Finance

https://doi.org/10.12958/1817-3772-2025-4(82)-51-58

UDC 336.71:338.28:004(477)

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THE MAIN TRENDS IN THE DEVELOPMENT OF FINANCIAL INNOVATIONS IN THE DIGITALIZATION OF UKRAINE'S ECONOMY

Formulation of the problem. At the current stage, the main trend in the development of the global economy is digitalization, which is the process of spreading digital technologies in all aspects of business. Ukraine is also actively involved in the processes of globalization of the digital economic space and is transforming the economy from analog to digital in accordance with the Concept of Development of the Digital Economy and Society of Ukraine for 2018-2020 [1].

As you know, constant progress gives rise to the emergence of digital and innovative technologies, new models, technologies, a new type of thinking, creates new conditions for all subjects of economic activity, which in the future will not only lead to GDP growth, and will ensure the creation of a basis for the formation of electronic systems necessary for the citizens and businesses of the state. In addition, it should be noted that Ukraine has significant innovation and digital potential, which remains unrealized today and creates new opportunities to ensure the development of our country.

Analysis of recent research and publications. The study of problems and trends in the development of digital transformation of business processes is a priority for such domestic and foreign scientists as: V. Apalkova, R. Asen, B. Blechschmidt, R. Bukh, R. Heeks, S. Kolyadenko, G. Chmeruka and others.

A significant number of scientific works of foreign and domestic researchers are devoted to the theoretical and applied aspects of clarifying the essence, formation and functioning of the sphere of financial innovations: S. Volosovich, L. Dudynets, T. Kalashnikova, M. Maramigyn, N. Morozko, G. Pochenchuk, A. Semenog, M. Tarasyuk, D. Filipov and others. Noting the significant results of scientific achievements, it should be noted that a number of theoretical and practical issues of the functioning of the sphere of financial innovations in the conditions of digitalization of the economy of Ukraine require further study and analysis.

The purpose of the article is to substantiate the peculiarities and expediency of using the main forms of financial innovations in the conditions of digital transformation of the economy of Ukraine.

Presentation of the main research material. In the conditions of digitization of the modern economy, transformation is taking place in all spheres of economic life, including the financial sphere. Digitization is a general characteristic of most modern financial innovations and is due to the growing influence of information and communication technologies in the process of production and provision of financial services.

Radical changes are taking place in the field of financial technologies at the current stage, associated with increasing the level of automation, openness and consumer orientation. The value of this innovative sector is very high, as the global implementation of financial technologies is growing by 15-20% annually. In addition, in the conditions of the spread of the coronavirus infection, quarantine and forced isolation, the relevance of the use of digital technologies in the financial sphere began to increase throughout the world.

In the modern business environment, investment support for innovative activities of business entities is

relevant and an important tool for the development of entrepreneurship. Since innovation plays an important role in the activities of all market participants, there is a steadily growing interest in this category from the scientific community and practitioners. Modern trends of digitalization and value creation based on information resources are gradually changing the concept of accounting as a key information system of business management.

According to the Global Innovation Index in 2019, almost a third of investments in R&D in Ukraine came from abroad. Ukraine took 15th place (out of 129 economies) in terms of gross R&D spending from abroad. The distribution of domestic R&D expenditures (16 billion UAH) shows that in 2018 more than half (56.3%) went to scientific and technical (experimental) development, while 22.7% went to fundamental scientific research and 21% to applied scientific research. Costs are concentrated in Kharkiv, Dnipropetrovsk and Zaporizhzhia (1-3 billion UAH each) and Kyiv (7.5 billion UAH), where the main scientific institutions of the country are located. In Ukraine, there are approximately 988 researchers per million citizens. The quality of education is one of the main strengths of the economy, not only compared to the sub-regional level, but also on a global scale. In the 2019 Global Innovation Index, Ukraine ranked 14th in terms of enrollment in higher education institutions, with 83.4% of the population studying at this level.

What is more impressive is that it ranks 2nd in terms of employment of women with advanced degrees (almost 30% of all employed). In addition, in 2019, the country performed well in three dimensions of the Global Competitiveness Index - recruitment of graduates (54th place out of 141) and ease of finding qualified workers (53rd place), as well as recognition of research institutions (44th place) - although in the dimension of the state development of clusters, Ukraine took a less favorable place (96th place) [2, pp. 571–573].

