The detailed description of FinTech's impact on the main banking processes viewed from different angles and obtained from multiple research methods can be found in chapter 4.2.

Throughout the research, the author was carefully studying the performance measurement in the banking sector. As a result of these studies, the author has found that Nordic banks are currently either not employing alternative performance measures to measure the impact of FinTech at all or starting to perform them to a little degree and with another purpose. Thus, the quantitative indicators of FinTech's impact of banks' performance, and especially, financial performance remain unidentified.

Moreover, the author came to the conclusion that the banking sector is experiencing a need for the alternative performance measures because the conventional financial performance measures do not reveal a direct connection between banks' performance and the FinTech development, as they do not take into consideration the factors needed to evaluate this impact. Although, the measurement of the impact is crucial, as it enables banks to understand and measure the impact of FinTech, and then develop and enhance it in the right ways and spheres to improve the overall performance.

Though the impact was not measured quantitatively, throughout the research, it became evident that FinTech is more likely to have a positive impact on traditional Nordic banking than a negative effect. This implies complementarity between FinTech and traditional banking, rather than substitution and disruptive innovation (Li, Spigt, Swinkels 2017). However, the results are still a subject for further research due to the research limitations described below.



### 5.1.2 Practical implications of the results

In general, this thesis is supposed to contribute to further development of banking performance in Nordic countries in the light of FinTech era. Hence, the implications of the results are addressed to banks' management, owners and investors, the persons who are responsible for the development of the banking performance and can change or impact the situation.

This thesis has the potential to contribute to further development of Nordic banks' performance for several reasons. First of all, this paper reviews the impact of FinTech on the performance of Nordic commercial banks from multiple perspectives. This review proves the importance of FinTech in all the key areas of modern banking. Secondly, the research reveals the inability of conventional performance measures to evaluate the impact of FinTech and finds that Nordic commercial banks do not employ alternative performance measures in the performance evaluation. Finally, combining the first two findings, the author justifies the importance of decent measurement for FinTech impact, as FinTech is an integral part of modern banking and one of the key influencers on banks' performance. Furthermore, FinTech is not an intermediate stage, but a phenomenon which will stay in modern banking for a long period. Finally, it is important to remember that "what you measure is what you get" (Kaplan and Norton 1992, 71) and, thus, to employ FinTech properly and beneficially its impact should be measured accordingly.

The findings of this research suggest several courses of action be taken by the banks' management, owners and investors. The main goal of the research was to give the clue to the Nordic banks on how FinTech is impacting their activities to succeed in the operations. The author is sure that the results can give a clear picture of the significance of FinTech's impact on the banking sphere in the long-term. Moreover, the unique feature of this research is its comprehensive examination of several factors by which the success of banks' activity is determined and exploration of the FinTech's influence on them. The results also reveal the areas for improvement in modern banking. Thus, banks' management is provided with the information of the areas which should be paid more attention to and then improved. The variety of variables and several views on the performance has also shown the difference in the impact of FinTech's on different constituents of the modern bank. Consequently,

based on the results the interdependence between FinTech and the performance of each banking sphere starts to be seen. Depending on the strategy of the organisation, each bank can select which areas require the improvement and, considering the limitations, take a certain course of actions to achieve the desired results.

Furthermore, this information can be used to develop alternative performance measures as it clarifies which areas are impacted by FinTech and how they are impacted. The research allows banks' management to study what should be measured to evaluate the FinTech's impact. Based on that information, alternative performance measures can be developed and tested to find the ones to evaluate the impact of FinTech.

Finally, the findings of the research may be valid to the financial researchers intended to understand the big picture of the interdependence of various indicators of the operations within a bank. As the results of this research are based on both the qualitative and quantitative, the scope for further analysis is broadened and it can be used both for qualitative and quantitative analyses in the field of banking.

