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on the topic: **«DEVELOPMENT STRATEGIES OF THE WORLD'S LEADING BANKS IN THE ERA OF TECHNOLOGICAL TRANSFORMATION»**
на тему: **«СТРАТЕГІЇ РОЗВИТКУ ПРОВІДНИХ СВІТОВИХ БАНКІВ В УМОВАХ ТЕХНОЛОГІЧНОЇ ТРАНСФОРМАЦІЇ»**

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TABLE OF CONTENTS

INTRODUCTION

In today's fast-paced world, innovative technologies that change the entire industries are constantly emerging. Technologies change people's everyday life, habits, ways of communication and the way they interact with the world. Financial services and banking, in particular, are not exceptions: nowadays financial technology (fintech) companies – young, flexible and rapidly developing market players change the rules of the game, create brand new products, set novel trends and even modify the desires and preferences of consumers applying the synergy of finance and technology. As a result, traditional and conservative institutions, such as the world's leading banks are forced to adapt to the new conditions and develop effective strategies to keep their market shares and profits. This topic is being actively researched and discussed all around the world by leading consulting companies (KPMG, EY, PwC, Deloitte, Bain, McKinsey and others), global financial and economic institutions (European Banking Authority, World Economic Forum) and scientists. Thus, the importance of determining optimal development strategies for traditional banks in modern conditions of technological transformation justifies the **relevance of the subject** of this work and its practical application.

The aim of this work is to identify the development strategies of the world's leading banks in modern conditions of technological transformation.

Objectives of the work are the following:
- to study the essence, features and the process of forming a banking strategy;
- to identify the main technological innovations in the banking sector in Ukraine and the world;
- to determine the essence of fintech, its types and the way it is regulated;
- to study the current state of the world banking industry and its main players;
- to analyze the main models of collaboration between banks and fintech companies;
- to research and define the key risks, problems and perspectives for the banking sector prompted by technologies;

The object of the research is the development strategies of the world's leading banks.

The subject of the research is the impact of the technological transformation on the development strategies of the world's leading banks.

During the work on this thesis, the main methods of coefficient analysis of financial indicators of banks were used. The work was written based on the collection and further analysis of the relevant information base: Ukrainian and global literature on banking management, annual financial statements of the banks, publicly available reports of consulting companies related to fintech and banking, available statistics on industry trends and relevant web resources.

The practical application of the results of this work is the opportunity for the management of traditional banks to better understand and successfully implement effective development strategies in order to adapt to technological changes and increasing competition. In the future, this topic may be supplemented by a more thorough assessment of the effectiveness of each strategy as well as the development of new strategies.

The scientific novelty of this work is represented by a practical study of the existing development strategies of the banks on specific and relevant examples.

Keywords: BANKS, BANKING SECTOR, FINTECH, INFORMATION TECHNOLOGY, STRATEGY.

CHAPTER 1
THEORETICAL ASPECTS OF INTERACTION OF TECHNOLOGICAL INNOVATIONS AND BANKING STRATEGIES

1.1. The essence, features and the process of forming the bank's strategy

Before any research, it is indispensable to clearly know the object of the study. Thus, only after a complete understanding of the essence of the bank's strategy, the peculiarities of its formation and types, it makes sense to assess its changes under the influence of certain factors. Additionally, it is crucial to determine who in the organizational structure of the bank is responsible or impacts the development of the strategy, what exactly is required for this and in which cases the strategies may change.

First of all, it is worth mentioning that the process of forming, maintaining and modifying the corporate strategy is one of the main aspects of banking management, just like in any other business. Creating the mechanism of management, based on the principle of coherence with the external environment and the bank's development strategy can be recognized as one of the main functions of the subjects of banking management, in other words – top managers. Once the corporate strategy is clearly defined and formulated, managers continue to supervise and monitor the smooth functioning of all components of the bank's governance mechanism. As an illustration of this statement, Ukrainian PhD in economics from the state higher educational institution "Ukrainian Academy of Banking of the National Bank of Ukraine" Kryklii has derived the general formula (1.1) of the mechanism of bank management (Kryklii et al., 2011, p.15):

$$MECH_m = f(S_m, C_m, F_m, M_m), \qquad (1.1)$$

where *$MECH_m$ – is the mechanism of bank management;*

S_m – is the bank's strategy along with its strategic aims;

C_m – is the criteria for achieving the goals of bank management;

F_m – internal factors influenced by management to ensure that management criteria are maintained at a certain level;

M_m – functions and methods of bank management.

Thus, according to the formula above, the definition of the strategy along with the strategic goals of the bank for the near and long term is one of the 4 key elements of bank management. Generally, the strategic and permanent goal of banks is to increase their market value by improving their image, competitiveness, brand recognition and efficiency, profitability. To achieve this goal of bank management, it is necessary to develop a smart strategy and plan the bank's business activities, create an effective organizational structure, conditions for recruitment of skilled workers and the full realization of their potential, ensure qualified and consistent management of individual banking operations, organize control, audit, security, information and other systems, constantly monitor the level of banking risks, form a corporate culture and provide the appropriate moral climate in the team.

Thus, any banking strategy is formed based on specific goals set by top management. In order to fully understand **the concept of banking strategy**, it is advisable to consider the definition of this concept in the various literature of different researchers and different countries of origin. Some definitions of banking strategy are given in table 1.1.

Table 1.1 Various definitions of banking strategy as seen by different researchers

| #	Country of origin, year	Name of the researcher	Definition of a strategy
1	Ukraine, 2017	Dovhan Z.M.	The general direction (or program, plan) of the bank, the concept of activity, which determines the priority goals, objectives and ways to achieve them, and also distinguishes a certain bank among its competitors (Dovhan, 2017, p.108).
2	Serbia, 2012	Milenković I.	A formal expression of the direction of making key business decisions, determining the tactics and the implementation of actions that shape and direct the bank towards the future, following its vision by defining the objectives and modalities of action (Milenković, 2012, p.6).
3	Ukraine, 2011	Kryklii O.A.	A set of rules for decision-making that act as the guidance for the bank in decisions about future markets, products, organizational structure, profitability and risk profile at all levels of business (Kryklii et al., 2011, p.17).
4	UK, 2008	Johnson G., Scholes K., Whittington R.	The direction and scope of a bank over the long term, which achieves advantage in a changing environment through its configuration of resources and competences intending to fulfil stakeholder expectations (Johnson et al., 2008, p.3).

Table 1.1 (continued)

5	India, 1999	Rao V.S.P.	The specific path of action chosen by a bank to achieve its objectives, which provides a unified direction for the organization (Rao, 1999, p. 37).
6	Canada, 1987	Mintzberg H.	1) As a *plan*: an intended or consciously followed course of action. 2) as a *pattern*: a consistency in behaviour, whether or not intended; 3) as a *ploy*: a specific manoeuvre intended to outwit an opponent or competitor; 4) as *position*: a direction intended to locate or fit a business within its environment, and deciding on what position to adopt; 5) as *perspective*: the way a company views itself in the world, through the eyes of its management and employees (Mintzberg, 1987, pp. 11-13).
7	USA, 1986	Andrews K.R.	The pattern of major objectives, purposes or goals and essential policies and plans for achieving those goals, stated in such a way as to define what business the bank is in or is to be in and the kind of bank it is or is to be (Andrews, 1986, p.28).

Source: composed by the author based on the information from various sources shown in the table

Therefore, based on the information given in table 1.1, we can see that Ukrainian definitions (rows 1, 2) of strategy focus on its importance in decision making and achieving goals, while British definition (row 3) points out that strategy is vital in order to achieve competitive advantage in a changing environment. A classic US definition from the end of the 20th century, as presented by K.R. Andrews (row 4) emphasizes that the strategy makes it possible to form a clear concept of the bank as an institution and its business direction. At the same time, a famous Canadian professor and researcher Henry Mintzberg (row 5) explains the strategy in 5 different aspects: as a plan, as a pattern, as a ploy, as a position and as a perspective. Indian definition by V.S.P. Rao (row 6) is similar to Ukrainian ones, stating that strategy is a specific path and direction of action. Finally, Serbian researcher I. Milenković (row 7) notes the importance of the synergy between the bank's strategy and vision. Despite the presence of a plethora of definitions of a strategy, all of them contain such keywords: "direction", "long-term", "tasks", "goals", "business activity", "decision making", "achievement", "future". Thus, in conclusion, we can state that in conditions of fierce competition and fleeting market situation, compliance with

such a direction in the long run for the bank should ensure the achievement of the goals and provide competitive advantage among other banks.

However, the definition of the main goal does not exclude the possibility of the existence of many other goals and objectives in different areas of bank management. It is important to distinguish between the general strategy (mission) of the bank and the basic strategies of its development as specific types and directions of its activity (see Figure 1.1).
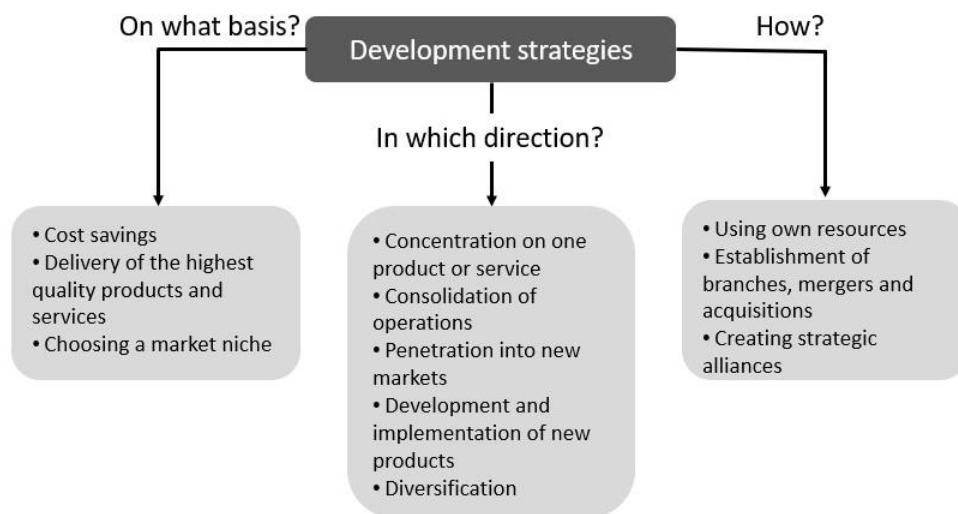
Figure 1.1 – Examples of various bank's development strategies as directions of its business activity

Source: composed by the author based on the information from the source (Dovhan, 2017)

Respectively, different classifications of strategies by various aspects exist. For example, as presented by professor Dovhan, there are 3 levels of the banking strategy: corporate, business and functional (Dovhan, 2017, p.110).

The Corporate strategy is the strategy of the bank as a whole. It is directly related to the corporate mission, allowing one to determine in which markets the bank operates, whether it is a diversified or single product in nature, focuses on a wide or narrow range of customers.

The Business strategy is being developed for each structural unit of the bank.

The Functional strategy is defined for each functional area of a particular field of bank's activity, such as projects financing, human resources management, credit

management, deposit operations management, bank branch network management, marketing, currency management, securities management, cash operations management, accounting and reporting, bank security and safety. Each of these divisions develops its own strategy, which contributes to the implementation of the overall strategy of the bank.

It is immediately apparent that corporate strategy is the concept of the highest level, while multiple business and functional strategies are developed in accordance with it.

According to another classification by purpose, developed by H. Igor Ansoff, there are 4 following groups of strategies as sets of rules (Ansoff, 1988, p.11):

- *the first group* is the rules used in assessing the performance of the bank in the current period and for the future. The qualitative side of the evaluation criteria is usually called the *benchmarks*, while the quantitative side is represented by *the tasks*;
- *the second group* is the rules that govern a bank's relationship with the external environment, which determine which products and technologies are developed, where and to whom they are sold, and how the advantages over competing banks are achieved. This set of rules is called a *product-market strategy or business strategy*;
- *the third group* is the rules according to which relationships are established in the bank itself. They are usually called *organizational concepts*;
- *the fourth group* is the rules according to which the bank organizes its daily activities, i.e. the *basic operational methods of financial management*.

It is also important to note that the strategy is formed during the strategic planning process. As noted by Dovhan (2017, p.88), **strategic planning** is a managerial process of maintaining a balance between the goals of the bank and its available resources in the conditions of constant changes in the market environment and state regulation. The main purpose of strategic planning is the creation, implementation and development of such new directions of banking activities that would increase the bank's income and strengthen its position on the market. Strategic planning is vital in a rapidly changing environment, especially if there is competitive pressure from stable operations. It is important for the bank in terms of the diversification of the main activity or non-traditional business of the banking institution if it plans to change the forms of activity (markets and operations) or, if necessary, adjust management activities.

The importance of strategic planning should never be underestimated, but unfortunately, Ukrainian companies, unlike foreign ones, often underestimate its importance. As a result, as Dovhan mentions (2017, p.88), underestimating the role of strategic planning causes the following problems: lack of a clear development strategy creates potential problems with attracting investments; lack of reasonable criteria for evaluation of investment projects; lack of a mechanism for determining the indicators of the operational short- and long-term performance; lack of a reference point of the bank's future.

The description of the process of different types of strategic planning is described in table 1.2 below.

Table 1.2 The process of different types of strategic planning

Level of management	Period		
	Short-term planning (1 year)	*Middle-term planning (2-3 years)*	*Long-term planning (3-5 years)*
Bank	Approval of strategic plans, the formation of development funds	Strategic goals and objectives	Landmarks of activity and the mission of the bank
Unit (e.g. marketing)	Development of an action plan and budget	Activity programs of units	Provisions in the direction and areas of activity
Functionally-operational	Plans and budgets	Regulations and programs	Branches and directions of functional activity
	Strategic documentation		
	Bank strategy		Annual budget Marketing plan

Source: composed by the author based on the information from the source (Dovhan, 2017)

As it can be seen from table 1.2 above, during the process of strategic planning the bank's **strategy is developed**, which is formed, as a rule of thumb, for a long term (5-10 years). As a prominent financier in the field of strategic planning, M. Porter once remarked: "The meaning of the strategy formation is to cope with the competition" (Dovhan, 2017, p.91). Thus, the starting point in the development of the strategy is to determine the strength of competition, its underlying factors, as well as strong and weak sides to the bank in respect to those.

Dovhan (2017, p.91) distinguishes the following stages of complex strategic planning: strategic (situational) analysis; clarification of the bank's mission; determination of strategic goals of the bank; development of banking strategies (marketing, risk management, organizational structure and banking staff); development of an action plan. To better understand this complex process, it makes sense to visualize it in a diagram (see Figure 1.2).
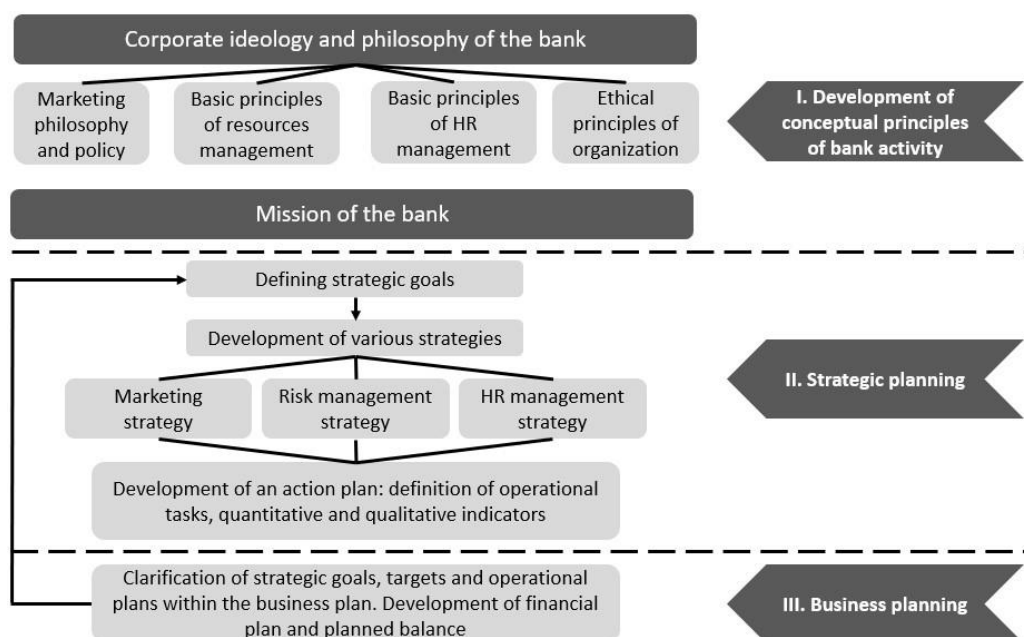
Figure 1.2 – Stages of strategic planning

Source: composed by the author based on the information from the source (Dovhan, 2017)

That said, the strategic analysis makes it possible to make a formal description of the bank as an object of management, to identify its features and development trends concerning the external environment, as well as to form an information base for forecasting and reasonable choice of alternative strategies. An important feature of strategic analysis is the focus on the perspective (future). Qualitative research methods (diagnostics, interviews, situation scanning, heuristic methods, benchmarking) are widely used in strategic analysis. As Dovhan (2017, p.92) highlights, the most well-known method of strategic analysis is SWOT, which is named after the initial letters of the following words: "Strengths", "Weaknesses", "Opportunities" and "Threats". This approach makes it possible to assess the strengths and weaknesses of the bank, potential opportunities and risks to avoid.

Kryklii et. al (2011, p.21) claim that in order to properly set the goals and form the strategy, management utilizes various support subsystems: *legal support* – laws, decrees, resolutions, orders; *regulatory support* - instructions, guidelines, standards, regulations etc.; *information support* – economic, commercial, financial and other reports and information.

It should be noted that in a stable external environment (for example, without constant emerging crisis), the strategic plan of the bank does not require constant updating and adjustment. However, in today's world, it is difficult to find economic systems and financial markets that develop autonomously and are not affected by global factors, especially if we are considering an unstable Ukrainian market. New achievements in the field of computer technology and communications have led to the transformation of local financial markets into a global market, some segments of which are sensitive to any changes in other areas.

Thus, in the modern economic conditions we live in, not a single bank can function successfully without the creation of conceptual foundations of development, which are formulated in the form of a strategy. In the world of dynamically developing markets, as well as continuous improvement of financial instruments and intensification of competition, strategic planning has become a mandatory component of effective bank management.

1.2. Modern technological innovations in the field of banking in the world and Ukraine: the definition of fintech, its types and regulation

Banking has throughout the whole history been one of the industries which are most resistant to disruption by technology. Since the issuing of the first mortgage in England in the 11th century, banks have built robust businesses with multiple benefits: strong distribution through branches; unique expertise such as credit underwriting supported by both data and judgment; the special status of being regulated institutions that supply credit, the power of economic growth, and have sovereign insurance for their liabilities (deposits). Moreover, the inertia of consumers in financial services is high. Generally,

consumers have been slow to change their providers of financial services. Especially in developed markets, consumers have historically gravitated toward the established and long-living brands in banking and insurance that were usually seen as pillars of stability even in times of economic turbulence.

The result has been a banking sector with defensible economics and a strong business model. As history depicts, these institutions have managed to survive even the worst world crises such as the Great Depression from 1929 to 1939 or the financial crisis of 2008. Even after this, banks remain systemically important to the economy since they are highly reliable and regulated institutions, they hold a monopoly on issuing credit and taking the risk, they are the major repository for customers' deposits, and they continue to act as intermediaries for all payments.

However, right now this may be changing. Back in 1994, Bill Gates forecasted the convergence of technology and the financial services industry. He even dismissed traditional commercial banks as "dinosaurs" and stated that they can be "bypassed" (Newsweek, 2010). This can be explained with the changes in the modern world, as technology and innovations are developing rapidly, and the main takeaways of this process for the past two decades are the following, as reported by USAID (2018): the Internet has become available everywhere in the world; Smartphones and mobile applications have appeared and are gaining popularity, even in developing countries; Social networks are spreading rapidly; Big Five technology companies (Amazon, Facebook, Google, Apple, Microsoft) have developed innovative products and services that set new standards for quality, speed and user-friendliness; Labour migration increased and, accordingly, remittances increased; Small and medium-sized firms began to look for alternative ways to finance their activities; Private investors, formerly engaged in real estate, began to look for new ways to earn money.

With the impact of these factors, consumers all over the world have started craving digital services. Consequently, over 25 years later after Gates' statement, financial technology (fintech) had become an industry segment of its own, and, as reported by one of the "Big 4" accounting firms KPMG (2019), hitting $135.7 billion worth of investments across 2,693 deals in 2019. Despite becoming a common term, **the definition**

of fintech is still ambiguous, that is why it makes sense to gather some of them in order to get a clear picture. It should be noted that all the definitions below are retrieved from US and European sources:

- a dynamic segment at the intersection of the financial services and technology, where tech startups and emerging market entrants are innovating on products and services currently provided by the traditional financial services sector (PwC, 2016);
- a segment of the technology start-up scene that is disrupting sectors such as mobile payments, money transfers, loans, fundraising and even asset management (Munch, 2018);
- a technology that relates to conducting financial services activities, with the end client/user being a financial institution (Antle, 2013);
- technology that serves the clients of financial institutions, covering not only the back and middle offices but also the coveted front office that for so long has been human-driven (Antle, 2013);
- technologically enabled financial innovation that could result in new business models, applications, processes, or products with an associated material effect on financial markets and institutions and the provision of financial services (European Banking Authority, 2017).

