MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY STATE UNIVERSITY
Educational and Scientific Institute for Business Technologies "UAB"
Department of International Economic Relations

Drofa Anna Oleksandrivna

MASTER'S LEVEL QUALIFICATION PAPER

on the topic "THE INFLUENCE OF FINTECH DEVELOPMENT ON PAYMENTS AND MONEY TRANSFERS SPHERE IN UKRAINE"

Specialty 292 "International Economic Relations"

Student II Course _____ Drofa A.O.
(signature)

group MEm-81a

It is submitted for the Master's level degree requirements fulfillment.

Master's level degree qualification paper contains the results of own research. The use of the ideas, results and texts of other authors has a link to the corresponding source _____ Drofa A. O.
(signature)

Research advisor Doctor of Economics, Professor_____ D'yakonova I.I.
(signature)

Sumy, 2019

SUMMARY

of Master's level degree qualification paper on the theme

"THE INFLUENCE OF FINTECH DEVELOPMENT ON PAYMENTS AND MONEY TRANSFERS SPHERE IN UKRAINE"

Drofa Anna Oleksandrivna

The main content of the master's level degree qualification paper is set out on 52 pages, including a list of used sources of 82 titles, which is placed on 10 pages. The work contains 4 tables, 11 figures, as well as 2 application.

KEYWORDS: FINTECH, PAYMENTS, MONEY TRANSFERS, FINANCE, TECHNOLOGY

The purpose of the master's level degree qualification paper is to study the theoretical foundations and the process of financial technologies development and their impact on the sphere of payments and money transfers in Ukraine.

The object of the study is development of financial technologies in the payments and money transfers sphere.

The subject of the study is economic relationships that emerge from the formation, analysis and refinement of the new financial technologies in the field of money transfers and payments in Ukraine based on the example of JSC CB "PrivatBank".

To achieve this goal and objectives there were used following scientific methods of research: systematization and generalization (theoretical justification of the FinTech concept and classification of financial technologies); systematic analysis (analysis of FinTech advantages and risks for consumers and banks, investments and adoption in the FinTech sphere); comparison (comparison of trends in the FinTech market in Ukraine and in the world); analysis (assessment of the economic activity of PrivatBank and its

activities in the payments and money transfers sphere); graphical method (graphical display of trends in the FinTech market and in the payments and money transfers sphere).

The information base of the master's level degree qualification paper is researches by scientists and international organizations in the FinTech sphere, financial reports of the National Bank of Ukraine and JSC CB “PrivatBank”.

The main scientific results of the work are as follows:

1) author's definition of the concept of "FinTech" and "FinTech system";

2) systematization of approaches to the FinTech classification;

3) identification of key benefits and risks of FinTech for consumers and banks;

4) development of recommendations on the implementation of innovative financial technologies in the money transfers and payments sphere, based on the example of PrivatBank.

The results can be used by and JSC CB “PrivatBank” during development of their strategic plans for improving existing Fintech products and services, as well as developing new ones in the field of money transfers and payments. In addition, general recommendations may be applicable by other Ukrainian banks for the further development of their financial technologies.

The results of the approbation of the main provisions of the master's level degree qualification paper were considered at: Drofa A.O. The development of the Fintech industry and its influence on the financial sector / D’yakonova I.I., Drofa A.O. // Вісник СумДУ. Серія «Економіка». – 2019. - № 4. - С.81-86.

Year of Master’s level qualification paper fulfilment is 2019.

Year of Master’s level paper defence is 2019.

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
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Educational and Scientific Institute of Business Technologies "UAB"
Department of International Economic Relations

APPROVED BY
Head of the Department
_____
(academic degree, academic rank)
_____ _____
(signature) (full name)
«__» _____2019.

TASKS FOR MASTER'S LEVEL DEGREE QUALIFICATION PAPER

specialty 292 " International Economic Relations "
student II course, group MEm-81a
Drofa Anna Oleksandrivna

1. The theme of the paper is “The influence of FinTech Development on Payments and Money Transfers Sphere in Ukraine”

approved by the order of the university from « __ » _____ 2019 №___

2. The term of completed paper submission by the student is «___» _____2019

3. The purpose of the qualification paper is to study the theoretical foundations and the process of financial technologies development and their impact on the sphere of payments and money transfers in Ukraine.
4. The object of the research is development of financial technologies in the payments and money transfers sphere.
5. The subject of the study is economic relationships that emerge from the formation, analysis and refinement of the new financial technologies in the field of money transfers and payments in Ukraine based on the example of JSC CB “PrivatBank”.
6. The qualification paper is carried out on materials of researches by scientists and international organizations in the FinTech sphere, financial reports of the National Bank of Ukraine and JSC CB “PrivatBank”.

7. Approximate master's level degree qualification paper plan, terms for submitting chapters to the research advisor and the content of tasks for the accomplished purpose is as follows:

Chapter 1 Theoretical Basis of the Financial Technologies
Chapter 1 deals with the research of concepts and history of FinTech, analyses the FinTech classifications and segmentations, and identifies major benefits and risks for consumers and banks emerging from FinTech.

Chapter 2 The Influence of Fintech Development on Payments and Money Transfers Sphere on the Example of JSC CB “PrivatBank”
Chapter 2 deals with the assessment of the economic activity of the PrivatBank, analysis of PrivatBank's activities in payments and money transfers sphere, development of proposals for increasing of FinTech using in payments and money transfers sphere.

8. Supervision on work:

Chapter	Full name and position of the advisor	Date, signature	
		task issued by	task accepted by
1	D’yakonova I.I., professor		
2	D’yakonova I.I., professor		

9. Date of issue of the task: « ___ » _____2019

Research Advisor: _____ D'yakonova I.I.
(signature)

The tasks has been received: _____ Drofa A.O.
(signature)

CONTEST

INTRODUCTION

Despite a large number of studies in the FinTech sphere, this topic is currently relevant due to rapid development of technologies and the strengthening of their influence on the financial sector. Global financial services are changing rapidly thanks to new technologies. Because of this, today there is no universal understanding and definition of FinTech. Furthermore, there is no unified approach to system definition and FinTech classification. The sphere of payments and money transfers is leading in attracting innovative technologies both in the world and in Ukraine and has the highest adoption rate among other FinTech areas.

FinTech market is also dynamically developing in Ukraine. Today, PrivatBank is one of the most innovative banks in our country. Therefore, we consider it appropriate to assess the influence of FinTech in the money transfers and payments sphere based on example of PrivatBank and develop recommendations for its further development in this area.

An analysis of research and analytical materials in this area indicates the need for further analysis of the general condition, importance and development trends of FinTech in the global and domestic financial markets, as well as their impact on the financial system as a whole and on payments and the money transfers industry in particular.

The purpose of the qualification paper is to study the theoretical foundations and the process of financial technologies development and their impact on the sphere of payments and money transfers in Ukraine.

To achieve this goal requires the formulation and solution of the following tasks:

- research of the concept and history of FinTech;
- analysis of FinTech classifications and segmentation;

- detection of main benefits and risks for consumers and banks arising from FinTech;

- assessment of the economic activity of the PrivatBank;

- analysis of PrivatBank's activities in payments and money transfers sphere;

- development of proposals for increasing of FinTech using in payments and money transfers sphere.

The object of the research is development of financial technologies in the payments and money transfers sphere.

The subject of the study is economic relationships that emerge from the formation, analysis and refinement of the new financial technologies in the field of money transfers and payments in Ukraine based on the example of JSC CB “PrivatBank”.

To achieve this goal and objectives there were used following scientific methods of research: systematization and generalization (theoretical justification of the FinTech concept and classification of financial technologies); systematic analysis (analysis of FinTech advantages and risks for consumers and banks, investments and adoption in the FinTech sphere); comparison (comparison of trends in the FinTech market in Ukraine and in the world); analysis (assessment of the economic activity of PrivatBank and its activities in the payments and money transfers sphere); graphical method (graphical display of trends in the FinTech market and in the payments and money transfers sphere).

The information base of the master's level degree qualification paper is researches by scientists and international organizations in the field of FinTech, financial reports of the National Bank of Ukraine and JSC CB “PrivatBank”.

The results can be used by JSC CB “PrivatBank” during development of their strategic plans for improving existing FinTech products and services, as well as developing new ones in the field of money transfers and payments. In addition, general

recommendations may be applicable by other Ukrainian banks for the further development of their financial technologies.

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1. THEORETICAL BASIS OF THE FINANCIAL TECHNOLOGIES

1.1. The concept of the Financial Technologies

In general, finance as well as the banking sector play an important role for people, businesses and government in every country. In recent years, traditional banking has been changing significantly and becoming more and more digital. In this context, the word “FinTech” has become very widespread nowadays all over the world. This term is derived from the combination of the two words “finance” and "technology" and reflects the close relationship between these two spheres. However, today there is no universal understanding and definition of FinTech, because every day there are many new technologies appeared that transform and expand the FinTech concept.

According to "150 years of Fintech: An evolutionary analysis" the term "FinTech" appeared in the early 1990s. At this time, the concept of financial technology was broadly characterized as the use of technology to provide some financial solutions to consumers [1]. It is also worth noting that Fintech was originally the original name of the Financial Services Technology consortium, a project initiated by Citicorp, the predecessor of today's Citigroup. Nevertheless, due to the rapid development of technology in the financial sector, FinTech is currently a generic term for innovative technologies that lead to continuous improvement in the financial services industry [2].

According to Oxford Dictionary FinTech characterized more from a technical point of view and is defined as “computer programs and other technology used to provide banking and financial services” [3]. IFZ FinTech study provides quite similar definition of this term and characterized it as “software solutions for innovative products, services, and processes in the financial industry, improving, complementing, and/or disrupting existing offerings” [4].

The European Parliament understands FinTech as innovations regarding the implementation of business operations and the automation of certain processes that have the ability to destroy financial markets and change its existing structures [5]. Thus, this term characterizes FinTech from a technical point of view as previous definitions, and also shows its impact on the financial market and its structure.

Subsequently, the FinTech concept was expanded and supplemented with new features and peculiarities. Thus, according to the Basel Committee on Banking Supervision, "FinTech is 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" [6].

The PricewaterhouseCoopers in their Global Fintech Report defines FinTech as "a combination of technology and financial services that's transforming the way financial businesses operate, collaborate, and transact with their customers, their regulators, and others in the industry" [7]. PwC also emphasizes that FinTech is a dynamic segment at the intersection of financial services and technology sectors, where technology-oriented companies have implemented the innovative financial products and services that a traditional financial institution currently provides [8].

T. Lee and H.-W. Kim in their scientific work "An Exploratory Study on FinTech Industry in Korea: Crowdfunding Case" characterized FinTech as a new type of financial services, based on the combination of information technologies and other financial services such as money transfers, payments etc. They also draw attention to the fact that FinTech includes all technical processes from updating financial software to programming a new type of financial software that can affect the field of finance around the world [9]. Thus, this definition also characterizes the impact of financial technology on the global financial system.

According to the Dorfleitner G. and Hornuf L. FinTech means companies or representatives of companies that combine financial services with modern, innovative technologies. New FinTech companies offer innovative Internet-based and application-oriented financial products and services, which are more user-friendly, efficient, transparent, and automated. At the same time, they believe that traditional financial institutions have not yet exhausted the possibilities for improvements along these lines. In a broad sense, they define FinTech as companies that simply provide technology to financial service providers [10].

United States Government Accountability Office (US GAO) defines FinTech as "use of technology and innovation to provide financial products and services". US GAO characterizes FinTech products and services as those typically provided over the Internet or through mobile devices, rather than through personal visits to branches of financial institutions. Thus, mobile devices become the main communication channel between providers of financial services and products and their consumers.

US GAO considers that the main advantages of Fintech products are convenience for consumers and lower costs. At the same time, US GAO emphasizes that FinTech products are subject to the same risks as traditional financial products and services, but FinTech risks are not always fully covered by applicable laws and regulations, which carries hidden threats for both suppliers and consumers of financial technologies. In addition, US GAO focus on the fact that FinTech activities create data security and privacy concerns and with high probability could impact overall financial stability as FinTech grows [11].

According to Ernst & Young, the FinTech system includes all organizations, such as start-ups, traditional financial institutions, telecommunications companies, which create innovative business models and related technological support. This is a value-added approach as it relates to the business models used by FinTech [12].

Overall, FinTech brings together all players in the financial market: FinTech start-ups, regulators, banks, international payment systems, bankers and financiers associations, etc. There is close interaction between all participants, which allows joint efforts to develop new financial technologies. Today, the closest cooperation is between banks and FinTech companies. Thus, FinTech companies and banks can cooperating in multiple ways. Beyond the usual partnership, banks can invest in FinTech companies or establish own start-up programs. At the same time, banks can acquire FinTech companies or launch own FinTech solutions. It all depends on the human, technical and capital resources of banks [13].

Based on our analysis of the scientific literature in the financial technology sphere, we have identified that FinTech is a combination of technologies and financial services aimed at meeting the ever-growing financial needs of customers through innovative financial products and services that differ from traditional banking services in terms of convenience, simplicity and transparency.

In general, the FinTech system consists of interactions between following players on financial market: financial institutions, start-ups, infrastructure, e-commerce, technology and telecommunications companies. The main factors that affect this system are consumers and users, emerging technologies and tools, investors, incubators and accelerators, regulators and government (fig. 1.1).

The ever-growing financial needs of customers and users are expanding FinTech's market share. In turn, new technologies and innovative tools allow financial institutions and other FinTech market participants to most effectively and optimally meet these needs. Regulators and the government monitor the functioning of FinTech companies and develop a legal framework for their activities to protect all participants in the FinTech system and reduce the risks of introducing new technologies into the financial sector. Moreover, investors, incubators and accelerators also have a great influence on the development of FinTech.

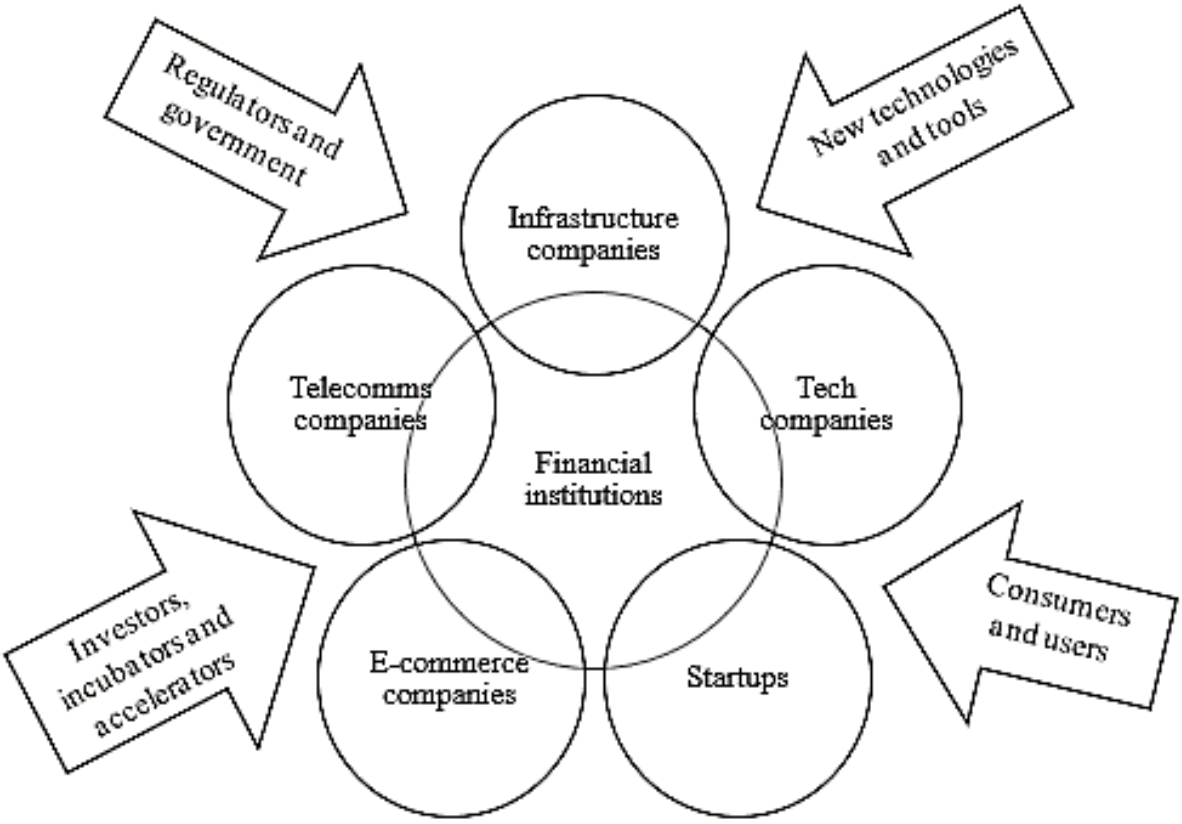


Figure 1.1 - FinTech system

Investors are accelerating the development of FinTech by injection additional capital in this area. Incubators offer new players initial funding, help develop a business model, and often provide a place to work. Accelerators offer FinTech start-ups great growth opportunities through investment, connections, mentoring and education.

