DIRECTIONS FOR IMPROVING THE DIGITALIZATION OF FINANCIAL TECHNOLOGIES IN UKRAINE

Stanislav Sieriebriak
Doctor of Law, Associate Professor at the Department of Public and Private Law,
Volodymyr Dahl East Ukrainian National University, Ukraine
e-mail: sieriebriak1@gmail.com, orcid.org/0000-0001-7207-594X

Summary

The article analyzes the essence of the state regulation of digitalization of the financial system of the state, taking into account the changing political and economic situation in Ukraine. The main conceptual approaches to the definition of basic terms are considered, and the features and purpose of digitalization of financial technologists are defined.

The peculiarities of the formation of the Fintech system are clarified. It is determined that the financial technology industry includes many tools, including: computers, smartphones, tablets, cloud technologies, artificial intelligence, machine learning, augmented and virtual reality, and many others. It is concluded that the process of digitalization of financial technologies is at the stage of its development and requires adjustment of its individual directions.

It is determined that in Ukraine, digital financial services are provided by three types of companies: traditional financial institutions, startups that introduce new formats of financial services, and large technology companies that are actively expanding their presence in the financial sector.

The main factors that influence the development or inhibition of the development of the digitalization system of the financial technology industry are considered. The main measures that will contribute to the digitalization of the financial sector at both the global and national levels are highlighted. The author proposes priority areas for improving the processes of digitalization of the financial sector in Ukraine, among which an important, key role is played by the creation of an appropriate system of legal support for these processes.

Key words: digitalization, financial sector, financial technologies, areas for improvement of legislation, banking sector, fintech, blockchain.

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1. Introduction

The extensive application of digital technologies in all spheres of public life is driving the continuous development of information systems in the financial sector. In addition, they actually change the conceptual approaches to building relationships in the financial market of any country (including Ukraine).

In recent decades, the issues of digitalization and digitalization have been gaining momentum and becoming key issues for discussion on the development of economic systems in general. Even during the spread of the COVID-19 pandemic, these processes became more acute and relevant, as the pandemic has dramatically changed the views of financial market researchers and practitioners on traditional financial services.

During this period, the following new concepts have been actively developed: “financial engineering, financial innovation, FinTech, blockchain, financial networking, which confirms the

continuous irreversible development of new financial instruments and technologies, as well as the significant digitalization of the process of providing classic banking and other financial services.

Changes in the conditions for the provision of financial services by major financial intermediaries, the gradual abandonment of traditional formats of their provision and the transition to social networking among financial market participants, and the development of alternative social networking finance have led to the active digitalization of traditional financial instruments.

The inability of large financial institutions to anticipate and minimize financial risks in a timely manner, loss of flexibility, and inability to ensure the stability of capital circulation in the economy, which began during the 2007-2008 crisis, not only increased distrust of such institutions, but also led to the search for alternative financial instruments and networked forms of organizing financial transactions by technologically advanced investors. These processes have influenced the use of blockchain technology, the development of numerous financial mobile applications, and the emergence of alternative payment systems outside of banking institutions.

Therefore, ***the main purpose*** of this research paper is to identify the main directions of modernization of the state policy in the field of digitalization of the financial sector of Ukraine's economy. The main tasks set by the author in addressing this issue include the following: 1) to identify the main factors affecting the digitalization of the financial sector in Ukraine; 2) to analyze the main directions for improving the digitalization of the financial sector in Ukraine; 3) to analyze current and prospective legislation in the field of digitalization in Ukraine; 4) to identify promising areas for reformatting the state policy in this area.

Materials and methods of research. Our study focuses on rethinking approaches to the formation of state policy in the field of digitalization of financial instruments. This was made possible by applying the method of retrospective analysis of the main stages of legal regulation of this area in Ukraine. In some cases, the method of comparative legal analysis was used to define the terminology in this area both among scholars and to consolidate the relevant terms at the level of regulatory legal acts. The main emphasis was placed on the works of both foreign and Ukrainian scholars, as well as EU and Ukrainian legislation, due to the specifics of the subject matter of the study. We mainly used the modeling method to characterize the main areas for improving the digitalization of financial instruments, taking into account the current situation, as well as other special conditions, such as a pandemic, war, etc. At the same time, a number of issues in this study were considered using the analysis method. In general, where appropriate, certain generalizations have been made about the approaches to the issues under study.