As it can be seen from the above, all definitions of fintech make it clear that fintech firms are essentially technology companies that provide financial services disrupting the traditional financial market by offering innovative products, new business models and improved customer experience. Thus, due to its perfect synergy of classic financial services and technology, fintech is rapidly evolving, disrupting the order of things in the traditional value chain. Obviously, the use of technology in finance is not something new, nor are many of the products and services that new companies in the sector are offering. Rather, it is the novel application of technology and its speed of development that make the modern wave of innovation unlike any we have seen before in the financial industry. Leveraging the latest technologies and new areas of activity, fintech companies are reshaping the picture of competition, blurring the boundaries established among players in the global financial services sector.

As it has been already mentioned, the fintech market currently is huge and gathering an enormous amount of investment, growing rapidly each year. A recent forecast by Market Data Forecast (2020) claims that by 2025, the global financial technology market is expected to reach a market value of approximately $305 bln, growing at a compound annual rate (CAGR) of about 22.17%. Moreover, according to research conducted by another member of the "Big 4", PricewaterhouseCoopers (PwC, 2016), the most revolutionary changes and transformations are evident now and in the nearest future exactly in the consumer banking and payments sectors (28% of businesses around the world are endangered), followed then by insurance and asset management companies (22% of companies are at risk). In this report, a quote by one of the top managers of an international banking organization is given, which perfectly explains the current market situation: "We thought we knew our customers, but in fact, the FinTech segment knows them" (PwC, 2016).

As a part of their research, the PwC team has conducted a global survey (2016) of a wide range of market participants representing the world's leading financial institutions. For this study, they surveyed 544 respondents, primarily Chief Executive Officers (CEOs), innovation leaders, Chief Information Officers (CIOs), and senior executives (C-level roles) involved in the digital and technological transformation process (for example CDO – Chief Digital Officer). It is worth noting that among the respondents, a third (exactly 30%) was represented by banks. The results of this survey were presented to the leaders of various financial services segments in 46 countries. As a result, they have highlighted the main areas of revolutionary changes in the financial services sector (see Figure 1.3).
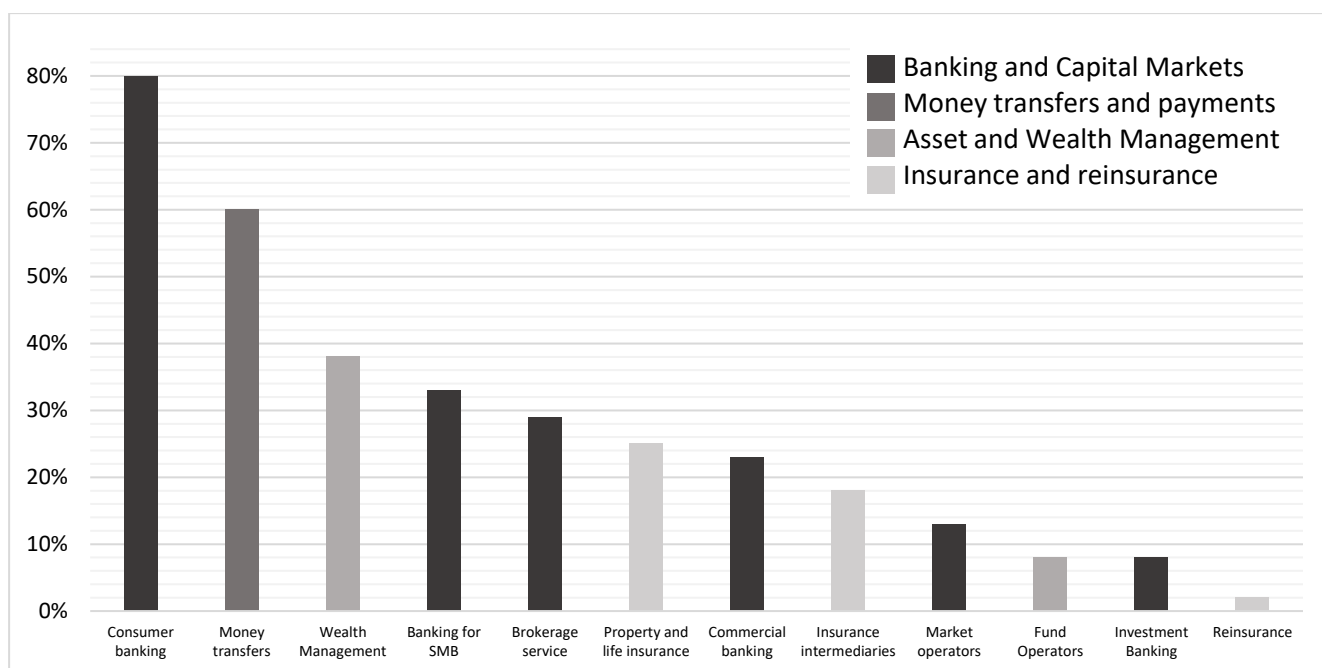
Figure 1.3 – The main segments of the financial services sector, subject to revolutionary changes prompted by fintech in the nearest future

Source: composed by the author based on the information from the source (PwC, 2016)

Thus, as it can be seen from figure 1.3, watching the ongoing developments most of PwC's survey respondents expressed the opinion that consumer banking along with money transfers and payments sectors are most likely to revolutionize in the nearest future, while wealth management and insurance are less subject to dramatic changes. In order to understand how fintech so significantly disrupts traditional banking and money transfers segment, it is important to list the key fintech innovations related to the banking industry, as presented by researcher Pertseva (2017, pp.50-51):

1. ***P2P lending*** as an alternative to retail bank lending. The essence of this service is the usage of a special platform (application installed on a smartphone), which allows customers to borrow from other individuals and provide loans themselves. Since 2007, the size of the US P2P lending market has grown by 15–20%. The reason for this growth is the smaller difference in interest rates compared to traditional banking. It should be noted that these platforms (applications) do not take the risks of borrowers' default – it is completely on the people participating in the money exchange.

2. ***Digital banking*** is the ability to provide financial services via mobile and online platforms, which completely reshapes the quality of the bank's interaction with the client, saving time and costs. Some modern banks already have a presence only on these platforms without physical branches (for instance, Ukrainian Monobank). Such banking systems not only simplify the work with the client but also improve the security of personal data and the degree of personalization, as well as increase the speed and the quality of services.

3. ***Electronic payment systems*** as lenders. This direction began to develop actively when banks reduced the volume of lending operations after the great financial crisis of 2008. Payment systems such as PayPal and Square charge a percentage or commission for the operation from the seller of goods (borrower) who used the platform of this settlement system. This has now into an even more modern direction – ***mobile payments,*** which have become accessible for everyone with the advancements in mobile wallet technology, digital authentication and NFC in each smartphone. Nowadays one would rarely see an individual making a money transfer in a bank or using checks – everything is completely digitized, especially among the younger generation.

4. ***Blockchain*** is a specialized technology that allows one to store data about transactions while operating only on the resources of the system participants themselves. The transaction log is kept by users only without the participation of a central counterparty in the form of a bank or a payment system. Thereby, the cost of transactions is reduced by 10–20 times, and the cost of their execution is decreased by 40–60%. This technology is nowadays actively used in payment systems (for example, bitcoin), but can be used to exchange any information.

5. ***Cryptocurrency*** is a unique payment system and currency. The main advantage of cryptocurrencies, such as Bitcoin, Ethereum, Ripple and others, is their decentralized nature, allowing settlements and payments to be carried out without control from the monetary authorities. The users of this unit of account create their own currency using special computer programs based on blockchain technology. Cryptocurrency is actively used today for online payments and is also one of the means of investment.

6. *Smart contracts,* which utilize a specialized computer program (digital algorithm, often using blockchain) allowing to automatically execute contracts between buyers and sellers. The centre of the smart contract is a distributed ledger technology. The system ensures the autonomy and independence of the contract due to a decentralized environment that excludes the human factor. In modern conditions, the system of smart contracts allows people to exchange money, property or securities without the participation of intermediaries.

7. *Robo-advisors* are the algorithms that automate investment advice to lower its cost and increase accessibility. Such complex algorithms utilize machine learning and artificial intelligence, essentially substituting the whole market of Registered Investment Advisors which is highly developed in the US and is represented by both individual advisors and big companies including investment banks.

Thereby, it now becomes clear how fintech revolutionizes banking and payments. For instance, the emergence of P2P lending online platforms allows individuals and businesses to borrow from each other without intermediaries. Lending innovation is also reflected in the emergence of alternative lending models, use of non-traditional data sources and powerful data analytics for risk assessment, acceleration of customer-focused lending processes and reduction of transaction costs. Regarding payments, it should be mentioned that in recent years this sector has also faced a major change in the way things are done. This was influenced due to the rapid proliferation of new, technology-driven payment processes, new digital applications that facilitate transfers, the emergence of alternative processing networks, as well as the increased use of electronic devices for transferring money from one account to another. As a response to the survey results, PwC (2016) came up with an accurate and precise conclusion, that *disintermediation* is the most powerful and dangerous "weapon" of fintech since fintech companies de facto deprive banks of their functions of intermediaries in payments and lending authorities.

For a better illustration of types of fintech companies that are influencing traditional banks and directions of such impact, table 1.3 presents some relevant case studies, collected and further researched by us from the recent report of the World Economic Forum in collaboration with Deloitte (2017).

Table 1.3 Examples of modern fintech products and key findings associated

#	Company Name	Key finding	Description
			Lending
1	LendUp	Payday loan alternative	LendUp, a US direct online lender and financial education company, offers a proprietary underwriting model to serve borrowers who lost access to credit after the financial crisis. The company offers loans at lower rates than payday lenders and significantly lower rates as borrowers repay. Website: https://www.lendup.com/
2	ZestFinance	Artificial intelligence for underwriting	ZestFinance provides machine-learning based underwriting technology to financial institutions that helps with analyzing and processing complex, disparate data to improve pricing decisions. With investment from Chinese internet search giant Baidu in 2016, it is developing a credit scoring platform for Chinese borrowers, based on Baidu's search data. Website: https://zest.ai/
3	OnDeck	Fintech-bank partnership	JPMorgan partnered with online lender OnDeck to improve its loan origination to the bank's nearly 4 million small-business clients. The partnership, and its near-term profitability, has motivated OnDeck to reorient its strategy to focus on delivering a highly scalable OnDeck-as-a-Service model. Website: https://www.ondeck.com/
			Digital banking
4	N26	Curated platform new entrant	A German fully digital bank, N26 has identified its user-centred digital experience as its key differentiator. The bank engages the best providers, from Allianz to TransferWise, to offer products that N26 itself doesn't focus on, which resulted in a highly curated platform. Website: https://n26.com/en-eu
5	Intuit	Bank/fintech trade-off deal	JPMorgan and Wells Fargo recently signed contracts with Intuit that gives the latter easy access to banking customers' data in exchange for new ways of data usage for Intuit. The banks have stated they want the agreement to be a model for contracts with other tech firms, as the response to a fight for data monetization. Website: https://www.intuit.com/

Table 1.3 (continued)

6	Bank of America	Mini Robo-branch	Bank of America recently tested the concept of automated branches by opening three mini bank branches with ATMs and videoconferencing, but without employees. In addition to the ATMs, the new Robo-banks (called "automated centres") allow clients to make a videoconference call to a Bank of America employee at another location. Website: https://www.bankofamerica.com/
		Payments	
7	Wise (formerly TransferWise)	New Foreign Exchange (FX) solutions	Wise, formerly TransferWise is a retail FX platform, which originally branded itself as an alternative to high bank fees, but in recent years has started to work with select banks to expand its customer base. It has announced partnerships with N26 in Germany, Starling in the United Kingdom and LHV in Estonia (the largest local bank in the country). Website: https://wise.com/ru
8	Faster Payments	Expansion of real-time system for businesses	The UK Faster Payments system was created to allow money transfers to move cheaply between accounts in hours, substantially faster than previous solutions. Recently, the limit for processing has been raised to £250,000 for business payments, allowing the system to handle most business transactions. Website: https://www.fasterpayments.org.uk/
9	Apple Pay	Growth of mobile payments	The 2014 launch of Apple Pay opened the world to the potential of mobile payments. Apple Pay has constantly grown since its introduction, and Apple's Chief Executive Officer Tim Cook claimed that the global number of transactions rises by 450% each year. Website: https://www.apple.com/ru/apple-pay/
10	TransferGo	Easier payments for migrant workers	This UK fintech company became especially popular among migrant workers in Central and Eastern Europe due to quick payments (within 30 minutes even on weekends), a fixed exchange rate and a transfer fee. Website: https://www.transfergo.com/uk
11	Ant Financial	Becoming the largest fintech in the world in 5 years	A Chinese fintech Ant, an affiliate of Alibaba Group launched in 2015, is now valued 50% more than Goldman Sachs ($150 billion, compared to $99 billion). The reason for Ant's growth is its platform business model connected to Alipay and a wide offering of financial services including payments, loans, wealth management, microlending and insurance. Website: https://www.antgroup.com/en

Source: composed by the author based on the information from companies websites

Despite all the benefits that fintech innovations bring to the world and their convenience to customers, they are **highly supervised and regulated** around the globe. It can be explained with a concern around fintech that exists because of historical "bubbles", including the dot-com "bubble" in 2000 and the fall of the financial system in 2008. In 2016, U.S. senators described the factors that could lead to a world crisis again: "As we saw during the crisis, gaps in understanding and regulation of emerging financial products may result in predatory lending, consumer abuse, or systemic issues" (Reuters, 2016).

Further that year, political leaders and other government members convened at the World Economic Forum in Davos, Switzerland. As a result, they issued a paper arguing that "there is an 'urgent need' to do more to ensure the rapid growth of fintech does not become a risk to 'systemic stability'", which was influenced by the fear that "traditional finance companies will take excessive chances as they race to keep up with newcomers." (World Economic Forum, 2016) In the report, they also mentioned three general desires: "There needs to be a new forum for the public and private sector to prioritize the most promising fintech areas. A debate on the ethical use of financial data for commercial purposes and a set of industry standards for fintech." (World Economic Forum, 2016) Given these conditions, it is now unclear if excessive regulations and standards can limit the growth of a fintech market.

As an example of more *laissez-faire* (noninterference to the market) approach, support from the government and less regulation had a significant impact on fintech growth in China, Kenya, and the United Kingdom (Citi, 2016). However, still, advocates of a pro-regulation approach raised concerns about the security risks and lack of transparency, citing "how fast and obscurely money can move" (Reuters, 2016). Additionally, they claimed that "lending is always likely to carry the danger that borrowers won't be able to pay. Insufficient regulatory oversight could allow mountains of bad debts to pile up. The risk could be compounded given that the vast majority of these startups launched during a period of historically low default rates" (Reuters, 2016). Other risks, along with those already mentioned, that were raised at the World Economic Forum (2016) included:

- Alternative sources of finance can shift risk to the client and have detrimental effects;
- Market electronification followed by inappropriate use of algorithms;
- Data abuse caused by security leaks and hacker attacks;
- Regulatory arbitrage (since regulations are different across countries);
- Payments effectiveness (classic clearinghouse payment system versus blockchain).

All of these concerns mentioned above could cause a significant aversion among investors to fintech. Nevertheless, to assuage such dangers, the World Economic Forum encouraged self-regulation by fintech, since they had the best understanding of the direction of the technology and consumer needs.

It is advisable to take a look at the development of fintech **in Ukraine**. According to the latest research conducted by USAID (2018) in cooperation with Unit.City, currently there are nearly 80 fintech companies in Ukraine. Some of them are startups while some are big players with a long presence on the market. Fintech started developing in Ukraine after the crisis in 2008-2009, although the majority of these companies (58%) emerged after 2015. USAID (2018) also mentions that the development of fintech is highly supported by the National Bank of Ukraine and the government, and evidence is the Comprehensive program for the development of the financial sector of Ukraine until 2020, which states key initiatives that should be taken in the financial market: a course for the non-cash economy 2020; transition to ISO20022 standards; storage and exchange of documents in electronic format using an electronic signature; cancellation of stamps, seals and paper copies; possibility to order financial services online; the possibility of using the bank ID system for remote identification of bank customers; protection of the rights of financial services clients; improvement of the financial literacy of the population; new rules to encourage the licensing of new players in the payments sector.

Many of the Ukrainian fintech companies are aiming at the European market, so our intellectual resource is being exported. But, on the positive side, the infrastructure necessary for the development of the startup environment is being formed as accelerators and incubators. However, to stimulate the growth of new projects, it is necessary to go a long way to create the right conditions for doing business in the country – this applies to

both the regulatory environment and tax policy for innovative companies, as well as simplicity and transparency in startups. In table 1.4, the main growth factors of fintech in Ukraine are described across 4 aspects: infrastructure, expertise, law and regulatory environment and access to capital and investment.

Table 1.4 Growth factors of fintech in Ukraine

Infrastructure	Expertise
- *Internet* is now more accessible to the population. In 2008, only 24% of adults in Ukraine had access to the Internet, while in 2017 the number rose to 63%. The Internet and its speed in Ukraine are constantly improving, which is especially evident in the mobile Internet. Continuous investment and support of high-speed Internet will further contribute to the development and use of FinTech services and products in the country. - *Electronic identification* facilitated by the national project "Bank ID" and the recent introduction of electronic passports (ID cards) makes it easier for customers to use fintech products and thus develops the market.	- Ukraine maintains high standards of education, especially in the field of mathematics, and the country's talented IT specialists support not only the national but also the global FinTech industry. Thus, a FinTech-unicorn "Transferwise", with a market value of more than $1.1 billion, is a team of software developers in Cherkasy. Although high qualifications have already been achieved in the field of information technology, the Ukrainian FinTech sector will benefit even more from the involvement of financial professionals who can provide it with necessary assistance.
Legal and regulatory environment	**Access to capital and investment**
The environment for supporting FinTech and other startups is currently being improved. Among the important changes that have recently been introduced in Ukrainian legislation are: - Permission to sign invoices and transactions with the electronic signature; - Banks are no longer required to translate documents into Ukrainian if they were created in English; - Ukrainian IT companies continue to use simplified taxation - 5% per year; - National Bank of Ukraine continues to gradually lift restrictions on the repatriation of dividends - the limit has been increased to USD 5 000 000 per legal entity per year; - Recent adoption of the law on electronic identification and trust services for electronic transactions in the internal market (Law on Electronic Trust Services).	- Ukrainian government regularly declares support for foreign investment. In general, from a regulatory point of view, starting and doing business in Ukraine for foreign investors does not differ from the conditions for doing business for domestic investors, since the requirement to obtain a special permit from the government for foreign direct investment has recently been abolished. - Ukrainian startups are increasingly using crowdfunding platforms for funding. According to research by Mastercard, about 87% of representatives of the banking sector are ready to partner with FinTech startups. - The creation of new acceleration programs in Ukraine will reduce the costs of FinTech startups and stimulate initial funding.

Source: composed by the author based on the information from the source (USAID, 2018)

Thereby, with the help of these growth factors, fintech in Ukraine has been growing rapidly for the last 20 years. According to the aforementioned USAID research (2018), the segment structure of Ukrainian fintech companies is the following (see Figure 1.4).
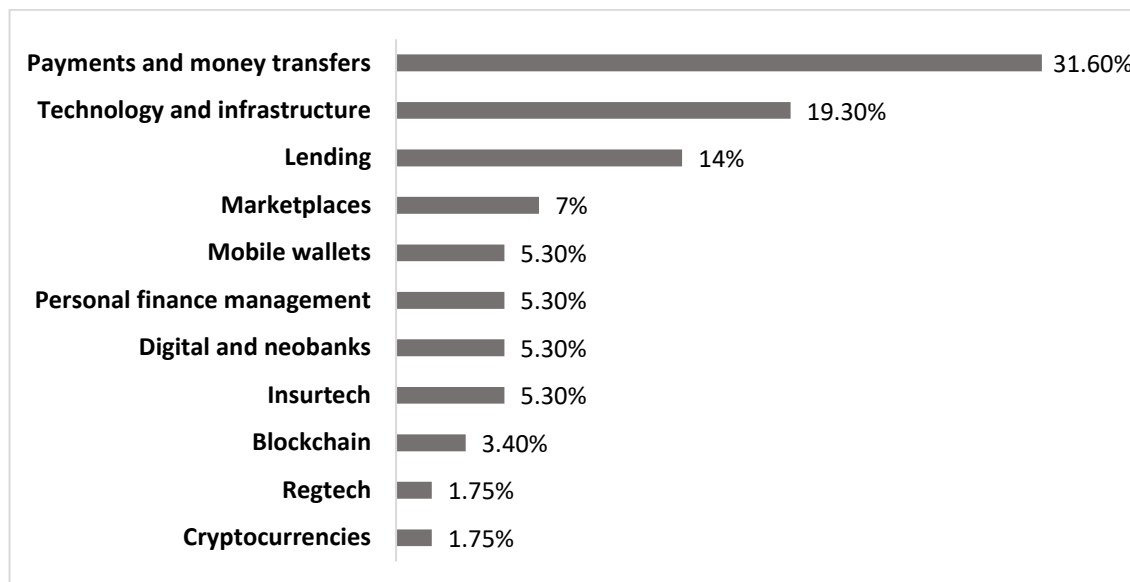
Figure 1.4 – The segment structure of Ukrainian fintech companies

Source: composed by the author based on the information from the source (USAID, 2018)

As is it is evident from figure 1.4, the vast majority of Ukrainian fintech companies provide solutions for payments and money transfers. The main players in this field are Easypay, iPay, Portmone, UAPAY, iBox, Liqpay, Way4Pay, GlobalMoney (USAID, 2018). It is also worth mentioning what was highlighted in USAID's research (2018), that a lot of Ukrainian fintech providers partner with banks and international payment systems. Mostly, these companies partner with TASCOMBANK (26%), international payment systems such as Visa and MasterCard (23%), Oshchadbank (16%), Alfa-Bank (14%), Raiffeisen Bank Aval (11.6%), FUIB (9.4%).