The FinTech industry is very dynamic and fast moving. In order to understand how FinTech development influence on financial sphere in over the world, need analyse its history. According to the FinTech evolutionary analysis, which was made by Buckley R., Arner D., Barberis J., there are three major epochs in the evolution of FinTech, and the general history of the development of the FinTech sphere is more than 150 years old.

First era, which also called as FinTech 1.0, was from around 1866 to 1967. At that time, the financial services industry remained largely analogous, despite its close

relationship with technology. The following milestones in the development of financial technologies can be identified in this period. In 1860, the first electronic money transfer system Western Union was established. In 1875, cash register was patented. In 1950, first credit cards were issued.

The second era, which also called as FinTech 2.0, was from 1967 to 2008. Throughout it, finance was increasingly digitalised due to the development of digital technology for communications and transactions. In the late 1960s and 1970s, there was a very rapid development of electronic payment systems. In 1967, first ATM was opened in London. In 1973, the Society for Worldwide Interbank Financial Telecommunication (SWIFT) was established by 239 banks from 15 countries, in order to meet the need to integrate domestic payment systems across borders. The following year, Herstatt Bank went bankrupt, which entailed the first serious regulatory focus on FinTech. This subsequently led to the creation of the Basel Committee on Banking Supervision to help find ways to avoid such risks in the future. The "Black Monday" which happened in 1987, showed that global markets are technologically interconnected. This event further led to the development of such called “circuit breakers”, whose main goal was to control the rate of change of prices in stock markets in real time. In 1981, online banking was launched in the USA. In 1995, Security First Network Bank, the first exclusively online bank in the USA, was found. In 1997, the first mobile payment was made by SMS. In 1998, a worldwide online payments system PayPal was established. In 2003, first contactless credit card was created.

During the second era of FinTech, it became clear that new technologies carry a large number of risks. On the one hand, they make unnecessary the physical presence of customers in bank branches, and, therefore, indirectly facilitate its work. But at the same time, instant withdrawal of funds can increase the burden on a financial institution. All these threats were considered and partially resolved in the next FinTech era.

Since 2008, after the Global Financial Crisis, the third era of FinTech development has begun and continues to the present. It also called as FinTech 3.0. From that time to the present, new start-ups and FinTech companies provide innovative new financial products and services directly to enterprises and the public, as well as banks. Given the fact that post-crisis regulation increased the liabilities and costs of banks, they increasingly began to cooperate with FinTech companies and introduce new technologies into their traditional list of financial services and products. This attracted a huge amount of investment in FinTech sphere. In addition, the Global Financial Crisis has led to massive job losses, especially in the financial sector, that forcing people to seek new opportunities. Thus, highly qualified unemployed people began established start-ups in deferent FinTech spheres.

In 2009, a crowdfunding platform Kickstarter was launched. In 2010, first Bitcoin-transaction was made. Next year, Google Wallet, today known as Google Pay, was created. In 2013, the first initial coin offering – the cryptocurrency industry's equivalent to an Initial Public Offering – was announced. In 2014, mobile payment and digital wallet service Apple Pay was launched. In 2016, the PSD2 Payment System Directive was entered into force. In a year, Mastercard started testing of biometric bank cards and BNP Paribas launches a VR application for mobile banking.

The last stage is characterized by the rapid development of the FinTech industry. At a time when traditional financial institutions recovered from the crisis consequences, FinTech companies began to actively gain a place in the financial services market. At this stage, a significant role in the development of the FinTech industry was played by the fact that people began to trust banks less and preferred FinTech instead of it. Another factor in the rapid development of FinTech was an increasing of global internet penetration rate. This, in turn, led to an increase in the financial literacy of the population and increased the acceptance of FinTech services and products [1, 14].

Based on the research of Haddad C. and Hornuf L. it can be argued that United States has the largest FinTech market, followed by the United Kingdom, Canada, India, and Germany at a considerable distance. In their study, the authors showed that FinTech sphere develops more in those countries, which have well-developed capital markets, easily accessible the latest technology and people have more mobile telephone subscriptions. At the same time, they say that the stronger the financial system, the less FinTech start-ups in the country. It is believed that FinTech companies are trying to bridge the gap in finance sphere in countries, which financial systems have many shortcomings [15].

In general, the importance of financial industry in economic growth raises the importance of financial innovations. Today, FinTech sphere combines traditional financial system and modern technology. Cooperation between these two parts changes the financial services market and contributes to emergence of new innovative financial products and services, which are handy, intuitive, personalized and affordable. In general, FinTech system consists of interactions between following players on financial market: financial institutions, start-ups, infrastructure, e-commerce, technology and telecommunications companies. The main factors that affect this system are consumers and users, emerging technologies and tools, investors, incubators and accelerators, regulators and government

Innovations in the financial sector have a long history. Many FinTech companies currently operate around the world, offering competing products and services in many key business areas. With the development of FinTech, many new providers of financial services, payment instruments and systems have appeared. It is worth noting that in recent years, the financial services market has seen a particularly rapid increase in automation, specialization and decentralization, thanks to which financial institutions are finding more and more efficient and complex ways to use big data and find individual approaches to their customers.

1.2. Classification of financial technologies

In order to assess the potential benefits and risks associated with FinTech innovations for the economy, it is advisable to provide a classification of FinTech services. Existing literature on this topic offers several classifications; however, given the rapid development of FinTech services, there is still no consensus on the standard classification. Thus, in this section we will analyse three FinTech service classifications developed by Dorfleitner G. and Hornuf L., International Monetary Fund and Basel Committee on Banking Supervision.

According to research by Dorfleitner G. and Hornuf L., the FinTech industry can be divided into four major spheres based on business models of FinTech companies. Thus, scientists distinguish such areas as financing, asset management, payments and other FinTechs (fig. 1.2).

The finance sector includes FinTech companies that provide financing to individuals and businesses. This area can be divided into two big segments. The companies that relates to the first sector offer products and services in crowdfunding sphere and companies in second segment offer factoring or credit products and services without crowdsourcing.

Crowdfunding can be described as a form of financing in which a large number of investors provide financial resources to achieve a common goal. Instead of a traditional bank, the intermediary is a crowdfunding platform.

At the same time, there is a credit and factoring segment, in which FinTech companies in cooperation with the banks, provide loans to individuals and enterprises without the help of crowds. Typically, such companies automate many of their processes, thereby providing cost-effective, fast and efficient financial products and services.

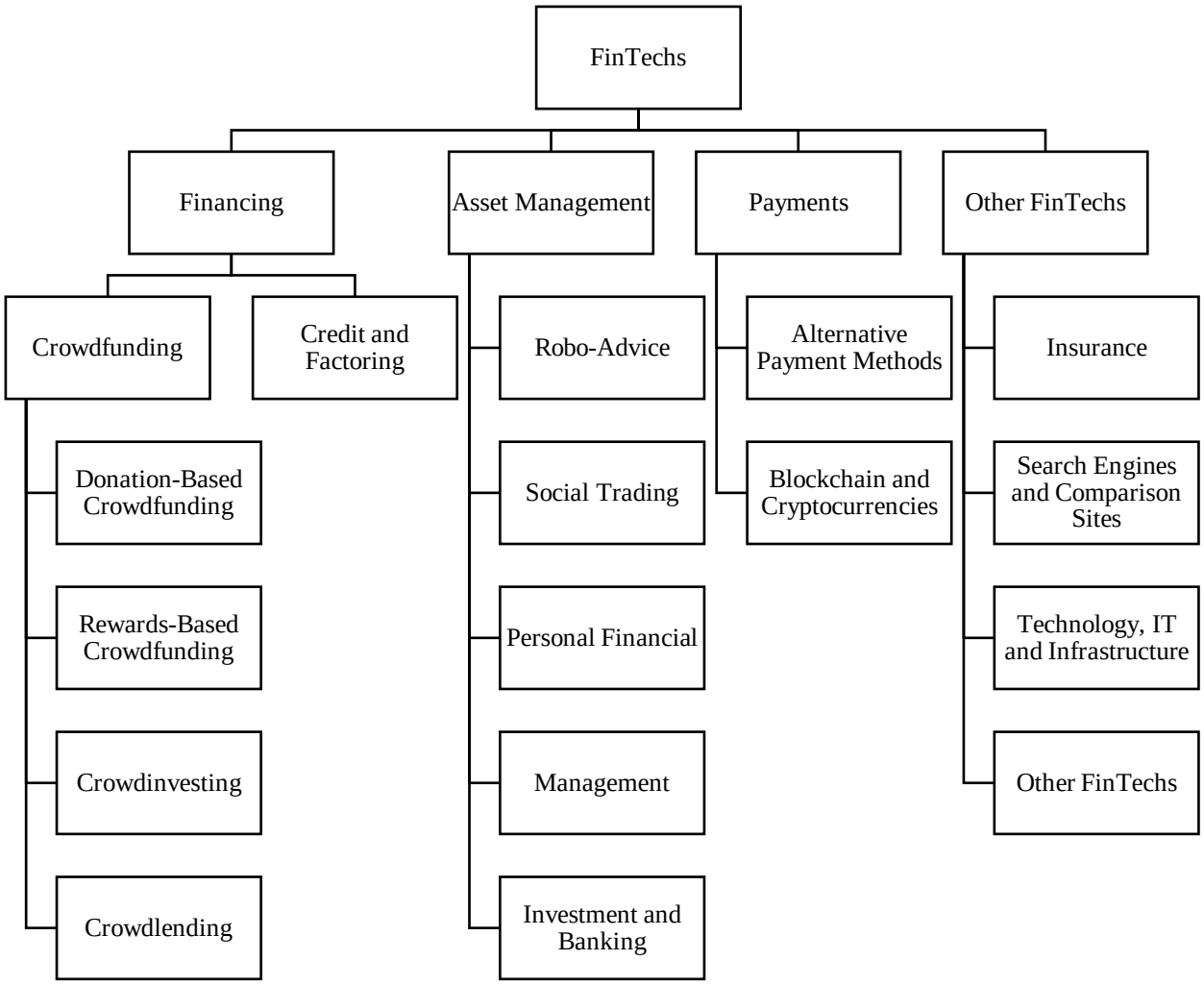


Figure 1.2 – Segments of the FinTech Industry [10]

The asset management area includes FinTech companies, which offer advice, disposal and asset management, as well as aggregate personal wealth indicators. This segment is also divided into the following segments: robo-advice, social trading, personal finance management, investment and banking. It should be noted that innovative software solutions and computer systems play an important role in the business models of many FinTech companies in the field of asset management.

The payment segment is a general term that applies to FinTech companies whose applications and services are related to national and international payment transactions. The payment segment includes blockchain and cryptocurrency segments. One of the

most famous cryptocurrencies is Bitcoin. Nevertheless, at the same time, there are more than 700 other virtual currencies in the world that have not reached the level of market capitalization of Bitcoins. Alternative payments segment includes FinTech companies that offer mobile payment solutions. This mainly refers to the use of desktop or mobile applications for making payments or money transfers, but this also applies to electronic wallets and various contactless payment systems. An electronic wallet is a system that stores both digital currencies and payment information for various payment systems. A great advantage of such systems is that payment information can be used during the payment process without re-entering via mobile phone or the Internet. This allows users to make very fast and convenient transactions, better than in the traditional banking industry.

The other FinTech segment includes those companies whose financial services and products cannot be attributed to the previous three areas. These are services such as insurance (also known as InsurTech), search engines and comparison sites, technology, IT, infrastructure etc. [10].

According to the IMF, there are four main technology area, such as artificial intelligence and big data, distributed computing, cryptography, mobile access and the Internet in five main areas of financial services: payments, savings, borrowing, risk management and consulting (tab.1.1). This classification is quite similar to the previous one, but at the same time focuses on technological aspects, while the former was more based on the types of financial services.

Artificial intelligence and big data allow financial institutions to analyse vast databases using innovative algorithms to predict behaviour of financial market participants and prices. Financial applications in this area can make recommendations for investment, automate loan approvals based on a quick analysis of credit history, facilitate regulatory compliance and detect fraud, and automate the trading of financial assets.

Table 1.1 – Major Technologies Transforming Financial Services [16]

<table>
<tr><td colspan="2">Technology</td><td colspan="5">Financial Services</td></tr>
<tr><td>Foundations</td><td>Innovations</td><td>Pay</td><td>Save</td><td>Borrow</td><td>Manage Risks</td><td>Get Advice</td></tr>
<tr><td rowspan="4">Artificial Intelligence and Big Data</td><td rowspan="4">Machine learning Predictive analytics</td><td></td><td colspan="4">Investment advice (robots)</td></tr>
<tr><td colspan="2"></td><td colspan="2">Credits decision</td><td></td></tr>
<tr><td colspan="3">RegTech, fraud detection</td><td></td></tr>
<tr><td></td><td colspan="3">Asset trading</td><td></td></tr>
<tr><td rowspan="4">Distributed Computing</td><td rowspan="4">Distributed ledgers (Blockchain)</td><td>Settle payments</td><td colspan="4"></td></tr>
<tr><td>B2B</td><td colspan="4"></td></tr>
<tr><td colspan="3">Back-office and recording</td><td></td></tr>
<tr><td colspan="3">Digital currencies</td><td></td></tr>
<tr><td rowspan="3">Cryptography</td><td rowspan="3">Smart contracts Biometrics</td><td colspan="3">Automatic transaction</td><td></td></tr>
<tr><td colspan="4">Security</td></tr>
<tr><td colspan="4">Identity protection</td></tr>
<tr><td rowspan="3">Mobile access and the internet</td><td rowspan="3">APIs Digital wallets</td><td colspan="4">Easy to use digital wallets, Financial dashboards, P2P</td></tr>
<tr><td></td><td colspan="3">Crowdfunding</td></tr>
<tr><td colspan="4">Interoperability and expandability</td></tr>
</table>

Another innovation is distributed computing, which has increased computing power and stability. Today, blockchain has become one of the key technologies in this area. It provides the ability to make payments and settlements using cryptocurrencies. In addition, it allows you to make direct business operations bypassing intermediaries and, as a result, significantly reduce costs.