The effectiveness of Ukraine's innovative activity in 2019–2020 decreased according to most other indicators.

The reasons for this are the decrease in spending on research and development and education as a percentage of GDP, which affected the quality of human capital development and research. In addition, the level of development of innovative infrastructure remains quite low compared to the leading countries of the world. Weaknesses also include the protection of intellectual property rights, the development of clusters and the share of the population that uses the Internet. Among the achievements of Ukraine is the improvement of the position according to the following indicators: talent attraction index, market and regulatory opportunities in the labor market, creativity, penetration of high technologies, qualification [3, p. 38].

Before the pandemic, many companies considered digitization as a means of saving financial resources and reducing unnecessary costs. If the data can be analyzed and emails sent automatically, it frees the sales team and the marketing team from redundant work and helps them focus on other tasks. However, digital transformation also offers businesses huge opportunities to innovate and find their way into their industry. The goal here should be the creation and development of optimization services throughout the organization.

Conferencing software, project hosting platforms, customer experience tracking and monitoring capabilities, and other important forms of software should be chosen based on their ability to create a unified experience so businesses can operate with as little confusion and disruption as possible.

A clear example of a company that has increased investments in the development of digitization during the coronavirus pandemic is the LEGO Group. As a result, the company's revenues increased by 2 times by the end of 2020. The rapid development of technology in recent years has led to changes in the financial sector: mobile wallets, online banking, crypto-platforms - what was once a rarity has become an integral part of everyday life. Fintech is a new outlook and a powerful trend in the financial sector. Fintech attracts the attention of not only program developers, but also players in the financial market who are ready to implement modern solutions. Therefore, it is important to understand the state of financial technologies in Ukraine and analyze their prospects. In Ukraine, the fintech industry is at an early stage of development, so it faces a number of challenges.

The crisis of the COVID-19 pandemic significantly accelerated the transition to digital technologies in various spheres of activity, which was manifested in the sharp growth of electronic commerce, the growth of the pace of implementation of video conferences, distance learning and financial technologies. According to the IMF, modern progress in the development of mobile money, financial and technological services, and Internet banking can bring significant benefits to the population with low incomes and small businesses [4], which, in turn, determines the relevance of research into the use of digital technologies in the financial sphere. Considering the factors of fintech development, Belinska G. focuses not only on external, but also on internal influencing factors that distinguish them from traditional banking and other financial services and make them more attractive to consumers, in particular, cost and price factors, the influence of which is associated with the lower cost of financial transactions, implemented using fintech [5]. Despite the significant results in the study of theoretical aspects of the development of financial innovations in the conditions of digitalization of the Ukrainian economy and world globalization, further research is needed. Fintech companies are financial institutions that

use technological developments to carry out transactions.

There are about 150 fintech companies in Ukraine today, most of which were founded within the last 5 years. The main directions of fintech products and services according to the Basel Committee on Banking Supervision are presented in fig. 1.