1.3. Key characteristics and main players of the world's banking industry

In 2020, just like any other industry and the world economy as a whole, the banking sector is experiencing a crisis. Moreover, it is difficult to say exactly when this crisis will end and when we can expect to return to normal life. However, unlike many past shocks,

the COVID-19 crisis is not a banking crisis – it is a crisis of the real economy. Banks will definitely be affected, as credit losses appear and as demand for banking services decreases, but global banking entered the crisis well-capitalized and is far stronger than it was 12 years ago in 2008 (McKinsey, 2020). Research conducted by one of the biggest and most well-known consulting firm McKinsey & Company presents an annual review of global banking in 2020, covering issues prompted by the COVID-19 pandemic. Surprisingly, their findings also imply the needed shift to using technology and more cooperation with fintech.

According to McKinsey's research (2020), banks will face a two-stage problem in the years to come: at first, there will be severe credit losses, but all banks are going to survive through it. Later, in the middle of a global recovery, banks will experience a challenge to ongoing operations that may stay up to 2024 and beyond. Depending on the scenario, from $1.5 trillion to $4.7 trillion in cumulative revenue in this sector could be forgone in the next 4 years.

McKinsey (2020) claims that **credit losses** are self-explanatory in modern conditions. To stop the virus from spreading, societies around the world shut their economies, sometimes even twice, throwing millions of people out of work and closing millions of local businesses. Those are all banks' clients, and their inability to keep up with their obligations will significantly increase personal and corporate defaults. Due to this, the world's banks have reserved $1.15 trillion for loan losses before the third quarter of 2020, which is much more than they did through all of 2019. Banks have not yet had to make substantial write-offs with the help of government support that kept households and companies afloat. But this is not going to last for long, and McKinsey experts project in the base-case scenario that loan-loss provisions in the next years will exceed those of the Great Recession in 2008.

McKinsey (2020) then elaborates that in the second phase, banks' income statements will be affected. In some way, the pandemic will only amplify already existing trends, such as low interest rates. But it will also decrease demand in some sectors and geographic areas. Additionally, banks will obviously reduce their risk appetite. The McKinsey team (2020) expects in their base-case scenario that global revenues could drop by about 14%

from their pre-crisis trajectory by 2024, and, in absolute measures, the COVID-19 crisis may cost the industry $3.7 trillion.

So far, banks responded quite well to the first stages of the crisis, keeping employees and clients safe while maintaining the financial system. Now they need to understand how to deal with the next phases of the downturn by preserving capital and rebuilding profits. The McKinsey analysts (2020) suggest one way of improving the productivity of banks' operations: accelerating the shift to digital banking and reconfiguring the branch network, where demand has decreased. In the past year, the use of cash and checks has fallen and, in most markets, about 20 to 40% of consumers use substantially less cash. At the same time, people's interest in digital banking has rocketed in many countries, although this trend also varies. For instance, in the United Kingdom and the United States, only 10 to 15% of consumers are more interested in digital banking than they were before the pandemic. While in Greece, Indonesia, Mexico and Singapore, the percentage of more interested people ranges from 30 to 40%.

As McKinsey (2020) suggests, in order to make the new digital habits usual, banks can start with consumer education about the benefits of digital banking in terms of safety and convenience. Even before the crisis, the world's leading banks in developed countries had already started migrating payments, transfers and cash transactions to self-service and digital channels. In addition to those who were already digital-only customers previously, another 10 to 15% of customers will be unlikely to use a branch after the crisis, which further proves the need for the shift to digital banking.

McKinsey (2020) states that banks' clients won't obviously abandon the branch, of course, but lower demand prompted by the COVID-19 crisis creates an opportunity to redesign the banking approach. Some world-leading banks are already using machine learning and Artificial Intelligence to study their customers, with special attention to demographics, ATM proximity, and competitors. As part of this development, banks will need to retrain some branch employees, for example by suggesting flexible roles that combine on-site and remote work, such as the customer experience officer. They can also be trained on new skills to eventually become contact-centre agents. With time, some

workers can acquire a set of skills to become "universal" bankers, able to work simultaneously in a variety of roles.

Consequently, banks need to change their agenda in different ways that were not expected before the crisis, and McKinsey (2020) experts see possible paths that will position banks well against the new trends. They must improve their speed and agility, even fundamentally reinvent their business models to stay alive during times of 0% interest rates and economic challenges, while adopting the best novel ideas from digital competitors.

Another relevant market research was performed by the member of the "Big 4" accounting companies KPMG (2020). They highlighted the banking areas that are likely to be most impacted by the current crisis: profitability and credit management, customer relationship and commercial models, operational resilience and business continuity management.

As for **profitability and credit management**, the KPMG (2020) team has also pointed out that a low-interest rate scenario could reduce the core banking profitability in mature markets. As a result, financial institutions are now shifting towards commission-based income from payments and tech businesses. There is currently a high credit risk of corporate and retail banks' clients, and in order to continue supporting the recovery of the real economy, they need to consider some primary aspects. First of all, KPMG (2020) states that banks should take into account new forward-looking information related to the COVID-19 when assessing their clients' credit score. They also need to update the "default rates" which need to consider any waivers granted by the authorities with the expiry of the creditworthiness. Additionally, they need to define and update the "recovery rates" and possibly introduce forms of deferred payments or agreements on longer maturities (restructuring debt, etc.). The significant decrease in economic activity is creating significant consequences on credit quality as banks are making bigger loan loss provisions. KPMG (2020) has found out that few European banks have already posted substantial losses in Q1'20 (January - March) to face a potential increase in bad loans. KPMG analysts (2020) also state that in order to deal with bad loans and reduce banks' non-performing loans (NPL) ratio they need to pay particular attention to the

securitization of such loans (the process related to risk management by backing up the loans with mortgages, for instance), and even a secondary market for bad debts might emerge.

Regarding **customer relationship and commercial models,** KPMG (2020) also claims that the crisis may accelerate the shift to the digitalization of the industry in order to be able to offer an excellent customer experience. Banks, even those that are the most focused on branches, are now forced to encourage the use of channels that have never been their strategic priority. This prompts the need to speed up their digital transformation path through partnerships and collaborations with fintech companies. Technological innovation can also play a crucial role in guaranteeing the **operational continuity of the banks**. Thus, active use of robotics solutions or artificial intelligence would allow for easier protection in case of the absence of staff. Given the necessity to have an unpredictable availability of infrastructural resources, there is a clear opportunity also for the banking sector to evaluate the advantages of available Cloud technologies.

Having examined the current market situation, it becomes now even more evident that banks definitely must include digital transformation as one of the key directions on their agenda. It now makes sense to take a look at the world's top-performing banks to understand the competitive landscape and select possible candidates for the practical study of their strategies. A reliable resource of such information is The Banker Database - a service from the Financial Times, providing comprehensive coverage of the leading banks in more than 190 countries. It combines standardized financial data, senior management information, The Banker Rankings, FT.com news and market data with original financial statements to provide all the information for worldwide bank research and analysis. The Banker's research and rankings have been the industry's standard measures of performance for more than 50 years.

The bank's size is traditionally measured by its total assets or capital size. Table A.1 in Appendix A contains the top 10 world banks by Tier 1 capital last year, as presented by The Banker Database (2020). As it can be seen from table A.1, despite an economic crisis, China's "Big Four" – Industrial & Commercial Bank of China, China Construction Bank, Agricultural Bank of China and Bank of China – all maintained their positions as

the four largest banks in the world. Another 4 huge US banks followed the Chinese giants: JPMorgan Chase, Bank of America, Wells Fargo and Citigroup. UK's HSBC landed on the 9th position on the list, being the largest European bank, and Japanese Mitsubishi completed the top as #10.

Conclusions to chapter 1

1. A strategy is one of the crucial elements of bank management, a specific set of rules for decision-making, a path that allows the bank to achieve its aims and also distinguishes the bank among its competitors. A strategy is formed during the gradual strategic planning process, which also involves strategic analysis, clarification of the bank's mission, determination of strategic goals of the bank, development of various banking strategies and an action plan. All these components are essential for the bank's adequate functioning, continual growth and success since they ensure not only clear goals setting but also the required steps for their achievement.

2. Fintech firms are technology companies that provide financial services disrupting the traditional financial market by offering innovative products, new business models and improved customer experience. The banking and payments sectors are most subject to revolutionary changes prompted by fintech in the nearest future due to the existence and rapid evolution of such technologies as P2P lending, digital banking, electronic payment systems, blockchain and others, which deprive banks of their functions of intermediaries in payments and lending authorities. Despite the risks and concerns around the world associated with digitalization and security, the fintech market is mainly self-regulated and gathers enormous amounts of investments each year.

3. The Ukrainian fintech market is still emerging and immature yet growth factors such as government support, infrastructure and regulatory changes, talented IT specialists and active startup investing contributes to its development. The vast majority of Ukrainian fintech companies provide solutions for payments and money transfers, and a lot of our local fintech providers partner with banks and international payment systems.

4. The banking sector in 2020-2021 is experiencing a crisis just like any other industry in the world, with current issues and threats including credit losses, reduced profitability due to low-interest rates, forced branch closures associated with changes in customer

behaviour and dangers for operational continuity. This unpredictable future in the crisis, however, accelerates the shift to the digitalization of the banking industry so that the banks could offer an excellent customer experience, cut costs, adapt to the changing environment and, essentially, survive.

CHAPTER 2
ANALYSIS OF DEVELOPMENT STRATEGIES OF LEADING WORLD BANKS

2.1. Trend analysis of the main Bank-Fintech collaboration models

In the past two decades, worldwide digitalization has influenced and changed nearly all industries, creating new opportunities for business and bringing innovative solutions. Starting from around 2010, even one of the most traditionally conservative sectors of the economy – banking – has been confronted with new entrants on the market, potentially disruptive technological and Interned-based innovations. Initially, banks' natural reaction was disbelief and denial. Due to their natural agility and attractiveness for investors, fintech companies started rapidly developing and growing customer bases all over the world. At some point, banks realized that it makes little sense to compete with fintech while, on the other hand, fintech representatives understood that it is impossible to destroy the domination of the incumbent banks. Thus, it became clear for both parties that a prosperous future lies in collaboration. Nowadays, it appears hard to find a large bank that does not cooperate with fintech or does not adapt to a digital strategy. Since these collaborations can be classified by their common form, a UK entrepreneur with more than 20 years of experience working in the management of financial services companies Alessandro E. Hatami (2018) points out three main types of bank-fintech interaction. In the framework of our study, it is expedient to empirically analyze these models of interaction on real examples of banks that implemented them and calculate the positive effect of such collaboration.

Hatami (2018) calls the first type of bank-fintech cooperation **"The Channel"** because in this case bank acts as a channel enabling the fintech company to sell its product to the bank's clients. The benefit for the bank is the possibility to offer its customers a new product or service at a relatively low cost of time, effort and capital. The bank also receives valuable insight into whether this offer is popular with customers and thus can decide what to do next: terminate the partnership, develop this product in-house or deepen

the collaboration with fintech. Fintech, in turn, benefits from easy access to new customers, increased brand awareness through an association with a well-known bank, and a better understanding of the market to improve its products. The third-party – customers – receive a new offering from the bank they are familiar with, which may be potentially interesting and useful. Additionally, they get assurances from the bank that this particular fintech company is not a scam and can be trusted with their money.

However, this model is unfair in terms of risks. That said, Hatami (2018) points out that the risks for the fintech side are almost non-existent, as such a partnership is narrow and the bank's issues will not directly affect the fintech firm. In an ideal version of such interaction, a bank can learn from observing how fintech works, but in reality, there is a risk of potentially nurturing its own competitor in exchange for market analysis. In addition, if the fintech product harmed the client, responsibility becomes a question. Even if a bank can legally abdicate responsibility for a problem caused by fintech, society and even regulatory pressure may force it to take on obligations.

One of the most vivid examples of such partnership is the collaboration of JPMorgan Chase and a fintech lending company OnDeck, which was already briefly described in section 1.2 of this thesis. In April 2015, WSJ reported (Rudegeair & Simon, 2015) that JPMorgan's Chief Executive Officer James Dimon realized that the company could increase its market share in small business lending, which was at the level of 8% at that time. According to a US consulting company Barlow Research Associates (Rudegeair & Simon, 2015), JPMorgan Chase was losing to Bank of America and Wells Fargo in that area. In addition to this, there was a significant decrease (a decline of 38% in 2014 compared to 2006) in issuing small loans to business among the 10 US largest banks, meaning that the biggest players in the banking industry were ignoring small business borrowers for a long time, and in 2015 they decided to participate in this market more actively.

As a result of this, JPMorgan Chase signed a deal with OnDeck Capital Inc., and after this announcement, OnDeck's shares immediately rose by 28%. In 2016, JPMorgan Chase started originating small business loans (less than $250,000) through the partnership with OnDeck, although they were marketed under the brand of JPMorgan

Chase – Chase Business Quick Capital – and resided on the bank's balance sheet (Rudegeair, 2015). In other words, OnDeck was more of a technology vendor in this channel-type collaboration model, rather than a lending partner. This successful partnership lasted for 3 years and had great outcomes for both parties. Even though OnDeck had to take a $900,000 impairment charge for a Chase-specific technology, the company had shortly announced its plans to pursue a bank charter, either by applying for one or by acquiring a bank. On the other side, JPMorgan Chase mentioned in a written statement that "It's been a great collaboration with OnDeck. They helped us create and launch an online loan application process that gave business owners faster decisions and easier access to credit, something we will continue to do on our own platform" (Wack, 2019). This illustrates the path that the bank had chosen after terminating the partnership – to develop the product in-house with its own resources.

That said, it makes sense now to find actual evidence of the success of this collaboration. First of all, in JPMorgan Chase strategic update published on February 27 (2018), it is mentioned that the Chase Business Quick Capital product powered by OnDeck has a strong customer satisfaction – an average NPS (Net Promoter Score) of 83. Net Promoter Score was calculated as the percentage of promoters minus the percentage of detractors as of December 2017, at the peak of the bank's partnership with OnDeck. For understanding, Net Promoter Score measures customer experience and predicts business growth. It basically shows how likely it is that a customer would recommend the brand to a friend or colleague (Net Promoter, 2020). To compare Chase Business Quick Capital's score with industry benchmarks, we have utilized a special website Delighted and received the results highlighting that NPS at the level of 83 overtook all the banks in the sector, even with the highest results. Thus, this metric is already a great illustration of the success of the JPMorgan Chase and OnDeck partnership.

Another indicator that can be used to show the success of the deal between JPMorgan Chase and OnDeck for the bank is the interest income that it generates from loans. We expect that the partnership with OnDeck has allowed JPMorgan Chase to earn more interest income, cut interest expenses and, thus generate more net interest income. In order to be able to observe visible changes before and during the collaboration, we have

collected data from JPMorgan Chase's financial statements (SEC, 2012-2019) and presented it in table 2.1 below.
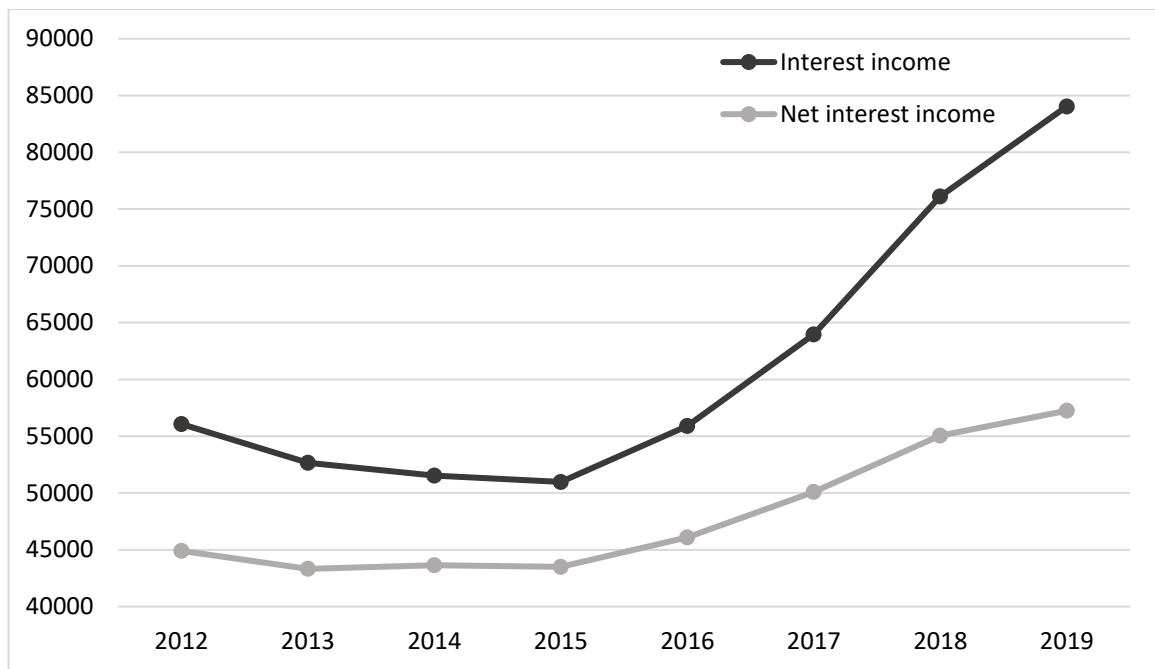
Table 2.1 JPMorgan Chase's interest income for the years 2012-2019

#	Indicator	Measure	2012	2013	2014	2015	2016	2017	2018	2019
1.	Interest income	Value, $mln	56063	52669	51531	50973	55901	63971	76100	84040
2.		Growth rate, %		-6.1%	-2.2%	-1.1%	9.7%	14.4%	19.0%	10.4%
3.	Net interest income	Value, $mln	44910	43319	43634	43510	46083	50097	55059	57245
4.		Growth rate, %		-3.5%	0.7%	-0.3%	5.9%	8.7%	9.9%	4.0%

Source: composed by the author based on the information from the financial statements

In order to clearly understand the dynamics, it should be noted that the agreement between the two companies was first announced on December 1, 2015, the cooperation began in 2016 and continued until August 2019. Thus, we should be able to observe the most visible positive changes during the period of the years 2016-2018. Years 2012-2015 were also analyzed for the purpose of seeing the past inherent dynamics and values of the bank's interest income before the partnership with OnDeck took place. As it can already be seen from table 2.1, before the end of 2016 there was a significant negative trend in both gross and net interest income. However, things have changed significantly with the results of 2016 year-end, when interest income rose substantially by 9.7% for just one year, and net income increased by 5.9% by the same time. Next year these two indicators showed even faster growth, and in 2017 their growth rates peaked at the levels of 19% for interest income and 9.9% for net interest income respectively. Afterwards, when the collaboration of JPMorgan Chase and OnDeck was terminated, it is evident that the growth rate was still positive, but it slowed down significantly. The continuation of the significant positive trend can be explained by the fact that after the end of the bank-fintech deal, JPMorgan Chase kept lending to small businesses, but with its own platform without leveraging external partners, and therefore its interest income did not grow as effectively.

For a better illustration of the changes in interest income dynamics depicted in table 2.1, it makes sense to display it via the diagram in figure 2.1.

Figure 2.1 – Dynamics of JPMorgan Chase's interest income for the years 2012-2019, $ millions

Source: composed by the author based on the information from table 2.1

Figure 2.1 above allows us to clearly observe the significant difference in the growth rate of the interest income (both gross and valid) before 2015 and after. Thus, the presence of such positive dynamics is evidence of the obvious efficiency and benefit of this "Channel" type bank-fintech deal not only for the fintech company but also for the bank itself.

Alessandro Hatami (2018) then presents the second type of partnership between a bank and a fintech company called **"The Satellite".** In this case, the bank basically buys fintech, while leaving it relatively independent. FinTech receives a significant increase in capital, confirmation of the success of its business model and potential access to the bank's customer base. The bank considers such an investment as an opportunity to experiment in the private sector without changing its existing operations. Thanks to this approach, the bank gets a decent market analysis, as well as exclusivity and control of new propositions. By leaving FinTech separate, the bank also protects itself from any harmful influences due to the mismatch between the way the bank is managed and the needs of an earlier-stage business. In addition, this approach is beneficial for staff. Many

talented fintech employees may not want to be part of a large, complex legacy organization, such as a bank, but they will keep working for a bank-owned FinTech. In this model, there is a substantial risk for the bank. If the experiment fails for any reason (low customer appetite, an unexpected crisis in FinTech, changes in regulations and rules, etc.), the bank may have to write off a significant investment.