Cryptographic technologies make it possible to simplify various financial products and services, including smart contracts (a set of promises indicated in digital form, which must be fulfilled in accordance with certain procedures and subject to certain conditions, such as selling an asset at a certain price). Furthermore, sensory and biometric technologies create more reliable security systems in all areas of financial services.

Mobile access and the Internet have made financial services and products convenient and affordable anytime, anywhere. This significantly expanded the range of consumers of financial products and services, as well as a list of application

programming interfaces. In turn, this allows users to make direct transactions between people (P2P) and for direct financing of the company (crowdfunding) [16].

According to the Basel Committee on Banking Supervision, three main sectors of financial products and services stand out that reflect the enabling technologies that support these innovative products. The three sectors are directly related to core banking services, at the same time market support services are related to innovations and new technologies. Thus, based on this classification, there are such main areas of financial services as credit, deposit and capital raising services; payment, clearing and settlement services in the field of retail and wholesale; investment management services.

Table 1.2 – Sectors of innovative services [6]

<table>
<tr><td colspan="5">Sectoral Innovations</td></tr>
<tr><td>№</td><td>Credit, deposit, and capital raising services</td><td colspan="2">Payments, clearing and settlement services</td><td>Investment management services</td></tr>
<tr><td>1</td><td>Crowdfunding</td><td>Retail</td><td>Wholesale</td><td>High-frequency trading</td></tr>
<tr><td>2</td><td>Lending marketplaces</td><td>Mobile wallets</td><td>Value transfer networks</td><td>Copy-trading</td></tr>
<tr><td>3</td><td>Mobile banks</td><td>P2P transfers</td><td>Fx wholesale</td><td>E-trading</td></tr>
<tr><td>4</td><td>Credit-scoring</td><td>Digital currencies</td><td>Digital exchange platforms</td><td>Robo-advice</td></tr>
<tr><td rowspan="8">Market support services</td><td colspan="4">Portal and data aggregators</td></tr>
<tr><td colspan="4">Ecosystem (infrastructure, open source, APIs)</td></tr>
<tr><td colspan="4">Data applications (big data analysis, machine learning, predictive modelling)</td></tr>
<tr><td colspan="4">Distributed ledger technology (blockcain, smart contract)</td></tr>
<tr><td colspan="4">Security (customer identification and authentication)</td></tr>
<tr><td colspan="4">Cloud computing</td></tr>
<tr><td colspan="4">Internet of Things / mobile technology</td></tr>
<tr><td colspan="4">Artificial intelligence (bots, automation in finance, algorithms)</td></tr>
</table>

Credit, deposit, and capital raising services includes crowdfunding, lending marketplaces, mobile banks and credit-scoring. Payments, clearing and settlement innovative services consist of mobile wallets, P2P transfers and digital currencies in retail sphere and value transfer networks, foreign exchange wholesale and digital

exchange platforms in wholesale sphere. Investment management services includes high-frequency trading, copy-trading, e-trading and robo-advice technologies.

At the same time, this classification covers a wide range of market support services such as portal and data aggregators, ecosystem (infrastructure, open source, APIs), data applications (big data analysis, machine learning, predictive modelling), distributed ledger technology (blockcain, smart contract), security (customer identification and authentication), cloud computing, Internet of Things and mobile technology, artificial intelligence (bots, automation in finance, algorithms).

Based on the Basel Committee on Banking Supervision survey of key providers per FinTech activity, the highest number of FinTech companies are in the payments, clearing and settlement category, followed by credit, deposit and capital-raising services (fig. 1.2).

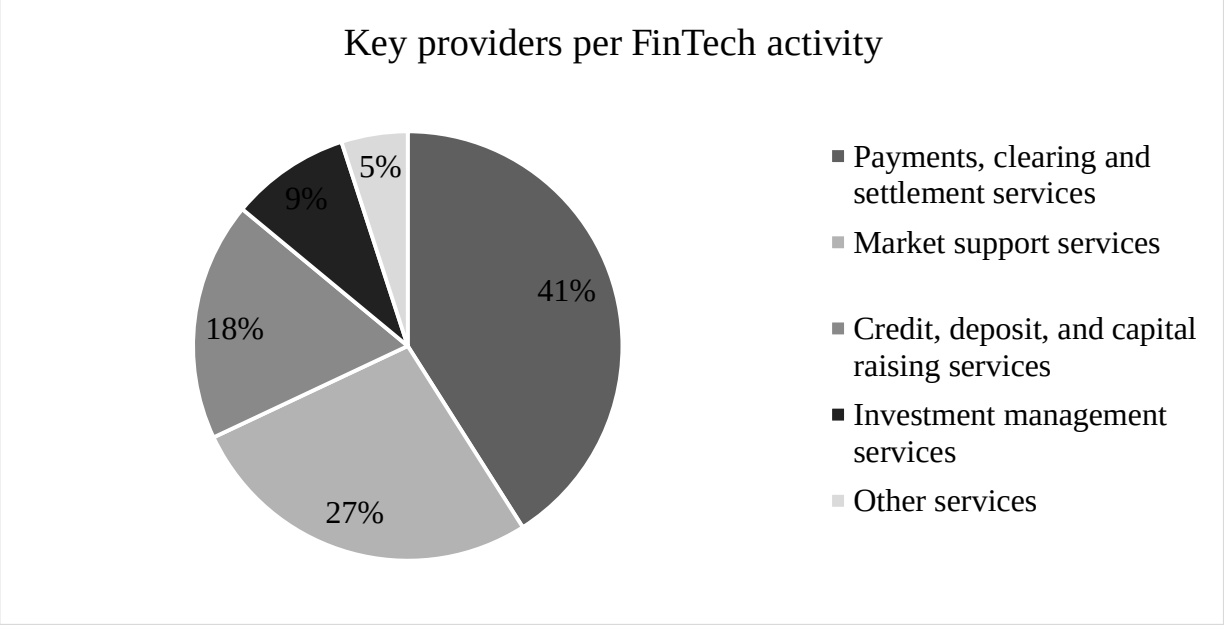


Figure 1.2 – Key providers per FinTech activity in the world in 2018 [6]

According to the US Agency for International Development survey, the main part of FinTech providers in Ukraine are working in payments and money transfers

sphere (31.6%), infrastructure and enabling (19.3%) and lending (14%) spheres (fig.1.3). Based on a comparison of the industry segmentation of FinTech companies, we can conclude that the situation in Ukraine displays the same trends as in the global financial technology market.

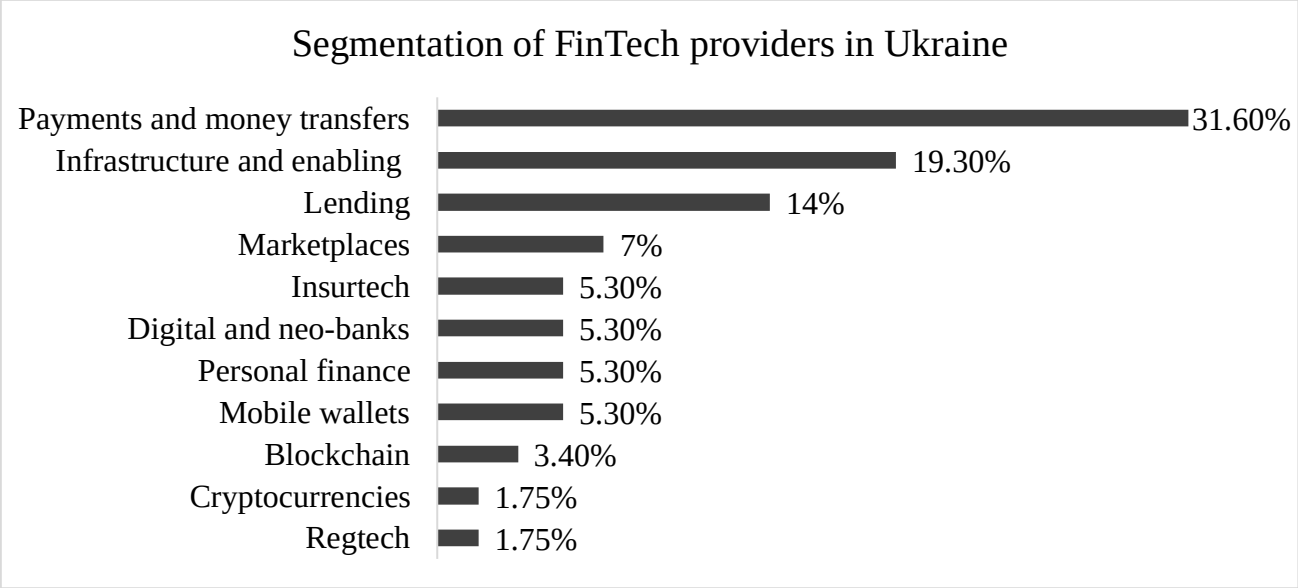


Figure 1.3 – Segmentation of FinTech providers in Ukraine in 2018 [13]

The well-known examples of Ukrainian FinTech companies that involved in payments and money transfers sphere are EasyPay (a payment system for online and offline payments), Portmone (an online payment service used to pay for utilities, money transfers and many other services), LiqPay (PrivatBank online payments system), iBox (a system of offline payments with many payment terminals), Electrum (electronic financial and payment tools), Fondy (international payment platform for internet acquiring), MOSST (a diversified money transfer service) and GlobalMoney (clearing services and handling of e-money).

The most popular Ukrainian companies in infrastructure and enabling sphere are bNesis (service that combines various types of systems including payment, e-Commerce, scoring systems, as well as social network and banking systems via their

APIs into a single solution), Bintels (business intelligence and business data visualization services), PaycoreIO (automation and optimization of payment processing, facilitation integration with payment systems) and Smart Data (data mining and risk management).

The well-known examples of FinTech companies in the field of lending and bank challengers are online lending services such as MoneyVeo, CreditPlus, MyCredit etc.

In Marketplaces area is represented by two big Ukrainian FinTech companies CheckDom (software products and hardware solutions for private clients, house managers and businesses) and Treeum (online platform that owns well-known brands such as Finance.ua, Minfin.com.ua, Finline and Bank Online).

The most popular Ukrainian FinTech companies in insurtech industry are CIVILKIN (a web-based service and mobile app that allows buy and manage insurance policies), EWA (SaaS insurance platform), INSART (insurance broker) and Alfa Protection (protects e-commerce companies from payment fraud).

The biggest Ukrainian digital friendly banks are PrivatBank, Monobank, UkrSibbank, Raiffeisen Bank Aval, Alfa-Bank and First Ukrainian International Bank.

Due to the lack of proper regulation, many Ukrainian companies involved in blockchain technology operate in foreign markets. However, there are many FinTech companies that work in the local market, such as: KUNA (the first and most famous cryptocurrency exchange in Ukraine), Distributed Lab (a blockchain expertise centre that focuses on the development of innovative products and architectures), and BitFury (an international company, known for the implementation of blockchain technologies in the public sector of the economy of Ukraine), etc [13].

FinTech companies use technology in order to develop innovative solutions for a wide range of financial activities, including payments, lending, asset management, financial advice, etc. Based on these types of financial activities, many classifications of financial technologies have been proposed. Nevertheless, we believe that

classifications based only on types of financial services are not insufficiently fully, because they do not completely reflect the theological side of this issue.

In our view, the most comprehensive classifications are those developed by the IMF and the Basel Committee on Banking Supervision, because they cover various financial services and technologies and show how they interact with each other.

Based on the data provided by the Basel Committee on Banking Supervision and the United States Agency for International Development, we can state that all over the world, as well as in Ukraine, the largest number of FinTech companies is concentrated in the field of payments and money transfers, which caused our further interest in this topic.

1.3. The Influence of FinTech Development on the Payments and Money Transfers Sphere

The development of the FinTech industry has a huge impact on the financial sector as a whole and, in particular, on the sphere of payments and money transfers. FinTech companies are fast growing and attract a large amount of investment each year in their development. At the same time, traditional financial institutions feel threatened on their part, because with the increasing number of FinTech companies, competition in the financial services market is growing too.

FinTech is one of the most dynamic business areas in the world. According to KPMG, in 2018 global investment in FinTech companies hit USD 111.8 billion with 2,196 deals. But compared to the previous year, the first half of 2019 was a quiet start for FinTech investments around the world. Thus, in first half of 2019, global investment in FinTech hit USD 37.9 billion with 962 deals (fig.1.4).

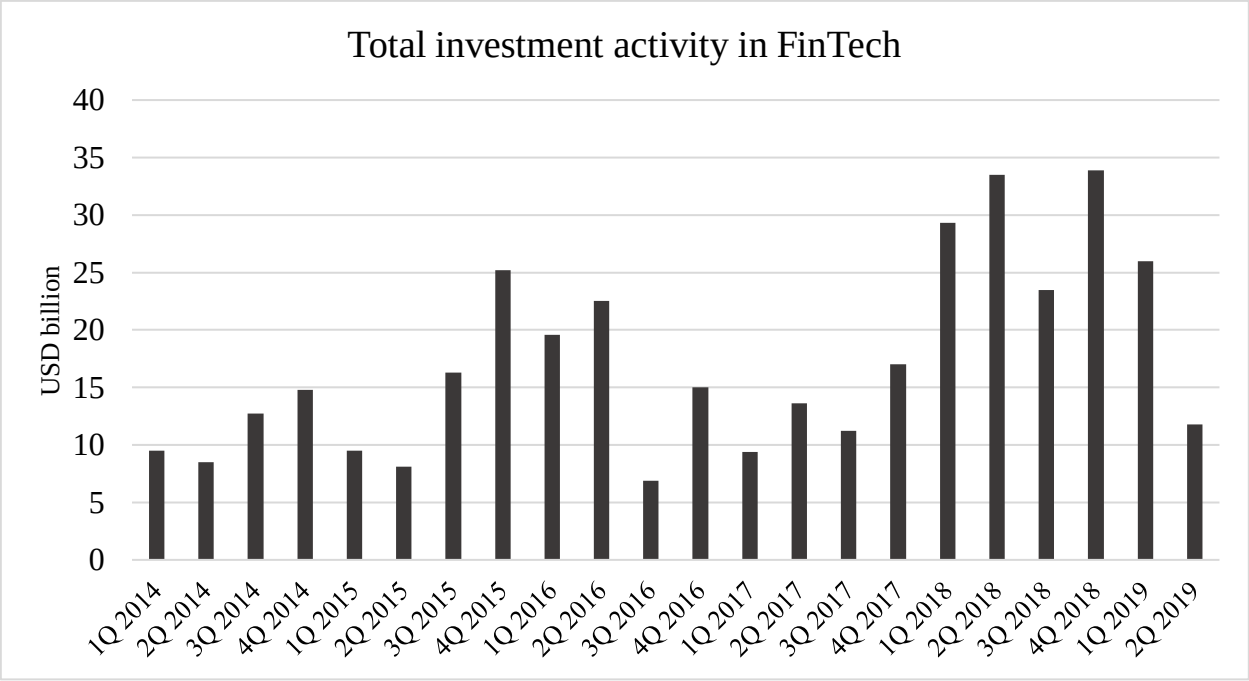


Figure 1.4 – Total investment in FinTech, USD billion [17]

At the same time, in the US FinTech investment reached USD 18.3 billion across 470 deals, in Europe USD 13.2 billion across 307 deals and in Asia Pacific only USD 3.6 billion across 102 deals. It is expected that the FinTech sphere will actively develop in the near future around the world. Payments and money transfers are expected to remain one of the most attractive investment areas [17].

According to Ernst & Young survey, adoption of FinTech services has moved steadily upward, from 16% in 2015 to 64% in 2019. The level of consumer awareness of FinTech services is high in all FinTech categories, but it is especially high in the field of money transfers and payments. Moreover, it is worth noting that the sphere of payments and money transfers is the most digitalized among other financial services.

