

Modern Types of Financial Innovations in the Conditions of Digitalization of the Global Banking System

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Abstract—This article reveals the features of the influence of innovation processes on the transformation of financial services, contains the principles of financial innovations, presents a classification of financial services in terms of provided services segments. There are highlighted problems in the functioning of banks in the modern banking ecosystem and presented the possibilities for transforming the patterns of their activities. The possible risks associated with the innovation activities of banks are detailed analyzed, and the general aspects of their regulation are presented.

Keywords—*innovation; banking services and products; innovative banking products; fintech; financial technologies*

I. INTRODUCTION

One of the main functions of the financial system is to facilitate the distribution of financial resources by distributing them among market agents. The transfer of funds between investors and borrowers, as well as diversification and insurance is commonly used in the context of this function. Its improvement involves changing both mechanisms or distribution channels, and also the financial institutions themselves, which is particularly reflected in the concept of financial and technological transformation (fintech).

Financial innovations are additional value-added changes in the financial system, implemented by reducing costs, reducing risks, or by creating new elements of the system and expanding the interaction options of agents using new products, services and processes that can better meet the needs of participants.

Digitization is a general characteristic of most modern financial innovations and is due to the growing influence of information and communication technologies in the production and provision of financial services. Its impact is objective, taking into account the increasing influence of information technologies on the life of humanity as a whole, the growth of informatization of the population and the number of Internet users (the average growth rate of the

share of active users of the total population of the earth from 2000 to 2019 was 13.44 per cent) [1].

The rise of digitalization has a significant impact on the functioning of the entire global banking system, transforming provided financial services and associated risks.

II. EVOLUTION OF DIGITALIZATION IN THE GLOBAL BANKING SYSTEM AND ITS IMPACT ON THE TRANSFORMATION OF FINANCIAL SERVICES

Digitalization processes in the banking sector are progressive, which can be represented in the form of the next stages of development.

The first stage coincided with the intensification of the transformation of financial technologies, the development of new financial instruments, first of all - derivatives, and caused a significant restructuring of the entire global financial system [2].

The second stage is characterized by the implementation of mobile banking, mobile payments and social networks into banking: in this case, the ways customers interact with banks have actually changed.

The third stage came in recent years and is caused by the growing popularity of technologies that allow banking services to be provided to non-banking organizations. These changes have become a significant challenge for banks, pushing them into a tough competition, in which access to cheap financial resources and customers is not the key to ultimate success. In this turn are needed fundamental changes in the transformation of business approaches.

The total global investment in financial technology in 2018 amounted to about 111.8 billion dollars, actually doubling compared with the previous year ("Fig. 1").

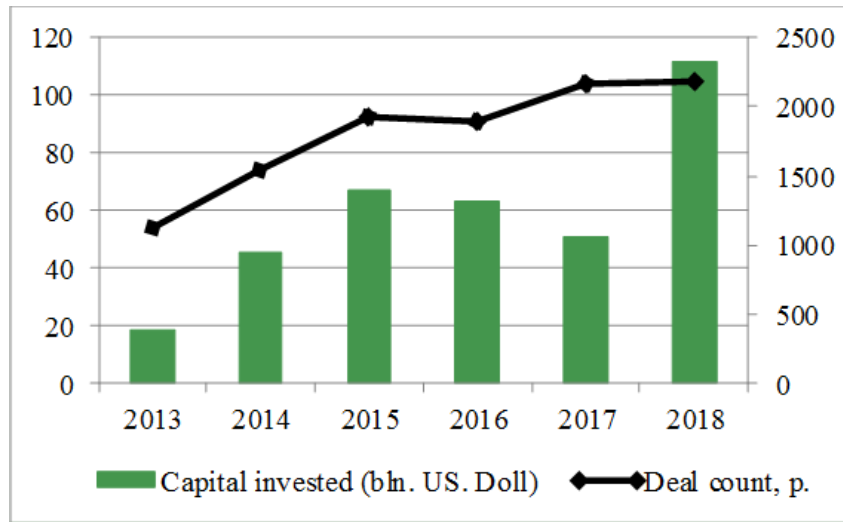


Fig. 1. Total investment activity (VC, PE and M&A) in Fintech [3].

Currently, the main trends in the global financial ecosystem market are asset consolidation and consolidation of transactions, global expansion of fintech infrastructures, in particular in the areas of payment infrastructure, active growth of investments in technologies of distributed registries, in particular blockchains; Strengthening trends in the InsureTech industry, digitalizing banking services, merging innovative enterprises with classical ones, transforming traditional industries in line with the specifics, increasing regulatory requirements for companies operating in this field. Meanwhile, the share of banking organizations in the aggregate revenue from projects built on the basis of innovative technologies remains insignificant, and takes the leading role only in the lending and asset management segments of large corporate clients.