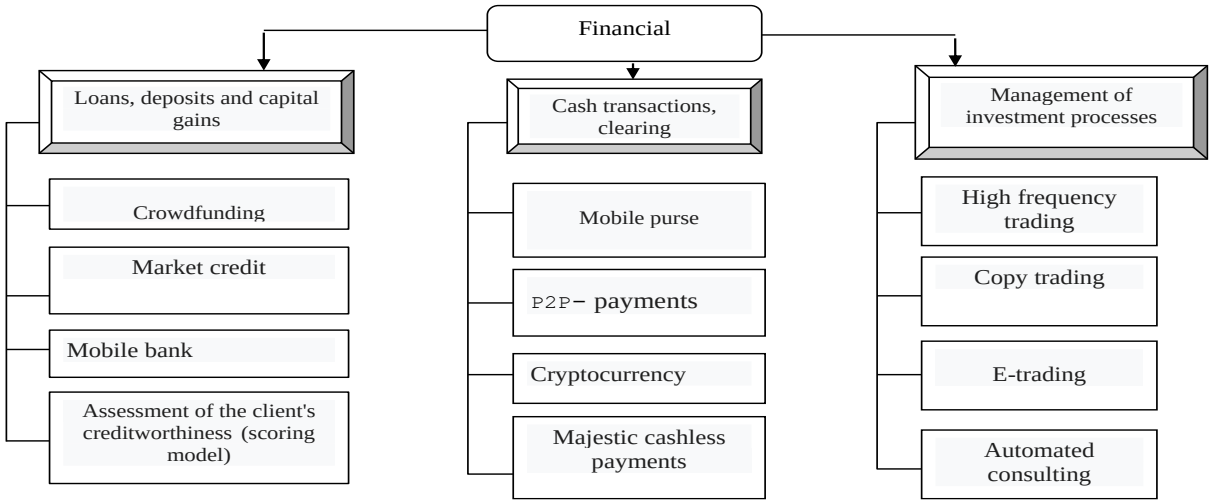

Fig. 1. **Classification of fintech products and services according to the Basel Committee on Banking Supervision**
Sourse: formed by the authors based on [6]

The development of financial innovation, as research shows, is especially noticeable in the last five years. As you know, the basis of the existence of any phenomenon is a set of conditions (factors). The main factors that contributed to the rapid development of fintech in the world, as practice shows, are the following: the global economic crisis that began in 2008 and its consequences.

During this period, the population began to lose confidence in traditional banking financial products and instruments; worldwide growth of digitization processes that have covered almost all spheres of human life, including the financial sector. Digitization increases the satisfaction of consumers of financial services; expands the capital management capabilities of the economic entity; reduces costs of all financial market participants; accelerates financial transactions; increases the territorial coverage of financial services; increases the transparency of relations on the financial market.

The development of information processing technologies has determined the development of such fintech segments as blockchain, P2P lending, online scoring, algorithmic trading and others; the active spread of the Internet (the geography is expanding and the speed of its work is increasing), which enables a person to be in cyberspace around the clock. Accelerated development of the mobile device market contributes to this process; rapid spread of social networks and messengers.

The growing popularity of social networks contributed to the emergence of fundamentally new types of financial services based on the exchange of information between users (crowdfunding, P2P transfers and financing, social trading, etc.); striving for innovation, increased requirements for ease of use of services, quality and speed of receiving information, characteristic of the most numerous generation of millennials in world history (born between 1980 and the beginning of the 2000s). This generation already depends on automated, faster and more efficient technologies and services.

As a result, demand for digital payment systems will grow rapidly this year and beyond; the success of technological companies in other sectors of the economy (retail, entertainment industry, etc.). The emergence of successful companies that have significantly changed their markets and offered more competitive products and services has sparked the interest of entrepreneurs, including in the financial sector; the growth of the volume of electronic commerce stimulates the growth of the volume of services in the segment of payments and transfers, as well as in the segment of financing.

The increase in the turnover of online trade is a driver of the development of payment services (including electronic wallets, internal payments using applications and instant payments), as well as services in the field of lending to buyers [7, p. 9-10].

Fintech opens up huge opportunities for all subjects of the financial sphere. It provides customers with lower costs, real-time payments, a wider choice of services and greater convenience. Fintech can contribute to the expansion of access to financing for individuals, small and medium-sized enterprises that are not sufficiently covered by financial services.

Revealing the positive impact of financial technologies for all its subjects, researchers note the growth of

competition on it, the consolidation of information technologies by financial organizations to diversify their business, the reduction of information asymmetry and the improvement of pricing efficiency, the expansion of the set of financial services and the circle of potential customers, the provision of financial accessibility in countries with a developing economy and a developed economy [8, p. 71].

Financial services in most countries of the world are developing at a fast pace, are in a process of constant change and evolution. Their evolution contributes to the modernization of the entire state system, which takes place on the basis of the introduction of financial, information and communication technologies, within which Blockchain technology is actively used [9]. Programmers, financial analysts, and economists note that the prevalence and demand for Blockchain technology will grow exponentially. This technology is successfully used not only in digital financial systems. Fig. 2 shows the scheme of operation of Blockchain technology.