### 5.1.3 Limitations and recommendations for further research

This thesis has several limitations, which could affect the results. First of all, the research was based on the secondary data available on the Internet, mainly in the forms of articles. The topic of the research is rather new and thus, not all of the data were taken from the academic sources. It compelled the author to interpret the findings on his own and make them fit into the research context. Besides, some of the parts were challenging to analyse because of the lack of accessible data due to the novelty of the topic and since many of the sources are in the Finnish, Swedish, Danish or Norwegian languages. The fact that a lot of the sources were in these languages made it impossible to take information from these sources as the author does not speak these languages and the amount of data was too voluminous to use the translators. Thus, the number of Nordic banks which could be included in the research was limited, as only the banks included in this research had their annual reports and other data available on the internet in English. Thus, the consequent limitation is the sample of the chosen banks. The research studies 3 banks, however,

on the Nordic market more banks are represented. Therefore, the results do not represent the whole picture and do not represent the overall situation on the market. Furthermore, the chosen companies represent only the Nordic market, which limits the implications of the research in other countries. It should be understood that the practical implications of this thesis are relevant only for the context of the Nordic banking meaning that the suggestions do not apply to other countries since their cases are different. Therefore, further research might be expanded and include more countries or comprise other countries from completely different economic areas. Future research could undertake an extended analysis of the impact of FinTech on commercial banks by studying different countries, because other countries may have a different structure in the banking industry. It would also be sensible to expand the sample of Nordic banks to include the banks not included in this research. Further research could also be conducted on the impact of FinTech in certain regions, such as the Single European Payment Area (SEPA)<sup>21</sup> countries, for example.

As for primary data, it is worth noticing that qualitative research was not very extensive, and the interviewees represented not all the banks researched in the secondary data analysis. Furthermore, despite that the interviewees had sufficient experience in the economic science and banking industry, there could be interviewees with expertise for exact field meaning that their insights would be based solely on the examined area. In turn, future research might include interviewees with wider expertise or more interviewees with expertise in different single fields.

Since FinTech is a rather new topic and not well studied yet, not all the secondary data were taken from the well-established websites, databases and online libraries.

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<sup>21</sup> A payment-integration initiative of the European Union for simplification of bank transfers denominated in euro. SEPA consists of the 36 member states including the 28 member states of the European Union, the four-member states of the European Free Trade Association (Iceland, Liechtenstein, Norway and Switzerland), and Andorra, Monaco, San Marino, and Vatican City. (Wikipedia contributors 2019.)

However, most of the data were retrieved from the dependable meaning that the reliability was leveraged to be ensured. However, relatively many of the articles had a different topic than one of this research. Therefore, some of the findings required a specific interpretation. Conceivably, it could have impacted the results. Furthermore, the articles used as the secondary data sources could have their own biases, understanding of issues and conclusions based on the authors' subjectivity. The author of this thesis was determined to neglect the works which seemed to be subjective. Finally, the author thoroughly verified some ideas with other sources to use only the most reliable and objective works in this research. The author believes that as FinTech is a fast-growing field and the research in this area is very extensive, there would be more reliable and valid data available for future research.

Data quality issues qualitative and quantitative research were discussed in the chapters 3.3.1 and 3.3.2. The author of this thesis made everything possible to ensure data validity and reliability and overcome all the threats to the quality of the collected data. However, there might still be a room for bias in this research. During the research and data analysis, the author strived to be objective and impartial in his interpretations. However, a relatively short academic background might bias his way of understanding. Nonetheless, the whole picture, in general, was coherent, as the author has some expertise in the business and banking fields due to the two-year business studies at the university.

Moreover, IT investment was used as a proxy for the potential value of the FinTech investment because no other data are available. Although the author believes the reasonable assumptions were made, it is impossible to avoid the potentially negative impact of this proxy on the data analysis results.

This thesis rather superficially focuses on the impact of Fintech components on all of the main banking stakeholders and activities in Nordic countries. In turn, the scope of the further research area could be narrowed down to certain financial components in a region or certain banking stakeholders and activities.

