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# Globalization trends for financial innovations development

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**ABSTRACT**

The article provides systematization of the main development areas of the FinTech industry, identifies key technologies contributing to its rapid development. Fintech companies global investment forecast is made. Some of the world's financial technologies are analyzed and the effectiveness of their use in the context of economic growth is substantiated. The main trends in the development of FinTech in Ukraine are described. The structure of Fintech companies in the Ukrainian financial services market is forecasted to change. The problems of introduction of financial technologies in Ukraine are investigated and the directions of providing economic growth in the country due to the use of the latest financial technologies and digital platforms are proposed.

**Keywords**: financial innovation; financial technology; financial services; FinTech; Fin-Tech companies

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## 1. Introduction

### 1.1. Formulation of the problem in general

There is a doubtless fact that proceeding of innovations plays an important role in a modern economic development and ensures growth in all sectors. Financial sector responds to innovations faster than the rest, because even minor fluctuations in the financial markets make direct impact on the economic system as a whole and may be a source of growth and the cause of the crisis. One and of the weightiest factors accelerating the innovation process in the financial markets is internal request of the company to form an investment pool, which is associated with the implementations of the specific projects. Moreover, the motivating reason for such steps are the desire to get a super profit, to provide liquidity or to reduce costs etc.

Significant impact on financial innovation has external environment, including the processes of globalization and international financial markets integration, increasing competition, global consolidation, rapid growth of information technology etc. Globalization, as a result of deregulation processes and restrictions reduction for the regional markets access, has greatly increased the profitability of financial and insurance business by accelerating the free movement of capital and widespread use of new instruments, which, as a result, caused appearance of the new methods and mechanisms for risk management. Moreover, globalization contributes to exacerbate competition between financial intermediaries seeking to capture some market segments internationally.

The interdependence between competition and innovative development has a stimulating impact. Competition encourages financial institutions to develop new products and services, as well as to adopt non-standard approaches to the ways of doing business, while innovations open new directions, in fact, for the competition itself. At the same time sharpening of the competition led to the significant changes in the financial sector, which accelerated consolidation processes, market sharing and the emergence of large operators successfully operating on the international financial markets. Yet one more important factor is the rapid development of information technologies, their wide spread in financial institutions practice, and in the operating mechanism of international and national markets.

Modern markets forming comes under the influence of digital technology, the result of which is the appearance of new forms and elements of financial infrastructure, including virtual banks and other financial institutions, financial and technical companies, international systems of electronic money, digital currencies markets etc. According to the results of numerous researches, at the appropriate level of information technologies the process of information transfer from the one subject to another within the financial market is accelerated, and it significantly improves the work of financial institutions and promotes the development of the economy as a whole.

In the area of finances, this has led to the emergence of non-financial corporations providing traditional financial services - FinTech. Broadly speaking, this concept means the sector of the economy, which brings together companies utilizing the latest developments for the production of high-quality financial services. In the narrower meaning FinTech are those companies, belonging to the sector. By some estimates, since 2010 investments into FinTech companies exceeded 50 billion US dollars [28], as well as in 2016 - 24,7 billion US dollars (first half of 2017 – 11,6 billion US dollars), being twice higher than Y2013 level and indicating a high rate and growth of FinTech -industry. In general, the number of FinTech companies in the world exceeds 12,000, but their development has not reached its maximum level. 82% of the financial institutions expect an increase in the number of partners with FinTech companies in the next 3-5 years [5].

According to Google search engine, the term FinTech recently received a monthly average of about 201,000 requests [15]. Such quantity seems to be not great, especially compared to the searches of such word as "bank", which currently reach over 2.24 million searches each month, but this is still much higher, if we compare with the search term "financial services", being about a 40,500 monthly requests [15]. Assessing the scale of searching queries, it should be noted that recently, there have been a significant increase in Fintech interest within a scale from 0 (in 2011) to 100. Thus, the Fintech term has proved in popularity in a much wider business world.

Over the period of its existence, the principle of FinTech has not changed: they appear where you can offer a new financial product, better meeting the existing consumer needs, or where there is a chance to provide cheaper and better services. On the other hand, with world financial crisis 2007-2009, causing significant changes in the regulatory mechanisms and leading to the technological development with fundamentally changing nature of financial markets, institutions and services, and causing new challenges. In order to avoid such negative effects in the future, FinTech problems are being actualized as innovative solutions to improve the functioning of both financial markets, the subjects and their regulators.