Many scholars have devoted their works to the study of financial technologies. For example, the work of Murinde V. et al. highlights the impact of the fintech revolution on the future of banking, exploring the opportunities and risks of this phenomenon. The authors analyzed technological innovations and innovative approaches in the banking sector aimed at optimizing services and improving efficiency. Das S. R. devoted his research paper to the future of fintech, offering analysis and forecasts on the evolution of financial technologies. The author also focused on the impact of artificial intelligence, blockchain technologies, cybersecurity, and other factors on financial technology strategies, citing modern scientific and technological advances. Alawi S. M. et al. analyzed the impact of financial innovation and institutional quality on financial development in emerging markets. The authors explained the role of innovation and the institutional environment in financial development, especially in emerging markets. The research paper by Fong D. and his co-authors analyzed the impact of major modern technologies on the future development of the fintech industry. The authors identified seven key technologies that will determine and influence the evolution of financial technologies. An interesting study was also conducted by Marszk A. and Lechman E., in which the authors examined the role of information and communication technologies (ICT) in

the implementation of financial innovations in European countries. The paper analyzes trends in financial technology, providing an important contribution to understanding the interaction between ICT and the financial sector in the modern world. The study by Kumar T. and Kaur S. focuses on the evolution of fintech in the context of the financial era, in which the authors investigated the main aspects of the development of the fintech industry and its impact on the modern financial paradigm. Ukrainian authors have also thoroughly researched this topic. For example, S. Obushnyi et al. highlighted the importance of financial technologies for the Ukrainian economy and proposed strategic ways to achieve innovation and stability. The authors also revealed the essence and relevance of the use of financial technologies in the global financial market. Researchers Danylkiv H. et al. revealed the peculiarities of the development of innovative instruments in global financial markets, focusing primarily on the analysis of the latest trends in this context. Kovalenko Y. M. and Litvin Y. A. devoted their work to analyzing the classification and directions of innovative solutions in the financial sector, their classification and determination of directions in the financial sector. The authors systematized various instruments and defined their role in stimulating innovation and economic development. O. M. Shevchenko and L. V. Rudych devoted their research to studying the impact of digitalization on the development of financial technologies in Ukraine. The authors examined the technological and economic changes taking place in the Ukrainian financial sector under the influence of digital transformation.

All of these scientific achievements are of great value for the development of both legal science in general and the legal understanding of the digitalization process in the financial sector. However, it is worth noting that these works do not contain provisions on the current state of legal regulation of the digitalization of the financial sector in special circumstances, in particular, in a full-scale war. Therefore, we believe that it is necessary to propose new approaches to the development of a mechanism for legal regulation of digitalization of the latest technologies, considering the challenges of today and with a view to improving the efficiency of this system.

The study made it possible to identify those internal and external factors that negatively affect the effectiveness of the system of state control (supervision) over economic activity. A thorough analysis of the current situation in the Ukrainian State made it possible to identify the main directions of modernization of the State policy in this area, considering the interests of all participants to these legal relations. In the following, we will present the results of the author's study of these aspects.

2. The evolution of the FINTECH sector

The financial technology industry is rapidly developing and improving. Despite the gloomy economic situation, the FinTech revolution continues. Numerous transformative FinTech trends are expected to drive a $332.5 billion financial technology industry in 2022, even in the face of global inflation, crypto-zone, and bad geopolitical sentiment *(Calderon, J. Watch, 2022).* The diverse range of products and services provided by financial technologies, namely payment processing, online and mobile banking, online lending, P2P payments, financial software and services, makes it possible to develop, improve and transform not only the financial industry but also other sectors of the economy, such as transportation, hospitality, education, fundraising, etc. FinTech can be defined as software, services, or businesses that make financial processes more efficient than traditional methods. By using special software on computers and smartphones, business owners and consumers are better able to manage their financial transactions. A FinTech provider is an individual or a company that uses a technology platform (online or offline) to provide new financial services more efficiently and affordably or

to improve the delivery of existing ones *(Emerging Role of Data and Fintech in the Development of Digital Economy, 2021)*.