Worldwide 96% of consumers know of at least one alternative FinTech service available to help them transfer money and make payments. In average, 75% of global consumers use a money transfer and payments FinTech service. This indicator sharply increased from 18% in 2015 to 75% in 2019. Today, 48% of global consumers use an

insurance, 34% - savings and investments, 29% - a budgeting and financial planning, 27% - a borrowing FinTech services (tab.1.3).

Table 1.3 – Comparison of FinTech categories ranked by adoption rate from 2015 to 2019 [12]

Category	2015 Adoption Rate	2017 Adoption Rate	2019 Adoption Rate
Money transfer and payments	18%	50%	75%
Insurance	8%	24%	48%
Savings and investments	17%	20%	34%
Budgeting and financial planning	8%	10%	29%
Borrowing	6%	10%	27%

Small and medium-sized enterprises (SMEs) are also increasingly using FinTech services. 56% of SMEs use a banking and payments FinTech service. 46% of SMEs use a financing FinTech service [12].

Today FinTech industry is tackling with gap between things that banks offering customers and things that customers expect especially from a user experience and conveniences prospective. But we believe that despite powerful technologies, FinTech companies will not be able to completely replace banks in the financial services sector, but they can threaten financial institutions that are slowly changing and adapting to the business trends in the financial services market and, accordingly, are unable to meet the growing needs of consumers.

According to recent research of PWC, 88% of traditional banks fear losing revenue to FinTech companies in areas such as payments, money transfers, and personal loans. The amount of business at risk continues to grow, and has already risen to an estimated 24% of revenues [7].

The development of the FinTech industry carries a number of advantages and risks for users of financial services and products, as well as for the banks themselves and the financial system as a whole (tab.1.4).

Table 1.4 – Benefits and risks for consumers and banks arising from FinTech

Areas of influence	Benefits	Risks
Consumers	- Convenience; - Lower cost; - Financial inclusion; - Faster services; - Improved security.	- Unauthorized transactions; - Fraud; - Cybercrime.
Banks	- Cost reduction; - Expansion of market share; - Infrastructure improvement; - Process optimization; - Improved security; - Risk management.	- Increased competition; - Dependence on technologies; - Cyber-attacks; - Insufficient regulation.

FinTech products and services have following benefits for consumers:

- Convenience: Consumers can use FinTech products and services on different mobile devices in order to access a wide range of financial services anywhere regardless of the physical location of financial service providers. They can also access these services any time of the day. Furthermore, FinTech products and services provide customers the ability to see information from all of their financial accounts together in a single application that is more convenient than reviewing information from each account on separate statements.

- Lower cost: Innovations in payments, including the use of distributed ledger technology (DLT), could reduce the cost of payments for consumers. DLT means using of shared and synchronized digital data geographically spread across multiple sites, countries or institutions. In addition, using of FinTech products and services often carried out without charging fees for payments, so consumers save by avoiding paying for checks or ATM fees. Furthermore, FinTech companies may be able to pass these cost savings on to consumers, because they predominantly do not have overhead costs associated with physical locations and use automation instead of numerous staffs to provide financial services.

- Financial inclusion: This means that individuals and legal entities can get access to financial products and services that fully meet their needs. It also means that vulnerable groups such as weaker sections and low-income groups can get access to FinTech products and services. This is especially relevant for low developed and developing countries.

- Faster services: This is primarily achieved by automating the process of providing financial services. Constantly synchronized data makes transactions and other financial services many times faster. In addition, payment data that stored in mobile applications may reduce transaction time for online purchases because consumers do not need to reenter billing information.

- Improved security: Processes such as tokenization and data encryption significantly increase the security and reliability of financial transactions through mobile applications and contactless payment systems. It mitigates the risk that transaction information can be used fraudulently. Furthermore, while lost or stolen credit and debit cards can be used to make fraudulent payments, a lost or stolen mobile device can have security features that protect information in mobile applications from unauthorized use [11].

On the other hand, FinTech carries some risks that are difficult to assess at this stage due to the limited availability of official and confidential data. It is important that consumers and banks will be fully aware of the risks inherent in new FinTech products, especially when risks may be new to the financial services market.

The most common risk that users face in the area of money transfers and payments is unauthorized transactions. Partly due to the fact that some FinTech products increase the number of firms involved in a transaction, which may increase the risk of unauthorized transactions. In addition, consumers can also face the risk their funds could be lost due to the failure of their payment provider.

Furthermore, users can also be a victim of a cybercrime. Unlike traditional fraud schemes with which the financial industry knows how to deal, cybercrime is less studied and is developing very quickly. The continuous digitization of the financial sector opens up new opportunities for cybercriminals and exposes customers and banks to new dangers. It is important to remember that FinTech services as well as traditional ones collect sensitive consumer information and are connected to the Internet. And because of this all of them may be vulnerable to cyber-attack and can pose data security risks. But in defence of FinTech it should be said that consumers can face mentioned risk regardless of whether they use a traditional or FinTech services [14].

The main benefits for banks arising from FinTech are:

- Cost reduction: the implementation of advanced financial technologies allows banks to significantly reduce their operating expenses and improve profitability. Technologies such as artificial intelligence, machine learning, big data analysis, cloud storage, robo-assistants and others can replace many financial professionals and significantly reduce the time required to complete certain operations, which can help reduce costs.
- Expansion of market share and targeting new clients: the development of new financial products and services based on innovative technologies allows banks to diversify their activities and cover new target segments on the financial market. In addition, innovative financial technologies can help to find an individual approach to each client and thus help increase the loyalty and attract new customers.
- Infrastructure improvement: combining various financial systems into one large mechanism, organizing the rapid transfer of information throughout the banking system, as well as quick interaction with external systems, for example, simplifying integration with payment systems. Moreover, the use of APIs by banks greatly simplifies the development of new financial products and services.

- Process optimization: cloud-based technology, machine learning and artificial intelligence can significantly improve operational activities of the bank and accelerate decision-making process. In addition, robo-advisors and Internet bots can replace large staff and quickly and timely provide the necessary information to the clients.

- Improved security and fraud detection: new financial technologies allow banks to reliably encrypt and transmit information over a secure communication channels both within the bank and during connection with external systems. Timely investments in improving security can help banks to avoid large losses during hacking attempts.

- Risk management: computer algorithms, machine learning and artificial intelligence can help banks predict, analyse and manage their risks better. All these technologies can significantly simplify the management of the current risks of the bank and predict and minimize possible risks in the future.

According to the KPMG, there are three main drivers of FinTech-related risks. The first risk is the growing dependence of financial institutions on technology. Financial companies are increasingly dependent on technology and the use of big data. The use of technology has significantly expanded and encompassed areas that are new to many companies, including data collection and analytics, artificial intelligence, automation, robotic services, cloud computing services, platforms, blockchain and cryptographic assets.

The second risk related to the fact that the financial sector is becoming increasingly interconnected and complex. Examples of this are the outsourcing of many FinTech-related functions and services, as well as the increasingly platform-based nature of financial services for people. Such a complex structure complicates the management of new FinTech products and services and may impede their further development.

The third risk is that now banks began to compete beyond financial services, faced with increased competition from non-financial institutions. This is especially true

in the field of money transfers and payment services, in which large international corporations launched their own payment systems [18]. In order not to lose their market share, banks need to adapt to the new competitive environment and interact with their competitors.

Among other things, lack of generally accepted FinTech standards can lead to additional risk. In general, successful cyber-attacks can undermine confidence in technology business models in financial sphere, slow down the development of innovative financial products and services, as well as hinder the overall development of the FinTech. Cybersecurity is a key risk for FinTech and could benefit from the establishment of mandatory regulatory standards both nationally and internationally.

FinTech already provides significant benefits to consumers and financial institutions. However, the increasing use of FinTech solutions also brings risks that regulators and supervisors must manage. On the global and national levels, FinTech might affect financial stability by changing the market structure in financial services. The regulatory area should keep up with financial technology and protect users and banks from the threats that FinTech carries.

In Ukraine, FinTech, especially in the field of payment and money transfers, is regulated by the National Bank of Ukraine (NBU). Because improving the reliability of the payment infrastructure is one of the key objectives of controlling financial stability. The entities subject to NBU supervision are payment system operators, payment system participants and payment infrastructure servicing operators [19].

The main legal act regulating payments in Ukraine is the Law of Ukraine "On Payment Systems and Funds Transfer in Ukraine", which defines the overall principles of the functioning of payment systems in Ukraine, the concept and general procedure for the implementation of money transfers within Ukraine, as well as sets responsibility of the subjects thereof [20].

It is also worth noting that on July 23, 2019, the NBU introduced the concept of a new model of legislative regulation of the sphere of payments and money transfers. Expected that it will provide an incentive for qualitative and innovative development of payment products and services. Under the new legislation, payment services will be able to be provided by banks, payment institutions, e-money institutions, postal operators, as well as state and local governments. Banks will provide payment services under the banking license, at the same time, non-banking institutions will provide relevant services under the licenses to provide payment services [21].

We would also like to focus on fact that now in Ukraine development of the FinTech market is one of the bullet points of the Comprehensive Program of Ukraine Financial Sector Development Until 2020. The Cabinet of Ministers defined financial technologies and cashless payments among the primary objectives of the Concept for the Development of the Digital Economy and Society of Ukraine for 2018-2020. In April 2019, the NBU established its Expert Council on Communications with Innovative Companies. This will enable the National Bank to understand the requirements and the development directions of an innovative financial market, while for innovative companies, the peculiarities of the current regulatory and legislative framework [22].

The widespread adoption of new technologies has several advantages, but at the same time creates certain risks. Among the obvious advantages of FinTech are such as increased financial efficiency, better and more targeted financial products and services, as well as increased financial accessibility in developing countries.

However, it can also create risks such as fraud, cyberattacks, increased competition for financial institutions and a strong dependency on technology. It is worth noting that these risks also relate to some extent to traditional banking services and products, but the main danger of FinTech's risks lies in the fact that they are still poorly researched and may contain some security gaps.

Moreover, all these risks are exacerbated by the lack of uniform regulation and standards in this area, which also negatively affects the development of FinTech technologies and their application in the banking sector.

In some spears of financial services FinTech became more popular than traditional banks. In order to stay on the market, traditional banks are forced to adapt to modern realities. FinTech can help banks provide financial products and services more effectively and strengthen their competitive advantages.

Today banks and FinTech companies switching from competition to mutually beneficial cooperation, because innovation is a primary aspect of survival for traditional banks. We expect in the near future banking system become more open and digitalize. Furthermore, there will be more collaboration between traditional banks and FinTech companies.

2. THE INFLUENCE OF FINTECH DEVELOPMENT ON PAYMENTS AND MONEY TRANSFERS SPHERE ON THE EXAMPLE OF JSC CB “PRIVATBANK”

2.1. Assessment of the economic activity of the PrivatBank

Joint-Stock Company Commercial Bank “PrivatBank” is a universal bank with a focus on the retail segment and selective presence in the corporate segment. PrivatBank provides universal service to a wide range of clients, being the leader of the Ukrainian market in the retail segment, actively promoting services for small and medium-size businesses and selectively working in the corporate sector [23]. The mission of PrivatBank is “By provision of the best quality financial services, we drive economy for development, business – for growth and individual clients – for making dreams come true” [24]. The majority of corporate clients serviced by the bank are small and medium-sized enterprises. At the same time, a large share of the use of banking products is provided by large financial and industrial corporations. Particular attention is paid to the service of companies with a wide network of structural units.

According to market research carried out by Gfk Ukraine in the II quarter of 2019, 55,3% of individual clients considered us as their main bank. This percentage exceeded the total percentages of the next twenty banks in the Gfk ranking. This index made up 63,7% for corporate clients [25]. In 2018, PrivatBank increased its number of clients by 1.5 million to about 22 million, with almost every second client (about 9 million) an active user of Privat24 [26].

PrivatBank is recognized as the Best Ukrainian Retail Bank of the Year in the global ranking of Best Retail Bank Ukraine 2018, which is published annually by the British Global Banking & Finance Review. According to the newspaper, PrivatBank is recognized as the best Ukrainian retail bank by financial indicators and market share.

They also noted the bank's inspirational innovation strategy, which supports the trend of positive change in the global financial community [27].

PrivatBank is among the top 20 most visited financial services and institutions sites in the world. As of June 1, 2019, PrivatBank ranked 18th in the SimilarWeb global rankings among the top 20 financial sites in the world, led by the US giants PayPal, Chase, Wells Fargo and Bank of America. According to SimilarWeb, the bank's website has almost 49 million visits each month. In Ukraine, according to the June Web Resources Rating published by the Internet Association of Ukraine, PrivatBank's reach has become the most visited online resource of Ukrainian companies, ranking fourth after Google, Youtube and Facebook [28].

PrivatBank's key resources are technological resources. PrivatBank pays serious attention to the research and development, stimulate the development of innovations in the organization (data science technology, machine learning, agile methods in project management, innovation awards, the hackaton events). PrivatBank's efforts in this area are aimed at the continuous development and improvement of new financial products and services for customers. At the same time, most of the effort and investment is spent on improving the Privat24 platform, which generates a high level of commission income for PrivatBank. Along with online services, the PrivatBank has a wide network of branches, automated teller machines (ATMs), point of sale terminals (POS-terminals) and self-service terminals (SSTs) that allow serving clients throughout the country [23].

Today, PrivatBank owns the second largest branch network and the largest network of ATMs and terminals among Ukrainian banks. Since the beginning of 2019, the network of POS-terminals of PrivatBank has increased by 15% to 190 thousand units. First of all, the share of small and medium-sized retail outlets, which account for more than 150,000 POS terminals, has increased. An average of 3 million purchases are made daily with PrivatBank's cashless bank cards and smartphones. It is predicted that by 2022 the number of POS-terminals will increase to 250 thousand pieces [29]. The network of

ATMs of PrivatBank for 2018 amounted to 19,900 pieces (the PrivatBank share is 54% of the banking network), while the PrivatBank installed 250 innovative cash-recycling ATMs, which significantly help to improve the quality of services and optimize ATM service costs [23].

Overall, in 2018, solvent banks received UAH 21.7 billion in net profit. The last time the banking system was profitable in 2013, when its profit was UAH 1.4 billion (fig. 2.1).

Figure 2.1 – Profits and losses of Ukrainian banks, UAH billion [30]

Today, PrivatBank accounted for almost 60% of the sector's profit (fig.2.2). PrivatBank, along with other state-owned banks, occupied a significant position on the market in 2018: the aggregate share of state-owned banks amounted to 54.7% and 63.4%, respectively, for net assets and deposits of the population.

One of the main factors of the growth of banking system net assets in 2018 was an increase of highly liquid assets (+48 bln UAH). Loan portfolio of the banking system have increased by +33 billion UAH: +11 billion USD increase of the loan portfolio of legal entities, + 22 billion UAH increase of the loan portfolio of individuals [23].