A successful example of such a collaboration is the acquisition of Simple Bank by BBVA (Banco Bilbao Vizcaya Argentaria) in 2018, a Spanish international banking group, one of the top-50 largest banks in the world (#42 by total assets in 2029 according to the S&P rating (Ali, 2020)) and, notably, the most digitalized bank (rated #1 in 2020 by a trusted source the FinTech magazine (Lawrence, 2020)). Simple was founded in 2012 and by 2018 it had already more than 100,000 customers across the United States. That year, BBVA had decided to acquire Simple for $117 million to accelerate its digital expansion. As BBVA Chairman & CEO Francisco González said: "Simple will reinforce our global digital transformation while BBVA will provide the means to help Simple maximize its outstanding growth potential" (BBVA, 2018). Simple continued to operate under the same brand as before, keeping its philosophy and approach to customer experience.

In order to examine the success of this acquisition, it makes sense to look at the digital activity of BBVA for the past 6 years, which can be found in their public financial statements (BBVA, 2014-2019). Relevant metrics are presented in table 2.2 below.

Table 2.2 BBVA's digitalization indicators for the years 2014-2019

#	Indicator	Measure	2014	2015	2016	2017	2018	2019	2017-2019
1.	Number of clients	Value, mln	51	66	70	72.8	74.8	78.1	
2.		Growth rate, %		29.41%	6.06%	4.00%	2.75%	4.41%	7.28%
3.	Number of digital customers	Value, mln	12.4	15.4	18.1	22.6	27.2	32.1	
4.		Growth rate, %		24.19%	17.53%	24.86%	20.35%	18.01%	42.04%
5.	Number of mobile customers	Value, mln	5.9	9	12.2	17.8	23	29	
6.		Growth rate, %		52.54%	35.56%	45.90%	29.21%	26.09%	62.92%

Table 2.2 (continued)

7.	Digital sales	Value, percentage of sales, number of transactions	5	8.4	16.8	28.0	41	45	
8.		Growth rate, %		68.00%	100.00%	66.67%	46.43%	9.76%	60.71%

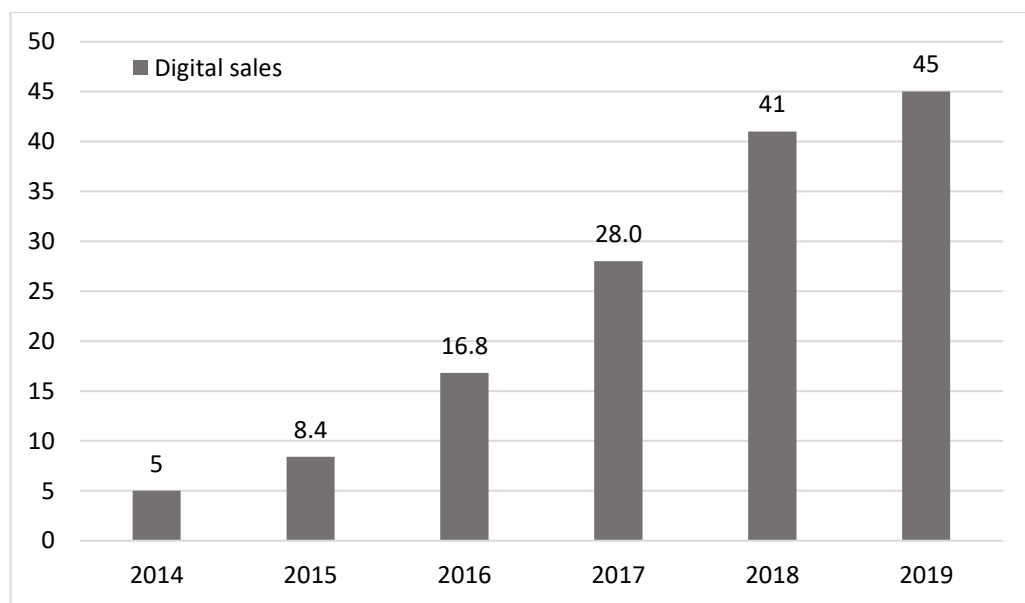*Source: composed by the author based on the information from the financial statements*

In terms of the BBVA and Simple collaboration, we should closely analyze the changes and growth that took place for the period 2017-2019. As it can be seen from table 2.2 above, the total number of clients grew by 7.28% for the period of 3 years, which is a normal rate for a constantly developing bank, but the growth rates of digital and mobile customers are substantially bigger: 42% and 63% respectively. These numbers clearly indicate the benefits that the bank gained through the acquisition of Simple Bank. Another evident change worth mentioning is that since 2015, the number of customers using digital channels has doubled, and the number of customers doing it through their mobile phones has tripled. Such rapid dynamics indicate that BBVA succeeded in accelerating its digital transformation over the course of the last 5 years. As BBVA's management claims in their 2019 annual report, mobile customers now represent more than 50% of their active customer base, which was achieved through improving BBVA digital banking channels in collaboration with Simple Bank. Moreover, it is immediately seen that digital sales increased by 61% over the period of 2017-2019, which can be interpreted as the most relevant indicator showing digital presence and bank transformation. Digital sales represented in 2019 45% of total sales in terms of value, nearly 50%, versus a level of only 28% in 2017.

As an illustration of the dynamics described above, it makes sense to visualize data in diagrams. Figure 2.2 below depicts the growth of BBVA's digital customers and figure 2.3 represents the growth in digital sales.
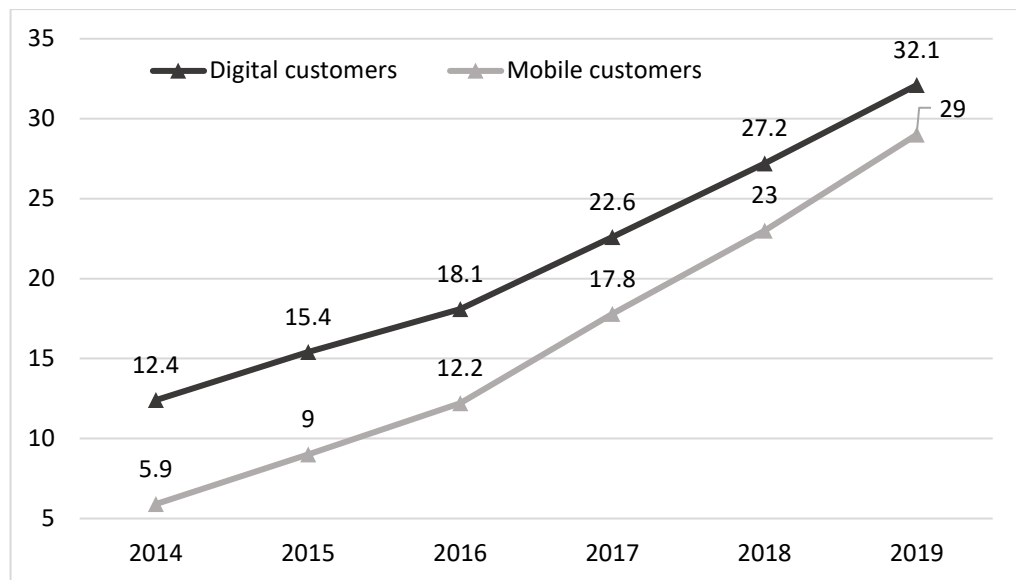
Figure 2.2 – Dynamics of BBVA's digital customers for 2014-2019, millions

Source: composed by the author based on the information from table 2.2

Figure 2.3 – Dynamics of BBVA's digital sales for the years 2014-2019, percentage of sales, number of transactions

Source: composed by the author based on the information from table 2.2

Thus, from the diagrams above we are able to observe strong growth trends in both digital customer base and digital sales, specifically in 2018 and 2019. Obviously, these metrics are interrelated, since more digital customers allow the bank to generate more revenue via digital channels, but a thorough examination of both allows one to see a

complete picture of how the bank boosted its digital transformation by investing in a fintech company.

Like "The Satellite", A. Hatami (2018) describes a third model of a more traditional acquisition named **"The Merger".** In this model, a transaction takes place with a clear understanding from both sides that the fintech company will be completely integrated into the bank and rebranded accordingly. This is obviously beneficial for the bank, allowing it to provide innovations under its own brand, at the same time increasing value proposition and awareness to the customers. In addition to the risk associated with the satellite cooperation model when a bank may have to write off an investment, there is a danger related to merging two companies with different business models and cultures. Careful management and preceding research are required here to avoid big failure.

An example of such a collaboration type is the acquisition of a card startup Final by a banking giant Goldman Sachs as part of their "acquihire" plan in 2018. As part of the deal, Goldman hired dozens of engineers and product managers in order to create consumer finance products on its online lending platform Marcus (PYMNTS, 2018). Since this acquisition involves hiring staff and is related to consumer lending, it makes sense to analyze relevant metrics associated with labour productivity as well as the volume of issued loans and respectively generated interest income. Labour productivity is calculated as the ratio of total income or net income to the number of staff and shows the efficiency of the average employee of the institution, as well as the correctness of the personnel management policy of the company. Naturally, each institution aims to increase productivity, since this means that each employee is able to produce more income for the business, and at the same time the company may save on wage costs and invest free resources into something else.

First of all, we examined Goldman Sachs's number of employees dynamics (Statista, 2020) and annual income statements (WSJ, 2020), collected relevant data required on total revenue and net income to assess labour productivity from 2016 through 2019 and presented it in table 2.3 below.

Table 2.3 Goldman Sachs's labour productivity indicators for the years 2016-2019

#	Indicator	Measure	2016	2017	2018	2019
1.	Number of employees	Value, thousands	34.4	33.6	36.6	38.3
2.		Growth rate, %		-2.3%	8.9%	4.6%
3.	Total Revenue	Value, $ thousands	27967000	29533000	33416000	33294000
4.		Growth rate, %		5.6%	13.1%	-0.4%
5.	Net Income	Value, $ thousands	7398000	4286000	10459000	8466000
6.		Growth rate, %		-42.1%	144.0%	-19.1%
7.	Labour productivity (total revenue)	Value, dollars per 1 employee	812994.19	878958.33	913005.46	869295.039
8.		Growth rate, %		8.1%	3.9%	-4.8%
9.	Labour productivity (net income)	Value, dollars per 1 employee	215058.14	127559.52	285765.03	221044.386
10.		Growth rate, %		-40.7%	124.0%	-22.6%

Source: composed by the author based on the information from the financial statements

As it can be seen from the table above, first there was a negative trend in the number of employees in 2017 compared to 2016, but then, right after the acquisition number of staff worldwide significantly grew by 3 million people in total (8.9%) and continued to increase in 2019 as well. At the same time, total revenue showed a positive rate of growth of 13%, while net income rose more than twice by an impressive 144% in 2018. Given the sharp increase in the bank's staff, it could first be assumed that this change will negatively affect productivity, but the significant positive dynamics of net income refutes this hypothesis. According to the calculations, as a result, labour productivity on total revenue fell slightly, however, labour productivity on net income has increased substantially, especially compared to previous periods: in 2017 this indicator fell by 40% and then rocketed by 124% in 2018. Thus, we can conclude that the bank's decision to absorb employees of the startup Final to create new offers to the customers was correct and they were able to generate a significant amount of net income, meaning that the expenditures on new employees were justified. For a better understanding of the resulting numbers and visible dynamics, it is better to present it on diagram 2.4.
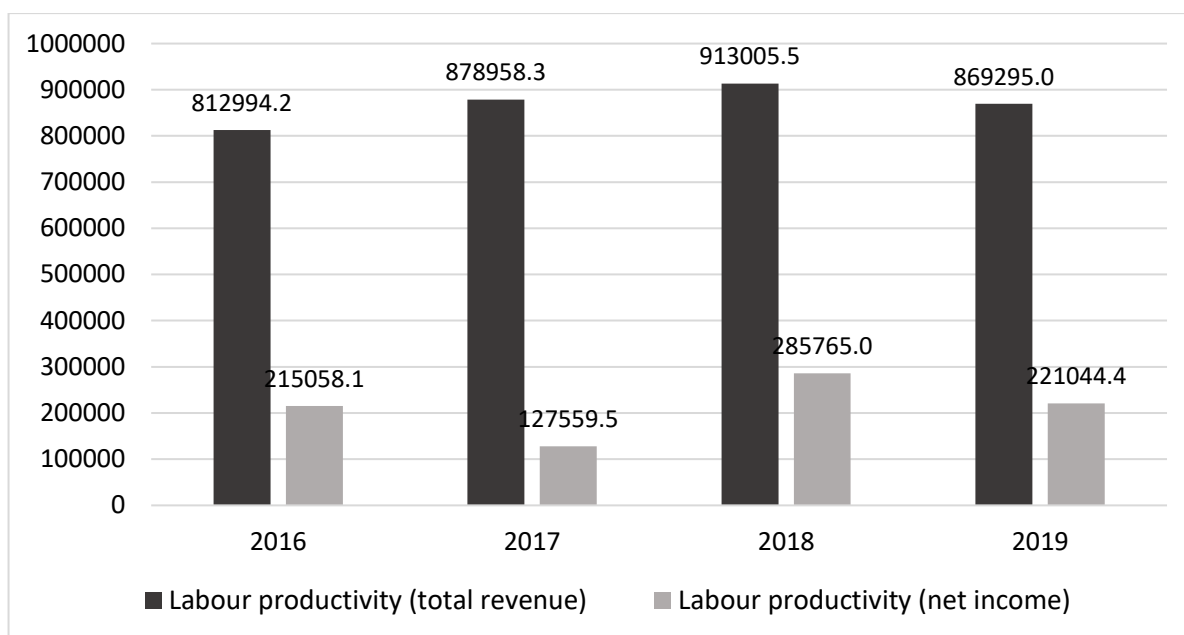
Figure 2.4 – Dynamics of Goldman Sachs's labour productivity for the years 2016-2019, dollars per 1 employee

Source: composed by the author based on the information from table 2.3

Then, we also extracted from the income statements (WSJ, 2020) the trend of interest income in table 2.4, as it is directly related to the reason for signing a deal with Final.
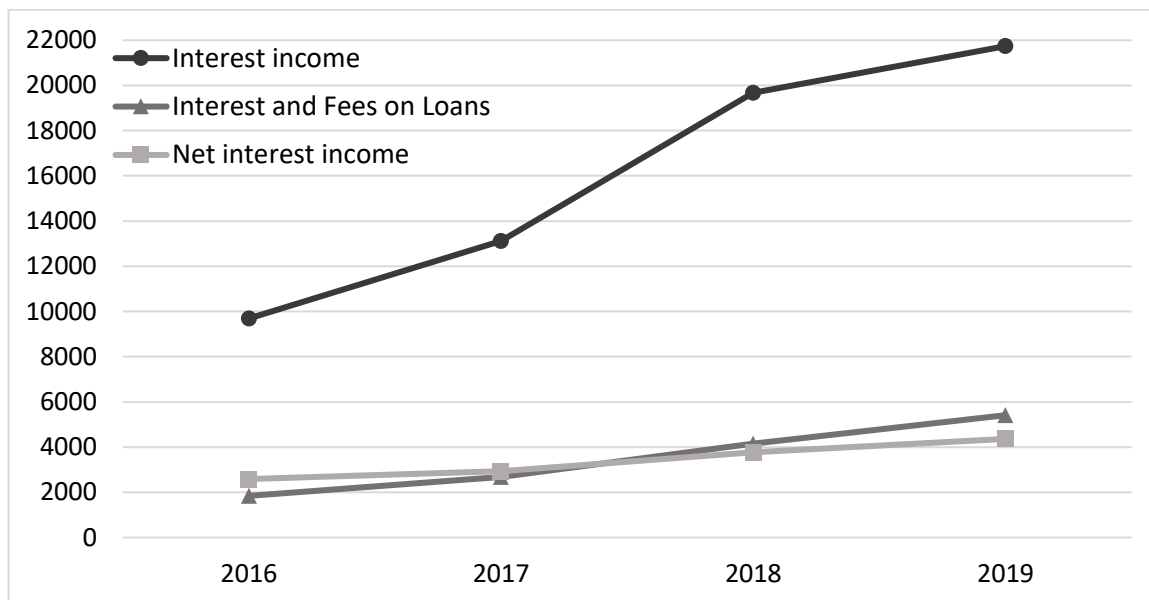
Table 2.4 Goldman Sachs's interest income indicators for the years 2016-2019

#	Indicator	Measure	2016	2017	2018	2019
1.	Interest income	Value, $mln	9691	13113	19679	21738
2.		Growth rate, %		35.3%	50.1%	10.5%
3.	Interest and Fees on Loans	Value, $mln	1843	2678	4148	5411
4.		Growth rate, %		45.3%	54.9%	30.4%
5.	Net interest income	Value, $mln	2587	2932	3767	4362
6.		Growth rate, %		13.3%	28.5%	15.8%

Source: composed by the author based on the information from the financial statements

It should be noted that the total interest income of the bank includes interest on fees and loans, interest on federal funds, interest on bank deposits and other interest or dividend income. Thus, in the table, we presented data on total interest income as well as interest on fees and loans, since Goldman Sachs acquired Final to boost credit activity

among its clients. As it is evident from the table, both interest income and interest income on fees and loans increased by a significant 50% and 55% respectively, and net interest income also showed substantial growth of 28.5%. The visualization of these changes can be seen in figure 2.5 below.

Figure 2.5 – Dynamics of Goldman Sachs's interest income for the years 2016-2019, $ thousands

Source: composed by the author based on the information from table 2.4

Analyzing the diagram in figure 2.5, we can observe the sharp increase in interest income and another important change: in 2018, interest on fees and loans for the first time in the examined period exceeded net interest income, and the gap continued to grow in 2019. Therefore, it proves that Goldman succeeded in its plan to improve its consumer lending with the help of Final and eventually gained much more growth in interest income, especially on fees and loans.

Finally, we also gathered the data from the annual balance sheets (WSJ, 2020) on the number of loans issued by the bank to its customers in table 2.5, as it is another measure of lending activity. Net loans (total loans minus loan loss provisions) are broken down into commercial and industrial loans, consumer and instalment loans and real estate mortgage loans. We collected data on all these measures to be able to see not only the general dynamics of loans volume but also the changes in loans structure.