### 1.2. Formulating the goals of the article

The purpose of the article is to investigate the essence of modern financial technologies and activities of Fintech companies, to determine their role in the modernization of the financial system, to reveal the tendencies of financial technologies development in the world, problems of their implementation and prospects of use in Ukraine.

## 2. Material and methods

The common methodological bases of the research are the fundamentals of the contemporary economic theory, as well as works and researches of leading Ukrainian and foreign scientists on the financial innovations. The informational bases of the research are works of national and foreign specialists in the area of financial innovations and the author's research. Advanced methods of scientific cognition have been used to achieve the set purpose: a historical and logical approach, systemic and functional analysis and factor analysis.

### 2.1. Theory

The theoretical basis for the study of financial innovation, technology and digital platforms and their role in ensuring socio-economic growth is laid down in the following researches: A Bettinger [4] was one of the pioneers to define Fintech as a category, which implies financial technologies, combining banking experience with the modern management science and information systems; I. Barberis [40], was the one to study historical routs of Fintech; M. Buckle [6], which proved that financial innovations cause new financial instruments and financial brokers techniques, as well as structural changes within the financial system in line with new financial markets emergence with changes in organizations organization and behavior; S. Warschauer [30], who used programming in capital budgeting, paying particular attention to the choice of investment alternatives that allowed to reach the settled KPIs; G. Dorfleitner [10], J. K. Van Horn [10], that justified FinTech companies as an important driver of innovations within the financial industry. They allow to make financial operations more convenient and transparent. They indicated, that these companies potentially foster financial stability and economic growth; M. Kastels [7], when studying the mechanism of productive capital increase, he came to the conclusion that this process is increasingly dependent on the use of science and technology, information quality and management, as well as the revolutionary nature of technological change, where the central place belongs to information technologies, able to change the material basis of the modern world; G. Munch [19], who stated, that Fintech facilitates business and reduces costs. To his opinion, Fintech companies can save huge costs, as they are much more flexible than traditional banks, have no overheads and liabilities, by which traditional banks are burdened. Their insignificant size lets to innovate and adapt at the extent, which big corporations can only dream about; M. Miller [18], who developed the model of combination of financial supervision and innovations of commercial banks, showing that financial supervision and innovations of national commercial banks are at a stage of moderate correlation; K. Perez [21], who proved that financial innovations provide production activity development and its enhancement, they contribute to improving the functioning of the financial sector itself as a part of the financial services industry, reduce risks and increase opportunities to generate investment income, mobilize assets and facilitate refinancing of liabilities, provide manipulation of financial brokers in various financial instruments; P. Tufano [29], emphasized that current innovative companies focus on those problem issues that usually caused stress for consumers and reduced profitability. He claims that in this way they are "making a superprofit" by exploiting part of the market that was previously occupied by other products. Additionally, researcher provides an example with money transfers: banks traditionally set a high fee for cross-border transfers, offering mediocre service, and the transfers themselves often went to the recipients within three days; D. Lleveline [16] who stated, when studying financial innovations, that they were those core triggers for the financial crisis. Paying particular attention to the emergence of tools and business models designed to offset credit risk, he concluded that it significantly changed the traditional banking economy and that new business models emerging from financial innovation became a key element in the crisis; P. Schufel [27], who, as a result of his research, concluded that Fintech is a new financial industry that uses technology to improve financial performance. According to these researchers the specific use of digital technologies is defined, including NanoTech, BlockChain, RetailTech, FinTech, LegalTech, Digital marketing, Grid technologies, GovTech , e-ID.

The theoretical and methodological principles of financial innovations and the issues of the efficiency of their use in financial markets highlighted in the researches of local scientists, such as D'iakonova [9], V. Babenko [2, 3, 22], Z. Kulczyk [2], I. Perevozova [2, 22], O. Syniavska [2], O. Davydova [2], L. Lomovskykh [3], A. Oriekhova [3], L. Korchynska [3], M. Krutko [3], Y. Koniaieva [3], N. Daliak [22], L. Zherdetska [34], G. Karcheva [35], N. Morozko [37], A. Ryabova [26] , O. Smirnova [38], D. Tretyakova [39] and others.

Despite significant revision in the theory of innovation and development of financial markets, current trends in the evolution of digital technology in the financial sector and the opportunities that they create, predetermine the study of the latest trends and processes, called «FinTech».