Digitalization opens up new channels not only for financial transactions, but also for financial participants who can present competition to banks. New technological systems are implemented on the basis of the following principles:

- availability and speed of work (the Internet as the main place of service);
- scalability and openness (Open-API interfaces);
- distributivity (technology of distributed registries);
- safety and security of customer information (validation technology, encryption and cryptography);
- standardization (tokenization of contract elements), use of cloud repositories for data storage, for analysis – large amounts of information and machine learning methods.

The implementation of these principles allows unregulated members to provide services independently of banks, creating the ground for increased competition. (“Table I”).

TABLE I. TECHNOLOGIES, TRANSFORMING FINANCIAL SERVICES

Technologies		Financial services				
Foundations	Innovations	Pay	Save	Borrow	Manage	Get advice
Artificial intelligence, Big Data	Machine Learning		Investment advice			
			Credit decisions			
	Predictive analytics	RegTech, SupTech, InsureTech		Fraud Detection		
Distributed computing	Distributed ledger	Asset trading				
		Settle payments				
		B2B services				
		Back-office				
Cryptography	Smart contracts	Digital currencies				
	Biometrics	Automatic transactions				
		Security				
Internet	APIs	Identity protection				
		Dashboards				
		Digital Wallets				
	Mobile access	P2P, Microcredits		Factoring		
		Crowd-funding				

^a. Source: [4], [5], Author.

Considering the issue of transformation of financial services provided, it should be noted that their range has grown significantly. In particular, the fintech segment includes [6]:

- payment related products — mobile payments, e-commerce, P2P transfers, alternative payment instruments; blockchain technologies are exceedingly notable, in particular cryptocurrency;
- financing instruments that represent an alternative to banking institutions in terms of lending — crowdfunding, factoring and in terms of investment business — asset management tools - private finance management, robo-trading, risk management;
- technologies mediating the provision of financial services - datamining tools, marketplace;
- services associated with RegTech industry regulation (regulatory technologies), aimed at ensuring compliance with supervised regulatory requirements and SupTech (supervisory technologies), which contribute to the implementation of regulatory functions by regulators.

III. NEW RISKS ASSOCIATED WITH PROCESS OF MODERN FINANCIAL INNOVATIONS IMPLEMENTATION

We can distinguish such positive moments in the provision of modern financial innovations:

- simplified nature of conducting and tracking transactions, especially in multilateral cross-border transactions;
- uninterrupted operation of the network, fault tolerance and guarantee of transaction processing, including due to the distributed nature of the network and a large number of copies of data;
- reducing the need for documentary registration of transactions between participants;
- increased transparency and immutability of keeping registers of transactions, cheaper transactions due to their mass and automation;
- greater financial inclusion and complementarity of products;
- significantly higher control over personal data of customers.

However, current trends in the global banking system under the influence of the development of digitalization contribute to the manifestation of new digital financial risks:

- Risks of the realization of information threats (cyber risks), due to the possibility of data loss as a result of the imperfection of the information exchange system, and as a result of cybercrime, fraudulent actions;
- Risks associated with the growing interdependence of financial market participants, including through the development of open software interfaces;

- The risks associated with the expansion of the use of third-party services, suppliers of new technologies, outsourcing, including the risks of concentration;
- Operational risks associated with the increasing dependence on information technologies that support the main decisions of financial market participants; here separately it should be highlighted:

Model risks associated with the use of mathematical models based on incorrect assumptions or poor-quality data, the use of opaque models, as well as the incorrect use of models with an increase in the price of risk;

Risks of procyclicality arising from the widespread use of similar decision-making models by financial market participants, including due to insufficient resources for developing internal models or following established market practices without properly analyzing them, as well as due to the technological complexity of quality control of models based on machine learning, which can lead to the realization of a “self-fulfilling prediction” and systemic risks;

- Risks of unfair practices using new technologies;
- Risks of regulatory arbitration associated with insufficient regulation of new forms of activity, including the emergence of new participants in the financial market.

Changes in the form of provision of financial services affect the financial ecosystem landscape. Now the key link in distribution is not a bank as a monopoly, universal intermediary aggregating financial and information flows, but a platform representing a separate service operating on the principle of openness and multithreading.

The participants of the financial ecosystem are, firstly, the owners of the platform, who are the initiators and owners of intellectual property rights to this technology, determining parameters of access to it and the service as a whole. Secondly - providers - technical organizers of the platform responsible for infrastructure of the system. Thirdly, producers offering specific services may play not only and not so much banks as individual niche fintech companies, relatively self-sufficient participants representing a certain range of services in a narrow area, such as remote banking or asset management, and even individual citizens, and organizations, as in the case of P2P services.

