

Institutional and Regulatory Architecture of the Global Financial Innovation Ecosystem

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ABSTRACT. The article is devoted to a comprehensive study of the processes of development of financial innovations and determination of the effects of their implementation, as well as to the characterisation of key institutions, levels and instruments in the regulatory architecture of national financial markets and outlining trends in the development of the global financial innovation ecosystem. It is substantiated that financial innovations not only significantly expand the resource capabilities of economic entities to overcome the discretionary restrictions imposed by market regulators, but also ensure the most productive use of financial capital and accelerate the recovery of national economies from recession; in addition, by penetrating national markets, they cause radical modernisation of the global financial infrastructure and existing financial services, and also bring them to a qualitatively higher level of development. It is stated that large-scale digitalisation of all spheres of human life, as one of the universal forms of global economic development, has had a powerful impact on the structural dynamics of financial innovation in recent decades, which takes the form of manifestation in the dynamic spread of digital channels of financial and banking services for business entities; transformation of classical financial intermediaries into high-tech corporate structures with a diversified range of client services; and global spread of It is noted that the global stage of the world economic development based on the digital paradigm is characterised by a systemic, multi-level and multi-component influence on the development of financial innovations of the whole system of universal and specific factors. It is determined that the global ecosystem of financial innovations, as a qualitatively new value proposition of innovative developments of financial profile and a group of interconnected and interacting institutions that ensure their creation and market circulation, is at the stage of forming its institutional and regulatory architecture in modern conditions. Based on the results of the study of the processes of innovation in the global financial sector, the author concludes that national financial markets tend to follow two main and conceptually different models, namely, centralised and decentralised, some features of which are now clearly manifested in many countries. It is confirmed that the main institutions in the regulatory architecture of national financial markets are traditionally, on the one hand, national (central) banks, and on the other hand, financial institutions in their independent status and in connection with the established self-regulatory organisations. It is noted that financial regulation in different countries of the world has an ambiguous (and sometimes a clearly expressed dualistic) impact on the development of financial innovations. Thus, on the one hand, a strict regulatory regime can significantly increase market confidence in financial innovations, and on the other hand, the easing of regulatory pressure can intensify innovation. It is noted that despite the fact that in recent decades several institutional levels have been distinguished in the architecture of regulation of financial innovation – national, regional and supranational – the main efforts are still made at the national level, where regulatory sandboxes are used as instruments for regulating financial innovation at the national level. It is concluded that the key tasks of institutions in the field of regulating the market circulation of financial innovations should include both traditional ensuring of the integrity and productivity of the financial market

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and comprehensive support for its innovation, as well as training and testing of new technologies in a controlled environment.

KEYWORDS: financial innovations, financial market, innovation, digitalisation, international economic system, financial infrastructure, fintech services, big tech companies, institutional and regulatory architecture, diversification, blockchain technologies, cryptocurrencies, sandboxes.

Introduction

Over the past two decades, the international economic system has been strongly influenced by digital transformational changes, which not only significantly increase the efficiency of existing business processes, but also form fundamentally new models of organisation and management of production, social relations and types of economic behaviour of business entities. Against the backdrop of large-scale and comprehensive digitalisation of all spheres of human life, we are all witnessing the emergence of numerous financial innovations that are actively penetrating national markets, causing radical modernisation of the global financial infrastructure and existing financial services, and moving them to a higher level of development.

Financial innovations not only significantly expand the resource capabilities of economic entities to overcome discretionary restrictions imposed by market regulators, but also ensure the most productive use of financial capital and accelerate the recovery of national economies from recession.

Financial innovations occupy a special place in the system of modern innovative developments, which are widely represented in various segments of the global market. Their economic nature reflects, first and foremost, qualitatively new methods and forms of operation of economic entities in the financial market, as well as new financial products, technologies and institutions that mediate the circulation of financial capital and ensure an increase in the efficiency of its accumulation and redistribution in the economy.

The issues of financial sector innovation and the institutional and regulatory architecture of the global financial innovation ecosystem have been studied by well-known scholars and practitioners, including Grifoli M., Jenkinson N., Kashima M., Campbell J., Lewis M., Miller M., Menger K., Nasika I., Peneder M., Thorpe H., Festre A., He M., Lekov M., Haksar M. Despite the fact that the first conceptualised principles of innovation in the financial sector appeared long before the concept of innovation was understood, a number of issues still require research and establishing cause and effect relationships.