It is worth noting that neither scientific approaches nor practice can determine the place and time of origin of the Fintech term, but the phenomenon that it characterizes, has occurred much earlier. Atlantic Telegraph Company was one of those ones, which in 1866 laid the cable across the ocean, reducing the time of financial payments between America and Europe from months to days, even hours, and, as a result, saving time and money for transactions. In recent human history, Barclays Bank is referred to as the FinTech, establishing in 1967 the first ATM in London, which helped financial institutions to make more efficient use of their cashiers' working hours and reduce costs.

The Fintech term appeared in 1972 and helped to circumstance models helping to solve everyday banking problems of Manufacturers Hanover Trust , with vice president of the Bank, Abraham Leon Bettynger [23] giving the following definition of “Fintech as an abbreviation that means financial technology combining banking experience with modern methods of science and computer management” [4]. Furthermore, the citation of A. Bettynger S. Warshauer study [30] proves that his work was not unnoticed. Although this fact must be obvious, given that the simulator Fintech project in Russia in the early 1990s was done by Citibank.

Nowadays, the concept of "FinTech" does not have a clear definition. The most authoritative source is the Oxford Dictionary, where Fintech is interpreted as a "computer programs and other technologies that were previously used to support or provide banking and financial services: fintech is one of the fastest growing areas for venture capitalists" [20]. Another popular vocabulary of our time, Wikipedia, suggests that "financial technology, also known as fintech, is an economic industry consisting of companies that use technology to provide financial services in a more efficient way" [31].

The researcher at Friborg University of Applied Sciences P. Shueffel [27] understands Fintech as a new financial industry that uses the latest technology to facilitate financial activities. D'iakonova I. [9] defines it as a multi-vector, a unique and comprehensive form of interference of the latest technology into the financial industry, which is characterized by quantitative and qualitative development through startups and efficiency improvement of services delivery. Morozko N. [37] uses the term "financial technological space" as a synonymous to FinTech, and defines it as an industry that incorporates technologies for banking and corporate finance, capital markets, financial analytics, payments and personal finance management, it further includes private investment and private venture investment.

Summarizing the aforementioned interpretations, FinTech should be understood as technologies used in financial and insurance activities, which substantially alter traditional financial services, such as mobile payments, money transfers, lending, storage and asset management to optimize costs, increase value added, enhance realization processes, security and so on.

## 3. Results

The object of study is the processes of financial technologies development and their economic dimensions. To reach this goal, general scientific and specific research methods were used, namely: systematic analysis (to substantiate the theoretical basis of financial technologies and financial innovations concepts); historical and logical method (for the study of transformations of financial technologies, identification of preconditions and factors of their development); scientific abstraction, analysis and synthesis, systematic generalization (for development of categorical apparatus of financial technologies); benchmarking (to explore global leadership strategies in FinTech field); structural and functional analysis (to study the resources and mechanisms of financial innovation implementation by countries); as well as structural analysis (to determine the directions of development of FinTech in Ukraine).

There are three phases of FinTech development [1].

The first period (FinTech 1.0) lasted until 1987, when the financial sector utilized informational technologies, primarily based on analog transmission data.

The second phase (FinTech 2.0) (1987-2008). Within this period, technological innovations were introduced and funded mainly by financial sector leaders.

The third period (FinTech 3.0) started after 2008, when the post-crisis regulation of financial institutions required from management the elimination of the most problems causing crises. This led to the emergence of numerous startups, offering effective solutions to financial institutions, and defined the possibilities of digitalization in the future. The impetus for the Fintech revitalization were changes in the European regulatory legislation – The Directive Payment Services II (PSD 2) (European Commission, 2015), which require banks to open software data to a third party only after getting the consent of the consumer and the service provider. As early as in 2017, Ernst&Young found that over 33% of Internet users were actively using Fintech services. These data were obtained by interviewing 22 000 Internet users from more than 20 countries [12, 13, 25].

The most common are Fintech services in the developing countries, namely Southern Africa, Mexico, Brazil, India, China, where Fintech services proliferation was 46%, being higher than the average level in the developed countries, where it amounted to 28%.

The reason for these trends is the development of traditional financial infrastructure, as well as the decrease of the cost of smartphones, better access to the Internet, which has led to the increased demand for digital services within Fintech companies. Market segmentation of Fintech services in different countries varies: China and India are high in all areas of Fintech services, with Brazil having a higher level of online budgeting and financial planning services.