Table 2.5 Goldman Sachs's loans volume indicators for the years 2016-2019

#	Indicator	Measure	2016	2017	2018	2019
1.	Net Loans	Value, $ million	47291	63473	77763	105553
2.		Growth rate, %		34.2%	22.5%	35.7%
3.	Commercial & Industrial Loans	Value, $ million	29598	38736	48724	46307
4.		Growth rate, %		30.9%	25.8%	-5.0%
5.	Consumer & Instalment Loans	Value, $ million	13828	18503	21755	34545
6.		Growth rate, %		33.8%	17.6%	58.8%
7.	Mortgage Loans	Value, $ million	3865	6234	7284	24701
8.		Growth rate, %		61.3%	16.8%	239.1%

Source: composed by the author based on the information from the financial statements

As it can be seen from table 2.5 above, net loans were increasing steadily over the observed period. However, when looking at the change that took place in 2018-2019, we can observe that commercial & industrial loans decreased by 5%, while consumer & instalment loans together with mortgage loans showed significant growth of 59% and 239% respectively. The structure of Goldman Sachs's loans can be better illustrated in a diagram in figure 2.6. It is evident that the ratio of different types of loans issued by the bank has changed substantially in 2019 compared to the preceding periods. Previously, commercial loans accounted for more than 60% of all loans issued by the bank, customer loans for less than a third, and mortgage loans for less than 10%. In 2019, after the absorption of the Final, the structure changed dramatically and commercial loans accounted for less than half, while loans to individuals together exceeded 56% of the total loan portfolio. This indicates a change in the focus of bank lending from legal entities to individuals, which became possible due to the creation of new consumer credit products with the help of the expertise of the startup Final.
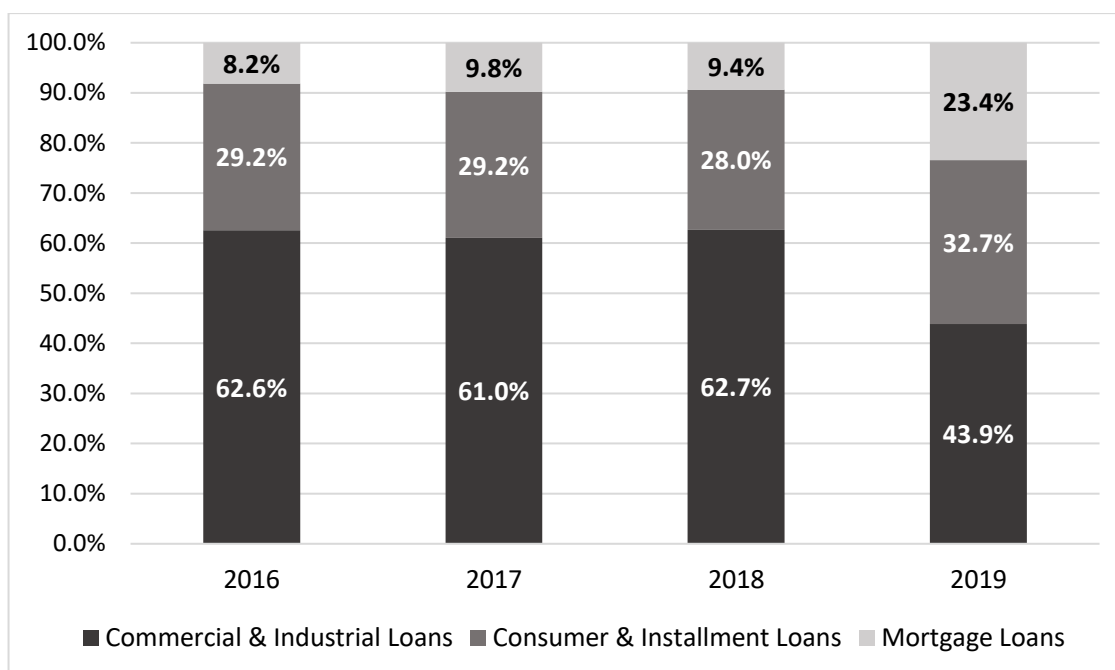
Figure 2.6 – Dynamics of Goldman Sachs's loans structure for the years 2016-2019

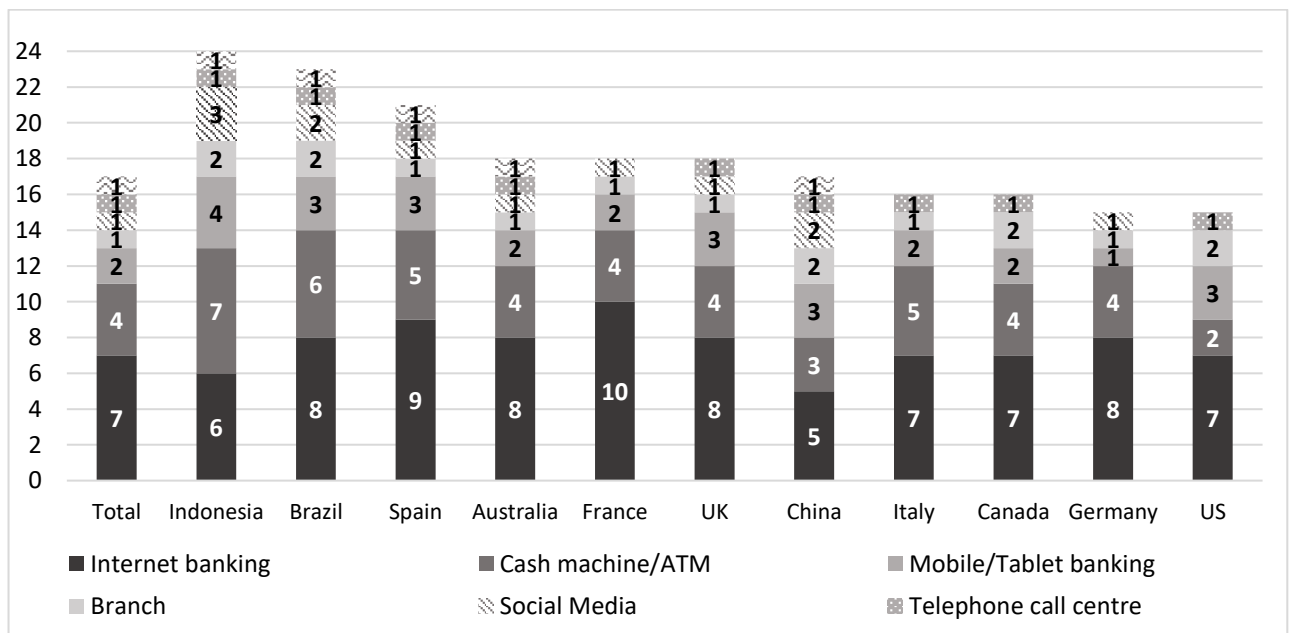*Source: composed by the author based on the information from table 2.5*

Having examined the dynamics of labour productivity, interest income and loans of Goldman Sachs, we can summarize that the decision to acquire Final was beneficial for the bank's personnel management efficiency and activity on the market of consumer loans. When announcing the deal in 2018, Chief Commercial Officer of Goldman Sachs's division Marcus, Omer Ismail mentioned in a statement provided by the bank: "We are eager to find experienced teams of talented people who have proven themselves to be consumer-centric in their approach to consumer financial services" (PYMNTS, 2018). Consequently, our analysis proves the fact that investing in new staff and their unique client-oriented approach facilitated by a fintech startup Final brought evident positive results to the bank.

In conclusion, it is becoming clear that the constantly changing and evolving market landscape leaves legacy banks with important decisions to make. Therefore, in the nearest future, we will see an increasing number of large and small banks collaborating with fintech companies in various ways. Wise choice of the best way of development is going to become a determining factor in the success or even survival of both the incumbents and the challengers.

2.2. Research of industry trends and changes in modern banking prompted by technology

In addition to analyzing the individual cases of interaction between specific banks and fintech companies, it is also advisable to look at the situation in the market as a whole in order to identify global trends and gain an understanding of how the entire banking industry is changing and developing. So, to be able to identify the dynamics, it makes sense to first look at the situation in the global banking market 5-6 years ago, in 2015 and 2016, when the whole world first started actively talking about fintech.

Let's first examine the underlying reason behind worldwide shifts to digitalization: customer behaviour. In an article written for Fortune author cites a speech of Anthony Jenkins, the former CEO of Barclays: "I predict that the number of branches and people employed in the financial services sector may decline by as much as 50% over the next 10 years, and even in a less harsh scenario I expect a decline of at least 20%" (Mount, 2016). Such a forecast can be compared with the data collected by Citi (2016) on how consumers of that time interacted with their bank. They surveyed 9,000 retail banking respondents in 11 key markets: Australia, Brazil, Canada, China, France, Germany, Indonesia, Italy, Spain, UK and the US, and the results are presented in figure 2.7 below.


Figure 2.7 – Number of interactions with the bank every month by channels, 2015

Source: composed by the author based on the information from the source mentioned in the text

From figure 2.7 we can see that, according to the Citi survey (2016), an average customer in 2015 interacted with their main bank 17 times a month across various channels, and digital channels such as internet and mobile banking, social media and ATM accounted for 15 of those interactions. Such a structure was true for customers across all 11 key markets that were included in the survey, both emerging (Indonesia, Brazil) and mature (Europe, North America) groups. This became possible due to the rapid adoption of personal devices that change the way customers interact with everything in their everyday lives, including banks. It is also immediately evident that the number of interactions via branch was normally quite insignificant – only 1 or 2 per month for all markets. This shift in customer behaviour 6 years ago acted as an indicator that banks needed to change their strategy from the traditional one – opening new branches, hiring more on-site employees – to a novel, omnichannel strategy. The key points for this strategy were the use of digital offerings, a gradual reduction and modernization of branch network and targeting different customer segments with relevant banking channels.

The need for such drastic changes and, in particular, the dynamics of bank closures can be clearly seen in US statistics since in this market these issues are studied in detail and more accessible information is provided. The latest research conducted by a member of the previously mentioned "Big 4" accounting firms, EY (2020), presents the dynamics of banks and thrifts branch net closings (differences between branch openings and closings) in the US from 2012 to 2018 (see Figure 2.8).
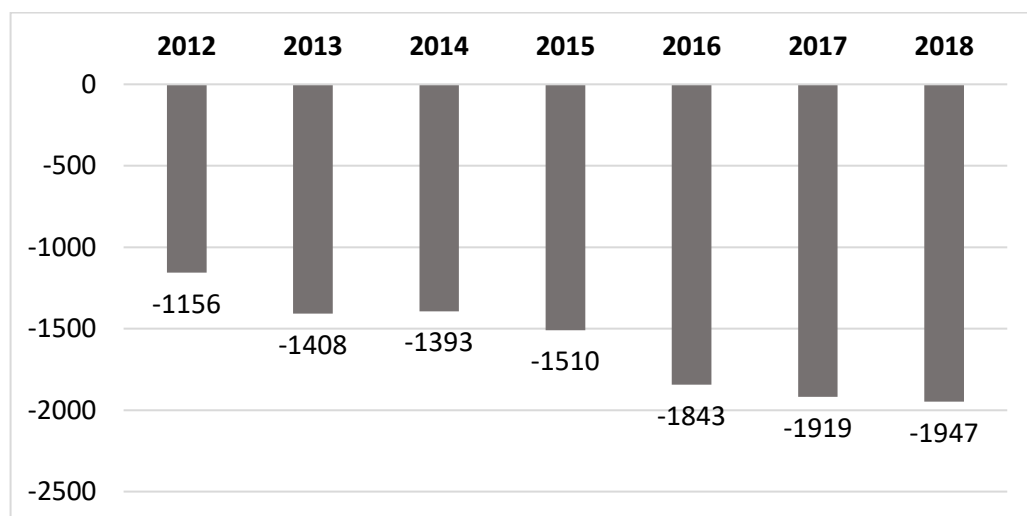
Figure 2.8 – US banks' branch net closings, 2012-2018

Source: composed by the author based on the information from the source mentioned in the text

As it can be seen from the dynamics depicted in figure 2.8, the number of bank closures grew significantly – by 68% over the period of 2012-2018. This clearly reflects the customer preference for digital engagement described earlier.

So, we understand that since 2015 customer trends have moved even deeper in digitalization, personalized offers and convenience. According to the aforementioned research by EY (2020), the use of digital is changing the customer experience journey raising the bar of customer expectations. Thereby, EY (2020) claim that 67% of customers say their standard for good experiences are higher than ever; 80% of customers say the experience a company provides is as important as its products and services; 59% of customers say companies need cutting-edge digital solutions to keep their business; 59% also say they're open to firms using artificial intelligence (AI) to improve their experiences; 73% of consumers aged 18-34 would be willing to buy financial products and services from tech companies (basically fintech). What is more, today out of the 58% of customers who want to receive digital advice from their banks, only 12% actually receive that advice. Additionally, it is clear that consumers now are more comfortable with mobile banking than with offline or even internet banking, which is different from the situation in 2015. Nearly two-thirds of mobile users have at least one financial app on their device. EY (2020) also forecasted at the beginning of 2020 that by 2021, 3 billion people (almost half of the world's population) will use a banking service on their devices (a growth of 53% compared to 2017).

Apart from the survey numbers, EY (2020) also present 5 key customer expectations from financial institutions and banks in particular: *integrated propositions addressing core needs* – consumers expect financial providers to offer services that cover his core needs that are not only related to finance – they are looking for partners to support them in important life moments and decisions; *hyper-personalized offers* – customers are interested in personalized financial advice and offers tailored to their personal needs and circumstances; *appropriate use of personal data* – consumers are comfortable with sharing their data with financial providers in return for improved advice and better propositions; *high integration across physical and digital channels* – customers are craving omnichannel banking experience that would make it possible to switch easily

between physical and digital channels when needed; *banks as solid partners for financial health* – consumers are now giving preference to banks that are able to act as partners in financial health, for instance analyzing customers' spending habits and advising on best ways to manage money. Thus, with a clear understanding of the desires and expectations of modern customers, banks nowadays have the opportunity to adapt accordingly, creating new services and channels of interaction, improving customer experience and making useful collaborations with companies in the technology sector.

In the research EY (2020) also disclose valuable insights into the scenario expected in the market in 2025: about one-third of revenues generated by traditional banks will be lost to novel disruptive business models. The areas where revenue will be diminishing along with the percentage of losses and its causes are presented below:

Payments (-34%): digital payments via wallets, P2P (Peer-to-Peer) /A2A (Application-to-Application) or digital only cross-currency exchange.

Wealth & Asset Management (-33%): digital-only brokerage and Robo Advisors.

Personal and Credit Card, SME Lending (-17%): digital-only lending, new credit scoring, P2P marketplaces.

Mortgages (-15%): digital only robo-mortgages.

Having examined changes in customer behaviour and dangers to the bank's revenues in the future, it is advisable to take a look at the respective actions of the banks across the world. Banks now recognize the importance of shifting their strategic agenda to a more proactive one, and therefore they implement various digital initiatives. These actions are common for major banks across the world, but they are being used with different intensity by geography in the following way:

North American banks: using data & customer analytics to provide personalized solutions; integrating digital, in-person and remote advisory services.

**European banks:** digitalization of front office, implementing cloud architecture and simplifying processes; providing digital infrastructure for customers using cloud computing; leveraging advanced modelling to reduce RWA (Risk-Weighted Assets).

Asia Pacific banks: partnering with fintech start-ups; developing their own platforms and boosting cross-region connectivity to gain more global clients; using API

(Application Programming Interface) and launching internal API stores to provide secure access to third parties.

Additionally, EY (2020) also present the results of their banking survey with the most popular choices that banks are leveraging and planning to leverage in order to respond to the modern changes in the market: thus, 28% of respondents said they prefer building a separate digital bank, 39% are creating a digital capability centre, 48% are closing non-bank partnerships, 58% are willing to invest as private equity or venture capital investors, 68% are starting accelerator programs and the vast majority (81%) answered they are going to close bank-fintech partnerships. Among all the services where a bank-fintech partnership is possible, 41% of respondents mentioned that payments are the most reasonable area, 21% preferred customer services and 19% – lending. That said, we can conclude that banks all over the world are now actively implementing digital initiatives including leveraging the latest technologies (cloud, data analytics, API, robots) in attempts to boost their own digital transformation and partnering with emerging fintech startups. Such trends provide additional proof to the fact that collaboration between traditional banks and fintech companies is one of the most popular and beneficial ways to adapt to the current market situation.

In terms of digital transformation and focus on Information Technology development among the banks, there is no doubt that they should actively invest in IT to become more efficient through process automation and gain a competitive advantage by providing more digital services. As we have already seen from consumer demand and disruptive business models in banking, traditional banks are naturally being forced to modernize, otherwise, their market shares and returns are in danger of substantial decrease. This digital transformation is being reflected in hiring more IT employees and engineers and, obviously, relevant expenditures on hardware, software, new investments and maintenance, services. We decided to examine the dynamics of bank IT spending for the years 2013-2020 across various regions and also the latest forecast for 2021-2022 prepared by Celent and visualize it in figure 2.9.
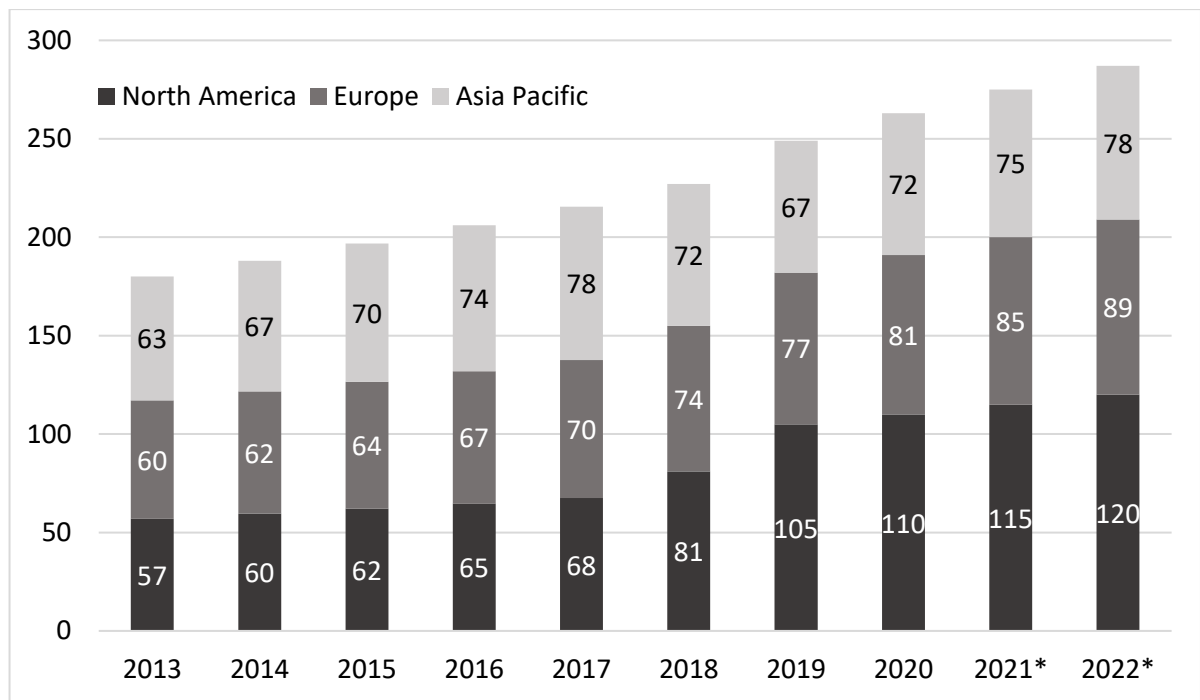
Figure 2.9 – Total bank IT spending across North America, Europe and Asia Pacific, $ billions

Source: composed by the author based on the information from the source mentioned in the text

As it is evident from the chart in figure 2.9 above, IT spending of banks across all examined regions has been growing gradually at a rate of about 4-5% annually, but in 2019 this indicator increased significantly by 9.7%, mostly due to North America. According to the forecast by Celent (2019), these expenses will continue to grow at a steady pace as banks are chasing the digital transformation goal. In addition to these figures, Business Insider (2020) also presents some insights into the IT/tech spend of some of the largest consumer-facing US banks by asset size (as of Q1 2020). Thus, Business Insider (2020) shows that IT expenditures of Truist bank will increase the most for the period of 2020-2024 at a compound annual growth rate of 15.42%, and KeyBank spent the highest percentage of its total assets on IT in 2020: this category of spending accounted for 1.8% of total assets. In terms of absolute value, Wells Fargo is the leader in bank annual IT spending at the level of $9.61 billion, followed by Bank of America with expenditures at $9.14 billion and JPMorgan Chase with $8.91 billion. The fact that leading US banks are investing so much in IT is a reflection of the current global trend of

digital transformation in banking, and also sets an example for all other players in the market.

However, in their research, Citi (2016) pointed out a problem with existing banks active IT investment policy. Obviously, banks, especially large ones have complicated and sophisticated business models, dramatically different from those of technology companies. Citi highlighted that in 2016, over 70% of the IT expenses of banks are allocated to the maintenance and support of existing legacy IT systems rather than new investments. It is clear that digital transformation is a gradual process and should be carefully planned and implemented over the long term, but currently, fintech firms are much more agile in creating new financial technology products and offerings, and they also don't have the need to maintain or modernize legacy systems, unlike traditional banks. This advantage makes the strategy of partnership with fintech companies more attractive and flexible compared to the complex, long-term and costly process of the bank's own digital transformation.

2.3. Analysis of variances of the Bank-Fintech collaboration examples

For a more in-depth analysis of the bank-fintech collaboration models with examples that were presented in this chapter, it is advisable to apply one of the most commonly used methods of economic analysis – **analysis of variances**. This tool is widely used in the budgetary process since it is important to constantly compare actual costs with budgeted (planned) costs and further investigate why differences may have occurred. The methodology of the classic analysis of variances is described in the book on Management Accounting (Weetman, 2006). Thus, to analyze these differences it is better to do it in terms of cost per unit rather than the total cost of an item in the budget. A cost per unit can be evaluated in advance of the operations to be undertaken and utilized as a particular comparison standard. In that way, according to the definition by Weetman (2006), a standard cost is the planned unit cost of the products, components or services produced in a period. Then, once the standard cost was estimated, it can be compared with the actual

cost. The ideal yet unrealistic scenario is when the actual cost matches the standard, however, in reality, the actual cost is often not the same as the standard one. As Weetman (2006) describes, this situation means that there is a variance to be investigated – a difference between a planned, budgeted or standard cost and the actual cost incurred. In the event the actual cost is greater than the standard cost, adverse variance appears, and favourable variance is the other way round. Weetman (2006) also distinguishes the main types of cost variances, each of which is calculated in its own way: direct materials cost, consisting of price and usage; direct labour cost decomposed into rate and efficiency; a variable overhead cost also composed of rate and efficiency; and fixed overhead cost, which can be broken down into expenditure and volume.

However, in our research, we are interested in comparing values of particular indicators in different periods of time and identifying factors influencing the changes the most. Thus, a slightly different approach to the analysis of variances would be suitable here. Analysis of variances (also known as *factor analysis*), according to the Ukrainian researchers Mnykh & Buriak (1998) is a methodology of complex and systematic study and measurement of the influence of the selected factors on the indicators. Mnykh & Buriak (1998) distinguish various types of analysis of variances, such as deterministic and stochastic, deductive and inductive, single-stage and multistage, static and dynamic, retrospective and perspective. In our case, since we are aware of the exact factors influencing the indicators, it is advisable to apply a deterministic analysis of variances.

The general methodology, according to Mnykh & Buriak (1998), is as follows: first, it is required to choose the factors that determine the studied indicator; then to determine the form of the relationship between factors and the indicator; then, a model of relations between the indicator and factors should be built; the final stage is to calculate the influence of the factors and assess the role of each of them in changing the value of the indicator. Mnykh & Buriak (1998) also point out the main types of factor models: additive, multiplicative, multiple and combined models. In our study, we will apply various types of factor models in accordance with the nature of the examined indicator.