The purpose of this study is to systematise the factors of financial innovation development and determine the effects of their implementation, as well as to characterise the key institutions, levels and instruments in the regulatory architecture of national financial markets and to outline the trends in the development of the global financial innovation ecosystem.

To achieve this goal, a number of tasks were identified:

- to reveal the competitive advantages of financial innovations;
- to characterise the structural dynamics of financial innovations;
- classify the factors of financial innovation development and determine the effects of their implementation;
- to show the historical logic of the evolutionary development of the institutional and regulatory architecture of the global financial innovation ecosystem;
- describe the key institutions, levels and instruments in the regulatory architecture of national financial markets;
- identify trends in the development of the global financial innovation ecosystem.

Competitive determinants of financial innovation

Financial sector innovation was conceptually determined by the classics of economic theory several centuries before the actual emergence of financial innovations in international business practice. It was most fully conceptualised in the theories of portfolio investment, general equilibrium, financial intermediation, behavioural finance, corporate finance, etc. All of them, from the standpoint of their own scientific object, consider financial innovations as a modern methodology for increasing the level of financial competitiveness of economic entities by improving their business functions and operational processes.

Over the past two decades, the international economic system has been strongly influenced by digital transformational changes, which not only significantly increase the efficiency of existing business processes, but also form fundamentally new models of organisation and management of production, social relations and types of economic behaviour of business entities. It is no coincidence that amid the large-scale and comprehensive digitalisation of all spheres of human life, we are now witnessing the emergence of numerous financial innovations that are actively penetrating national markets (Figure 1), causing radical modernisation of the global financial infrastructure and existing financial services, and moving them to a qualitatively higher level of development.

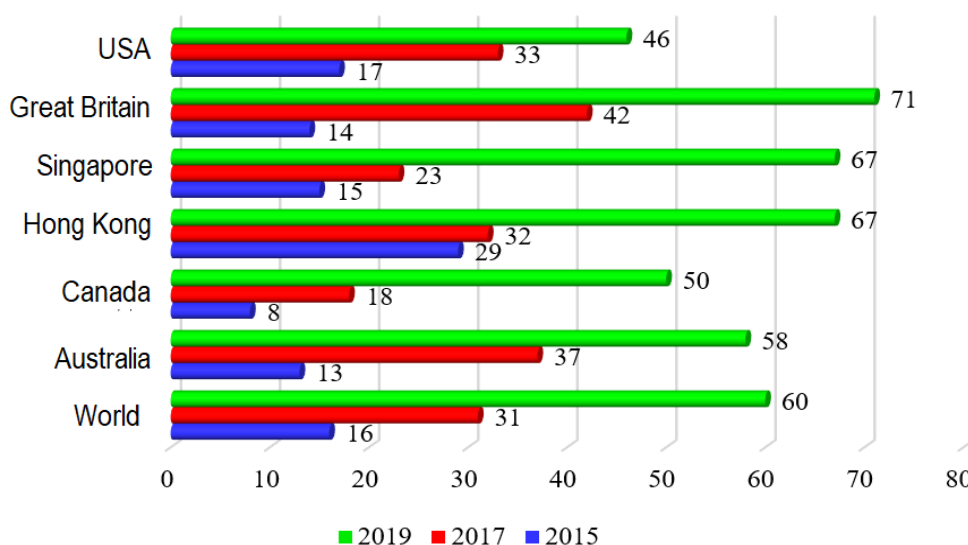


Figure 1. Market penetration of fintech services in selected countries in 2015–2019, %

Source: compiled by the author based on data from²

Financial innovations not only significantly expand the resource capabilities of financial institutions to overcome discretionary restrictions imposed by market regulators, but also ensure the most productive use of financial capital and accelerate the recovery of national economies from recession. The competitive advantages of financial innovations are the reason why it is during the crisis periods of national business cycles that the market demand for financial innovations, which become an integral component of corporate strategies and business models of companies and firms, grows particularly rapidly. Suffice it to say that in 2010–2022 alone, the annual value of global investments in fintech companies increased more than 20 times, reaching USD 209.3 billion by the end of the period. (Fig. 2).