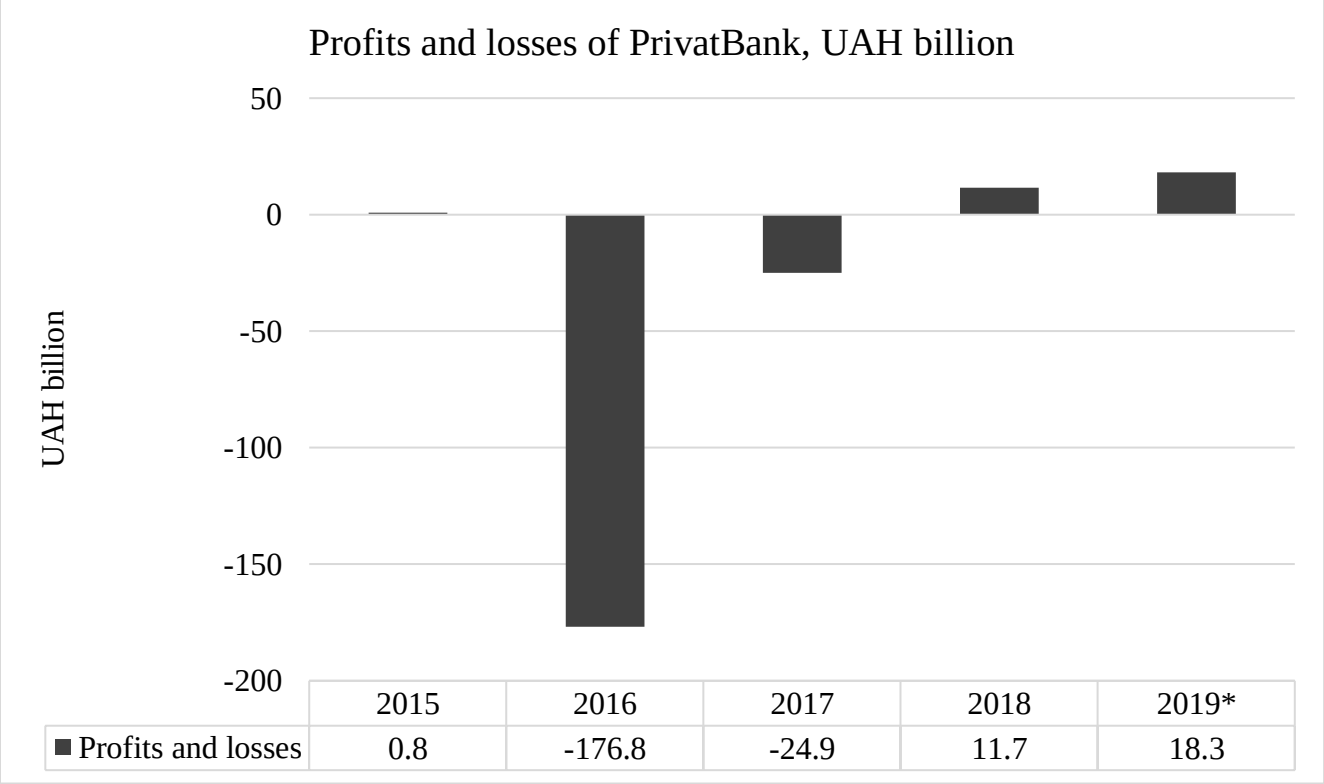


Figure 2.2 – Profits and losses of PrivatBank, UAH billion [31]

The development of the banking sector in 2018 was accompanied by a significant increase in digital services and electronic sales channels:

– the increase in the number of active cards was +6% (from 34.9 million in 2017 to 36.9 million in 2018),

– the number of ATMs increased by 7% in state banks (from 7.2 thousand in 2017 to 7.7 thousand in 2018);

– the number of payment terminals increased from 251.7 to 292.3 thousand pcs.

The growth of the PrivatBank's loan portfolio was +11.8 billion UAH, which is the result of lending development: legal entities (+3.6 billion UAH) due to the traditional products (credit lines, investments) and innovative products development; individuals +8.1 billion UAH due to the card products (card "universal") and new products development (payment by instalments).

PrivatBank continues the quantitative and qualitative development of services, which contributes to the growth of the active cards number by 4% from 19.6 million (in 2017) to 20.4 million in 2018. The number of operations in the Self-Service Terminal (SST) increased by 22 million compared to 2017. The number of operations in the Automated Teller Machine (ATM) in 2018 amounted to 433 million units. The number of clients of Privat24 system increased by +1.3 mln. (+ 18%).

Due to the weighted interest rate policy in 2018, the bank significantly improved its interest margin and reached a spread of 2.3%, while in 2017 the PrivatBank had a net interest loss and a negative interest spread of -1.1%. The increase in the number of active clients (by 10%) and the increase in transactions volumes, both in the branches and on-line channels, allowed to achieve an increase in net commission income by 49% compared to 2017 - up to UAH 15.2 billion.

At the same time, operating expenses remained at the managed level (+14.7% to 2017 compared to the annual inflation rate of 9.8% and the increase of the average nominal wage in Ukraine by 20.5%). The Cost/ Income ratio for 2018 was 45%, which is one of the best among competitors. The PrivatBank completed the year with a profit of UAH 12.8 billion, which is the maximum in the PrivatBank’s history and is precondition of the largest profit for the Ukrainian banking system over the past five years [23].

According to the Financial Stability Report published by the National Bank of Ukraine, PrivatBank has the highest return on equity of 31% among state-owned banks, supporting the positive trend of increasing the profitability of the Ukrainian banking sector. In 2018, the sector average return on equity exceeded 10%. Only 14 banks, mainly

subsidiaries of foreign banking groups and PrivatBank, have a return on equity of more than 30% [32].

In 2019, PrivatBank, became the only Ukrainian financial institution to be featured in the global ranking of the Top 1000 World Banks, published annually by the British magazine The Banker. According to The Banker, in 2019, the largest Ukrainian state bank PrivatBank ranked 7th in the global rating of the banks, which showed the best dynamics of the transition from loss to profit [33].

The priorities of the PrivatBank's activities were and will continue to improve the quality of customer service, with the obligatory observance of the legislation requirements, the development of lending with a high quality of loan portfolio, improvement and development of banking products and services, optimization of infrastructure. All these actions led to an increase in the PrivatBank's financial performance: already in the first quarter, the Bank has been profitable and finished 2018 year with a record profitability for the Ukrainian banking system [23].

There are key components of the PrivatBank’s strategy:

- To continue growth in the retail segment: to maintain its current market share on the Ukraine finance market; continue to reduce operating costs; save and improve franchised positions of payment systems.

- To activate SME: to improve current and develop a new financial product and services for small and medium-sized businesses; further capacity building of units engaged in small and medium-sized businesses.

- To initiate development of the corporate segment: to expand potential in the sphere of crediting medium-sized corporate clients.

- Risk management system and handling non-performing loans: to improve management and organisation systems to ensure complex risk management; to introduce key performance indicator system considering risk factor; to recover debts under the inherited portfolio of non-performing loans.

- Management of operating expenses and organisation: to implement programs aimed at optimizing operating expenses; to accurately divide the PrivatBank's activities into segments and separate areas of control for its better management; add the missing functional divisions to fill the gaps in the functioning of PrivatBank. [24].

The PrivatBank's goal for the next year is to achieve profitability in line with the PrivatBank's Business Strategy objectives, with the preservation of leading positions in the Ukrainian banking market [23]. The approved Development Strategy is based on dynamic market growth forecasts thus the bank will be flexible in its efforts to stimulate the retail segment and lending to small and medium-sized enterprises. Moderate presence in the corporate segment will enable the bank to achieve optimal balance between financial attractiveness and risk.

According to the key metrics set out in the PrivatBank's Business Strategy, in 2022 PrivatBank plans to receive UAH 8,4 bln net profit. Total shareholder return during the period from 2018-2022 will amount to UAH 81 bln, not including the funds PrivatBank is determined to recover through the courts [34].

Currently, PrivatBank is one of the most innovative and dynamically developing banks in Ukraine. Furthermore, it occupies a leading position in many national and international rankings. PrivatBank provides a wide range of financial products and services available for business and private clients, in full accordance with international standards.

In recent years, PrivatBank has become one of the leading drivers of positive changes in the development of the banking sector. PrivatBank's transformation program, which is based on generally recognized corporate governance principles in the world, ensures the strengthening of positions in the market of modern banking services and stable profitability of the bank.

2.2. Analysis of PrivatBank's activities in payments and money transfers sphere

FinTech's largest market segment is payments and money transfers. Among FinTech services of PrivatBank, the most popular are also payments and money transfers. Generally, PrivatBank is a big player in the global FinTech market. PrivatBank provides a wide range of services not only in Ukraine, but also abroad. PrivatBank collaborates with many foreign partners (Annex C). Their cooperation mainly occurs in the field of international money transfers. In general, 35 money transfer systems operated in Ukraine in 2018, including 281 established by residents and 7 by non-residents. Volumes of transfers via money transfer systems in 2017 and 2018 is depicted on figure 2.1.

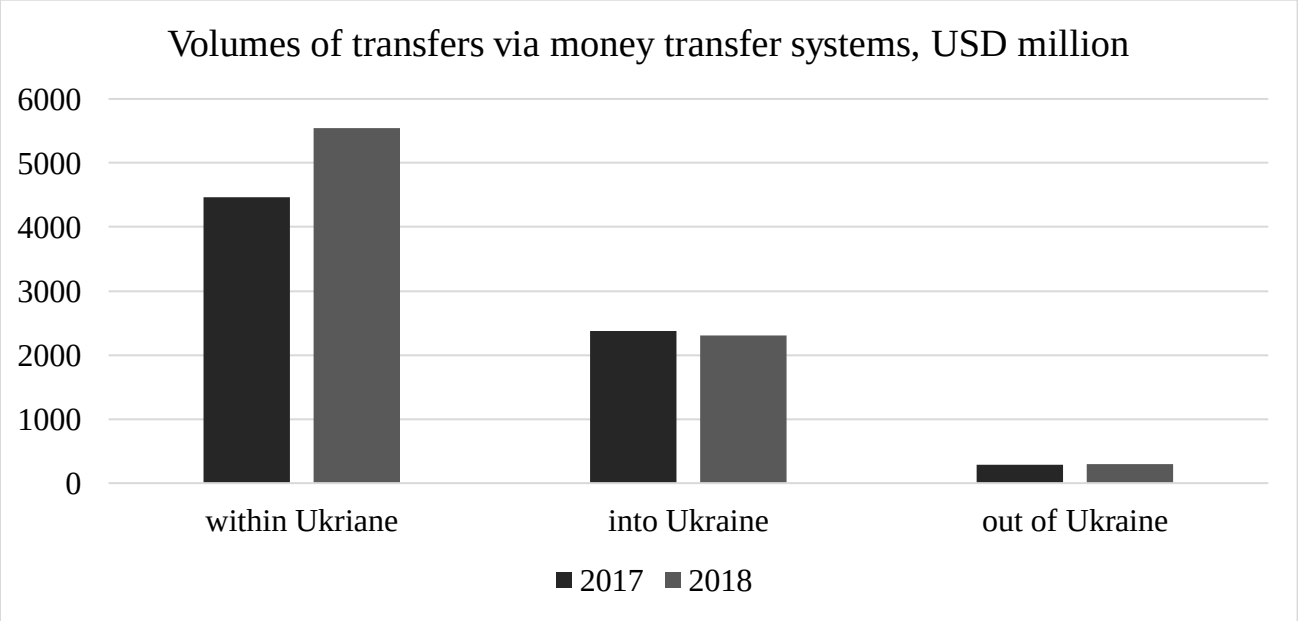


Figure 2.1 – Volumes of transfers via money transfer systems, USD million [35]

Western Union accounts for the greatest share of transfers to Ukraine and abroad in 2018 (59% of cross-border transfers to Ukraine and 77% to foreign destinations). MoneyGram takes second place with 23% of cross-border transfers to Ukraine and 19%

to foreign destinations. IntelExpress has 8% of cross-border transfers to Ukraine. RIA has 7% of cross-border transfers to Ukraine and 2% to foreign destinations [35].

The growth trend in card-based cashless transactions issued by Ukrainian banks was positive in 2018 the value of transactions increased to a 45.1% share of all transaction, or 5.8 pp higher than in 2017 and the number of operations rose to a 78.5% share, or 3.7 pp higher than in 2017 (fig. 2.2).

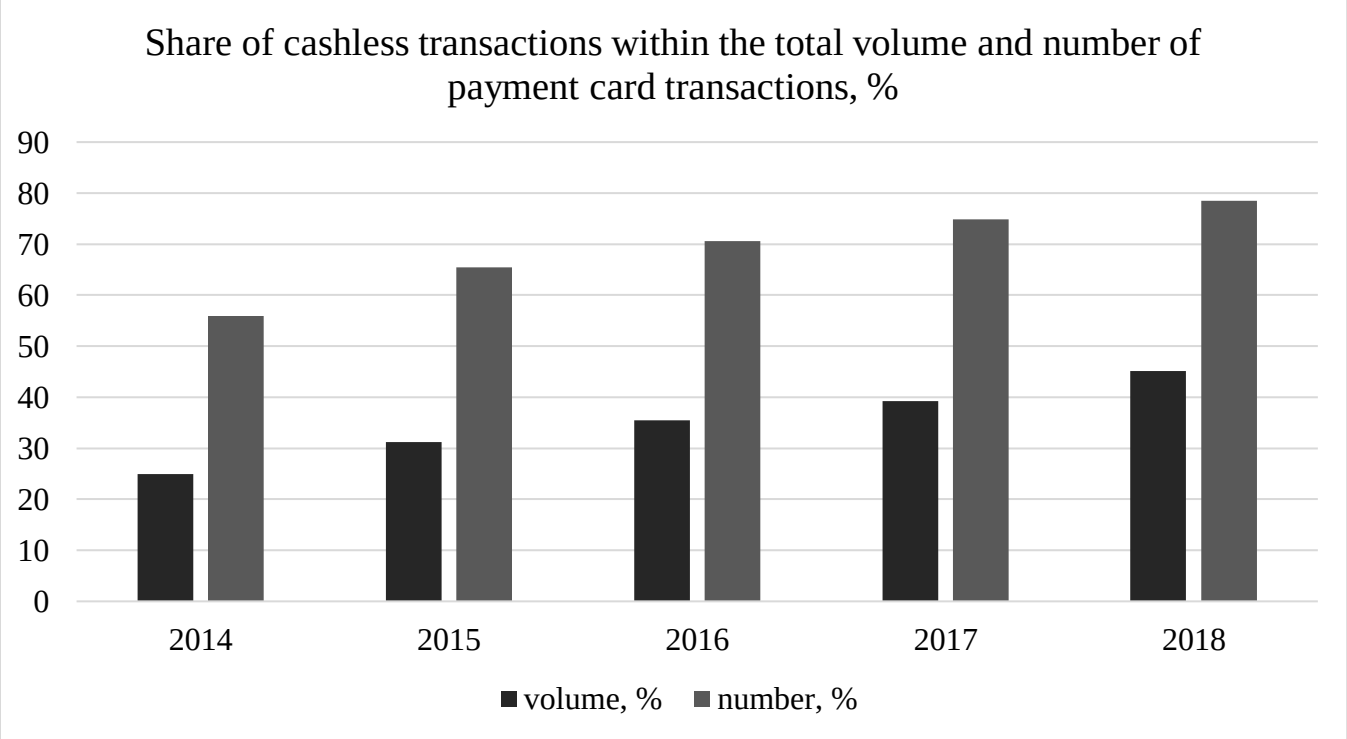


Figure 2.2 – Share of cashless transactions within the total volume and number of payment card transactions, % [35]

The global online transfer market is growing year by year. This trend demonstrates the growing consumer demand for affordable, fast and convenient digital products. More and more Ukrainians are opting for international money transfers online [36]. According to the NBU, out of the USD 1,2 billion received by Ukrainians from abroad during the first half of 2018, USD 628 million was paid through PrivatBank's online services and

offices. According to the PrivatBank, since the beginning of 2018, more than 70% of clients have received international transfers via remote channels without visiting the bank's branches. According to PrivatBank statistics, the top five "donor countries" from which the most money transfers to Ukraine came from early 2018 were the United States, Israel, Italy, Poland and Russia [37].