Digital technologies cover a wide range of tools, including computers, smartphones, tablets, cloud technologies, artificial intelligence, machine learning, augmented and virtual reality, and many others. To date, the financial sector of the national economy has already applied such innovative technologies that can ensure the speed, efficiency and security of financial transactions as cloud computing, blockchain, smart contracts, the Internet of Things, artificial intelligence and others.

Cloud Computing provides access to significant resources via the Internet. They reduce the cost of IT infrastructure, increase its scalability and agility, provide flexibility in resource management, and create opportunities for data storage with mobility and accessibility. Cloud technologies also allow data backup and recovery in case of loss or damage *(Shyshkina, O. V., 2023)*.

A blockchain is a distributed database that stores information in the form of blocks that are interconnected by a chain and protected from changes. The technology ensures the security of financial transactions, minimizes the risks of fraud, increases the efficiency of financial institutions, reduces costs and reduces the number of intermediaries *(De Filippi, P., 2019; Tapscott, D., 2014)*.

Smart contracts are programs that can automatically fulfill contractual terms without the need for an intermediary *(Shiklo, B., 2020)*. A smart contract can replace classic contracts by providing automated execution of transactions without intermediaries. In the financial sector, it reduces costs, increases accuracy, reliability, and reduces the risk of fraud because it is executed automatically. For example, a smart contract can check for fulfillment of conditions and make payments. Banks use them to automate payments, and insurance companies use them to determine insurance payments.

The Internet of Things (IoT) is a network of devices that exchange data without user intervention. The introduction of IoT in the financial sector allows collecting data about users and adapting services to their needs *(Ethereum Smart Contract Security Best Practices)*. For example, banking institutions can use data from monitoring the activity of banking service users to understand what financial products they need and to formulate appropriate personalized offers of such services.

Machine Learning is a technology that allows software systems to learn from data and make optimal decisions on their own. In the financial sector, it helps automate processes, improve the accuracy of analysis, reduce costs, and attract new customers. Artificial intelligence (AI) improves customer service, speeds up decision-making, and reduces financial risks. These technologies are used in electronic payments, banking applications, financial analysis, lending, and risk assessment, making financial transactions faster and more efficient.

Banking applications and online banking allow customers to conduct financial transactions anytime and anywhere, which increases convenience and reduces the cost of maintaining physical branches. The use of blockchain ensures the security of transactions and protection of confidential data. Financial institutions are actively using artificial intelligence, machine learning, and IoT to analyze data, automate lending and investment decisions, and assess risks. Digital technologies help analyze large amounts of data, which improves financial decision-making.

Advantages of using FinTech providers *(Doroshenko, Olena O., 2023)*:

– fast provision of financial services;

– few regulatory requirements (this allows providers to focus on improving their financial technologies and reducing costs);

– the possibility of cooperation with banks (this makes it possible to reduce operating costs, improve the quality of intermediary activities and become more stable);

– facilitating access to instant funds for urgent needs or small loans for people with low incomes;

– Increase financial convenience for users, as services can be accessed from any location with Internet access.

In Ukraine, three types of companies provide digital financial services. The first is traditional financial institutions (banks, payment systems, insurance companies). The second is startups that introduce new formats of financial services. The third is large technology companies (big tech) that are actively expanding their presence in the financial sector. These include telecom operators (Kyivstar, Vodafone), search engines (Google, Yandex), online platforms (Amazon, Alibaba), social media (Facebook, Tencent), and technology manufacturers (Apple, Samsung) *(Kovalenko, V. V., 2020).*

Thus, it can be concluded that although the penetration of digitalization processes into all spheres of life has been going on for quite some time, they are not yet complete. This is because each stage of human development has its own threats and challenges.