² *Global FinTech Adoption Index 2019. As FinTech becomes the norm, you need to stand out from the crowd.* EY, 2019, P.8.

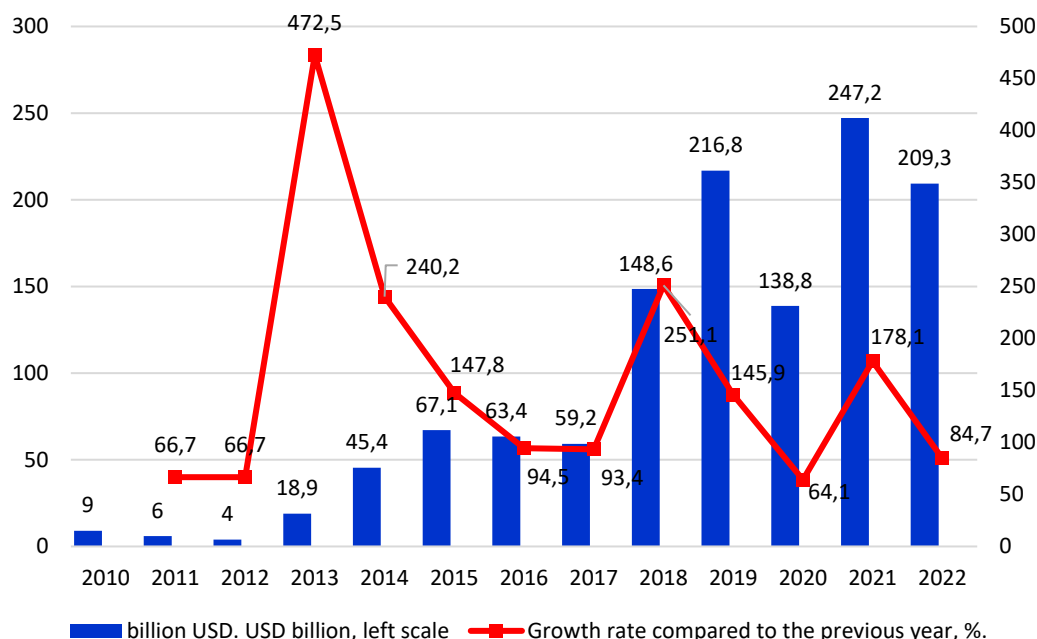


Figure 2. Global investment in fintech companies in 2010–2022

Source: compiled by the author based on data from³

Modern financial innovations are a powerful driver not only of the competitive development of national economies in the global environment, but also of the effective management by economic entities of their own financial resources and business risks in the face of instability and high volatility of the global economic environment. The fact that the theoretical discourse of financial innovations is at the stage of scientific revolution largely raises the issue of a significant expansion of their conceptual outline by modern economic science, taking into account the key methodological principles of the latest paradigm of financial globalisation, organic integration of the most constructive elements of previous theories and their maximum adaptation to the leading megatrends of the structural dynamics of the global financial market.

Each of the theories of financial innovation developed to date has its own competitive advantages and methodological shortcomings and has performed an important function in shaping holistic scientific views on the substantive

³ Total value of investments in fintech companies worldwide from 2010 to H1 2023 (in billion U.S. dollars). Statista. The Statistical Portal. URL: <https://www.statista.com/statistics/719385/investments-into-fintech-companies-globally/>.

nature, economic nature and driving forces of financial innovation. Their theories, being in constant development and improvement of their conceptual design, reflect the emergence of qualitatively new trends in the global development of the world financial market, which are a powerful driver of expanding the use of financial innovations in the real economic practice of economic entities of different nationalities⁴.

Structural dynamics and factors of financial innovation development

The large-scale digitalisation of all spheres of human life, as one of the universal forms of global economic development, has had a powerful impact on the structural dynamics of financial innovation in recent decades. This is most clearly manifested in the dynamic spread of digital channels for financial and banking services for business entities; transformation of classical financial intermediaries into high-tech corporate structures with a diversified range of customer services; global spread of mechanisms for remote provision of financial services to economic entities, electronic commerce transactions, online lending, online payment and online investment systems, etc.