Using the latest technology, FinTech companies destroyed financial services industry through improving ways of providing traditional services as well as innovation products. The main driving forces behind FinTech were the availability of mobile internet and smartphones, loss of public confidence in banks and dissatisfaction with banking services. Among the most pressing trends worth noting are: services via mobile phone, financial services and social networks , alternative types of payments , market places, P2P credit models, balance lending , new business models, artificial intelligence, digital identification and biometrics, open application programming interfaces (API).

FinTech firms benefit from scratching through the latest technology. They are not burdened with outdated systems compared to traditional financial services. The new technology can be easily integrated into FinTech from other progressive sectors. More than 75% of FinTech respondents state that they are considering new products and innovations development, as such products and services have important benefits, and 90% those top managers indicated their competitive advantage as being agile and having opportunities to expand the customer base.

Agility to adopt these innovative technologies in line with the best practices of other sectors of the economy allowed FinTechs to develop these competitive advantages. Agility in experiments with new technologies and business models became a so-called business card of FinTech because of their freedom from the inherited luggage, as well as minor cost of failure. FinTech platforms are compatible with the latest technologies such as cloud, artificial intelligence, DLT, enabling them to offer new products and services quickly. These analytical systems are constantly being improved to handle huge volumes of unstructured data in real time, they can also be integrated with existing FinTech sytems. Moreover, regulatory factors, related to innovation in the financial services significantly simplified.

FinTech acceptance is developing due to increased transfers and payments, as well as insurance services. Major players in the field entered the retail market segment, together with FinTech companies, to provide new services or improve the offers with a wide absorption. Other FinTech have responded to the growing availability of the Internet and smartphones to launch digital versions of existing financial products. New payment services, which entered the market and became widespread after 2015, include only digital online bank and payments through mobile phones. Financial services, shuttle services and payments were and still are the most popular FinTech service: they grew within YY2015-2017 from 18 to 50%.

Global Fintech investments were doubled in 2018 (Fig. 1), partly due to the small number of mega-deals, including the purchase of WorldPay by Vantiv company and the grant in venture funding of 14 billion dollars, attaracted by Ant Financial in H1'18. In the second half of 2018 there was a huge number of large deals concluded, including those made by PE company Blackstone's. In addition, 17 billion dollars investments in Refinitiv (formerly the Thomson Reuters financial and risk group) and $3.5 billion into the acquisition of Blackhawk Network prepaid cards by Black Lake and P2 Capital Partners.

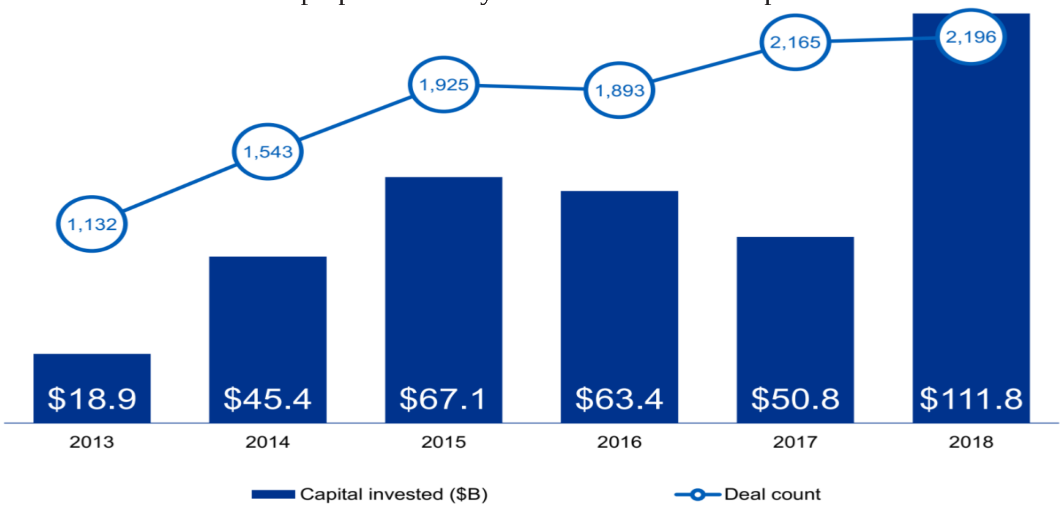


Figure 1. Total investment activity (VC, PE and M&A) in Fintech, 2013 - 2018 [24]

In general, 2018 was a year of record achievements in the fields of Fintech investments, including VC, CVC, M&A i PE.

New startups appeared in the new Fintech subsegments, in such a mature one as payments. For example, in 2018 the Danish payment company Nets merged with German Concardis concluding multibillion agreement. At the same time, Nets settled several other agreements, including Polish payment company Dotpay/eCard.