PrivatMoney system is an international payment transfer system created by PJSC CB "PrivatBank". It is possible to send both international and intra-Ukrainian transfers via PrivatMoney. Clients may transfer and receive funds via this system to the following countries: Austria, Azerbaijan, Czech Republic, Estonia, Finland, Georgia, Great Britain, Greece, Hungary, Israel, Latvia, Lithuania, Moldova, Poland, Slovakia, Sweden, and Ukraine. The PrivatMoney system provides innovative, technological and integrative solutions for making transfers. In Ukraine, PrivatMoney transfers are available for payment in over 2,100 branches and nearly 20,000 PrivatBank ATMs and terminals. The money is available to the recipient immediately after they are sent. PrivatMoney allows to receive online transfers directly to the card, both in euros, dollars and in national currency [38].

PrivatBank and ePayService have launched a new online payment service in Ukraine for PrivatBank accounts. As reported in the bank, the ePayService payment system has become a new partner of PrivatBank and a member of the international payment system PrivatMoney. ePayService is an international financial service for freelancers, webmasters and IT professionals. Payments in dollars and euros at PrivatBank will be available to individuals and entrepreneurs [39].

In addition, in PrivatBank customers can send international transfer via the SWIFT international payment network. SWIFT International Payments is a convenient way to transfer money abroad to accounts of individuals or legal entities without restrictions on the amount. Transfers can be made via the Privat24 online banking system [40].

For many years, PrivatBank has been developing and applying technologies that help its customers to perform their routine operations faster and easier than ever. Customers can make payments via Privat24 Internet Bank, Privat24 applications, SMS-banking, SSTs, ATMs and at branches.

First, let's look at Privat24 online banking tool. It is one of the main technological solutions of PrivatBank that allows users to make payments and transfer money as well as many other services. It can be accessed via different devices like desktops, smartphones, and tablets. Privat24 was recognized as the best online bank of Ukraine in the national FinAwards-2019 rating where experts and clients have identified the best products of the domestic banking sector [41].

Privat24 is the absolute leader in banking digital services. More than 70% of Ukrainian Android smartphone users use Privat24 mobile bank all the time. This is evidenced by the results of the June rating of mobile applications of Ukraine, published by the Internet Association of Ukraine. According to the study, Privat24 mobile bank became the second most popular mobile app after Viber in June, which is installed on more than 90% of domestic smartphones [42].

Over the past year, Ukrainians have become more and more active in using smartphones to pay their bills and other financial transactions. The number of regular users of Privat24 mobile bank is growing rapidly. In the figure 2.3 we see that compared to 2015, the number of Privat24 users has increased more than 3 times and today the number of Privat24 users reaches 9.8 million (fig, 2.3). As reported in PrivatBank, if in March 2018 the mobile version of Privat24 recorded 8.9 million transactions, then by March 2019 the number of transactions conducted through the mobile bank exceeded 15.8 million [43]. Every day, Privat24 conducts operations with 1.2 million customers. According to PrivatBank, today through mobile Privat24, twice as many transactions are performed on a monthly basis than through the cash desks of the bank - 15.8 million against 7.7 million transactions. At the same time, mobile application Privat24 is still less

popular than PrivatBank SSTs, through which Ukrainians carry out over 29 million financial transactions per month [44].

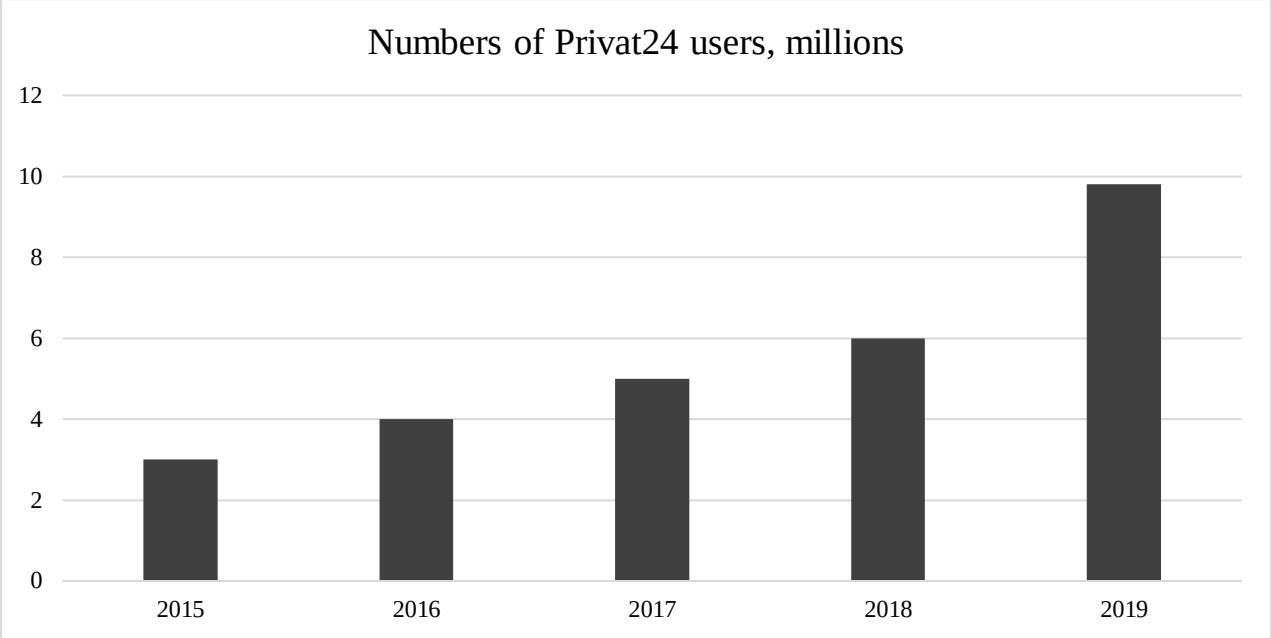


Figure 2.3 – The number of Privat24 users from 2015 to 2019, millions [43]

Privat24 allow users receive all the services for which previously they had to visit a branch or call the customer support. For example, view card statements, make regular payments, top up mobile phone, transfer money from card to card, pay bills, send money transfers and much more [45].

The big advantage of Privat24 is its multi-level security system. It includes two passwords to access Privat24 – a permanent one set by customer, and a dynamic one-time password for confirming transactions in the system. The dynamic password is generated newly each time and is sent to customers mobile phone as an SMS message. In addition, there are restrictions on the amount of transactions carried out during the day and during the month. Furthermore, Privat24 uses the Secure Sockets Layer protocol, for encrypting

the data transferred which provides secure connections between web-server and the client’s browser [46].

In addition to Privat24, PrivatBank has developed a LiqPay system. LiqPay was created in 2008 as an alternative to WebMoney and PayPal. LiqPay is a PrivatBank payment service designed to facilitate online payments between individuals and legal entities. In other words, LiqPay is web-interface of PrivatBank with which the card holders of Mastercard and VISA from around the world (150 countries) can pay for goods and services online, as well as send money from card to card. LiqPay provides following payment instruments: secure payments, regular payments and business payments. Secure payments enable customers to make protected payment on the websites and bank guarantees money transfer upon confirmation of delivery. Regular payments include payments by token (customer can manage payment frequency, amount and currency) and subscribe (customer can create scheduled Mastercard and Visa card payments with frequency of payments 1 per month or year). Business payments include invoices (convenient way to accept Mastercard and Visa cards payments remotely on the internet), payment refund (make full or partial refunds to customer's card via LiqPay business account, as well as API) and B2C (P2P credit) (make payments from business account to customers' cards).

LiqPay provides different payment confirmation methods like one-time password, card verification value, 3D-Secure, intelligent monitoring system transactions Deepmemo, individual rights and limits. In addition, LiqPay has anti-fraud system. Cloud based system is able to fully or partially replace specialist expert in decision making. The system enables to dynamically manage rules, limits and white and black lists data. Due to security matters the bank can hold money transfer up to 3 days in order to verify cardholder, money transfer will be executed or declined right after verification is confirmed by issuer-bank [47].

According to the results of 2018, the integration of the MasterPass digital wallet ensured a turnover of UAH 29 555 104 at 96 077 transactions with the LiqPay branded payment system, and the integration of the VisaCheckout platform - a turnover of UAH 6 288 245 with 3 738 transactions. At the end of 2018, another 1667 transactions for a total amount of UAH 2 414 819 fell on instant payment based on QR codes, working on the basis of the same LiqPay, and the integration of LiqPay into Telegram Payments in October 2018 gave the following result: 52 sellers, 4 383 transactions totalling 1,354,852 UAH [25].

On May 15, 2018, together with Apple, PrivatBank introduced the Apple Pay NFC payment system, and before that with Google, Google Pay. During 2018, 70% of PrivatBank customers who own an iPhone connected to Apple Pay. In Ukraine, PrivatBank's clients were the first, among clients of other banks, be able to use digital wallets to pay for purchases by smartphone. PrivatBank's clients can use both services and make contactless payments even without credit and debit cards online and in-store. Today, Google Pay works with all of Ukraine’s banks, unlike Apple Pay, that supports only the cards of PrivatBank, Oschchadbank and Monobank [48].

The main advantage of Apple Pay and Google Pay payments services is security and privacy. When clients use a credit or debit card with this payment services, the actual card numbers are not stored on the device. Instead of this, systems generate a one-time unique dynamic security code [49].

Furthermore, PrivatBank together with the Mastercard have launched the Mastercard Digital Enablement Service for Merchants. This service is a part of Mastercard digital platform that works with global digital systems like Apple Pay and Google Pay. The new tokenization for merchants’ service replaces card details with tokens and enables online merchants to considerably increase the rate of completed payments due to high level of trust to such transactions on the part of issuing banks. This service makes online payments easier and quicker while improving user experience. This

innovation provides new business development opportunities for online merchants and eliminates consumer barriers in terms of payment security [50].

PrivatBank has launched Apple Pay Payment Acceptance for more than 5,000 Ukrainian online stores and online services. According to the bank, companies that use the LiqPay payment service now have the ability to make contactless payments through Apple Pay on their sites [51]. At the same time, the contactless Google Pay service plans to fight for leadership in Ukraine. Google Pay integration with the most popular mobile bank will make contactless payments with smartphones more accessible to many bank customers in Ukraine. More than 6 million Privat24 Android users will now be able to activate contactless payments if their smartphone is equipped with an NFC module. Considering that Privat24 users triple their Android devices than iOS smartphones, Ukraine may become the first country in the world to see the traditional dominance of Apple Pay in the digital wallet market in favour of Google Pay [52].

Moreover, PrivatBank launched the Garmin Pay contactless payment service operating in Ukraine using the Garmin smartwatch. In Ukraine, the service is available to holders of Mastercard and Visa from PrivatBank. Garmin Pay uses tokenization to ensure user safety - data on the payer's account numbers are replaced with a personal digital identifier [53]. In addition, clients of PrivatBank are able to transfer money from their accounts to any card issued by PrivatBank via PayPal accounts. In Ukraine PayPal is a popular instrument for payment of purchases in foreign Internet-stores [54].

According to annual report of The Nilson Report, PrivatBank is one of the top 100 banks in terms of payment by bank card in the trading network. At the end of 2018, PrivatBank took 59th place among the largest world banks with an annual volume of card payments in the trading network of more than 8.9 million plastic cards (36% of the total number of cards issued by Ukrainian banks). The largest of the banks in this rating was the American JPMorgan Chase with an annual volume of acquiring transactions of 25,6 billion worldwide [55].

PrivatBank also offers its customers to use Internet-card. This virtual card is issued and served free of charge, and payments on the card are made with no fee charged. Customers can open Internet-card in UAH or USD and use it for payment of purchases all over the world [56].

One of technical solution of PrivatBank is use the QR code technology, with the help of which customers can pay for purchases at retail outlets or online in a few seconds. By means of Privat24 and LiqPay applications smartphone is able to scan price tags with QR code and make contactless payment [57].

PrivatBank has launched a new technology for paying for purchases of smartphones by QR code through POS terminals in Ukraine. This technology will allow customers to make contactless payments for any purchase using smartphones that do not support NFC payment. According to PrivatBank, in the first quarter of 2019, the volume of non-cash payments in the bank's acquiring network increased by 40.5% compared to the same period of 2018. By the end of the year, the bank plans to expand the network of retail terminals to 190 thousand, with most of them accepting contactless payments [58].

PrivatBank is the leader of the Ukrainian acquiring market. More than 70% of PrivatBank POS terminals accept contactless payments with cards or smartphones [29]. Small business has become the main driver of cashless payment network development - more than 4,000 small and medium-sized retail outlets have joined the acquiring network in recent months. Every day, through the PrivatBank POS network, bank cardholders pay more than 2 million purchases. Most often, Ukrainians pay by credit cards at grocery stores and supermarkets, which account for 48.4% of the total volume of transactions in the bank's terminal network. The second place in terms of cashless payments is occupied by clothing, footwear and accessories stores (10.86%), the third - by electronics and home appliances stores (8.27%). They also actively pay with cards in home goods stores (7.72%), pharmacies (6.57%) and cafes, restaurants and entertainment centres (6.57% of the total transaction volume) [59].

PrivatBank will continue to actively digitize its services and financial services, which have long gone beyond traditional banking and are forming a new digital ecosystem in Ukraine at the intersection of financial services, retail and e-commerce. Today, the most visited FinTech ecosystem platforms of PrivatBank are Privat24 and LiqPay. Privat24 is Ukraine's most popular and innovative online banking tool. One of the tasks of technological management of the bank is to complete the process of structuring and updating the basic technological complexes of the bank, which, given the significant increase in the volume of transactions, including digital ones, will allow to ensure the stability of the services with a few years ahead. The main priority of the PrivatBank management team is the development of innovations and comprehensive support of the unique team of developers and IT specialists of the bank.

2.3. Proposals for increasing of FinTech using in payments and money transfers sphere

Based on an analysis of the current activities of PrivatBank in the field of payments and money transfers, we identified the following problems and developed ways to solve them.

First of all, it is necessary to maintain and further improve the existing financial services and products of PrivatBank in payments and money transfers sphere. Now, PrivatBank financial products and services are one of the most developed and innovative in Ukraine, but, given the rapid development and emergence of new technologies, as well as the ever-growing needs of customers, PrivatBank must constantly be in trend and develop its financial products and services.

Privat24 Internet banking tool is one of PrivatBank's premier technology solutions that gives customers 24/7 access to their accounts. It allows users to control the flow of funds in accounts, open and replenish deposits, make payments and money transfers, and many other services. One of the main innovations of the updated Privat24 is the ability to issue a virtual card. Customers can issue a credit or debit card, which can be added to Apple and Google Wallet and used in stores for settlements. Another innovation of Privat24 is the ability to add cards from different banks to it. Other cards will allow customers to make money transfers, replenish mobile phones, pay for utilities and more. The updated Privat24 is based on a completely new architecture. This is due to the fact that the number of clients is increasing, as well as the number of transactions per customer. Therefore, Privat24 needs to be flexible and efficient.

At the same time, the main disadvantages of Privat24 are temporary crashes in the application. Moreover, sometimes Privat24 users are faced with such a situation that the information about the client's money account is not updated in real time, which sometimes creates temporary inconvenience to them. To avoid such problems, a good solution can be the implementation of new technologies that will ensure the smooth operation of the application and always display relevant information for customers in real time.

In addition to Privat24, there are various other applications, which can be improved with the latest financial technology. These are mobile applications such as Privat24 Business (provides round-the-clock access to accounts and payments in real time for legal entities and entrepreneurs), miniPOS (allows users to accept payments), SMS banking (helps to make money transfers even without an Internet connection), Privat Voice (allows customers to request a card balance and make any payment or top up phone according to the template created in Privat24), Financial Controller (allows users to view and approve payments on-line anywhere and at any time), and others [60]. The

implementation of innovative technologies will expand the functionality of these applications and make them more convenient for users.