3. Drivers of financial sector digitalization

In a rapidly evolving world, technological innovations play a key role in changing all aspects of life. One of the areas that has been most influenced by such innovations is the financial system *(Al Kasasbeh, 2023)*. From decentralized financial instruments to the use of artificial intelligence and the development of fintech platforms, technological changes are transforming and reforming the global financial system, providing us with new opportunities and creating new challenges for economic society. Modern technologies, such as blockchain, allow payments to be made directly between users, avoiding intermediaries, and also address security and privacy issues in electronic transactions *(Chong, 2019)*.

At the same time, the development of artificial intelligence makes financial analysis more accurate and predictable, and fintech companies are forcing traditional financial institutions to look for new ways to compete and provide services. Ebrahimi M. considers technological innovation as the process of creating, implementing and disseminating new ideas, products, services or processes based on advanced technologies and designed to improve or change existing methods and processes in various industries. Such innovations may include the development of new technical solutions, the introduction of new approaches to production, data analysis, and the creation of new products or services that meet modern consumer needs. Technological innovations are often aimed at increasing productivity, improving quality, and reducing costs in various sectors of the economy and society as a whole *(Ebrahimi, 2023)*. The international financial market is a set of all financial instruments, services, and transactions that are carried out between different countries and financial institutions. It is a key part of the global financial system and has a huge impact on the global economy. In the context of the international financial market, technological innovations play an important role in changing the way financial transactions are conducted, risks are managed, and financial services are provided *(Feyen, 2021)*.

If we summarize the main stages of the impact of digital technologies on the development of the financial market, scientists will identify the following *(Chunyts'ka, I., 2023):*

1. After the 2008 global financial crisis, banks had to adapt to new regulations, including stricter capital requirements, enhanced risk management, and tighter KYC (Know Your Customer) and AML (anti-money laundering) procedures. Simultaneously, the rise of the Internet, smartphones, social networks, and innovations from tech giants like Amazon, Facebook,

Google, Apple, and Microsoft set new consumer standards. Increased labor migration boosted remittances, while small and medium-sized businesses sought alternative financing, fostering the growth of fintech companies and digital financial technologies.

2. The period of global instability, marked by the COVID-19 pandemic and war, accelerated the adoption of digital financial services and e-commerce. Quarantine restrictions and social distancing increased reliance on digital channels for financial services. In the EU, fintech app usage grew by approximately 70% weekly, while in Ukraine, the rise in non-cash transactions drove the rapid development of financial innovations.

According to research, the development of financial technologies has been particularly noticeable in the last ten years. As you know, the existence of any phenomenon is based on a set of conditions (factors). The main factors that have led to the rapid development of fintech in the world include the following:

1. The active spread of the Internet (expanding geography and increasing speed), which allows people to be in cyberspace around the clock. The accelerated development of the mobile device market also contributes to this process.

2. The rapid spread of social networks and messengers. The growing popularity of social networks has 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.).

3. 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.

4. The growth of digitalization processes around the world, which have covered almost all spheres of human life, including the financial sector. Digitalization improves the satisfaction of financial services consumers; expands the ability to manage the capital of an economic entity; reduces the costs of all financial market participants; accelerates financial transactions; increases the territorial coverage of financial services; and increases the transparency of relations in 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, etc.

5. The desire for innovation, increased requirements for the convenience of using services, quality and speed of information are inherent in the largest generation of millennials in world history (born between 1980 and the early 2000s). This generation is already dependent on automated, faster and more efficient technologies and services. As a result, the demand for digital payment systems will grow rapidly this year and beyond.

6. The success of technology companies in other sectors of the economy (retail, entertainment, etc.). The emergence of successful companies that have significantly changed their markets and offered more competitive products and services has aroused the interest of entrepreneurs, including in the financial sector.