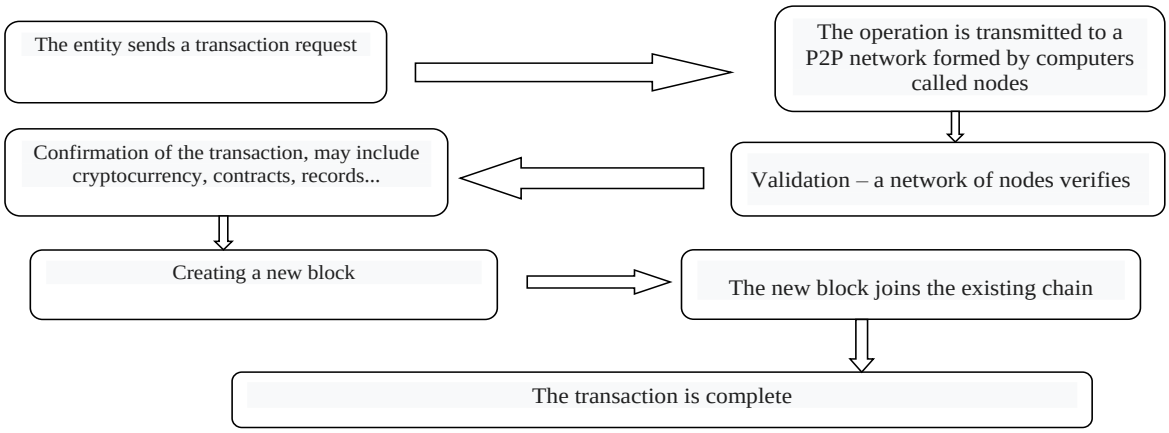

Fig. 2. **Scheme of operation of Blockchain technology**
Source: formed by the authors based on [9]

It is the blockchain technology that is a good example of such innovations, the application of which allows us [10]: to reduce the degree of risks of financial transactions; ensure a sufficient degree of trust between partners under conditions of maximum transparency.

We describe the properties inherent in this technology in the field of insurance:

- certification of transactions without intermediaries and implementation of electronic accounting;

- making payments and money transfers much faster and with a lower commission (especially in incoming and outgoing reinsurance transactions); increasing the level of cyber security of the insurer by checking the data that is received (transmitted), which is a guarantee of the reliability (authenticity) of the sources of their origin and the prevention of interception of information at an intermediate stage; implementation of the mechanism of individual microinsurance, in which the blockchain represents a third party (guarantor);

- obtaining certificates and other documents confirming the occurrence of an insured event from competent authorities (police authorities, medical institutions, etc.) and companies that provide various assistance services (medical, technical, legal), etc. [11].

Blockchain technology is a database for rapid exchange of information between users, while it has a high degree of protection, which is why its use is of interest to humanity and helps to effectively build relationships with partners and government bodies.

Along with the above-mentioned advantages, the use of financial technologies has a number of disadvantages: an insufficient level of regulatory regulation due to the use by fintech companies of business models different from traditional institutions; spontaneity of decision-making by consumers of online services; limited access due to a certain level of skills and availability of gadgets among users for online operations [12, p. 207].

According to the authors M. I. Dyb, O. M. Yurkevich, T. V. Mayorov, I. V. Vlasov and others, it is advisable to divide the sources of financing of innovative activities into two main groups - state and non-state.

Accordingly, the first category is represented by the system of centralized state financing of scientific, technical and innovative spheres directly from the state budget, the budgets of ministries and departments responsible to one degree or another for the development of innovative processes in the country, as well as at the expense of funds accumulated by specialized innovation funds [13, p. 104].

The second category provides for non-state sources of financing in the innovation sphere, in particular: own funds of innovative enterprises (scientific and scientific and technical organizations, innovatively active enterprises, integrated innovation structures), credit resources of the banking system, financial resources of non-banking financial institutions and various commercial structures, venture funds, foreign investments, private savings of individuals [13, p. 104].

Analysis of the financing of innovative activities involves the implementation of a number of tasks, namely: determination of technical and economic characteristics of innovations, assessment of their quality; increasing the level of competitiveness of products; determining the amount of investments for the development and implementation of innovations; determining the payback period of innovations; evaluation of the effectiveness of innovations; assessment of the structure of financing sources of innovative activity [14, p. 100]. According to the data of the State Statistics Service of Ukraine [15] regarding the distribution of volumes and the structure of sources of financing innovative activity in industry, the largest source of financing innovative activity in Ukraine during the last twenty years (2000-2019) remains the own funds of enterprises, the share of which in the total structure was 52.9-97.2% (7585.6 million UAH - UAH 13,427.0 million, respectively).

The historical maximum of the share of self-financing was recorded in 2015 (13,427.0 million UAH), and the minimum in 2011 (7,585.6 million UAH). Analyzing the absolute costs of enterprises for innovation, it is worth emphasizing their steady growth in 2000-2008.