LiqPay is a payment system, an open-source web application that allows customers to accept payments and transfer money using their mobile phone, the Internet and payment cards around the world. The advantages of LiqPay are the security implemented with a one-time password sent in an SMS to confirm transactions, and 3D secure code technology. 3D Secure Code is a security system that was invented to reduce credit card fraud. This allows customers to create a personal code or password that the they can use to confirm access to making payments with a credit card. In addition, another benefit is that LiqPay is trying to integrate with many payment systems, which empowers functional area of LiqPay and gives it additional competitor benefits. We did not find any significant drawbacks in the LiqPay system, so we could recommend maintaining the level of security and the functionality of the system in the future.

The main advantages of the PrivatMoney system are free SMS-informing the sender and recipient of the international transfer, quick deposit of money into the account, the availability of round-the-clock customer support centres, a large number of service points throughout Ukraine and the ability to make transfers in the most popular currencies. But at the same time, its biggest drawback is the limited number of countries available for international money transfers. Therefore, our recommendation for the development of the PrivatMoney system will be to expand the number of countries to which money transfers can be made.

It is worth noting that, in general, the cross-border payments area is particularly ripe for change and may benefit from new technologies. The main disadvantages of cross-border transfers are expensive cost and cumbersome. In addition, such services are quite opaque to users and in most cases, the price paid for international payments is not known at the time the transaction begins. Therefore, we believe it is good idea to attract new financial technologies in this area in order to make international transfers cheaper and

more transparent for users. This is especially relevant in view of the great competition in the international money transfer market.

We also think that PrivatBank should continue to expand partnerships with international partners in order to provide its customers with the best conditions for money transfers and payments around the world. PrivatBank has already implemented technologies such as Apple Pay and Google Pay payment services, which is an indicator that our market is attractive to the world's leading innovative companies. Today, Apple Pay and Google Pay payments services is one of the fastest, most convenient and safe ways to make purchase.

Based on the ever-growing customer base of PrivatBank, it is very important to find an individual approach to each client and quickly find solutions to problems that PrivatBank customers may encounter while using their financial services or products. It is worth noting that PrivatBank has a large staff of specialists and consultants who help clients use financial services and products, but at the same time, waiting for a consultation can take a lot of time, especially at rush hour. To solve this problem, it is appropriate to use Internet bots, which have a programmed list of the most common questions and answers. This technology allows to serve customers in the shortest possible time and not overload the staff of PrivatBank.

It is worth noting that PrivatBank has already advanced in this area and in 2018 it launched PrivatPayBot payment bot. It is recognized as one of the best financial decisions of the year for small businesses based on the annual rating of the Ukrainian market FinTech and e-commerce PSM Awards 2018. PrivatPayBot enables entrepreneurs and small businesses to accept payment for goods and services in cash without POS terminals - using the popular Telegram messenger [61].

In general, in order to improve the quality of financial services in the field of payments and money transfers, considerable attention should be paid to security issues. This applies to online transactions via mobile and computer applications as well as using

ATMs and POS terminal. The security issue is very relevant today, because number of cyber-attacks and fraud are increasing every day. This also applies to the protection of customer personal information and transaction information, which must be provided with secure encryption and use of reliable communication channels. The best solution for secure contactless payment is tokenization. A complex encryption system makes it impossible to use data in case of interception.

We consider the introduction of behavioural biometric technologies to be a great success for PrivatBank in the field of security. Thus, PrivatBank, in partnership with Mastercard, implements Ukraine's first behavioural verification project, based on behavioural biometrics - for progressive and secure authentication in an age where password is not sufficient to secure the account. The new solution is provided by NuDetect, a transparent user authentication platform from NuData, Mastercard. The NuDetect platform is already implemented in North America, Latin America and Europe. In December 2018, during an active shopping spree, NuData helped retailers identify more than 1 billion fraudulent digital transactions and stop 99% of fraudulent attacks, saving traders worldwide more than USD 500 million [62].

Moreover, PrivatBank and Visa announced the launch of FacePay24 biometric payment system for retailers in Ukraine. FacePay24 uses one of the world's leading automatic face recognition systems, Amazon Rekognition, and can scale this service to just about any outlet. Amazon Rekognition is built on secure, reliable and proven deep learning technology developed by Amazon's computer vision experts to analyse billions of images and videos every day. The PrivatBank and Visa solution does not use personally identifiable information that may be contained on your content to target products, services or marketing [63].

In our opinion, it is also worth focusing on the fact that PrivatBank is actively introducing various online identification systems for citizens to increase the security and convenience of customers in all areas of life and business. One of such systems is

BankID. BankID is a convenient way of online identification of citizens through Ukrainian banks for providing administrative and other services through the Internet. This way of modern identification helps to save time and money of citizens and to fully automate the process of service without human intervention. This is another important step in developing a modern transparent digital economy in the country, providing more reliable and secure services [64].

In addition, on October 4, PrivatBank and the Ministry of Digital Transformation of Ukraine signed a memorandum of cooperation to unite the efforts of the digital agency and the most innovative bank to develop and support accessible, transparent, secure and least cost electronic public services. SmartID technology is launched in Ukraine within the framework of co-operation in the sphere of digitalization. This will accelerate and expand the scope of digital services for nationals. The procedure for obtaining a Qualified Electronic Signature (QES) using SmartID technology will take less than a minute, and can be performed from any device connected to the Internet [65].

In general, it will be a good idea implement Know Your Customer (KYC) system on the national level in order to improve security in sphere of payments and money. It is worth noting that the NBU has already begun cooperation in this area with the European Bank for Reconstruction and Development (EBRD). The KYC's goal is to prevent money laundering. Related procedures also allow banks to better understand their customers and analyse their financial transactions. KYC includes the following key elements: customer acceptance policy; customer identification procedures; transaction monitoring and risk management [66].

It is also worth noting, that PrivatBank has launched a new open API platform that can allow FinTech companies to create new innovative and effective financial solutions that work with bank data and provide consumers with new FinTech products and services. PrivatBank became the first bank in the world to open a public API (in September 2009). Today it is used by more than 4,900 partners and not only in Ukraine.

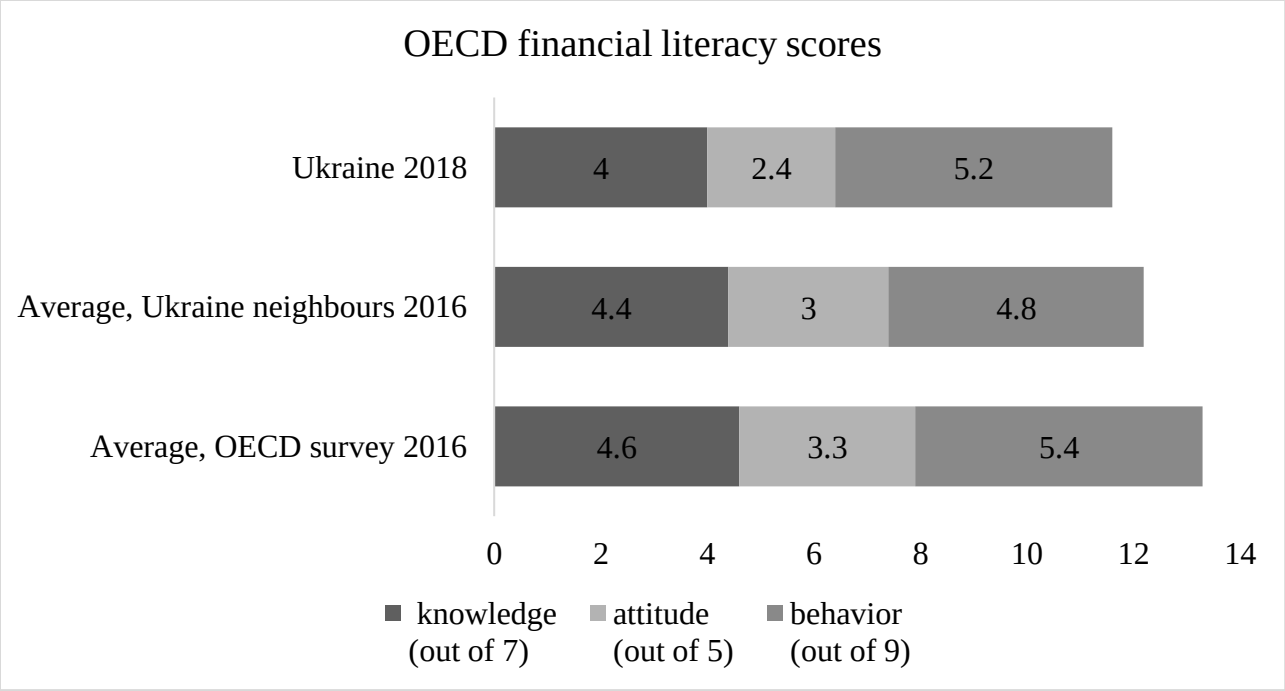
In the near future, the bank plans on opening up an even more powerful platform that will allow for greater functionality and the creation of new features, applications and services for consumers. PrivatBank's open API platform meets the safety requirements set by the European Bank Authority and requires two-factor authentication as well as a security guarantee for all channels through which user data is transmitted [67].

The main advantage of API is that it allows various software applications to interact with each other and exchange data directly, without the need for human intervention. In the field of money transfers and payments, PrivatBank created following APIs:

- Payments on a PrivatBank card (the API allows customers to transfer money between PrivatBank cards),
- Payments on a VISA card of any bank (the API allows customers to pay from a PrivatBank card to a VISA card of any international bank),
- Payments in Ukraine (API allows customers to make a payment from a PrivatBank card to a card of any other bank in Ukraine),
- Replenishment of mobile communications by a free amount (API allows customers to replenish mobile communications of Ukrainian operators by a specified amount) and other [68].

Given such a wide range of innovative financial technologies of PrivatBank, it is worth noting such a negative factor that impedes their active implementation and distribution among the population of Ukraine, as a low level of financial literacy of the population.

According to a survey conducted by the US Agency for International Development (USAID), the overall financial literacy index of Ukraine according to the OECD methodology is 11.6 (out of 21). This index is based on scores for financial knowledge, attitudes and behaviour (fig.2.4).



Fugure 2.4 - OECD financial literacy scores - international comparison [69]

It is worth noting that the financial literacy index in Ukraine is the lowest of the 30 countries in the 2016 OECD survey. The results for Ukraine are also slightly lower than the average of 12.1 for six neighbouring low- and middle-income countries where the OECD study was conducted (Belarus, Georgia, Hungary, Poland, Russian Federation, Turkey). This difference in results between Ukraine and other countries is associated with poor indicators of attitude and knowledge [69].

Based on the analysis of this data, PrivatBank should focus on improving financial literacy in the field of attitudes and knowledge about innovative financial products and services. One of the key points of the USAID study is that financial literacy is the lowest in the 18-24 age group, and that Ukrainians strongly support school financial literacy education. Therefore, we recommend that PrivatBank take the initiative and take part in the development and implementation of such a subject as financial literacy in schools. It is worth noting that PrivatBank has already begun educational activities. PrivatBank has successfully launched the Junior Bank project – a financial education

program for students from 6 to 17 years old [70]. According to PrivatBank annual report, in total over 672,000 pupils have attended the educational events of PrivatBank during 10 years [23].

We would also recommend PrivatBank to conduct training programs for the older generation due to their low level of awareness of a large number of financial products and services, as well as low financial literacy in general.

In addition, we would like to point out that PrivatBank already has an online course on how to shop online [56]. We believe that it would be advisable to develop and promote similar online courses in other areas of financial services and services, to increase the financial literacy of the population of Ukraine.

Furthermore, a good solution for the further innovative development of PrivatBank will be cooperation with local and international FinTech companies for the joint development of new financial products and services, as well as the improvement of existing ones. Such cooperation will help PrivatBank to maintain its leading position in the Ukrainian financial market and strengthen its competitive advantages.

Considering the fact that FinTech innovation requires capital, PrivatBank needs to allocate additional funds to improve existing ones and develop new technologies. However, it should also be borne in mind that it is necessary to improve not only technologies, services and products, but also ways of organizing banking activities, communication with customers, product promotion, etc.

PrivatBank should also pay attention to the issues that affect the development of innovations in the banking system, because the development of technology increases competition in the market. Therefore, in order to be in demand, banking institutions need to constantly monitor global trends and innovations. After all, in the era of new technologies, financial institutions have emerged that perform some banking functions and therefore compete with banks.

Today, PrivatBank's financial services are one of the most innovative and functional among the services provided by other Ukrainian banks. PrivatBank is the first bank in Ukraine to start using mobile and internet banking on the national level. Over ten years ago, PrivatBank was among the first banks that started using one-time SMS passwords. Among the recent innovations recognized all over the world, there are such products as payment mini-terminals, login to Internet bank using a QR code, and dozens of different mobile applications. Furthermore, PrivatBank is one of the largest developers of mobile payment applications in Ukraine. The most common innovation among the population is Privat24.

All these technologies give PrivatBank a great competitive advantage in the Ukrainian financial services market. In order to maintain its leading position, PrivatBank need continues to implement new financial technologies and invest in infrastructure.

Among the main areas of development, both for PrivatBank and for other Ukrainian banks, we can highlight the development of existing technologies, applications and infrastructure, as well as further improvement and expansion of their functionality by attracting modern innovative technologies.

Another area of development of PrivatBank we consider the improvement of the safe component in the field of money transfers and payments. We are convinced that improving security to protect money and personal information will help increase the trust and loyalty of existing customers and attract new ones.

For the full realization of its potential in the field of financial technology, PrivatBank should pay attention to increasing financial literacy among the population of Ukraine, because the rapid development of FinTech increases the need for continuous improvement in financial literacy. In Ukraine, financial literacy is at a rather low level, which may complicate the introduction of new features and technologies in financial products and services, as well as their adoption rate.

CONCLUSIONS

As a result of our research, we identified FinTech as a combination of technologies and financial services aimed at meeting the ever-growing financial needs of customers through innovative financial products and services that differ from traditional banking services in terms of convenience, simplicity and transparency. We also described FinTech as an interaction between financial institutions, infrastructure players, start-ups, e-commerce, technology and telecommunications companies, which are influenced by factors such as consumer and user needs, new technologies and tools, investors, incubators and accelerators, regulators and government.

Analysing the development history of FinTech, we determined that the fastest growth in technology in the financial sector began after the Global Financial Crisis. This was due to the fact that financial institutions could not quickly respond to consumer needs because of a number of regulatory and legislative restrictions that were implemented to overcome the consequences of the crisis. At the same time, the main factors of FinTech development were technological evolution, emerging customer expectations, availability of funding and capital, and support from governments and regulatory authorities.

In the scientific literature, there are many classifications of financial technology. The most complete classification in our opinion was developed by the IMF because it reflects not only the types of FinTech, but also the close relationship between financial services and fundamental and innovative technologies.

Based on a survey of the Basel Committee on Banking Supervision, it was found that by far the largest number of FinTech companies in the world are concentrated in the areas of payments and money transfers. The survey conducted by the United States Agency for International Development also showed that this area is the most popular in Ukraine. Moreover, according to KPMG, the sphere of money transfers and payments is

one of the most attractive for investments. A study conducted by Ernst & Young showed that this area is most dynamically developing in the context of FinTech adoption all over the world.