The dynamic development of financial innovations, which in recent decades has become an integral feature of global economic progress, is, on the one hand, a social form of dissemination of innovative developments in the financial sector, and on the other hand, it is based on the unique ecosystem formed in it, which is integrally “built-in” into the global innovation ecosystem. The vast range of factors that have a decisive impact on the trajectory of development and introduction of each individual financial innovation into international economic circulation is extremely complex in nature and hierarchical in nature. Therefore, a comprehensive consideration of such factors in the practice of managing financial innovations is a rather difficult task for innovators themselves, as well as for capital owners, educators and regulators of national financial markets. In view of this, the issues of systematisation of such factors and justification of a certain universal model of levelling their negative impact on the structural dynamics of financial innovation development on this basis are of great theoretical and practical importance. It is worth noting that the impact of

⁴ Engelen, E., Ertürk, I., Froud, J., Johal, S., Leaver, A., Moran, M., ... Williams, K. After the great complacency: The financial crisis and the politics of reform. Oxford University Press. 2011; Miller M. H. Financial Innovation: The Last Twenty Years and the Next. The Journal of Financial and Quantitative Analysis. 1986. Vol. 21. P. 459–471; Menger C. On the Origin of Money. *Economic Journal*. 2009. [1892]. Vol. 2. P. 239255. Reprinted by Ludwig von Mises Institute, 2009;

Peneder M. Austrian conceptions of money and the rise of digital currency. SUERF Policy Note, Issue No. 265, February 2022. 13 p. URL: https://www.suerf.org/docx/f_335ebb59c2d4bc89cef80c692c9a10b7_40325_suerf.pdf; Festré A., Nasica E. Schumpeter on money, banking and finance: an institutionalist perspective. *The European Journal of the History of Economic Thought*. 2009. Vol. 16 (2). P. 325–356.

such factors can be clearly identified through the prism of their functions and institutions, supply and demand for financial capital in the market, trends in the development of national financial markets, and the peculiarities of the global financial environment. At the same time, each successful financial innovation is a natural result of the positive impact of a unique combination of universal and specific factors of their development in the global competitive environment. It can be argued that the global financial ecosystem is a central actor in international financial relations, which is capable of radically transforming the structural dimensions of national and regional subsystems of the global financial market.

The global stage of the world economic development based on the digital paradigm is characterised by a systemic, multi-level and multi-component impact on the development of financial innovations of a whole system of universal and specific factors.

More specifically, *the universal factors of financial innovation development* include, first of all, the *key patterns and trends of world economic development in the context of financial globalism*, namely: green and digital transitions of the modern post-industrial economy; development of the global information society; transition of global processes from quantitative expansion of the main forms of international economic relations to their qualitative transformation; system of technological changes that affect the implementation of economic relations; parameters of international market competition and cooperation; peculiarities of the regulatory environment of international financial processes; scale and structure of global investment demand; achieved level of social, economic, scientific and technological development of countries and national innovation ecosystems formed within them; quantitative and qualitative parameters of human capital, entrepreneurship and labour markets development of individual states and regions; the effectiveness of the state policy to support innovation and the innovation ecosystem; the level of internationalisation, globalisation and regional integration of financial markets, etc.

Instead, the impact of the entire set of *specific factors of financial innovation development* should be analysed, in our opinion, through the prism of: fragmentation of functions performed by financial sector entities (including the division of entities into existing and new, niche and social network); asymmetry of the impact of value added in the structure of financial innovation on the competitiveness of financial institutions, products and services; deepening specialisation of digital technology developers from general information and communication technologies to Special attention should also be paid to such specific factors as: the diversity of effects arising from the implementation of financial innovations; deepening asymmetries in the propensity of individual financial institutions and segments of financial

markets to introduce innovative developments; management of data ownership, access to services of digital platforms and ecosystems in general⁵.