In 2018, some banks applicant and made serious strides to reach beyond their borders, such as Nubank in Brazil, N26 in Germany, as well as other British banks. The purpose of their development was to attract global investors. Thus, the Chinese technology giant Tencent in March joined the insurance company Allianz in order to invest 160 million dollars into German digital bank N26, to help the latter to provide international growth. Asian Fintechs also have the intention to invest as a way to go into a global scale.

In addition to the global expansion many banks applicants and digital banks also focused on expanding their services portfolio for the efficient competition both regionally and globally, as it is expected that such services enhancement (both within the country, and as a result of partnership) will continue to be one of the top priorities for digital banks.

In 2018 a lot of investors focused main attention on the business models of software as a service and (SaaS). Big technical players are constantly working to expand its offerings, including Alibaba, Google, and others. While some of these companies seek to compete directly with financial institutions, others have mainly focused on developing training products for banks and other financial institutions to launch their own Fintech solutions or enhance their internal efficiency.

In 2018, a number of major Fintech players have also made their Fintech investments. In September, PayPal purchased European payment platform iZettle 2.2 bln, and at the beginning of the year, Workday acquired Adaptive for about $1.6 billion. Stripe and Credit Karma were also very active in the M&A process.

Generally, over the past six years, global investment volumes made by Fintech companies has increased in almost 6 times. Despite the slight decrease in volumes in 2016-2017, growth in 2018 reached 220.1%. Payments, lending and banking have been the largest investments. Other global trends include mobile financial services, financial and account management, remittances, consultants, insurance technology, crowdfunding, P2P lending, blockchain and cryptocurrencies (Fig. 2).

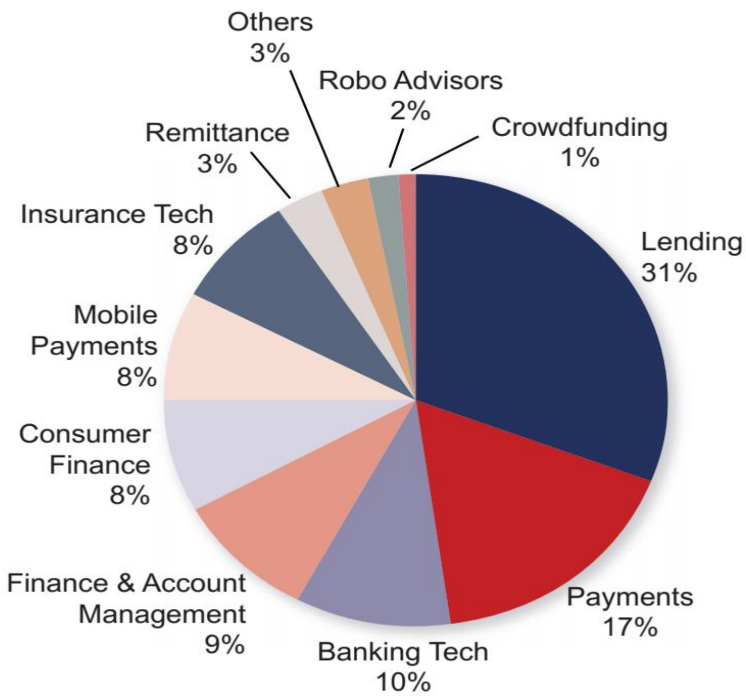


Figure 2. Global investing in FinTech by sector [12]

It is estimated that as of 2020, investment capital could reach $131.8 billion, while maintaining the annual growth rate of 8.6% (Fig. 3).

In Ukraine, FinTech is at the stage of emergence and has more than 60 companies with various levels of maturity. Privatbank (before nationalization) was the most developed in FinTech in Ukraine, they actively implemented technological services and essentially went before to not only Ukrainian market, but European. Meanwhile, FinTech became widespread among the players of the financial sector in Ukraine in 2017 after a series of advocacy events and forums devoted to this topic and its implementation, in fact, started after banking crisis and 2008-2009, with aftershocks in 2013-2014. During this period, significant changes have occurred in the banking sector of Ukraine, which are related to the following:

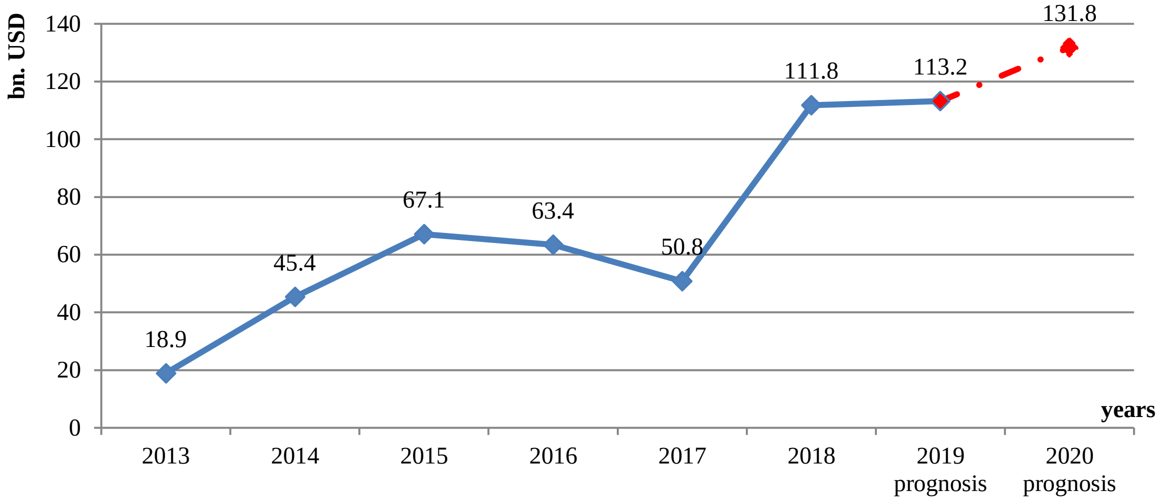


Figure 3. Forecast of global investment Fintech companies, billions of dollars.

*Source: calculated and constructed from Pulse of Fintech 2018, Global Analysis of Investment in Fintech, KPMG International (data provided by PitchBook ) January 4, 2019*

- suspending lending and reducing its presence on the national financial market by 20 European banks;
- a sharp decline in GDP in 2009 and 2015 respectively, accompanied by national currency devaluation and high inflation, which impacted the decline for the population purchasing power, and business bankruptcies. Banks, in turn, faced the growing portion of bad assets, which was reflected in a decrease of consumer credit offered by Ukrainian banks;
- consolidation of banks and reduction of their number from 175 in January 2008 to 88 in November 2017, which led to a decrease in the number of banking branches and restricted access to banking services;
- loss of the credibility to the banking sector from the side of households.

Financial crisis 2008-2009 in Ukraine led to the appearance of the first players within FinTech startups. The majority of projects was related to the payments and transfers. Approximately 58% of FinTech startups have been appearing starting from 2015.

Today, the FinTech development is actively supported by the National bank of Ukraine, which approved the complex program of Ukrainian financial sector development until 2020, providing implementation of the further initiatives: direction to cashless economy in 2020; transformation to ISO 20022 standards; electronic documents exchange with electronic signature, seals, stamps and paper copies cancellation; documents storage in electronic format; remote personal identification; ability to order financial services online; elctronic scancopes sight and signature of cash documents; the possibility to use BankID to the remote identification of bank customers; protection of the rights of users of financial services; financial literacy enhancement; new licensing rules to encourage new players in the payments sector [36].

Ukraine has a number of unique factors which, being combined with the developed infrastructure, contribute to the FinTech growth.

*Infrastructure.* Within YY2009 - 2019 the total number of Internet users has increased 9.3 times, with the annual rate 2.2% (Fig. 4).

In general dynamics one can extract two periods: nearly uniform increase with moderate growth in the first five years and accelerate growth contingent of users in the 2016-2019. For objective reasons that relate to the events in Crimea and Eastern Ukraine, the periods of subscriber reduction fall out from the general trend (2014).

Given the presence of the autocorrelation component of the formation of indicators of the total number of Internet subscribers, it is advisable to use autoregressive models, including the combined AR and MA model, including the autocorrelation component (AR) and the moving average model (MA) for the estimations. The sufficiently high level of statistical adequacy of the identified model (Fp=33,7;

$\left\{\begin{matrix} 2=0,05 \\ V_1=1 \\ V_2=6 \end{matrix}\right\}=5,99$; Fp>F2) ensures the objectivity of predictions for a given bias period. Provided that certain regularities of the number of subscribers change in 2020, the total number can reach 31 447 thousand people, and as of 2021 - 37698 thousand people. For the next two years, there will be a rather high growth rate of users, at the level of 20% annually.