7. The growth in e-commerce is driving the growth of services in the payments and transfers segment, as well as in the financing segment. The increase in e-commerce turnover is driving the development of payment services (including e-wallets, in-app payments, and instant payments), as well as customer lending services *(Mazaraki, 2018: 9–10; Kalashnikova, T. V., 2018: 202)*.

The EU also focuses on the digital transformation of the financial sector, where the following four priorities are identified:

First, overcoming the fragmentation of the single digital financial services market will give European consumers access to cross-border services and support the expansion of digital

operations by financial institutions. Cross-border growth is essential as online service development is resource-intensive, while replication is cost-effective and requires scaling. A larger market attracts investment, increasing service availability. Companies achieving economies of scale provide services at lower costs and better quality.

Secondly, establishing a regulatory framework in the EU to promote consumer-focused digital innovation and market efficiency. Technologies like distributed ledgers (DLT) and artificial intelligence (AI) enhance financial services, but their responsible use must align with EU values. Continuous monitoring and adaptation of legislation are essential to maintain support for digital innovation and reflect evolving market conditions.

Third, creating a European Financial Data Area to foster data-driven innovation by improving data access and exchange in the financial sector. The EU mandates financial companies to disclose comprehensive financial and non-financial information and facilitates open payment account data sharing under PSD2. Further efforts to enhance transparency and data sharing, while respecting data protection and competition laws, will drive innovation, support new financial products, and contribute to the creation of a unified European data market.

Fourth, addressing emerging challenges and risks from the digital transformation of financial services. Fragmented ecosystems involving unregulated digital service providers complicate existing regulatory efforts on financial stability, consumer protection, market integrity, and cybersecurity. The European Commission emphasizes the principle of "same activity, same risk, same rules" to ensure fair competition between traditional institutions and new market entrants. *(Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the regions on a Digital Finance Strategy for the EU, 2020).*

Today, it is important to recognize the main priorities for the development of the digital economy as a whole, as well as the digitalization of the financial sector itself. This will prevent resources from being wasted on less important areas and sectors. At the same time, the demand for financial services should be taken into account.

4. Main directions of financial technologies digitalization improvement in Ukraine

In today's interconnected environment, financial solutions need to be accessible, simple and reliable. This is essential for the development of the global economy and its individual sectors. Governments at the global level should address the problems of protecting financial services consumers, ensuring financial market integrity and maintaining financial stability in the world. The necessary measures include *(New technology key to globalization of digital economy, 2021; Fintech in a Global Economy: Finding balance between innovation and stability, 2018)*:

– Ensuring the functioning of efficient markets (by stimulating innovation in the financial sector and promoting competition), which will have a positive impact on the investment climate and consumer demand;

– raising the level of financial education of financial services consumers (business owners and individuals) on the risks and methods of data protection;

– ensuring legal regulation in the FinTech sector (including adaptation and modernisation of the regulatory framework to streamline and develop financial systems, as well as to ensure a favourable regulatory environment);

– ensuring the development of digital authentication;

– use of new financial technologies to improve the provision of financial services;

– ensuring the protection of the integrity and stability of financial systems;
– to carry out international coordination of legal regulation in the field of FinTech;
– encourage international cooperation in the field of FinTech;
– introducing forward-looking thinking and predictive strategies for the development of FinTech, etc.

Digitalisation affects the transformation of the legal system of any country. If we talk in more detail about the digitalisation of the financial sector, it is primarily about expanding the subject matter of financial law through the emergence of new objects of legal regulation (electronic money, digital currencies, financial assets) and the inclusion of new types of social relations *(Latkovs'ka, T. A., 2021: 39).*

Firstly, digital technologies complement the methods of legal regulation, in particular, they automate information processing and control over the fulfilment of tax obligations. The widespread use of digital technologies ensures not only the transfer of information but also its automatic processing, which helps to identify violations of legal requirements *(Reyestratsiya platnyka PDV. Portal Diya)*. VAT accounting technology allows tracking the process of paying the tax at all stages of the sale of goods, works and services. For example, a person who registers as a VAT payer is assigned an individual tax number, which is used to pay the tax and is retained by the payer until the registration is cancelled *(Reyestratsiya platnyka PDV. Portal Diya)*. 'Financial technologies' simplify the exchange of information, automate the processes of analysing accounting and reporting data on transactions with cash and other property, which leads to an increase in the efficiency of legal regulation *(Reyestratsiya platnyka PDV. Portal Diya)*.