One of the most important methodological issues in economic analysis is to determine the magnitude of the impact of individual factors on the growth of the

examined indicator. In the deterministic analysis of variances, there are few methods utilized for this purpose, however, most of them are based on the elimination principle. The most universal of them, which is used in all types of deterministic factor models is the principle of **chain substitution**. As Mnykh & Buriak (1998) explain, the chain substitution method allows to determine the influence of individual factors on the change in the value of the examined indicator by gradually replacing the base value of each factor in the volume of the examined indicator with the actual in the reporting period. Factors may influence the indicator positively or negatively, however, the algebraic sum of the influence of factors must be equal to the total change in the examined indicator.

To begin with, we decided to examine the change in JPMorgan Chase's net interest income during the partnership with OnDeck – an example of the "The Channel" collaboration model described by Alessandro Hatami. We have already identified that as a result of a 3-year partnership, JPMorgan Chase's net interest income grew by $13,375 million (31.6%) from 2015 to 2019. Net interest income (I_n) is calculated as the difference between interest income (I) and interest expense (E), but we would also be interested in examining how the changes in the fraction (F) of interest income in total revenue (which consists of interest income and noninterest revenue) affected net interest income. Thus, it makes sense to apply a mixture of an additive and a multiplicative factor model to determine which factor influenced net interest income the most. Thus, we have the following 3-factor combined factor model: $I_N = I - E = (R*F) - E$. For the calculations, we should first gather all the numbers from the JPMorgan Chase income statements (SEC, 2015-2019) in table 2.6.

Table 2.6 Incoming data for JPMorgan Chase's interest income variances analysis

#	Indicator, measure	Indicator designation	2015	2019	Growth rate 2015-2019, %
1.	Net interest income, $mln	I_N	43510	57245	31.6%
2.	Interest income, $mln	I	50973	84040	64.9%
3.	Interest expense, $mln	E	7463	26795	259.0%
4.	Total revenue, $mln	R	101006	142422	41.00%
5.	Fraction of interest income in total revenue	F	0.50465319	0.59007738	16.93%

Source: composed by the author based on the information from the financial statements

Algorithm for calculating using the method of chain substitution:

1) $I_{N2015} = (R_{2015} * F_{2015}) - E_{2015} = (101006 * 0.5046532) - 7463 = 43510$

2) $I_{N1} = (R_{2019} * F_{2015}) - E_{2015} = (142422 * 0.5046532) - 7463 = 64411$

3) $I_{N2} = (R_{2019} * F_{2019}) - E_{2015} = (142422 * 0.590077) - 7463 = 76577$

4) $I_{N2019} = (R_{2019} * F_{2019}) - E_{2019} = (142422 * 0.590077) - 26795 = 57245$

The second indicator (I_{N1}) differs from the first (I_{N2015}) in that when calculating it, the total revenue for 2019 is taken instead of 2015. The interest expense and fraction in both are at the values of 2015. That is, due to the increase in total revenue, net interested income grew by $20,901 million (64,411 – 43,510). The third indicator (I_{N2}) differs from the second in that when calculating its value, the fraction of interest income is taken for 2019 instead of 2015. That is, due to an increase in the fraction of interest income in total revenue, the net interest income increased by $12,166 million (76,577 – 64,411). The last indicator (I_{N2019}) is calculated with interest expense at its 2019 value, meaning that due to an increase in interest expense, net interest income decreased by $19,332 million (57,245 – 76,577). Thus, the growth of the bank's net interest income from 2015 to 2019 by $13,735 million (57,245 – 43,510) is the result of the influence of the following factors:

1) Increase in total revenue: +$20,901 million

2) Increase in the fraction of interest income in total revenue: +$12,166 million

3) Increase in interest expense (negative influence): -$19,332 million

Then we need to keep in mind the negative influence of interest expense in our model and calculate the result: 20,901 + 12,166 – 19,332 = +$13,735 million, which matches the actual increase in net income. Thus, even despite a significant increase in interest expenses, exactly due to a significant simultaneous increase in total revenue and the fraction of interest income in it, the bank's net interest income increased substantially. We can conclude that the goal to provide more loans to small business through a partnership with OnDeck was successfully reached and resulted in a rapid rise in net interest income.

Then, we should also examine the example of "The Satellite" model, an acquisition of Simple by BBVA in 2017 which resulted in the growth of the bank's digital sales and customer base. Unfortunately, it is not possible to find in the available public information data on the factors that determine digital sales to conduct the analysis of variances.

Consequently, we decided to examine the customer base and collected all the relevant data from the bank's financial statements (BBVA, 2016-2019) in table 2.7.

Table 2.7 Incoming data for BBVA's customer base analysis of variances

#	Indicator, measure	Indicator designation	2016	2019	Growth rate 2016-2019, %
1.	Number of clients, mln	C	70	78.1	11.6%
2.	Digital customers, mln	D	18.1	32.1	77.3%
3.	Mobile customers, mln	M	12.2	29	137.7%
4.	Offline customers, mln	O	39.7	17	-57.2%

Source: composed by the author based on the information from the financial statements

For BBVA's customer base we can build the following additive model: $C = D + M + O.$ The influence of each factor according to the chain substitution method:

1) $C_{2016} = D_{2016} + M_{2016} + O_{2016} = 18.1 + 12.2 + 39.7 = 70$

2) $C_1 = D_{2019} + M_{2016} + O_{2016} = 32.1 + 12.2 + 39.7 = 84$

3) $C_2 = D_{2019} + M_{2019} + O_{2016} = 32.1 + 29 + 39.7 = 100.8$

4) $C_{2019} = D_{2019} + M_{2019} + O_{2019} = 32.1 + 29 + 17 = 78.1$

Thus, the number of BBVA's clients increased from 2016 to 2019 by $8.1 million (78.1 – 70) due to the influence of the following changes:

1) Increase in digital customers: $84 – 70 = +14$ million

2) Increase in mobile customers: $100.8 – 84 = +16.8$ million

3) Decrease in offline customers: $78.1 – 100.8 = -22.7$ million

Result: $14 + 16.8 – 22.7 = +$8.1 million. As we can see from the calculations, the decrease in offline customers along with an increase in the mobile customers base contributed the most to the resulting growth of the customer base. Since the acquisition of Simple aimed to help offer more online and mobile banking solutions, it is evident that the partnership was successful and contributed to the digital transformation of BBVA.

Finally, we need to conduct an analysis of variances to examine the acquisition of Final by Goldman Sachs in 2018. Since it was a program that involved staffing Final employees to originate more loans to individuals, we decided to analyze separately labour

productivity and volume of loans. The data on Goldman Sachs's labour productivity from Statista (2020) and income statements (WSJ, 2020) is presented in table 2.8 below.

Table 2.8 Incoming data for Goldman Sachs's labour productivity analysis of variances

#	Indicator, measure	Indicator designation	2017	2019	Growth rate 2017-2019, %
1.	Number of employees, thousands	E	33.6	38.3	14.0%
2.	Total Revenue, $thousands	R	29533000	33294000	12.7%
3.	Net Income, $thousands	I	4286000	8466000	97.5%
4.	Labour productivity (total revenue), dollars per 1 employee	P_R	878958.3	869295	-1.1%
5.	Labour productivity (net income), dollars per 1 employee	P_I	127559.5	221044.4	73.3%

Source: composed by the author based on the information from the financial statements

First, let's examine labour productivity on total revenue. The model for labour productivity on total revenue is the following: $P_R = \frac{R}{E}$. Let's apply the chain substitution method to calculate the influence of each factor:

1) $P_{R2017} = \frac{R_{2017}}{E_{2017}} = \frac{29533000}{33.6} = 878958.3$

2) $P_{R1} = \frac{R_{2019}}{E_{2017}} = \frac{33294000}{33.6} = 990892.9$

3) $P_{R2019} = \frac{R_{2019}}{E_{2019}} = \frac{33294000}{38.3} = 869295$

Thus, Goldman Sachs's labour productivity on total revenue fell from 2017 to 2019 by $9,663.3 thousand (869,295 –878,958.3) due to the influence of the following changes:

1) Increase in total revenue: 990,892.9 – 878,958.3 = +$111,934.6 thousand

2) Increase in the number of employees (negative influence, since it is a denominator): 869,295 – 990,892.9 = -$121,597.9 thousand

Result: 111,934.6 – 121,597.9 = -$9,663.3. Thus, we can conclude that in this case, a negative impact from the increase in the number of employees exceeded the influence of growth in total revenue. Even though the labour productivity on total revenue fell by a small percentage (-1.1%), it is still not a sign of the failure of the acquihire program, since we also should examine the labour productivity on net income.

The model for labour productivity on net income is as follows: $P_I = \frac{I}{E}$. Calculating the influences using chain substitution method:

1) $P_{I2017} = \frac{I_{2017}}{E_{2017}} = \frac{4286000}{33.6} = 127559.5$

2) $P_{I1} = \frac{I_{2019}}{E_{2017}} = \frac{8466000}{33.6} = 251964.3$

3) $P_{I2019} = \frac{I_{2019}}{E_{2019}} = \frac{8466000}{38.3} = 221044.4$

So, Goldman Sachs's labour productivity on net income grew from 2017 to 2019 by $93,484.9 thousand (221,044.4–127,559.5) due to the influence of the following changes:

3) Increase in net income: 251,964.3 – 127,559.5 = +$124,404.8 thousand

4) Increase in the number of employees (negative influence, since it is a denominator): 221,044.4 – 251,964.3 = -$30,919.9 thousand

Result: 124,404.8 – 30,919.9 = +$93,484.9. Therefore, from the calculations, we can observe that the positive influence from the increase in net income (it nearly doubled for the period of 3 years) was 4 times greater than the negative impact from the increase in the number of employees. Based on this, we can conclude that the collaboration with Final was beneficial for Goldman Sachs and allowed it to generate significantly more net income, even despite the increased staff costs.

In addition to labour productivity, we decided to analyze variances in the loans volume and its structure, since the aim of the acquisition of Final was to create consumer finance products and provide more loans to individuals. The relevant data retrieved from Goldman Sachs's balance sheets (WSJ, 2020) is presented in table 2.9 below.

Table 2.9 Incoming data for Goldman Sachs's loans volume analysis of variances

#	Indicator, measure	Indicator designation	2017	2019	Growth rate 2017-2019, %
1.	Net Loans, $mln	L	63473	105553	66.3%
2.	Commercial & Industrial Loans, $mln	COM	38736	46307	19.5%
3.	Consumer & Instalment Loans, $mln	CON	18503	34545	86.7%
4.	Mortgage Loans, $mln	M	6234	24701	296.2%

Source: composed by the author based on the information from the financial statements

For net loans, we should apply a 3-component additive model, since the total volume of loans consists of commercial & industrial loans, consumer & instalment loans and mortgage loans: $L = COM + CON + M$. Then, accordingly, we calculate the influence of each component of the model on the resulting volume of loans:

1) $L_{2017} = COM_{2017} + CON_{2017} + M_{2017} = 38736 + 18503 + 6234 = 63473$

2) $L_1 = COM_{2019} + CON_{2017} + M_{2017} = 46307 + 18503 + 6234 = 71044$

3) $L_2 = COM_{2019} + CON_{2019} + M_{2017} = 46307 + 34545 + 6234 = 87086$

4) $L_{2019} = COM_{2019} + CON_{2019} + M_{2019} = 46307 + 34545 + 24701 = 105553$

Thus, the volume of Goldman Sachs's net loans grew from 2017 to 2019 by \$42,080 million (105553 – 63473) due to the impact of the following factor:

1) Increase in commercial and industrial loans: 71,044 – 63,473 = +\$7,571 million

2) Increase in consumer and instalment loans: 87,086 – 71,044 = +\$16,042 million

3) Increase in mortgage loans: 105,553 – 87,086 = +\$18,467 million

Result: 7,571 + 16,042 + 18,467 = +\$42,080 million. As we can see, the contribution to the growth of both consumer loans and mortgages to the total volume of loans is twice as large as the impact of the growth of commercial loans. Together, consumer loans and mortgages account for 82% of the total increase in all loans which is a quite significant indicator that thanks to the startup Final, Goldman Sachs managed to substantially expand its lending to consumers in just 2 years of partnership.

After analyzing variances on each of the considered examples, we were able to further confirm our hypotheses about the positive impact of banks' partnerships with fintech companies in the form of growth of the relevant financial indicators.

Conclusions to chapter 2

1. In the current market situation, both banks and fintech companies realize that it makes little sense to compete with each other, and it is impossible to destroy the domination of the incumbent banks. Thus, the benefits of collaboration are now clear for both parties and three main types of bank-fintech cooperation can be distinguished: "The Channel", "The Satellite" and "The Merger".

2.   As an example of the first model of collaboration "The Channel", where the bank acts as a sales channel for the fintech company's services to the bank's customers, JPMorgan Chase's deal with a fintech lending company OnDeck was studied. The purpose of the partnership was to expand the bank's lending to small businesses, and as a result, JPMorgan Chase's net interest income growth during the partnership was much higher than in previous periods. After applying the analysis of variances with a mixture of a multiplicative and an additive factor model, it was discovered that the net interest income during the partnership period increased dramatically due to a significant increase in total revenue and the fraction of interest income in total revenue, rather than a reduction in interest expenses. Thus, the goal to provide more loans to small business through a partnership with OnDeck was successfully reached and resulted in a rapid rise in net interest income.

3.   To investigate the effectiveness of the second model of the bank-fintech collaboration "The Satellite", in which the bank buys fintech leaving it relatively independent, an example of the acquisition of Simple Bank by a Spanish international bank BBVA was chosen. The goal was to accelerate the digital expansion of BBVA, and in the analysis, the rapid growth of the number of bank's digital customers and digital sales during the partnership was identified. Having analyzed variances using an additive factor model, it was found that digital and mobile customers made the largest contribution to the significant growth of the bank's entire customer base, while the number of offline customers decreased. Since the acquisition of Simple aimed to help offer more digital banking solutions, it is evident that the partnership was successful and contributed to the digital transformation of BBVA.

4.   To examine the third type of cooperation between the bank and fintech "The Merger", which is the complete acquisition of the fintech company by the bank, we considered the example of the purchase of the card startup Final by the banking giant Goldman Sachs. In terms of the partnership, the bank hired a vast majority of Final's staff to create financial products for individual customers. The analysis showed an outstanding increase in interest income, as well as labour productivity on net income already at the end of the first year of cooperation. Using analysis of variances with multiple factor

models, it was determined that the increase in net income had a greater impact on the growth of this indicator, meaning that hiring Final's employees allowed the bank to generate significantly more net income, even despite the increased staff costs. Additionally, the structure of the bank's loan portfolio was analyzed, and, as a result, it shifted towards individuals due to a simultaneous increase in the share of loans and mortgages for individual customers in total loans and a decrease in commercial and industrial loans. Analysis of variances with an additive factor model also made it evident that the contribution of the growth of both consumer loans and mortgages to the total volume of loans was twice as large as the impact of the growth of commercial loans. This is a good indicator that with Final, Goldman Sachs managed to substantially expand its consumer lending in just 2 years of partnership.

5. Modern clients of the banks are craving an omnichannel banking experience that would make it possible to switch easily between physical and digital channels, which results in the rapid development of new banking technologies and branch closures across the world. Additionally, customer expectations are now higher than ever since consumers wish to receive hyper-personalized offers, integrated financial propositions and high-quality custom financial advice. Thus, with a clear understanding of the desires and expectations of modern customers, banks nowadays can adapt accordingly, creating new services and channels of interaction and improving customer experience.

6. Banks now recognize the importance of shifting their strategic agenda to a more proactive one, and therefore they undertake various digital initiatives which include implementing digital infrastructure, partnering with fintech start-ups, using data and customer analytics to provide personalized solutions. Thereby, banks are now actively investing in IT to become more efficient and gain a competitive advantage, and the value of these investments among banks worldwide keeps growing. However, research shows that most of the IT expenses of banks are allocated to the maintenance and support of existing legacy IT systems rather than new investments. This shows that the strategy of partnership with agile fintech companies is more attractive compared to the complex, long-term and costly process of the bank's digital transformation.

CHAPTER 3
RISKS, PROBLEMS AND PROSPECTS FOR THE MUTUAL DEVELOPMENT OF BANKS AND FINANCIAL TECHNOLOGIES

3.1. Risks and problems associated with the impact of technology on the banking sector

Over the past few years, fintech has significantly improved the quality and convenience of traditional financial services. However, even despite the fact that many financial institutions have already easily adopted novel technological solutions and are actively partnering with fintech companies, there are some hidden risks and caveats that should be addressed. For example, the integration of fintech services into existing banking solutions has raised serious data security concerns. In addition, the rapid development of digital platforms has made the fintech sector and its clients clearly vulnerable to different disruptions in IT security networks. Therefore, it is essential to acknowledge the various issues and dangers associated with fintech that are deeply engaged with banks in business.

A fintech expert Julie Muhn (2020) points out the trending challenges and risks in fintech in the area of cybersecurity. First of all, she mentions **third-party security risks**. Ensuring and monitoring only internal security is not always enough to prevent dangers, especially in banking. For this reason, often when banks use the services of fintech companies from a not very reliable service provider, they are at high risk of losing their data, experiencing failure in services and even losing their reputation due to inefficient data. These types of damage happen because of third-party security risks. To eliminate third-party risks associated with fintech providers, banks must carefully consider fintech-related risks in their risk management assessment. Then, Muhn (2020) claims that probably the most dangerous and common types of security problems in the world market and banking industry, in particular, are **malware attacks and hacking**. It is now easier than ever for hackers to target the Society for World Interbank Financial Communications (SWIFT). SWIFT systems are utilized by nearly all banks in the world and leading financial institutions for exchanging crucial financial information. However, there were

already a few cyberattacks on the SWIFT infrastructure which indicates the increased level of sophistication of the hackers. Thus, banks have significant vulnerabilities in their processes which can be used by attackers to run malware and cause disruptions in banks.

Another important cybersecurity issue described by Muhn (2020) is **data breaches**. Obviously, data plays a very important role in every industry and every business, regardless of the type of activity. And for banks and other financial institutions, the data is vital and extremely vulnerable. However, with the introduction of inefficient fintech systems in the financial sector, the issue of data breaches has become even more urgent. Payment card details and personal information about users who make transactions on the Internet have become easily accessible to hackers, and this contributes to cyber theft. And when a financial institution cooperates with third parties, data loss may occur due to their inefficient fintech services. Additionally, Muhn (2020) describes such a phenomenon as an **application security risk**. Applications developed by fintech companies are used by many banks to access their customers' financial information in real-time. They use this information in real-time to perform transactions and other banking operations. However, if the software lacks reliable security modules and effective codes, it automatically becomes more prone to cyber theft. Attackers use weak security of the applications to steal clients' data and other sensitive information. Therefore, if a bank employee plans to develop a fintech solution or the bank plans to work with such software, there must be maximum confidence that the application includes all the crucial security features.

A very important technology risk mentioned by Muhn (2020) is **money laundering risk**. Modern fintech-driven banks often use cryptocurrency to conduct financial transactions. These cryptocurrencies are a vital part of the fintech ecosystem and are not officially regulated by any institution, set of standards or global rules. Thus, the frequent use of unregulated currencies creates the risk of money laundering and even terrorist financing. Because the identification of the beneficiary in any fintech-supported transactions is not possible due to the fintech pseudonymous nature, money laundering operations receive sufficient support from fintech services. Then, Muhn (2020) describes **digital identity risks**. With the proliferation of digital tools in banking and finance, the use of online and mobile services that use one-time passwords and security codes has

increased dramatically. These security measures are not completely secure and can be easily accessed by an experienced hacker. Vital bank customer data could be easily accessed through a faulty fintech system provided by some fintech company. Therefore, banks should regularly review and improve their online security architecture.

Muhn (2020) also mentions the major problem of **legacy banking systems**. Banks are struggling to integrate fintech solutions into their legacy core banking systems. These traditional banking systems are quite vulnerable to all kinds of cyber thefts, but this is not the biggest threat. When advanced fintech services combine with existing unsecured banking systems, they are also likely to become an easier target for attackers. Therefore, the first obligation of the bank before the introduction of fintech solutions in the company is to update its core banking systems. This will help the organization prevent the damage caused by possible cyber thefts as well as cut the costs of future maintenance support of the legacy system. Finally, Muhn (2020) indicates the risk associated with **cloud-based security**. Cloud solutions are one of the most important and popular aspects of the tech industry. Cloud computing services offer a wide range of services in the fintech ecosystem: from payment gateways and digital wallets to secure online payments. Although the cloud is considered a secure means of storing data, in case there are no adequate security measures, it can lead to the leakage of confidential financial information to the web, especially when a company works with an unreliable cloud solutions provider.

In conclusion, if hackers will continue to have easy access to the fintech platforms, bank clients' faith in the fintech will decline significantly. All this will lead to slower growth of the fintech industry. Thus, balanced innovations and mitigation of hidden cybersecurity risks are required to ensure the stable growth of the fintech sector. However, cybersecurity risks are not the only ones associated with fintech. Experts from Plante Moran, the 11th largest audit, accounting, tax, investment banking and wealth management firm in the United States (Snyder et al., 2020) have created a checklist for financial institutions to mitigate the exposure to risks associated with alliances with fintech companies. They argue that banks must do their due diligence before signing revolutionary deals and closely monitor the relationship further. Snyder et al. (2020) highlight the three main areas of risk in such collaborations.