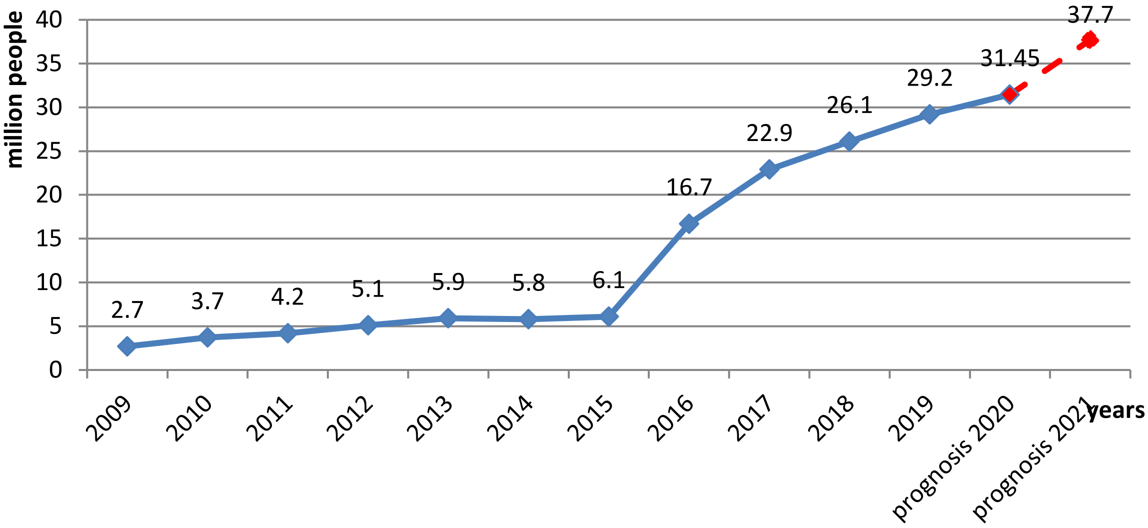


Figure 4. Dynamics of the number of Internet subscribers, millions of people

If we consider the trend of change in the number of Internet subscribers as a component of the life cycle of the process of development of the Internet in Ukraine, it can be conditionally determined that the country is on the verge of transition from the stage of "emergence" or startup (in the current scientific stage of the system's life cycle) to the stage of "growth ». It is 2017-2019 that can be seen as a conditional limit for such a transition.

Confirmation of this point of view is the analysis of trends in the number and distribution of FinTech companies in financial services. If this distribution was fairly uniform at the inception stage, the number of companies providing payment / transfer services has been accelerating since 2016 (Fig. 5). According to estimates made by the authors of the article, as of 2021, more than half of FinTech companies are focused on this type of financial services.

An important part of the infrastructure, which hinders the development FinTech in Ukraine is the lack of electronic identification. Electronic passports recently started to appear and start MobileID initiative will help to resolve the issue of electronic identification.

*Legal and regulatory environment*. Important changes recently introduced in the Ukrainian legislation will significantly affect the development of FinTech in Ukraine, namely: 1) authorization to sign bills and agreements by electronic signature; 2) permit to be banks not to translate documents, into Ukrainian, if they are in English; 3) simplified taxation for IT companies - 5% annually; 4) limitation withdrawal by the National Bank of Ukraine of dividends repatriation – the limit increased to five million dollars per entity per year; 5) actively support of the National Bank of Ukraine of the European Union Directives; 6) adoption of a profile law on electronic identification and trust services for electronic transactions in the domestic market (Law of Ukraine "On Electronic Confidential Services" dated 05.10.17 № 2155-VIII).

*Access to capital and investments.* Ukrainian startups use crowdfunding platforms for financing. According to research made by Mastercard [17], about 87% of the banking sector is ready for partnership with the FinTech startups. Creating new acceleration programs in the country will reduce the cost of FinTech startups and stimulate initial funding.

*Qualification.* Ukraine strives to maintain high standards of education in the fine sciences, and highly qualified IT professionals support the global FinTech industry. For example, a team of software developers in Cherkasy supports the implementation of FinTech projects for Transferwise company, which is estimated at more than 1.1 billion US dollars.

The vast majority of Fintech providers have appeared in the last three years (60%), whereas by 2015, only 40% were created. 84% of FinTech companies offer products and services, and 16% are still in the molding stage.