As a result of the crisis, costs were reduced during 2009-2010, 2013-2014, but then steadily increased again. Investments at the expense of state budget funds aimed at financing innovative activities during 2000-2019 were mainly 1-5% (from 24.7 to 639.1 million UAH). The share of financing of innovative activities at the expense of foreign investments in the overall structure during 2000-2019 was also relatively insignificant and ranged from 1 to 19% (115.4 million UAH - 1512.9 million UAH), which proves the difficulty of attracting foreign financial resources.

The amounts of other sources, which include the funds of banks and non-bank financial and credit institutions, ranged from UAH 273.0 to 6,542.2 million, and their share was 2.0 to 45.6% [15]. This fact testifies to the increase in the role of financial institutions and the activation of their participation in investment processes, which is a positive phenomenon.

Banking institutions pay special attention to the formation of the client base and strengthening of relations with clients.

In particular, in recent years, the trend of a personalized approach to targeting and interaction with customers based on the formation of their complete profile has remained stable. It also allows you to build new marketing strategies based on customer activity. Knowing the customer profile leads to the development of new products and new relationships, especially with digital and mobile bank customers (Table 1).

The development of digital technologies contributes to the emergence of certain potential risks that affect the efficiency of the financial system. Such risks include: market risk, which involves negative consequences from a significant change in the market situation; cyber risk arising from the specifics of the financial technology environment; technological risk, which involves a violation of the uninterrupted provision of services as a result of failures or errors in the operation of the service; legal risks related to insufficient protection of consumer rights [17, p. 64].

Table 1. **Financial innovative products and services**

Bank-innovator	Innovation
«CaixaBank» (Spain)	«SegurCaixa Auto» is a new auto insurance solution with additional functionality for mobile devices. The policy of «SegurCaixa Auto» consists in auto insurance of property in the 365x24 format with the provision of exclusive services, in particular in the organization of trips, personalized service and legal protection
«CaixaBank» (Spain)	«ReciBox» is an online and multifunctional service that allows customers to fully manage and control their own accounts. The service has a friendly, new-style interface, unique interactive functions of providing useful information about the status of accounts, evaluating your own payment information and managing expenses, receiving messages, an additional portal with easy access to home banking, etc.
«Fidor Bank AG» (Germany)	«Fidor Smart Current Account» is a free bank account built using an additional programming interface (API). Provides additional opportunities to constantly increase the range of products and services (credit transfers via Twitter, social lending, social trading of virtual currencies, etc.), to deepen existing customer relationships and attract new customers
«Wells Fargo» (USA)	«CEO Mobile® biometrics» is a new security standard for mobile banking services to provide fast and secure access to services. The «Mobile Eyeprint CEO» feature uses the customer's mobile device to create a retina pattern that can be used to identify them when logging in, saving time and eliminating the need to remember passwords, etc.

Source: formed by the authors based on [16]

The above-mentioned risks are not new, they may increase due to the rapid growth of fintech, new forms of interconnection (cloud computing, data services, etc.) that are not covered by regulation. We believe that the most significant impact on the effective functioning of fintech under the conditions of digitalization is the risk of cyberattacks that financial companies have been exposed to recently. Thus, a survey of financial services risk managers showed that 70% of respondents consider the impact of cyber risk on the functioning of the global financial system to be the most significant [18].

Despite the existing risks of financial technologies, the potential for their use is much higher, so government authorities should improve the institutional structure of fintech, monitor the most advanced global financial

technologies, adapt to international regulatory rules and supervisory practices, and modernize legislation.

Research shows that the global financial innovation market is one of the fastest growing in the world. The number of users of financial innovations in the world is growing annually due to the rapid penetration of the Internet.

The increasing involvement of consumers in the use of new financial innovations is evidenced by the increase in the level of penetration of financial services – in 2015, the average level of penetration was 16% (fintech markets of 27 countries were used for the study), in 2017 – 33%, in 2019 – 64% [19].

At the current stage, there are more than 10,000 fintech startups in the world, the number of which is constantly increasing. Among the Top 10 global startups in 2018, the following projects in the field of financial innovation occupy a special place:

Bancor (a convenient platform for direct exchange of various cryptocurrencies); Building Blocks (a social project using blockchain technologies); Starling Bank (a project in the field of online banking); new generation credit platform «Kabbage»; investment platform Robinhood. Internationally, the most mature markets are the USA and Great Britain. However, other regions, particularly Asian (for example, Singapore, South Korea), are aiming to create their own developed fintech industries.