Broadly speaking, the stability of traditional banks, considered in the classical sense, is doubtful. Now their role is being transformed to a large extent, and they will begin to assume both the role of distributors, providing a platform with the possibility of concluding a deal within its framework, and the role of integrators, who have the opportunity of expertise in creating highly loaded, scalable and flexible IT systems as a link, combining various IT systems and traditional institutions, as well as the role of individual niche companies.

The development of financial innovations threatens banks as the traditional distributors of financial services. This problem especially concerns those countries where the

universal nature of banking institutions imposes increased risks and obligations on them. The complexity of the banks activity is due to the reduction of direct customer contact with the seller of the service, and consequently reduces of expected load of services. The potential margin from transactions is also decreased. This is firstly due to their further decentralization and scale up, secondly - to the increasing of services specification, conducted by standardization of contract elements (smart contracts), which puts many banking products in the background. In particular, the decrease in margins concerns services that currently bring the main income — lending and asset management. For banks, this ultimately results in a reduction in the amount of information about customers, as a result, an avalanche-like reduction in the number of involvement in customer transactions. In the future, this trend will only increase, but for banks, everything is not lost: integration with fintech institutions transforms the revenue structure in favor of income from infrastructure control – from transactions, from data processing, and as a result, profitability can remain at the same level.

Today, about 47% of fintech companies specialize in the B2B sector, and most of the largest transnational banks are already in partnership with fintech start-ups or have initiated their own projects, concerning innovative technologies. Meanwhile, the potential for developing interaction is still significant: among medium-sized regional and small specialized banks, this percentage is not so significant, and long-term competitive risks increase. In fact, the cooperation of classical and newly formed institutions is mutually beneficial: fintech startups present banks with competitive advantages: maximum concentration on client needs and extreme flexibility, independence from regulatory bodies, while banks have significant financial and reputational resources, are able to ensure the interaction of young organizations with regulators and provide access to the already established infrastructure. The fact that Fintech often represents a company that is significantly concentrated on individual discrete functions can be organically supplemented by the universal nature of the activities of many banks. Fintech can reduce costs and increase efficiency, but only in the case of regulation and formed prudential requirements to ensure disciplined management of operational and cyber risks.

When using fintech companies as an element of infrastructure by banks, the most critical are systemic and operational risks, in particular, the risk of concentration of critical functions on the infrastructure of a small number of suppliers and regulatory risks caused by the transfer of control over part of the data flow to the counterparty. Their regulation is carried out on the basis of the Basel Standard 3, implemented in local regulations. Although the general principles of risk management remain unchanged, their concrete implementations are subject to transformation due to the changing landscape of activity.

The key consequences of the integration of universal banks with fintech companies are the transformation not only of individual banks, but also of the entire banking system. Firstly, the sector is being digitized from a technical point of

view: most services are now carried out remotely; hence the need for offices and offices is reduced. Due to the growing role of IT, financial and technical departments of banks will grow, or be integrated with separate structures. As a result of informatization, revenue structure is transformed: their main part based now not so much on the provision of services to the client, but rather on the provision of data and analytics on clients and their operations. Secondly, on the one hand, due to active absorption and formation of fintech companies, the banking sector of individual countries is consolidated, and, on the other hand, taking into account the spread of fintech services and facilitating their cross-border movement, the competition with banks and non-banking organizations is increasing foreign countries.

The cautious attention to innovative financial services from regulatory authorities in different countries is explained by the innovative character of this area and the uncertainty in determining risks associated with activities of fintech companies and the lack of consensus on the required level of regulation. The measures applied are mainly of a framework (soft) nature, establishing general principles, and obliging participants to inform the authorities and comply with high-level requirements. Meanwhile, taking into account the dynamic development of the sector and its potential mixing with classical banking institutions, in order to avoid regulatory arbitrage and risk transfer to an uncontrolled participant, it is necessary to improve the supervision system, in particular from the standpoint of data protection, methods of approving algorithms, stimulating further development of the industry, including modernization of legal security and mutual obligations of participants.

IV. CONCLUSION

In conclusion, it can be noted that the digitization of the global banking sector is an integral element of the transformation of all banking activities in the context of the emergence of rapidly developing innovative technologies. Services emerging as a result of the integration of innovative technologies and financial services are becoming platform-oriented. In these conditions, it becomes necessary to standardize methods for accessing data and developing technologies to ensure security against new risks. The financial ecosystem is changing and, following it, the models of organization of financial institutions. Meanwhile, risks remain that are being transformed, the regulation of which is necessary both on the part of service providers and on the part of regulatory bodies. This regulation should take into account: the characteristics of the regulated area (its global nature and the gradual erosion of the boundaries in the standardization of regulatory approaches), as well as the need to respect national interests.

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