The above factors are manifested both at the level of functions and institutional and regulatory structure of national financial markets, as well as their qualitative and quantitative parameters, prevailing instruments, factors of formation of demand and supply of financial capital, as well as key features and vector megatrends of the global financial environment. Their synergistic effect makes the process of innovation of the global financial sector systemic, which is manifested in irreversible, directed and natural changes in the product-type, subject, institutional and regulatory structure of national financial markets. This objectively requires the international community to join forces to counteract the negative impact of financial innovations on the global economic balance in order to prevent a deep imbalance in the structural parameters of global markets.

As for the internal factors, they make it possible to realise the existing individual potential for creating effects, including spillover and scale effects. External factors, on the other hand, can be associated with the realisation of the potential of the economy and financial market, network and multiplier effects, and the effect of preference. In particular, the following subjective effects may be relevant in financial markets:

- time effects in portfolio selection, in which entities perceive changes in risks or expected returns on risky assets;
- age (demographic) effects of portfolio and instrument selection due to differences in the life expectancy of decision makers⁶.

In a comprehensive analysis of the evolution and key patterns of action of the factors of financial innovation development, it is necessary to fully understand the fact that quite often such innovative developments become a direct tool for competition, including unfair competition, between corporate business structures and other groups of financial market participants. In view of this, the issue of ethics of economic behaviour of financial market participants is also becoming extremely important today for the maximum realisation of public interests in the financial sector. We are referring, first of all, to the objective need to ensure the regulation and maximum balance of economic interests of various participants in the global financial market as the central core of macroeconomic models of its development. At the same time, the priorities and goals of some activities or entities should not contradict others.

⁵ Frost J., Gambacorta L., Huang Y., Shin H. S., Zbinden P. BigTech and the changing structure of financial intermediation. *Economic Policy*. 2019. Vol. 34 (100). P. 761–799. URL: https://www.bis.org/publ/work779.pdf?mod=article_inline; Claessens S., Frost J., Turner G., Zhu F. Fintech credit markets around the world: size, drivers and policy issues. *BIS Quarterly Review September*. 2018. URL: https://www.bis.org/publ/qtrpdf/r_qt1809e.pdf.

⁶ Campbell J. Y., Luis M. V. *Strategic Asset Allocation: Portfolio Choice for Long-Term Investors* (Oxford University Press, New York, NY). 2002.

Evolution of the institutional and regulatory architecture of the global financial innovation ecosystem

The global ecosystem of financial innovations, as a qualitatively new value proposition of innovative developments of the financial profile and a group of interconnected and interacting institutions that ensure their creation and market circulation, is currently at the stage of forming its institutional and regulatory architecture. Such an architecture makes it possible for national governments and global financial management institutions to exert effective regulatory influence on the structural dynamics and vector megatrends of the global financial sector development⁷.

Based on the results of the study of the processes of innovation of the global financial sector, we can conclude that national financial markets tend to gravitate towards two main and conceptually different models, namely, centralised and decentralised, some features of which are now clearly visible in many countries. If we talk about the historical logic of the evolutionary development of the institutional and regulatory architecture of the global ecosystem of financial innovations, it should be noted that the economic crisis of 1929–1933 in the United States of America and a number of other Western countries resulted in the formation of a theoretical view of financial markets as highly unregulated economic substances by their nature, prone to massive fraud and manipulation by insiders, and capable of generating a deep imbalance in the structural parameters of the national economy.

This has led to the emergence of such a direction in the theoretical discourse of financial markets as the theory of endogenously unstable financial markets. Its founders, J. Keynes and G. Minsky, developed quite effective tools for regulating national financial markets in the first half of the twentieth century, which were widely used in real practice. At the same time, the deep shocks to the world economic system caused by the oil shocks of the 1970s and the global financial turbulence that has been growing since then, in the early 1980s, led to a fundamental change in the financial regulatory paradigm and a complete “reset” of the existing regimes of financial markets. All these changes, based on the key principles of the theories of efficient financial markets and new classical macroeconomics, involved radical financial deregulation, supported, incidentally, by global financial institutions.