First of all, there is **reputational risk**: financial institutions, like any other company, regularly face reputational risk when presenting any new product or service, regardless of whether it was developed by themselves or by a third party. A one-time breach of security in a newly introduced fintech product can seriously harm the trust and loyalty of the customer base that banks typically earn over the years. This, in turn, can also directly negatively affect profitability. Snyder et al. (2020) note that **unforeseen risk** is also present. The young fintech companies have yet not enough experience working with both regulators and regulations in general. On the other side, banks and credit unions are not used to working in such an ever-changing, fast-paced environment natural for technology companies. It is now impossible to pinpoint or predict what unforeseen risks may lie at the intersection of these two similar yet different areas.

Last but not least, Snyder et al. (2020) mention that there is a **regulatory risk,** which is the highest priority for financial institutions cooperating with fintech companies. Fintech products are actively transforming the financial sector, while legislators are not keeping up with the pace of the changes. It is possible that it will be a long time before banking rules and requirements are changed to take into account the fintech services. Meanwhile, regulators are thoroughly studying fintech relationships to ensure that financial institutions that partner with fintech still comply with traditional banking standards. In an effort to keep up with new fintech innovations and the risks involved, regulators are quickly issuing new policy guidelines or making changes to existing requirements and laws. For example, a global market leader in Governance, Risk and Compliance and Integrated Risk Management MetricStream (2020) highlights that China is currently considering banning cryptocurrency mining, while the United States has warned cryptocurrency markets exchange operators of the consequences of non-compliance with anti-money laundering and anti-terrorist financing regulations. In addition, FATF (Financial Action Task Force on Money Laundering) is now in the process of creating new international standards for the regulation of cryptocurrency companies.

Because of all of these regulatory changes, both fintech companies and banks must always monitor the regulatory landscape in the world and possible integrate reliable

compliance management systems to automatically track any changes and estimate their impact on the company to aid management's decision making and, consequently, act appropriately. For instance, one of the world's leading global banks uses a compliance management solution to detect and adapt to regulatory shifts in more than 67 markets. On the other side, regulators also rely on risk and compliance data to manage the changes they implement in their jurisdictions. MetricStream (2020) provides an example of the banking regulator of one of the greatest economies in Southeast Asia which uses risk reporting and analytics to aggregate information on risk events and determine its regulatory direction accordingly of more than 200 of the entities they regulate.

In addition to the risks already mentioned, it is worth mentioning the risks and the problems of partnerships between banks and fintech companies, to which we pay special attention. A member of the only fintech payments solution in India Razorpay, Harshitha Rao mentions the main challenges for banks and fintech to work together (Rao, 2020). Surprisingly, she highlights the **consumers' lack of exposure to tech**. Most of the reports and research papers that we analyzed emphasize the fact that consumers today are tech-savvy and, most importantly, they crave digital services and digital experience in banking. However, this is not true for all the bank's clients since there are millions of people who aren't that familiar with technology, especially in emerging markets. For those customers novel fintech solutions that the bank promotes may seem too complicated and, as a result, these consumers might change the bank they work with. As a result, this becomes a challenge for the collaboration of banks and fintech companies since those who are less equipped with technological knowledge should also be addressed.

In addition, Rao (2020) notes that cooperation between banks and fintech can prompt **trust issues**. Successful banks own the trust of their customers which was gained over the course of many years they have served their clients. However, when they introduce a disrupting technology that changes the usual order of things, even such strong trust is at high risk due to human nature. For instance, Rao (2020) describes the UPI technology – a Unified Payment Interface that combines multiple bank accounts (of any bank that is a partner of the system) into one mobile application merging different banking features, merchant payments and seamless fund routing into one system. As a result, UPI has

quickly become one of the most popular payment methods in India for P2P and P2M (Person-to-Merchant) transactions. But despite its clear benefits and rapid adoption all over the country, it is extremely hard to earn the trust of millions of consumers, which still prefer traditional banking over UPI when it comes to transactions of larger value.

In April 2020, the European Financial Management Association (EFMA) together with one of the world's leading consulting company Capgemini published the World FinTech Report 2020 exploring the challenges for traditional banks and ways for them to succeed in the modern market by becoming Inventive Banks (Capgemini & EFMA, 2020). In this report, researchers reveal "the disappointing reality of many bank/fintech partnerships" (Capgemini & EFMA, 2020): usually incumbent banks and fintech companies believe that any collaboration results in win-win synergies, however, success is measured by each party differently and insufficient control may lead to frustrating outcomes. Capgemini & EFMA (2020) in their report divided the problems with the bank-fintech partnerships into two parts: from the fintech's side and the bank's side. Thereby, from the banks' perspective, more than 2 out of 3 banking executives are not satisfied by collaborative initiatives of implementing open banking; three-quarters of banks' top managers admitted they didn't gain productive results from the partnership and often partners' KPIs (Key Performance Indicators) and strategic priorities do not match; a lot of people also mentioned that poorly structured cooperation leads to the poor balance of assets, which eventually results in an unquantifiable return on investment for the whole project. Besides, according to the Capgemini & EFMA (2020) survey, only 6% of the banks have achieved the ROI they expected from the partnership.

Capgemini & EFMA (2020) also make it clear that there are 3 main problems from the banks' side that make successful partnerships so rare. First of all, the researchers mention the so-called **"ownership dilemma"** – banks, when faced with innovation, often set an end aim of owning it, which immediately makes the propositions banks can offer very limited and, as a result, makes clients choose their competitors instead. Then goes **bureaucracy**, which appears since many traditional banks, especially large ones, have their departments operating as "organizational silos" (units that work independently and avoid sharing information). Thus, before approving any strategic decisions, such as a

partnership with a fintech company, each division must communicate and reach a consensus. Such an approach is obviously time-consuming and does not fit well with agile fintech companies. The third problem noted by Capgemini & EFMA (2020) is the **cost of innovation:** because the amounts of allowed IT expenditures are limited for banks, they are forced to often apply technological innovation to only one segment of the value chain which causes delays or even cancellations of a fintech product they are launching.

On the other hand, from the fintech's side researchers (Capgemini & EFMA, 2020) pinpoint 5 main areas of issues: organizational culture, process barriers, funding, leadership involvement and mismatched alliance. In terms of **organizational culture**, 7 out of 10 surveyed fintech firms mentioned they don't get along with their partner bank culturally or organizationally, and legacy banking infrastructure and overly complex processes slow down fintech's naturally fast and flexible style of work. It is worth mentioning that 58% of banks still utilize the legacy infrastructure and only 21% think that their systems are suitable for the collaboration. As for **process barriers**, more than 70% of fintech companies, which are used to working within a flat organizational structure, claimed they are experiencing complicated business communication and slowing down of the processes caused by the bank's highly siloed environment. When talking about **funding,** turns out that half of the fintech companies do not have sufficient funds to scale their businesses and operations, which creates difficulties for creating and commercializing the products together with banks. Regarding **leadership involvement**, 6 out of 10 fintech firms reported not enough required commitment from the bank's management which is also evident from the banking survey showing that only 19% of banks have dedicated an innovation team with decision-making authority for their projects. Finally, **mismatched alliance** means that more than half of fintech companies said they often find it hard to understand the bank's business problem or the scalability of the product, which creates difficulties in identifying the right partner for cooperation.

The World FinTech Report 2020 (Capgemini & EFMA, 2020) presented not only the problems of the bank-fintech collaborations but also the features that can help a bank collaborate effectively. Thus, Capgemini developed a specific benchmarking tool to measure the banks' readiness for cooperation with fintech called Open X Readiness

Index. Capgemini included around 60 banks across the Americas, Europe and Asia-Pacific regions in their research and measured them across the four pillars: People, Finance, Business and Technology. The researchers found out that most banks had issues with the collaborations associated with the People and Finance pillars. Then they analyzed the top 20% of banks to gain valuable insights into the traits of a bank that is ready for collaboration. With the help of this 4-pillar framework and using the right approach, conservative banks can customize and adapt their strategy to achieve a successful partnership with fintech companies.

Thus, in terms of People, Capgemini & EFMA (2020) identified that collaboration-ready banks had **a dedicated autonomous fintech collaboration team** consisting of a minimum of 10 people with experience in startups and enterprise partnerships. Such a team can significantly improve communication between the management of both parties, help to make joint decisions more effectively and speed up all processes, especially at the very beginning of the partnership. Additionally, top banks encouraged **intrapreneurship** – a practice of implementing entrepreneurship principles and innovations within the firm – in their companies and offered their dedicated collaboration teams training and upskilling on the latest digital trends and technologies, and in that way building an innovative culture inside can help banks to onboard the fintech partner.

As for the Finance pillar, Capgemini & EFMA's (2020) Open X Readiness Index leaders showed financial willingness to utilize a **fail-fast approach to innovation**. A fail-fast approach in systems design means immediate reporting when a condition close to a collapse appears. In business, fail-fast is a concept that includes comprehensive testing and gradual development to understand whether an idea has value. Such an approach in bank-fintech collaborations helps to cut potential losses when testing identifies something isn't working and to quickly switch to trying a different way – a strategy known as pivoting. Another important thing for banks to do is to **constantly monitor the fintech field**. Capgemini & EFMA's (2020) found out that banks that examined the fintech landscape and actively invested in hackathons and accelerators were able to reach higher success in their partnership with fintech. It is vital since the fintech sector is evolving rapidly and probably even faster than any other industry, and if a bank is not familiar with

the situation in this market it is much less likely that collaboration will have positive and efficient results.

Regarding Business, banks should always **assess solution scalability**. It turns out from Capgemini & EFMA's research (2020) that banks that succeeded in their cooperation partnered with fintech companies that could offer high scalability for their business. It helps to achieve the set business goals faster and move on to expanding the collaboration. In addition, a common feature among the effective collaborators was **deep engagement with trusted external parties** during the partnership. For instance, consultants and third-party subject matter experts can assist and eventually lead the cooperation to success due to their specific field knowledge and experience in driving collaborations.

As for the Technology pillar, top banks according to Capgemini & EFMA's research (2020) were among the **early adopters of new technologies**. Though it may be risky, accelerating digital transformation through investing in innovative technologies can reduce the technological distance between banks and fintech in middle- and back-office processes and make the whole collaboration easier to implement. And last but not least, in order to achieve a prosperous partnership with fintech companies, banks should **reduce dependency on legacy systems**. The top 20% of banks surveyed by Capgemini & EFMA reported that they switched from legacy systems to open and modern platforms such as those based on cloud systems. Such a development not only improved the integration with fintech from the IT side and operational effectiveness but also contributed to the customer experience in the front end. Once a bank becomes less dependent on legacy systems, it is open to implementing and replicating new technologies and business models.

In conclusion, technology creates many security risks for banks, and such profitable, at first glance, partnerships of banks with fintech have many issues and drawbacks. However, as successful examples of partnerships between banks and fintech companies show, there are clear steps and strategies that allow not only to achieve the desired results from collaboration but also to significantly modernize and improve the efficiency of the bank itself.

3.2. Perspectives for the mutual development of banking and technologies

Banks around the world are already actively using digital technology to transform different areas of their business. There is an even more breakthrough opportunity – to **completely switch to digital**. The digital revolution in the banking industry has only recently begun, and the world is now only experiencing its first stage, with most traditional banks already offering their clients high-quality web and mobile applications. An alternative approach to this is a fully digital environment of the bank, which becomes not just an additional function, but a fully integrated system. In the future, customers will use their devices to receive all banking services, from opening a new bank account and making regular transactions to resolving credit card billing disputes, all without any interaction with a physical bank branch.

In April 2016, McKinsey presented a global fintech report FinTechnicolor: The New Picture in Finance covering many aspects of the current market situation with fintech and banks as well as perspectives for the development of both. In an article presented by Sonia Barquin, a consultant in McKinsey's Kuala Lumpur office and Vinayak H.V., a principal in the Singapore office (2016), it is stated that according to the survey, in developed Asian markets, more than 80% of customers said they were willing to transfer some of their savings to a bank that would offer a convenient all-digital service. For clients in developing Asian markets, the number of people with such an opinion was over 50%. At the same time, many fintech companies are already taking advantage of these customer desires, offering simplified banking services at lower prices or with significantly less time spent on bureaucratic procedures. Some players provide completely new services to the market, for example, the US startup Digit offers customers to find small amounts of money to safely allocate as savings. Thus, the creation of a new fully digital banking business allows the bank to satisfy the ever-changing desires of customers quickly and efficiently, and this is especially true for fast-growing emerging markets.

Since banking is an extremely regulated sector known for its conservative corporate culture, there are important issues that need to be addressed towards full digitalization. This includes the need to create a new, more flexible culture required to develop an in-

house "startup". The research by Barquin & Vinayak (2016) shows that it is possible to create a new digital bank at significantly lower capital expenditures and lower operating expenditures per customer than those required to create a traditional bank. This can be explained not solely by the absence of branches but also by simplified banking products and more smooth processes like the utilization of vendor-hosted solutions and selective IT investment, which eliminates the need for expensive outdated systems.

Based on McKinsey experience of assisting banks with creating new digital businesses, Barquin & Vinayak (2016) have highlighted six main factors required to succeed. The first one is: *focus on the real value*. While it may seem obvious, business models, concepts and strategies vary from region to region and there is no such thing as a universal recipe. For instance, Poland's first digital bank mBank achieved success by offering its clients unsecured personal loans and this model may be good for the Eastern European market where credit cards aren't that popular, but it may fail in other countries. Thus, it is crucial for banks to focus on the value drivers and take into account any geographical or regulatory aspects in each area of operations. The second important principle indicated by Barquin & Vinayak (2016) is: *constantly test to improve customer experience*. When launching a new digital business or any products it is vital to not only perform preceding market research but also constantly gather customer feedback and insights in order to be able to indicate pain points of the clients in real-time and adapt accordingly. As an example, one company when launching their digital banking business was convinced in a hypothesis that for their clients, who are millennials in emerging markets, it would be important to have the opportunity to sign in using their social media accounts. However, after conducting interviews with their consumers and analyzing it thoroughly it was revealed that, in fact, modern educated millennials do not think that linking their finances to social networks is secure. So instead of the initial sign-in procedure, the company introduced another way, and it would have never happened without understanding real customer preferences.

The third success factor described by Barquin & Vinayak (2016) is: *organize for creativity, flexibility and speed*. This is important since creating a fully digital banking business requires a completely different way of working and thinking which is not usual

of traditional banks. Three main aspects have to be addressed: active cross-team collaboration, a working environment that promotes creativity and prototyping and a central team that acts as a "control tower". Another valuable issue mentioned by Barquin & Vinayak (2016) is: *create an ecosystem of partnerships*. Obviously, a new digital banking business would need to quickly gain a critical customer base, and the two sectors with large masses of digital clients are e-commerce marketplaces and telecommunications. A successful example here showing the value of the bank's partnership with e-commerce is Alibaba's Ant Financial, which has rapidly grown into a $20 billion business in just 2 years, becoming one of the biggest small business lenders in China.

An additional factor highlighted by Barquin & Vinayak (2016) is: *build a two-speed operating model*. We have previously discussed the problems of legacy bank systems that slow down all processes but to build and implement a successful digital bank two integrated IT systems are required: the traditional one, which may be slow but is definitely secure and stable acting as a back-end and an agile customer-oriented front end. Besides, for a faster scaling up and minimizing capital investments utilizing cloud-based data storages and data virtualization solutions is a great idea. And finally, the sixth success factor described by Barquin & Vinayak (2016) is: *get creative with marketing*. For digital-only banks which, unlike traditional banks, cannot acquire their clients through branches, marketing accounts for 25-35% of total operating expenses. New digital banks should be completely differentiated from the parent bank as a brand since they usually target a different audience – a younger, more tech-savvy audience. A Czech AirBank, which was launched without being backed by an existing bank, plays a good example here: it positioned itself as the "first bank you will like", promising its clients easy to understand jargon-free communication and transparent fees described in one document.

In addition to directly benefiting banks, digital finance can bring value to the entire economies in the future. In research from consultants of the McKinsey Global Institute (Manyika et al., 2016) it is stated that mobile financial services can stimulate inclusive growth helping billions of people and eventually adding $3.7 trillion to the GDP (a growth of 6%) of emerging economies in the next decade. The current situation is the following:

approximately 2 billion people and 200 million small and medium-sized business in developing countries do not have sufficient access to savings and credit or forced to pay high fees for a narrow range of banking products. Digital finance provided by mobile phones and the Internet can dramatically change the prospects of individuals, business and economies across the emerging markets, contributing to the GDP and financial inclusion. According to the research by Manyika et al. (2016), the generated GDP could provide up to 95 million new jobs in all industries.

Manyika et al. (2016) mention that digital finance would help a total of 1.6 billion individuals who previously couldn't access banking services. Many other stakeholders would benefit from this shift. In this way, banks are given new opportunities to assess credit risk, which will allow for the stable allocation of additional loans to individuals and small businesses in the amount of $2.1 trillion. Governments, in turn, will be able to reduce leaks in tax collection and public spending thus gaining $110 billion annually. Financial service providers will be able to save $400 billion a year on direct costs through moving from traditional to digital accounts, which require up to 90% less cost to service. Providers will also raise their revenue opportunities by broadening their clients base, thus being able to steadily increase their balance sheets by an astonishing $4.2 trillion.

Depending on the country's initial state, the potential which can be achieved with digital finance varies. Countries with lower income such as Nigeria, India and Ethiopia now have poor levels of financial inclusion and digital payments are not popular, meaning that they have the highest potential for growth with chances to add 10-12% to their GDP. Countries with income at the middle level such as China, Mexico and Brazil have the opportunity to boost their GDP by 4-5%, which is still significant.

Therefore, growth of financial inclusion can be achieved rapidly even without enormous investments and creating new infrastructure since mobile phones and Internet coverage are the main instruments that make everything possible. The digital finance future requires the commitment of both businesses and government since the main factors of success are the following: ensuring widespread access to digital and mobile infrastructure, promoting a dynamic business environment in the financial sector and creating superior digital finance products convenient for people and companies.

Apart from digitalization, it is worth mentioning the main fintech trends that will shape the future of banking as described by Chris Haughey (2020). He, first of all, mentions the fact that according to the report by EY (2019) presenting the Global FinTech Adoption Index, the fintech adoption rate by customers all over the world grew from 16% in 2015 to 64% in 2019, meaning that banks should always take into account the importance of integrating technology solutions in their businesses. In 2020, COVID-19 dramatically changed the social behaviour and interaction of people. It is estimated that digital banking will generate up to $8.6 billion in revenue by 2025. Products and services that were previously obtained physically are now available entirely online. One relevant example is how lots of retail transactions have shifted to contactless payments to meet social distancing safety recommendations. Because of the conditions the world is in now, we should expect even faster growth of fintech in the coming years. Every bank must be ready to digitize its processes, marketing, transactions and sales because, without it, it risks not surviving the next lockdown. It is also vital to constantly monitor the fintech trends to keep up with the rapid pace of technology development.

The first trend that is described by Haughey (2020) is **engaging underserved markets**. It is estimated by the World Bank (2019) in their Global Findex database that there are currently over 1.7 billion people that are not integrated into the formal financial system. This report states that most of these people (60%) do not have enough money in a bank account. Such markets include Brazil, Colombia, Peru, and especially India. According to the report by The Paypers (2020), despite the fact that 20% of India's population is not involved in banking, in recent years the FinTech sector in the country is actively developing and has grown to an estimate of $31 billion in 2020. India, with a population of 1.3 billion, is successfully attracting foreign investment. TechCrunch (2020) reports that the country currently has over 100 million microfinance accounts, and, for example, the successful startup Paytm has already more than 300 million mobile wallet accounts. This happens due to the fact that it is advantageous for a startup to enter an emerging market, as it gets the opportunity to operate virtually without competition and receives access to financing from investors which results in the rapid capture of market share and a certain niche of financial services. Thus, fintech startups will begin to

rapidly develop underserved markets, which, in turn, will open new opportunities and customer bases for banks.

Then, Haughey (2020) mentions the wider **adoption of blockchain and cryptocurrency.** Blockchain is one of the fastest developing fintech trends, which already has a strong influence on traditional banking systems. Legacy banking platforms are now at risk due to the possibility of peer-to-peer cross-border transactions thanks to blockchain. This decentralized technology has many advantages, including lower fees, higher speed of operations, better transparency, covering new markets, improved security, compliance with laws and regulations. Payment leaders Visa and Mastercard are already working on initiatives to integrate blockchain and cryptocurrencies into their payment platforms. Visa is currently negotiating with regulators (Marquez, 2020) to establish a compliance system to aid the wider acceptance of cryptocurrencies. At the same time, the Lithuanian startup, Bankera, seeks to merge traditional and crypto-economics into one platform. Focusing on speed, affordability and cost-effectiveness, Bankera strives to position itself as a blockchain-friendly bank with a variety of financial services, such as loans secured by cryptocurrency.