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## Appendices

### Appendix 1. Prepared questions for the interviews

1. When did the bank start adopting Fintech?
2. Can you explain (i) which Fintech tools are used in the bank, (ii) in which activities and (iii) to what extent?
3. Can you describe the impact of FinTech on bank's customers? Evaluate on a scale of 0 to 5?
4. Can you describe the impact of FinTech on bank's investors? Evaluate on a scale of 0 to 5?
5. Can you describe the impact of FinTech on bank's operations? Evaluate on a scale of 0 to 5?
6. Can you describe the impact of FinTech on competitiveness? Evaluate on a scale of 0 to 5?
7. Can you describe the impact of FinTech on bank's strategy? Evaluate on a scale of 0 to 5?
8. Can you describe the impact of FinTech on bank's risk management? Evaluate on a scale of 0 to 5?
9. Can you describe the impact of FinTech on bank's financial performance? Evaluate on a scale of 0 to 5?
10. Can you describe the impact of FinTech on bank's planning? Evaluate on a scale of 0 to 5?
11. Can you describe the impact of FinTech on bank's future growth? Evaluate on a scale of 0 to 5?

## Appendix 2. Calculations of the ratios

NORDEA																				
Conventional Performance Measures Accounting																				
Profitability																				
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
GPM, %	45,8	45,6	32,8	26,9	30,8	44,8	46,4	51,6	49,2	41,4	33,9	39,0	37,3	40,4	41,6	42,1	46,4	46,6	42,2	43,9
NPM, %	36,3	29,4	27,1	15,1	25,3	31,2	34,5	42,7	39,7	32,6	25,5	28,5	27,7	31,3	31,5	32,5	36,1	37,9	32,2	34,2
ROA, %	1,60	0,77	0,65	0,36	0,57	0,69	0,70	0,91	0,80	0,56	0,46	0,46	0,38	0,46	0,49	0,50	0,57	0,61	0,52	0,56
EPS, EUR	0,53	0,58	0,53	0,3	0,51	0,74	0,86	1,21	1,02	1,03	0,6	0,66	0,65	0,78	0,77	0,83	0,91	0,93	0,75	0,76
ROE, %	20,9	16,1	13,8	7,5	12,3	15,7	18	22,9	19,7	15,3	11,3	11,5	10,6	11,6	11	11,4	12,2	12,3	9,5	9,7
Asset Utilization Ratio, %	2,91	2,35	2,40	2,35	2,24	2,22	2,02	2,13	2,03	1,73	1,79	1,61	1,36	1,50	1,57	1,53	1,57	1,61	1,63	1,63
Liquidity																				
Current ratio	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acid-test Ratio	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solvency																				
Debt/Equity Ratio, %	17,8	19,2	19,4	20,0	20,5	21,0	24,1	21,6	21,7	25,6	21,6	22,7	26,4	34,2	20,6	21,4	19,8	18,0	16,5	15,8
Total Debt Ratio, %	1,06	1,05	1,05	1,05	1,05	1,05	1,04	1,05	1,05	1,04	1,05	1,04	1,04	1,03	1,05	1,05	1,05	1,06	1,06	1,06
Conventional Measures Market																				
	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Price-to-Book Ratio	1,7	2,16	1,49	1,03	1,39	1,62	1,76	2,14	1,73	0,9	1,34	1,34	0,92	1,03	1,35	1,31	1,32	1,32	1,23	0,9
Tobin's Q	1,12	1,11	1,07	1,05	1,07	1,08	1,07	1,09	1,08	1,03	1,06	1,06	1,03	1,04	1,06	1,06	1,06	1,07	1,07	1
Total Shareholder Return	-0,5	46,5	-19,8	-28,1	47,9	29,8	27,5	32,3	6,4	-46,9	78,6	3,7	-24,4	21	44,6	9,2	8,2	16,3	3,6	-19,5

Appendix 3. Impact of FinTech

Impact of FinTech		
	Description of Impact	Scale 0-5
Customers		
Investors		
Operations		
Competitiveness		
Strategy		
Risk Management		
Financial Performance		
Planning		
Future growth		