As a result, by the end of the 2000s, leading Western scholars quite reasonably stated that a mature model of the global economy with its

⁷ *Gercshenkron A. Economic Backwardness in Historical Perspective. Cambridge Mass: Harvard University Press, 1962.*

inherent feature of cyclical development, which J. Crotty very accurately qualifies as the basic principle of globally deregulated neoliberal capitalism, had been completed⁸. It is no coincidence that it is from this time that the system of international financial institutions and the entire arsenal of existing financial and regulatory regimes begin to be qualified as a new financial architecture. It is worth noting that it is based on a low level of regulation of commercial and investment banks, as well as an extremely low degree of state regulation of the shadow banking industry, represented by hedge funds, private equity funds and special (structured) investment instruments created by banking institutions⁹. Although the theoretical basis for the new financial architecture of the global economy is still at its pre-paradigmatic stage, we can already see the powerful transformational impact of fundamental global economic transformations on it.

Global experience shows that the main institutions in the regulatory architecture of national financial markets have traditionally been, on the one hand, national (central) banks, and, on the other hand, financial institutions in their independent status and in connection with established self-regulatory organisations. At the same time, central banks usually acted as borrowers of last resort, even in cases when they acquired the institutional formats of collective reserve systems. However, the high dynamism of global technological progress largely accelerates the subjective diversification of financial regulators, the range of which is steadily expanding due to companies producing financial innovations that can exert a powerful regulatory influence on the development of all structural subsystems of national financial services markets (Table 1)¹⁰.

It is worth noting that key differences in the existing approaches and instruments for regulating national financial markets create powerful motivations for market players to actively use them to maximise their profits. For example, experts from the Bank for International Settlements, the Financial Stability Oversight Council (USA) and the European Commission, while studying the evolution of the global financial market regulatory environment, emphasise the objective need to introduce universal norms and standards of financial regulation at the global level¹¹.

⁸ Crotty J. Profound structural flaws in the U.S. financial system helped cause the current global financial crisis, *Political and Economic Weekly*. 2009. Vol. XLIV. No. 13. P. 127–135.

⁹ Crotty J. Structural causes of the global financial crisis: a critical assessment of the “new financial architecture”. *Cambridge journal of economics*. 2009. Vol. 33 (4). P. 563–580.

¹⁰ He M. D., Leckow M. R. B., Haksar M. V., Griffoli M. T. M., Jenkinson N., Kashima M. M., ... & Tourpe H. Fintech and financial services: Initial considerations. International Monetary Fund. 2017. 49 p. URL: <https://investucattett.com/wp-content/uploads/2017/09/Fintech-and-Financial-Services-Initial-Considerations.pdf>.

¹¹ Restoy F. Fintech regulation: How to achieve a level playing field. London: Financial Stability Institute, Bank for International Settlements. 2021. 8 p. <https://www.piie.com/sites/default/files/documents/restoy-03-11-2021ppt.pdf>

Table 1

**EVOLUTION OF KEY ACTORS IN THE REGULATORY ARCHITECTURE
 OF THE FINANCIAL SECTOR**

Service.	Financial market institutions	Central banks	Fintech companies
Direct regulation		+	+
Back office operations	+		+
Currency transactions and payments	+	+	+
Loans	+		+
Insurance	+		+
Savings	+		+
Consulting	+		+
Key institutions	Traditional regulation		-
	The latest regulation		

Source: compiled by the author based on data from ¹⁰

In particular, they found deep interstate differentials in the existing mechanisms for regulating the activities of similar participants in national financial markets (Table 2). This example shows a deep knot of economic contradictions between the desire of big tech companies to commercialise their technological advantages globally and the inability of national regulators to ensure systematic regulation of their activities.

It should also be noted that financial regulation in different countries of the world has an ambiguous (and sometimes clearly dualistic) impact on the development of financial innovation. On the one hand, a strict regulatory regime can significantly increase market confidence in financial innovations, while on the other hand, the easing of regulatory pressure can boost innovation. In addition, over time, regulatory arbitrage may even arise, in which similar financial risks will be regulated by strict measures inherent in the traditional lending sector, thus encouraging market players to introduce diversified financial innovation tools¹².

¹² Claessens S., Frost J., Turner G., Zhu F. *Fintech credit markets around the world: size, drivers and policy issues*. *BIS Quarterly Review* September. 2018. P. 29–49.