It can be stated that FinTech is accelerating changes in the financial sector. It has a wide range of advantages and at the same time carries certain risks both for users of financial services and for banks that offer these services. FinTech can provide convenient, fast and secure solutions that can meet the ever-growing needs of consumers. In addition, new technologies enhance financial inclusion and reduces the cost of financial services and products. FinTech also has a number of advantages for banks, such as streamlining operations, reducing costs, increasing market share, enhancing competitive advantages and improving security. On the other hand, the rapid development of financial technology is fraught with some risks. For users, this is primarily unauthorized transactions, fraud and cybercrime. There are also some risks for banks such as increased competition in the financial services market, too much dependence on technology and cyber-attacks.

The information technology industry, including FinTech, is one of the few in Ukraine that is continually growing. A great example is PrivatBank with its experience in developing its own custom digital solutions. PrivatBank demonstrates a high level of implementation and active using of new technologies. It is largest and innovation-friendly bank in Ukraine. Innovative financial technologies help PrivatBank to maintain its leading position at the Ukrainian financial market. According to the results of our analysis, it can be argued that the bank is characterized by a high degree of integration of financial technologies into its business model, which positively affects its competitiveness and characterizes a high degree of consumer confidence in it. Every day, PrivatBank brings the future without cash, where convenient and safe payments are integrated into various areas of life and all kinds of form factors.

PrivatBank provides a wide range of the online banking tool, which allows users to transfer money from any bank card to another, as well as pay for cell phone and utility

bills. Privat24 is Ukraine's most popular and innovative online banking tool. Currently, approximately 9,8 million people use the Privat24 service in Ukraine. Due to the large number of PrivatBank partners in other countries, PrivatBank customers can make money transfers and payments worldwide.

The wide range of PrivatBank's foreign partners not only demonstrates its position as a competent participant of the world banking system but also, and most importantly, allows it to completely satisfy the necessities of the bank's clients in their international activities. Using state-of-the-art technologies, PrivatBank has made receiving international transfers simple and comfortable, without additional efforts on the part of the recipient, which allows PrivatBank to remain the national leader in this market.

Expansion of the acquiring network and the cashless infrastructure as a whole, launching fundamentally new services - all this allows PrivatBank to actually double the number of transactions in the acquiring network annually. Innovations such as accepting payments through messengers or cashless tip in POS terminals have become drivers of cashless payment growth. Today, PrivatBank continues to improve its technology and provides its customers with mobile device owners with a built-in NFC chip to accept payments by contactless cards.

In order to maintain a leading position in the Ukrainian financial services market, we would recommend PrivatBank to focus on developing existing mobile applications and improve their functionality using innovative technologies. In our opinion, one of the target areas for the development of PrivatBank in the FinTech sector may be to increase the financial literacy of the population of Ukraine. In the future, this will help PrivatBank to quickly and conveniently introduce new technologies, expand its client base and better understand the needs of its customers. In addition, increased attention should be paid to improving the security of financial transactions.

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ANNEXES

Annex A

SUMMARY

Drofa A. O. The influence of FinTech Development on Payments and Money Transfers Sphere in Ukraine. – Masters-level Qualification Thesis. Sumy State University, Sumy, 2019.

The master's thesis is devoted to the essence of the definition of the term “FinTech” and the impact of financial technologies on the sphere of payments and money transfers in Ukraine using the example of JSC CB “PrivatBank”. The results can be used by JSC CB “PrivatBank” during development of their strategic plans for improving existing FinTech products and services, as well as developing new ones in the field of money transfers and payments.

Keywords: FinTech, payments, money transfers, finance, technology

АНОТАЦІЯ

Дрофа А. О. Вплив розвитку FinTech на сферу платежів та грошових переказів в Україні. - кваліфікаційна дисертація рівня магістра. Сумський державний університет, м. Суми, 2019.

Магістерська робота присвячена суті визначення терміну «FinTech» та впливу фінансових технологій на сферу платежів та грошових переказів в Україні на прикладі АТ КБ «ПриватБанк». Отримані результати можуть бути використані і АТ КБ «ПриватБанк» під час розробки своїх стратегічних планів щодо вдосконалення існуючих, а також розробки нових, FinTech продуктів та послуг у сфері грошових переказів та платежів.

Ключові слова: FinTech, платежі, грошові перекази, фінанси, технології

Annex B

REFERENCES ON NON-UKRAINIAN SCIENTIFIC RESEARCHES, USED FOR CURRENT DIPLOMA THESIS

1. Buckley R., Arner D., Barberis J. 150 Years of FinTech: An Evolutionary Analysis [Electronic resource] JASSA. – January 2016. – Access mode:https://www.researchgate.net/publication/313364787_150_Years_of_FinTech_An_Evolutionary_Analysis

This paper presents an evolutionary analysis of FinTech development over the last 150 years. In this paper, three main stages of development of financial technologies are distinguished: Fintech 1.0. (from around 1866 to 1967, when the financial services industry remained largely analogue, despite being heavily interlinked with technology), Fintech 2.0 (from 1967 to 2008, when finance was increasingly digitalised due to the development of digital technology for communications and transactions), Fintech 3.0. (since 2008 to current time, when new start-ups and established technology companies have begun to deliver financial products and services directly to businesses and the public, as well as to banks). In addition, the authors also highlight the new phase of Fintech 3.5 in emerging markets. And they reveal it on the example of Asia and Africa, where recent developments in the field of technology were caused mainly by a deliberate choice of state policy for economic development.

This paper identifies five main areas of the FinTech industry in developed countries: finance and investment (FinTech extends beyond alternative financing mechanisms like P2P lending to include the financing of technology itself and the use of technology in financial transactions such as algorithmic trading), internal financial operations and risk management (these have been core drivers of IT spending by

financial institutions, as they have built better compliance systems), payments and infrastructure (payments have been an area of great regulatory attention since the 1970s, resulting in the development of both domestic and cross-border electronic payment systems), data security and monetisation (the digitisation of the financial industry means it is particularly vulnerable to cybercrime and espionage) and consumer interface (the consumer interface offers the greatest scope for competition with the traditional financial sector, as tech companies can leverage off their pre-existing customer bases to roll out new financial products).

Among other things, the authors pay great attention to the problem of regulatory innovation and the importance of RegTech. They emphasize that, in order to support this digital transition, banks must be able to compete equally in terms of their regulatory burden with startups that offer close replacements to regulated products. At the same time, startups should be able to work within the framework of the legal framework that allows them to grow their business before they become the object of expensive regulatory compliance costs. Thus, the way forward may be to establish threshold levels at which institutions must comply with regulatory requirements.

2. Haddad C., Hornuf L. The Emergence of the Global Fintech Market: Economic and Technological Determinants [Electronic resource] Institute for Labour Law and Industrial Relations in the European Union. – December 2016. – Access mode: https://www.econstor.eu/bitstream/10419/156261/1/877481172.pdf

This paper devoted to the investigation of the economic and technological determinants inducing entrepreneurs to establish ventures with the purpose of reinventing financial technology. The authors found that countries witness more FinTech startup formations when the latest technology is readily available and people have more mobile telephone subscriptions. Furthermore, the available labour force has a positive impact on the development of this new market segment. Finally, the more sound the financial system, the lower the number of fintech startups in a country. Overall, the evidence

suggests that FinTech startup formation need not be left to chance, but active policies can influence the emergence of this new sector.

In general, the authors investigated economic and technological determinants that have encouraged FinTech startup formations in 64 countries. Based on it they found that the United States has the largest fintech market, followed by the United Kingdom, Canada, India, and Germany at a considerable distance. Categorizing FinTechs in line with the value chain of a traditional bank - financing, asset management, payment, and other business activities - they show that financing is by far the most important segment of the emerging FinTech market, followed by payment, other business activities, and asset management. Financing for fintech startup formations might be important for multiple reasons, two of which could be the traditional funding gap that small firms around the globe face and funding constraints potentially due to more stringent banking regulations in the aftermath of the latest financial crisis.

This study yields important insights into the evolution of FinTech startups. Although the number of FinTech startup formations has steadily grown, this growth and the amount these firms have raised have recently dropped. Moreover, the authors generally found that countries witness more fintech startup formations when capital markets are well-developed, the latest technology is readily available, and people possess more mobile telephone subscriptions, suggesting that these factors are important drivers of FinTech demand.

3. Lee I., Shin Y. J. Fintech: Ecosystem, business models, investment decisions, and challenges [Electronic resource] Business Horizons. Volume 61, Issue 1, January – February 2018, Pages 35-46. – Access mode: https://www.sciencedirect.com/science/article/pii/S0007681317301246

This article introduces a historical view of FinTech and discusses the ecosystem of the FinTech sector. It describes various FinTech business models and investment types. In addition, technical and managerial challenges for both FinTech startups and traditional

financial institutions are discussed in this paper. This paper described FinTech ecosystem as interconnection between traditional financial institutions, financial customers, technology developers, FinTech startups and government. The authors emphasize that FinTech brings about a new paradigm in which information technology is driving innovation in the financial industry. FinTech is touted as a game changing, disruptive innovation capable of shaking up traditional financial markets.

One of the main ideas of this study is that the impact of internet technology has been especially obvious in the banking industry. Information intensive and time-sensitive in nature, virtually every component of the banking business' value chain benefitted from an innovative utilization of web technologies. From the bank's point of view, potential benefits of online banking include lower operational costs, shorter turnaround time, real-time managerial information, smoother communication within the organization, more convenient interaction with existing as well as prospective customers, and the provision of value-added services such as access to professional knowledge in financial management.

The growth of the smartphone user base in the mid-2000s facilitated the growth of mobile finance, such as mobile payment and mobile banking, which is an extension of e-finance. Financial institutions have allowed their customers not only to access bank account information, but also to make transactions, such as paying bills and remitting money, via their mobile device.

With the advances in e-finance and mobile technologies for financial firms, FinTech innovation emerged after the worldwide financial crisis in 2008 by combining the e-finance, internet technologies, social networking services, social media, artificial intelligence, and big data analytics. FinTech startups differentiated themselves from traditional financial firms with personalized niche services, data-driven solutions, an innovative culture, and a nimble organization. While FinTech is generally considered a threat to traditional financial firms, it also provides ample opportunities for these firms to

gain a competitive advantage over competitors. Most major financial firms have begun taking FinTech seriously and are developing strategies to compete, coexist, and collaborate with FinTech startups.

4. Allayannis G., Becker J. M. A Global Fintech Overview [Electronic resource] Darden School of Business. – April 26, 2019. – Access mode: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3386449

This paper presents overview of global Fintech industry and its peculiarities. According to this paper FinTech is the use of technology to solve financial services problems. It can be understood as traditional financial services segmentation and the technologies influencing these segments.

This study considers the various financial services segments in which technology solutions have been used to solve problems, including lending, payments, wealth and investment management, insurance, and regulation. For each of the segments, the authors identify key issues facing the segment, why and how FinTech might provide an answer to the challenges faced, and the potential difficulties fintech may experience in doing so. For example, in lending, FinTech could solve issues related to access and convenience-without the need for costly infrastructure.

In addition, the authors also discuss the potential advantages and disadvantages of traditional banks over FinTech. Finally, the paper describes influential technologies that are used in FinTech such as application program interface, artificial intelligence and machine learning.

5. Buckley R. P., Webster S. Fintech in Developing Countries: Charting New Customer Journeys [Electronic resource] Journal of Financial Transformation, Vol. 44. – June 1, 2016. – Access mode: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2850091

This paper discusses a customers' journey as the path the customer travels to satisfy their needs and wants that will typically consist of several separate processes. FinTech

product and service developers in advanced economies often understand how difficult many customers find their journey with banks and have been able the make the journey more pleasant and seamless. They are aided in this by their personal similarities to their customers in terms of background, education, and technological literacy. However, these similarities don't exist when products and services are being designed for customers in developing countries. In these markets, product designers need to rely on an evidence-based assessment of customer needs and wants, which will usually have to be specially commissioned, coupled, ideally, with visiting local villages and speaking to the local people who will be the potential customers for the products and services. The failure to appreciate the nuances of local customer journeys underlies many of the FinTech failures in the developing world.

Based on this, the authors of this study argue that FinTech has exhibited great promise in developed economies by providing customers with a highly accessible and streamlined path to fulfilling their financial needs and wants. While FinTech remains strongest in developed countries, investment is growing in developing countries and with some exceptional results. Expanding FinTech services into developing countries and tapping into unbanked markets remains attractive.

The main idea of this paper is that local knowledge and understanding of the problems potential customers face and their financial literacy levels is the key to the successful design and implementation of FinTech products and services in developing economies.

Annex C

Table C - PrivatBank's main partners in sphere of international payment transfer

Partners	Characteristics
TransferGo	It is a global online service that provides fast and secure international money transfers in real time. TransferGo was founded in 2012 in the UK. The company currently handles payments in 47 countries in Europe, Asia and Latin America with offices in Berlin, Vilnius and Warsaw. Over 4 months of cooperation in the Ukrainian market, TransferGo's local online service and Ukrainian PrivatBank have made more than 500,000 money transfers from Europe to Ukraine worth over 100 million euros. Currently, 62% of all money transfers to Ukraine are made using the TransferGo mobile application, which has been successfully adapted into Ukrainian for Android and iOS this year [71].
Western Union	Western Union is an international system of urgent money transfers, which unites more than 200 countries and territories. It is possible to send both international and intra-Ukrainian transfers [72].
MoneyGram	MoneyGram is the second largest international money transfer system in the world, present in 192 countries and having 244,000 points. International MoneyGram money transfer service is quick, safe and easy [73].
UnionPay	On July 4, 2018, PrivatBank and UnionPay International signed a memorandum of strategic partnership. UnionPay International is a subsidiary of China UnionPay, China's national payment system and the largest international payment system in the world in terms of transactions and issued payment cards. In the first phase of coopperation with UnionPay, PrivatBank is considering launching UnionPay International payment card service in ATMs and bank payment terminals in 2019. In addition, the Bank and UnionPay plan to develop joint innovative payment products [74].
RIA	The system of international money transfers RIA has 272,000 points of service in 147 countries of Europe, America, Asia and Africa. PrivatBank is the first in Ukraine in partnership with one of the world leaders in the field of payment services Ria Money Transfer launched a new money transfer service. PrivatBank clients can now receive RIA money transfers in Euros or US Dollars directly to their account or card - without visiting the bank or using remote self-service channels [75, 76].
IntelExpress	PrivatBank's clients can also receive cash transfers in Euros or US Dollars via IntelExpress system. The IntelExpress international money transfer system was established in 2006 in Georgia and is currently represented in more than 70 countries and has over 20,000 service points. In addition to a broad network of partner points across all continents, bringing together 27 different on-premises money transfer systems, IntelExpress-branded service points operate in the UK, Georgia, Greece and Italy [77].
Sigue Express Money Transfer	On September 23, PrivatBank resumed operation of the Sigue Express Money Transfer System in Ukraine, through which it is possible to send and receive funds through the Bank's branch network. Now PrivatBank is the only agent in the country of this system. Sigue Money Transfer is an international operator for instant money transfer. More than 60,000 service points in 143 countries. Send and receive transfers in US dollars through PrivatBank. Remittances and payments are made in US dollars by addressless technology [78, 79].
Hazri	PrivatBank has signed a partnership agreement with Hazri's international money transfer system. Hazri system is designed for international express money transfers between individuals [27]. The Hazri system was established in 2007 by Azerbaijan's largest bank, Capital Bank, and is intended for international money transfers between individuals without opening a bank account. The Hazri system operates at more than 3,500 service points located in banks in Azerbaijan, Ukraine, Georgia and Tajikistan [80,81].
Fin.do	In October, PrivatBank launched the possibility of free transfers to Mastercard cards through the Fin.do mobile service. Fin.do. Is a mobile application that allows you to instantly transfer money from Mastercard bank cards issued in the CIS, Europe, Turkey and Israel. Transfer to Ukraine is credited instantly and is available 24/7 [82].