Fintech startups are the leading link, but traditional financial organizations have also actively started investing in modern innovations. It should be noted that financial technologies penetrate into other areas of the economy [20].

The coronavirus pandemic has become a catalyst for the development of digitalization and an increase in the number of investments in digital technologies around the world. International companies began to pay more attention to the values that digitalization provides and stopped perceiving it only as a means of reducing financial costs.

It is expected that the number of investments in the development of digital technologies will increase during the years 2021-2025, because without digital support it will be difficult for companies to compete in the international market and satisfy the needs of consumers. In connection with the lockdown in most Western European countries, where only stores with essential goods are now open, there is an urgent need for companies to have an online presence and their ability to maintain the level of sales at the same level as it was before the outbreak of the disease of COVID-19. Behavioral habits of buyers are rapidly changing, and this need will continue to be relevant in the future when the coronavirus pandemic subsides.

Conclusions.

So, the current stage of digitalization of the economy has determined the trends and directions of development of the banking sector, but at the same time it has revealed challenges and threats, in response to which banking institutions must concentrate all their potential. In particular, priority tasks should include the need to prioritize digital initiatives and establish their clear alignment with the banking institution's corporate development strategy. In addition, the impact of digital initiatives should be reflected in key performance indicators, as well as when assessing the increase in business value before and after the implementation of financial innovations. Another important issue is the creation of teams within the corporate structure from among highly qualified and talented specialists and the formation of a culture of generation, development and implementation of digital initiatives.

Today, it can be said that the domestic banking system is not aloof from the global innovation process in the banking sphere and has sufficient innovation potential for the active implementation of financial innovations that have shown themselves positively on the markets of other countries, as well as the development of own innovations, which have already had some success. However, the general processes of digitalization of the national economy need to be accelerated, otherwise they can turn from opportunities into threats for Ukraine.

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Надійшла до редакції 18.10.2025 р.
Прийнята до друку 26.11.2025 р.

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Received: 18.10.2025
Accepted: 26.11.2025

Fomichenko I., Stashkevych I., Burtseva O., Byvsheva L. The main trends in the development of financial innovations in the digitalization of Ukraine's economy

The article examines current trends, as well as reveals the characteristics of financial innovation in such classes as radical and socially oriented, banking products and services, service channels, internal processes. The challenges and threats of the banking business, which are caused by the spread of digitalization of the economy and affect the emergence of financial innovations, have been identified. The main forms of intensification of innovative development of entrepreneurship in the conditions of digital transformation of economy are considered. The classification of fintech according to the Basel Committee on Banking Supervision has been studied. The leading foreign experience in the use of financial innovations is analyzed, its dynamic development is proved on the basis of the analysis of statistical data. The state of the Ukrainian fintech market is studied and the main problems of its functioning are revealed.

Keywords: innovation, financial innovation, digital economy, digitalization of the economy, information and telecommunication technologies, digital technologies, IT innovations, fintech companies, Blockchain technology.

Фоміченко І., Сташкевич І., Бурцева О., Бившева Л. Основні тренди розвитку фінансових інновацій в умовах цифровізації економіки України

У статті досліджено сучасні тенденції, а також розкрито характерні особливості фінансових інновацій у таких класах, як радикальні та соціально-орієнтовані, банківські продукти і послуги, канали обслуговування, внутрішні процеси. Визначено виклики і загрози банківського бізнесу, що зумовлені поширенням процесів цифровізації економіки та впливають на появу фінансових інновацій. Розглянуто основні форми активізації інноваційного розвитку підприємництва в умовах цифрової трансформації економіки. Досліджено класифікацію фінтех відповідно до Базельського комітету із питань банківського нагляду. Проаналізовано провідний зарубіжний досвід використання фінансових інновацій, доведено на основі аналізу статистичних даних його динамічний розвиток. Досліджено стан українського ринку фінтех та виявлені основні проблеми його функціонування.

Ключові слова: інновації, фінансові інновації, цифрова економіка, цифровізація економіки, інформаційно-телекомунікаційні технології, цифрові технології, ІТ-інновації, фінтех компанії, технологія Blockchain.