Table 2

THE VARIETY OF FINANCIAL SERVICES OFFERED BY BIG TECH COMPANIES

Examples of big tech companies	Core business	Financial market sector					
		Banking	Lending	Payments	Crowdfunding	Asset management	Insurance
Google.	Internet search and advertising						
Baidu (Du Xiaoman)	Internet search and advertising						
Apple	Production of technologies and equipment						
Tencent	Technology, games and messages						
NTT Docomo	Mobile communications						
Meta (Facebook)	Social media and advertising						
Amazon	E-commerce and online trading						
Alibaba (Ant Group)	E-commerce and online trading						
JD.com (JD Digits)	E-commerce and online trading						
Rakuten	E-commerce and online trading						
Mercado Libre	E-commerce and online trading						

Source: compiled by the author based on data from¹³

We fully agree with the experts of the Bank for International Settlements on the need for a comprehensive assessment by financial and regulatory authorities of existing corporate strategies and business models of big tech companies. In recent decades, financial innovations have become an integral component of the overall mechanism of democratisation of international financial relations, which has been particularly actively used by developed countries.

Just as the 1980s saw the emergence of financial innovation driven by the significant relaxation of regulatory restrictions imposed in the wake of the 1929–1933 crisis, today we are all witnessing unprecedented innovation across the global financial ecosystem.

¹³ Crisanto J. C., Ehrentraud J., Fabian M. Big techs in finance: regulatory approaches and policy options. FSI Briefs. 2021. №12. 15 p. URL: <https://www.bis.org/fsi/fsibriefs12.pdf>; Restoy F. Fintech regulation: How to achieve a level playing field. London: Financial Stability Institute, Bank for International Settlements. 2021. 8 p. <https://www.piie.com/sites/default/files/documents/restoy-03-11-2021ppt.pdf>

As far as financial innovations of the 1980s are concerned, the main one was, as we know, the Eurodollar market, which formed an institutional platform for the international interbank market and thus diversified sources of external liquidity for various national economic entities. Following the eurodollar market, the equity, bond and derivatives markets also gained momentum in the following decades. Today, we are witnessing an unprecedented intensification of the cryptocurrency market, which, by “dissolving” national borders, immediately enters the global money circulation. As a result, national governments are forced to develop appropriate regulatory tools for their legalisation, issuance, classification, accounting, circulation, licensing of crypto infrastructure, etc.

Currently, the prevailing view is that rating agencies, information and news market operators play a priority role in the development of the global financial architecture. For example, rating agencies have been assessing the level of riskiness of assets since the dominance of Basel I regulations in the financial regulatory system (1988–2003). At the same time, their significant drawback remains the fact that financial market operators themselves also issue securities and are assessed by rating agencies, which, in addition to powerful multiplier effects, create a conflict of economic interests of different groups of entities and increase their interest in market manipulation.

In addition, for certain groups of financial services consumers, the use of financial innovations can successfully replace rating in some cases. On the one hand, the potential of process automation challenges the rating function and the existence of rating agencies as infrastructure entities. On the other hand, not all financial market operators can afford to invest in the automation of financial processes, especially when it comes to the implementation of dynamic intelligent models; data collection, storage and processing; and protection of ownership rights to financial assets. For example, for small businesses, as noted by G. Cornelli, F. De Fiore, J. Frost and others, the use of big data-based methods will help to more accurately predict the amount of potential losses, as opposed to credit bureau ratings^{14, 15}. Thus, we can state the urgent need to intensify the use of machine learning and artificial intelligence in the interests of groups of highly specialised small businesses, which can achieve systematic automation of many production and commercial processes.

¹⁴ Cornelli G., Frost J., Gambacorta L., Rau P. R., Wardrop R., Ziegler T. *Fintech and big tech credit: a new database*. 2020. 32 p. URL: <https://www.bis.org/publ/work887.pdf>.

¹⁵ De Fiore F., Gambacorta L., Manea C. *Big techs and the credit channel of monetary policy*. 2023. 42 p. URL: <https://www.bis.org/publ/work1088.pdf>.