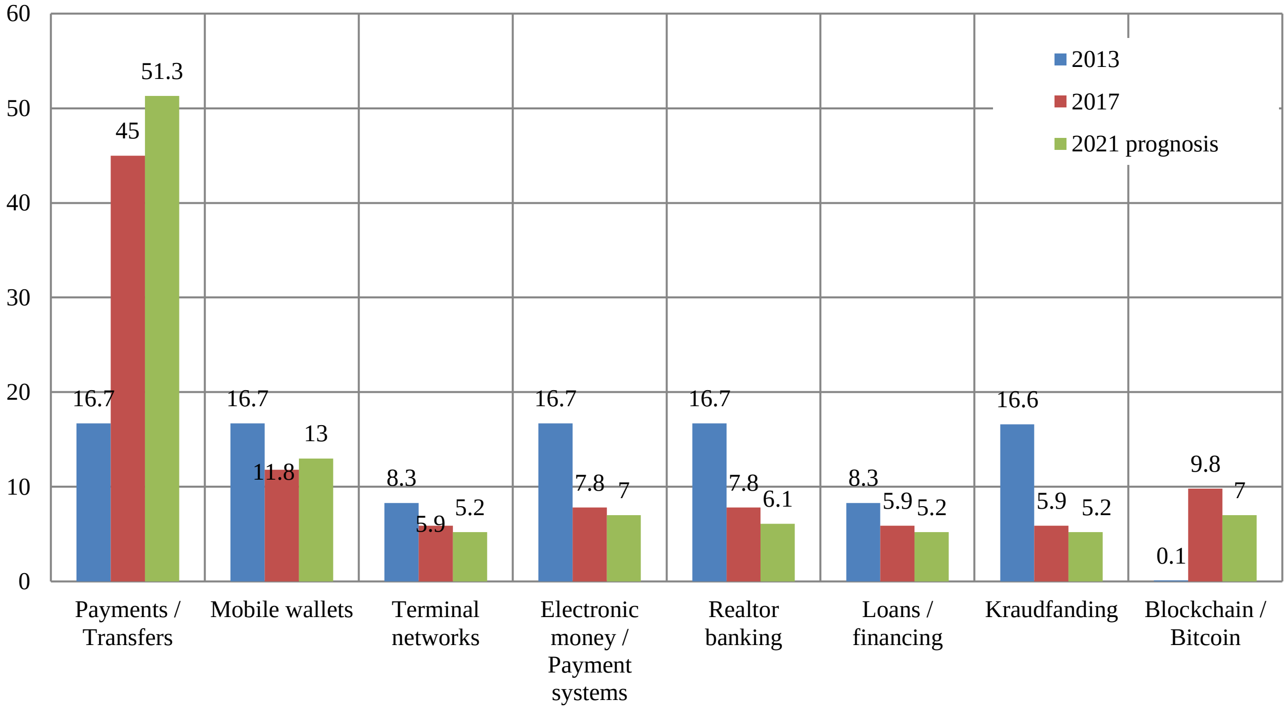


Figure 5. Changes in the structure of Fintech companies in the financial services market of Ukraine, %

*Source: calculated and built according to Fintech in Ukraine https://data.unit.city/fintech/fgt34ko67mok/fintech_in_Ukraine_2018_en.pdf*

## 4. Conclusions

Based on the analysis of the state and trends of the global Fintech services market, it is necessary to note the rapidly growing number of companies in this segment of the market. The proliferation of FinTech has led to the development of data processing technologies, increased distrust of traditional banks in the wake of the 2007–2008 global financial crisis, tighter banking regulation, the spread of social networks and messengers, changes in consumer behavior, the development of the sharing economy and the success of technology companies in the other sectors of the economy. The largest players in the market are companies in the US, China, the European Union and India. Their strong position in the FinTech market has been driven by a high level of investment, primarily in the areas of money transfers, payments, savings, investments and lending. The domestic sphere of Fintech services is developing rapidly, the number of companies supporting the development of domestic Fintech is growing. This is due to the increase in the number of Internet users and the expansion of the Internet, the increase in the number of smartphones, computers and tablets, the development of e-commerce.

Ukrainian Fintech companies are focused on the European market. Although intellectual resources are being exported to other countries, the necessary infrastructure is developed for the startup environment, in particular in the form of accelerators and incubators. It is recognized that in order to stimulate the growth of new projects, it is necessary to create conditions for doing business in the country. This applies primarily to the regulatory environment, legislative changes, tax policies for innovative companies, and simplicity and transparency in start-ups.

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