Secondly, there is a change in the 'property content' of financial legal relations. The property aspect of the legal regulation of financial relations reflects the state's desire to ensure financial stability *(Kuznyetsova, N., 2016).* Ukrainian legislation has been supplemented by the concept of 'digital thing' (Article 179-1 of the CCU), which includes virtual assets, digital content and other benefits with property value *(Tsyvil'nyy kodeks Ukrayiny: Zakon Ukrayiny vid 16.01.2003 № 435-IV)*. To regulate the circulation of digital assets, a number of laws have been adopted, including the law on digital content and digital services (draft law № 6576), and the National Bank of Ukraine has been assigned the function of supervising transactions with digital financial assets *(Tsyvil'nyy kodeks Ukrayiny: Zakon Ukrayiny vid 16.01.2003 № 435-IV)*.

Third, the discretion in regulating financial relations is increasing. The introduction of digital technologies creates a greater variety of legal regulation mechanisms. For example, within the framework of tax relations, taxpayers may submit declarations, calculations and other documents both in paper and electronic form (sub-clause 'c' of clause 176.2 of the Tax Code of Ukraine) *(Podatkovyy kodeks Ukrayiny: Zakon Ukrayiny).* Such flexibility allows to optimise the fulfilment of tax obligations and ensure compliance with modern digital realities.

Fourth, the main methods of legal regulation are being transformed. The Law of Ukraine 'On Banks and Banking Activities' obliges banks to provide authorised persons of the National Bank of Ukraine with free access to all information systems of the bank for inspections (*Pro banky i bankivs'ku diyal'nist': Zakon Ukrayiny*). This ensures prompt control and contributes to the transparency of financial activities. Tax monitoring is a form of constant interaction between tax authorities and taxpayers, which is carried out through telecommunication channels *(Ovcharenko, A. S., 2021)*. It provides direct access of tax authorities to accounting and tax records, which reduces the risk of tax evasion. Electronic document management is gradually becoming the main means of interaction, optimizing and simplifying tax administration *(Ovcharenko, A. S., 2021)*.

Finally, it should be noted that the main areas for improving the digitalisation of the financial sector in Ukraine are as follows:

1. Countering challenges and threats to the financial sector in times of war. That is, it is necessary to develop not only a stable financial system, but this system must also be flexible enough to respond quickly to rapidly changing circumstances of public life and the needs of consumers of financial services.

2. Ensure an adequate level of legal and regulatory framework for the digitalisation of Ukraine's financial sector. Although a number of regulations have been adopted in the area of digitalisation, including in the financial sector, the level of legal support for these processes is still low.

3.Collaboration with leading European institutions to join the European financial area and define common tasks and priorities.

4. Monitoring the success of digitalisation reforms in order to adjust them to the needs of today.

5. Developing the basic principles of state policy in the field of digitalisation, as well as setting priorities for the coming years.

5. Conclusions

Digitalisation of financial relations is an integral element of the transformation of not only financial markets but also the economy as a whole. Services resulting from the integration of innovative technologies and financial services are becoming platform-oriented. In such circumstances, there is a need to standardise data access methods and develop technologies to ensure security and protect against new risks.

The introduction of new digital technologies is contributing to increased competition in financial markets. Product offerings are expanding amid easier access to them. The boundaries between financial products and lifestyle services are gradually blurring, setting new standards.

Today, it is important to identify priority areas for improving Ukraine's legislation in the field of digitalisation of financial technologies in times of war, as the obvious problem is the lack of resources for global reforms.

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