Next, the researcher (Haughey, 2020) notes the growing importance of **Big Data**. Nowadays, any company accumulates incredible amounts of various data. If it is not used, the firm loses the opportunity to obtain valuable information based on data. Big Data, in turn, allows one to take all these large amounts of data in structured or unstructured form and apply deep analysis using computer algorithms. Businesses can use this technology for a variety of purposes, including *customer segmentation* – the ability to divide the customer base by age, geography, gender, health, behaviour etc. Having key information about each customer segment, the bank can use it to create better offerings and increase profitability; *fraud detection* – as security has become a major consumer concern, special attention needs to be paid to improving the security of customer data. Thus, with the help of large data sets, the company can study the behaviour at the macro level, which makes it easier to identify fraud and protect bank's clients; *risk management* – leveraging big data one can improve the risk assessment of lending to specific borrowers. In large amounts of data, it is possible to identify patterns that were not previously visible. Thus,

the use of big data for the banking business means the ability to create secure, personalized offerings and infrastructure for B2B and B2C customers. A vivid example here is the Canadian fintech company Quandl, which provides financial data to investment experts. Some investment banks and hedge funds use Quandl to obtain valuable information that is not available elsewhere. For instance, Schroer (2019) describes a case when investors in an oil exploration drilling project bought Quandl data to find out that the project would fail.

Haughey (2020) additionally notes a popular trend of **Robotic Process Automation** (RPA), which is a technology that automates basic routine business processes, such as replying to e-mail or replying to clients' requests via chatbots. RPA is like a software robot since companies get a full-time digital worker who, moreover, never makes mistakes and does only what it was programmed for. This technology will have a significant influence on the financial sector in the near future since banks can use RPA to automate many business processes and save time. For example, a robot can be coded to work with a program, simulating the way a real person interacts with a program. This can be useful in error testing before releasing digital banking products to customers. Thus, the Florida startup ViVi uses RPA in the form of a chatbot to serve customers called ViVian (Kelley, 2019). In addition, using machine learning technology, ViVian listens to human-to-human calls to learn and increase the quality of its customer service. An even better example here would be the way Danske Bank integrated RPA into many spheres of their work in 2016 (Danske Bank, 2016). In their report to Deloitte Financial Agenda, Danske Bank present their implementation of RPA into the process of registering payments from clients who are paying their debt, which includes bookkeeping, updating customer's account information, editing risk profile, setting follow-up dates. As Danske Bank (2016) report, the project resulted in time savings, full elimination of human errors, reduced expenses due to the absence of overtime and high-quality output. Overall, the bank claims that RPA brings the following tangible benefits: project payback after 3 months; 45% growth in employees' ability to concentrate on clients; 40% decrease of average process execution time. Thus, it is evident that RPA can bring a lot of value to

banks in a short time, significantly cutting expenses, improving the company's efficiency and services quality.

Additionally, Haughey (2020) describes the adoption of **Artificial Intelligence** (AI). One of the world's leading research and advisory firm Gartner (2020) forecasts that by 2024, 75% of companies in the financial services sector will have fully integrated AI solutions which allows receiving essential information from the clients. This will make it possible to provide customers with more personalized services through faster, deeper analysis which can only be performed by a machine. Thus, Bank of America uses artificial intelligence-driven software called Erica working as a digital financial assistant for the bank's clients (Hill, 2020). The bot leverages natural language processing (NLP) to identify the intent of user search queries, which provides much more valuable insights than simple transactional searches. This allows the banks to clearly understand consumers' spending habits, credit risks etc.

Haughey (2020) indicates the growing significance of **mobile payments.** Thus, according to Forbes (2020), registration in financial mobile applications grew by 71% in 2019 alone. In addition, it is noted that some firms have recorded a rise in the time of usage of their finance applications by 85% in the period from the last quarter of 2019 to the first quarter of 2020. This is due to the fact that global customers no longer rely as much on physical money as it was before. They would rather use quick, transparent, and easy-to-use mobile payments instead. The current leaders in this sector are Stripe, Apple, Alibaba, Venmo, Cash App, Tencent and Google. For example, Stripe has made the space for processing payments simpler with an API that easily integrates into the back-end of most websites. The company is now valued at more than $36 billion and keeps growing in the era of mobile commerce. Thus, by focusing on convenient mobile payment services, the bank can enlarge its market capitalization.

And finally, Haughey (2020) mentions one of the most threatening trends for traditional banks – **neobanking**. In Haughey's (2020) opinion, one possible reason why traditional banking is not so popular now as it was before is that millennials and Generation Z digital citizens have been brought up with technology since childhood. The future of the entire banking industry is seen in fully digital banking, which is also called

neobanking. The advantages of such a business model are visible, and among the most obvious are lower cost, higher speed of service, wider market access and the absence of a significant part of transaction costs from the provision of financial services. In Europe, the two largest neobanks are N26 and Revolut, both of which completed Series D financing in 2020, bringing their market value to $3.2 billion and $5 billion respectively (Sanchez, 2020). For the customer, in addition to an intuitive mobile application experience, these digital bank alternatives offer low-cost international transfers, no monthly fees and the possibility to create secondary accounts for a partner or child. Of course, neobanks pose a significant threat to traditional banks because they have many advantages, at first glance, but it should be noted that neobanks are not yet able to offer the full range of financial services in one place, which is important for the client. In addition, the customer base of traditional banks is so large that it is impossible to imagine an instant and irreversible transition of consumers from reliable banks with a long-standing reputation to niche fintech banks.

It is also worth noting the trends in the development of fintech in Ukraine and what impact this will have on Ukrainian banking. In July 2020, the National Bank of Ukraine published Strategy for the development of fintech in Ukraine until 2025. It is a comprehensive document covering the overview of the current fintech market situation, the mission, vision and main strategic pathways for the Ukrainian fintech future as well as a detailed implementation roadmap with exact deadlines and responsible parties.

According to this document (National Bank of Ukraine, 2020), the prioritized fintech branches in the process of implementation of the Fintech Development Strategy in Ukraine until 2025 are lending, payment services, billing management, blockchain and virtual assets, wealth management, cybersecurity and antifraud, regtech, Big Data analytics, Artificial Intelligence and insurtech. At the same time, the main vectors of the strategy are the following: developed cashless economy, high level of digital and financial literacy among the population and sustainable fintech ecosystem. All of these vectors have a direct influence on banks since a cashless economy means no more operations with physical money and a shift fully digital transactions, improved digital and financial literacy will aid the adoption of digitalization of banking and a sustainable fintech

ecosystem will be a good environment creating opportunities for bank-fintech cooperation in Ukraine.

Regarding a strategic goal of a developed **cashless economy**, the National Bank of Ukraine (2020) details that it includes increasing accessibility, building the necessary infrastructure and promoting trust in cashless transactions. The results of achieving this strategic goal are the following: existing remote identification and verification with respective services providers are working on the market; the remote opening of accounts for clients by financial institutions is available; neobanks and financial companies operate on the market with the possibility of opening payment accounts and issuing electronic money; available reception of QR-codes through fintech solutions as a convenient, reliable and cheap means of making payments; fully developed and accepted standards for instant payments; the vast majority of SMEs accepts non-cash payments through all channels.

As for a high level of **digital and financial literacy,** the National Bank of Ukraine (2020) indicates that it means implementation of the regulator's strategic initiatives to increase digital and financial literacy and stimulation of the cooperation between the financial sector and the academic space. The expected results from implementing this strategic vector are as follows: developed educational program on digital literacy in the financial sector with the help of established cross-institutional and cross-sectoral cooperation; the National Bank is a centre for the development of digital literacy in the financial sector with available interactive materials, an online portal and a mobile application; a comprehensive strategic vision among the participants of the financial ecosystem on the development of financial literacy in Ukraine; an existing and operating academic base with a focus on open banking and digital finance; developed frameworks of financial literacy competencies for adults, children and youth.

Considering a **sustainable fintech ecosystem**, this aspect is the most complex one and requires simultaneous efforts in multiple branches of the Ukrainian economy and infrastructure. The National Bank of Ukraine (2020) describes that a sustainable fintech ecosystem would include the development of an open financial market architecture and regulatory platforms, strengthening the investment potential and the level of development

of the fintech market, integration of the Ukrainian fintech ecosystem into the world financial space, development of the digital infrastructure and stimulating the digitalization of the financial sector. When the aim of a sustainable fintech ecosystem is fulfilled, the following outcomes will be seen: introduced standards of open banking in the Ukrainian market and market participants work according to PSD2 standards (an EU directive on payment services); transition from the "sandbox" prototype (Expert Council format) to a full-fledged regulatory sandbox and achievement of the NBU membership in the Global Financial Innovation Network; developed and approved White Book of regtech-suptech, created and operating register (map) of automated software packages/solutions that ensure compliance with the regulatory requirements of the National Bank by all players of the financial market; implemented system of automatic registration and monitoring of cyber incidents of financial sector institutions, in particular within the framework of public-private cooperation.

Thus, if all strategic directions of fintech development strategy in Ukraine are successfully implemented, banks will exist in a different environment in the regulatory, infrastructural and customer aspects. With the development of a cashless economy, appropriate remote identification/verification technologies and instant payments, banks will be able to confidently invest resources in the development of digital communication channels, applications and online services. Growing the level of digital and financial literacy will increase the confidence of Ukrainian consumers in digital financial services and ensure the adoption of new forms of banking by customers. And the creation of a sustainable fintech ecosystem, the introduction of standards and optimization of the work of financial regulators will ensure the stable development of banks in the direction of digitalization.

Conclusions to chapter 3

1. Over the past few years, fintech has significantly improved the quality and convenience of traditional financial services. However, along with the great value, it brings to financial institutions, especially banks, a lot of hidden risks and dangers associated with cybersecurity, money laundering, reputation, regulations and also unforeseen risks.

2. Despite the evident benefits of the bank-fintech collaboration which were discovered in our research work, reports show that many such partnerships have disappointing results due to a mismatch between the style of work, expectations, strategic priorities and success metrics of the parties. Main areas of collaboration problems include organizational culture differences, process barriers, funding and leadership involvement.

3. The most promising yet challenging opportunity for modern banks in terms of their development is to completely switch to digital or to launch their own separate digital banking business. This development will not only allow banks to survive and thrive in today's ever-changing technological world but can also accelerate the spread of digital finance, which, in turn, can stimulate inclusive growth helping billions of people and eventually adding $3.7 trillion to the GDP of emerging economies in the next decade. The digital finance future requires the commitment of both businesses and government since the main factors of success are the following: ensuring widespread access to digital and mobile infrastructure, promoting a dynamic business environment in the financial sector and creating superior digital finance products convenient for people and companies.

4. During the past years and especially due to the pandemic, products and services that were previously obtained physically became now available entirely online. Because of the modern social distancing requirements, it is expected that fintech will grow even faster growth in the coming years, and every bank must closely monitor the fintech trends to keep up with the rapid pace of technology development. The main fintech trends that are evident now and which will shape the future of banking are engaging underserved markets, wider adoption of blockchain and cryptocurrency, Big Data, Robotic Process Automation (RPA), Artificial Intelligence (AI), mobile payments and neobanking.

5. In Ukraine, according to the Strategy for the development of fintech in Ukraine until 2025 prepared by the National Bank of Ukraine, the main strategic goals of the fintech development are a developed cashless economy, a high level of digital and financial literacy among the population and sustainable fintech ecosystem. These improvements will positively change the banking environment in the regulatory, infrastructural and customer aspects aiding Ukrainian banks' digitalization processes.

CONCLUSIONS

In this bachelor's thesis, the features of banking strategy, the essence and types of fintech innovations in the banking sector, the current trends in the banking industry as well as the risks, problems and prospects for the development of interaction between banking and technology were studied. Additionally, three main models of the bank's collaboration with fintech companies were analyzed. Based on the results of the research work, the following conclusions can be drawn:

1. A strategy is one of the crucial elements of bank management, a specific set of rules for decision-making, a path that allows the bank to achieve its aims and also distinguishes the bank among its competitors. A strategy is formed during the gradual strategic planning process, which also involves strategic analysis, clarification of the bank's mission, determination of strategic goals of the bank, development of various banking strategies and an action plan. All these components are essential for the bank's adequate functioning, continual growth and success since they ensure not only clear goals setting but also the required steps for their achievement.

2. Fintech firms are technology companies that provide financial services disrupting the traditional financial market by offering innovative products, new business models and improved customer experience. The banking and payments sectors are most subject to revolutionary changes prompted by fintech in the nearest future due to the existence and rapid evolution of such technologies as P2P lending, digital banking, electronic payment systems, blockchain and others, which deprive banks of their functions of intermediaries in payments and lending authorities. Despite the risks and concerns around the world associated with digitalization and security, the fintech market is mainly self-regulated and gathers enormous amounts of investments each year.

3. The Ukrainian fintech market is still emerging and immature yet growth factors such as government support, infrastructure and regulatory changes, talented IT specialists and active startup investing contributes to its development. The vast majority of Ukrainian fintech companies provide solutions for payments and money transfers, and a lot of our local fintech providers partner with banks and international payment systems.

4. The banking sector in 2020-2021 is experiencing a crisis just like any other industry in the world, with current issues and threats including credit losses, reduced profitability due to low-interest rates, forced branch closures associated with changes in customer behaviour and dangers for operational continuity. This unpredictable future in the crisis, however, accelerates the shift to the digitalization of the banking industry so that the banks could offer an excellent customer experience, cut costs, adapt to the changing environment and, essentially, survive.

5. In the current market situation, both banks and fintech companies realize that it makes little sense to compete with each other, and it is impossible to destroy the domination of the incumbent banks. Thus, the benefits of collaboration are now clear for both parties and three main types of bank-fintech cooperation can be distinguished.

6. As an example of the first model of collaboration "The Channel", where the bank acts as a sales channel for the fintech company's services to the bank's customers, JPMorgan Chase's deal with a fintech lending company OnDeck was studied. The purpose of the partnership was to expand the bank's lending to small businesses, and as a result, JPMorgan Chase's net interest income growth during the partnership was much higher than in previous periods. After applying the analysis of variances with a mixture of a multiplicative and an additive factor model, it was discovered that the net interest income during the partnership period increased dramatically due to a significant increase in total revenue and the fraction of interest income in total revenue, rather than a reduction in interest expenses. Thus, the goal to provide more loans to small business through a partnership with OnDeck was successfully reached and resulted in a rapid rise in net interest income.

7. To investigate the effectiveness of the second model of the bank-fintech collaboration "The Satellite", in which the bank buys fintech leaving it relatively independent, an example of the acquisition of Simple Bank by a Spanish international bank BBVA was chosen. The goal was to accelerate the digital expansion of BBVA, and in the analysis, the rapid growth of the number of bank's digital customers and digital sales during the partnership was identified. Having analyzed variances using an additive factor model, it was found that digital and mobile customers made the largest contribution

to the significant growth of the bank's entire customer base, while the number of offline customers decreased. Since the acquisition of Simple aimed to help offer more digital banking solutions, it is evident that the partnership was successful and contributed to the digital transformation of BBVA.

8. To examine the third type of cooperation between the bank and fintech "The Merger", which is the complete acquisition of the fintech company by the bank, we considered the example of the purchase of the card startup Final by the banking giant Goldman Sachs. In terms of the partnership, the bank hired a vast majority of Final's staff to create financial products for individual customers. The analysis showed an outstanding increase in interest income, as well as in labour productivity on net income already at the end of the first year of cooperation. Using analysis of variances with multiple factor models, it was determined that the increase in net income had a greater impact on the growth of this indicator, meaning that hiring Final's employees allowed the bank to generate significantly more net income, even despite the increased staff costs. Additionally, the structure of the bank's loan portfolio was analyzed, and, as a result, it shifted towards individuals due to a simultaneous increase in the share of loans and mortgages for individual customers in total loans and a decrease in commercial and industrial loans. Analysis of variances with an additive factor model also made it evident that the contribution of the growth of both consumer loans and mortgages to the total volume of loans was twice as large as the impact of the growth of commercial loans. This is a good indicator that with Final, Goldman Sachs managed to substantially expand its consumer lending in just 2 years of partnership.

9. Modern clients of the banks are craving an omnichannel banking experience that would make it possible to switch easily between physical and digital channels, which results in the rapid development of new banking technologies and branch closures across the world. Additionally, customer expectations are now higher than ever since consumers wish to receive hyper-personalized offers, integrated financial propositions and high-quality custom financial advice. Thus, with a clear understanding of the desires and expectations of modern customers, banks nowadays can adapt accordingly, creating new services and channels of interaction and improving customer experience.

10. Banks now recognize the importance of shifting their strategic agenda to a more proactive one, and therefore they undertake various digital initiatives which include implementing digital infrastructure, partnering with fintech start-ups, using data and customer analytics to provide personalized solutions. Thereby, banks are now actively investing in IT to become more efficient and gain a competitive advantage, and the value of these investments among banks worldwide keeps growing. However, research shows that most of the IT expenses of banks are allocated to the maintenance and support of existing legacy IT systems rather than new investments. This shows that the strategy of partnership with agile fintech companies is more attractive compared to the complex, long-term and costly process of the bank's digital transformation.

11. Over the past few years, fintech has significantly improved the quality and convenience of traditional financial services. However, along with the great value, it brings to financial institutions, especially banks, a lot of hidden risks and dangers associated with cybersecurity, money laundering, reputation, regulations and also unforeseen risks.

12. Despite the evident benefits of the bank-fintech collaboration which were discovered in our research work, reports show that many such partnerships have disappointing results due to a mismatch between the style of work, expectations, strategic priorities and success metrics of the parties. Main areas of collaboration problems include organizational culture differences, process barriers, funding and leadership involvement.

13. The most promising yet challenging opportunity for modern banks in terms of their development is to completely switch to digital or to launch their own separate digital banking business. This development will not only allow banks to survive and thrive in today's ever-changing technological world but can also accelerate the spread of digital finance, which, in turn, can stimulate inclusive growth helping billions of people and eventually adding $3.7 trillion to the GDP of emerging economies in the next decade. The digital finance future requires the commitment of both businesses and government since the main factors of success are the following: ensuring widespread access to digital and mobile infrastructure, promoting a dynamic business environment in the financial sector and creating superior digital finance products convenient for people and companies.

14. During the past years and especially due to the pandemic, products and services that were previously obtained physically became now available entirely online. Because of the modern social distancing requirements, it is expected that fintech will grow even faster growth in the coming years, and every bank must closely monitor the fintech trends to keep up with the rapid pace of technology development. The main fintech trends that are evident now and which will shape the future of banking are engaging underserved markets, wider adoption of blockchain and cryptocurrency, Big Data, Robotic Process Automation (RPA), Artificial Intelligence (AI), mobile payments and neobanking.

15. In Ukraine, according to the Strategy for the development of fintech in Ukraine until 2025 prepared by the National Bank of Ukraine, the main strategic goals of the fintech development are a developed cashless economy, a high level of digital and financial literacy among the population and sustainable fintech ecosystem. These improvements will positively change the banking environment in the regulatory, infrastructural and customer aspects aiding Ukrainian banks' digitalization processes.

Thus, in the era of technological transformation, the world's leading banks are either applying their own digitalization strategies or choosing to partner with fintech firms, and the analysis of real examples shows that the latter is particularly effective but quite risky.

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APPENDICES

Appendix A

Top 10 World Banks by Tier 1 Capital

Table A.1 Top 10 World Banks by Tier 1 Capital

#	Bank Name	Country	Total Assets ($M)	Pre-Tax Profit ($M)	Tier 1 Capital[1] ($M)	Return on Assets[2] (%)	Return on Equity[3] (%)	Non-Performing Loans[4] (%)	Loans to Assets Ratio[5] (%)
1	Industrial and Commercial Bank of China	China	4307502	56050	380189	1.0	11.8	1.4	59.1
2	China Construction Bank Corporation	China	3638950	46723	316122	1.1	12.2	1.4	59.0
3	Agricultural Bank of China	China	3559126	38137	277608	0.9	11.0	1.4	55.7
4	Bank of China	China	3257474	35858	258431	0.9	11.2	1.4	63.4
5	JPMorgan Chase & Co	US	2687379	44538	214432	1.4	17.0	0.8	37.0
6	Bank of America	US	2434079	32755	188492	1.1	14.6	0.6	42.3
7	Wells Fargo & Co	US	1927555	24198	158949	1.0	12.6	1.4	51.0
8	Citigroup	US	1951158	23870	155805	1.0	12.5	1.0	36.8
9	HSBC Holdings	UK	2715152	13347	148359	0.3	5.9	1.2	41.1
10	Mitsubishi UFJ Financial Group	Japan	3096333	7631	143729	1.0	11.8	1.0	32.4

Source: composed by the author based on the information from the source (The Banker, 2020)

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[1] **Tier 1 capital** is used to describe the capital adequacy of a bank and refers to core capital that includes equity capital and disclosed reserves. Tier 1 capital is essentially the most perfect form of a bank's capital—the money the bank has stored to keep it functioning through all the risky transactions it performs, such as trading/investing and lending (Mitchell, 2019).

[2] **Return on Assets (ROA)** is an indicator of how profitable a company is relative to its total assets, which is calculated by dividing a company's net income by total assets (Hargrave, 2020).

[3] **Return on equity (ROE)** is a measure of financial performance calculated by dividing net income by shareholders' equity (Fernando, 2020).

[4] **Non-performing Loans (NPL) ratio** is a percentage of non-performing loans (when a borrower has not made regular payments for at least 90 days) in a bank's loan portfolio (Hanks, 2019).

[5] **Loans to assets ratio** measures the total loans outstanding as a percentage of total assets. The higher this ratio indicates a bank is loaned up and its liquidity is low. The higher the ratio, the more risky a bank may be to higher defaults (U.S. Business Reporter).