Institutions, levels and instruments in the regulatory architecture of national financial markets

Despite the fact that in recent decades, several institutional levels have been distinguished in the architecture of financial innovation regulation – *national, regional and supranational* – the main efforts are still made at the national level. In describing it, it should be noted that technological progress has become a significant factor in transforming not only financial products, services and their providers, but also consumers and institutions that are supposed to regulate market interaction. At the same time, while readiness for change is an imperative for market participants, it poses significant challenges for regulators to effectively regulate the market circulation of financial innovations. Thus, financial innovations have become the subject of regulation by many institutions, which, recognising their novelty and critical importance for the financial development of countries, have developed broad opportunities for their circulation in an experimental mode. This regime is aptly called the regulatory sandboxes, which were launched in 2012–2014 after successful experiments in the United States and the United Kingdom. In particular, the latest regulatory instruments that encourage and discourage the development of financial innovation are concentrated in the following areas:

- tax incentives;
- introduction of new regulatory instruments and norms;
- licensing, including limited licences and permitting procedures;
- improving the investor protection system;
- updating risk management requirements.

At present, there are sufficient grounds to speak of a wide variety of regulatory sandboxes as instruments for regulating financial innovation at the national level. Regulatory sandboxes are most often understood as a certain regulatory regime that grants developers of fintech products the right to implement them in a controlled manner in a limited environment for a certain period of time without the risk of penalties for violating the law¹⁶. In particular, the following types of regulatory sandboxes are currently being discussed:

- “sandboxes to test new financial products against the current regulatory environment to identify regulatory gaps and redundancies;
- “sandboxes to assess the opportunities and risks of establishing the latest regulatory norms driven by technological innovation;
- digital sandboxes (also known as data sandboxes), which are used to validate hypotheses and the value of regulatory and enabling technologies through the generation of large amounts of data;

¹⁶ *Regulatory sandbox*. Financial Conduct Authority. November 2015. URL: <https://www.fca.org.uk/publication/research/regulatory-sandbox.pdf>.

- thematic sandboxes, which are used when regulators focus on specific areas of financial services, such as financial inclusion or green finance;
- cross-sectoral sandboxes, which play a particularly important role in the process of diversifying the risks faced by companies and firms operating in different sectors of the economy;
- cross-border sandboxes that allow innovative solutions to be tested in several jurisdictions simultaneously through the interaction of regulators;
- strategic sandboxes that allow initiators to maintain global financial leadership by creating a favourable regulatory environment, such as the one in London, where 17 of the world's 50 largest fintech companies are concentrated¹⁷.

Countries around the world have developed quite diversified regulatory sandbox regimes, which differ fundamentally in terms of the scope of exemptions applied to FinTech companies; the diversity of firms that can benefit from the sandbox regime the number of consumers of services provided by fintech companies operating in the sandbox regime; the timing of the special regulatory regimes; the prevailing consumer protection mechanisms; the nature and degree of development of new financial technologies; the dominant forms of control, etc.

It should be emphasised that the key tasks of institutions in the field of regulating the market circulation of financial innovations include both traditional ensuring the integrity and productivity of the financial market and comprehensive support for its innovation, as well as training and testing of new technologies in a controlled environment. The achievement of these strategic goals at the national level is largely ensured by innovation hubs, incubators, accelerators and platforms, which not only receive comprehensive support from governments and venture capital, but also give rise to accelerators for the formation and implementation of specific tasks by financial regulators¹⁸. At the same time, the cyclical nature of global economic development imposes a number of requirements on the process of testing financial innovations that must be met by all financial market operators.

The most prominent example of *regional regulation of financial innovations* is the European Union, which traditionally pays considerable attention to the issue of regulating the development of the regional innovation ecosystem. The main instruments of the European Union for regulating the market circulation of financial innovations are being implemented in the direction of developing a single payment space of this

¹⁷ Truby J. Fintech and the city: Sandbox 2.0 policy and regulatory reform proposals. *International Review of Law, Computers & Technology*. 2020. Vol. 34 (3). P. 277–309; Bains P., Wu C. Institutional Arrangements for Fintech Regulation: Supervisory Monitoring. 2023. 58 p.

¹⁸ Claessens S., Frost J., Turner G., Zhu F. Fintech credit markets around the world: size, drivers and policy issues. *BIS Quarterly Review* September. 2018. P. 29–49.

integration bloc^{19, 20}, which ensures the dynamic development of European fintech companies and systematic innovation of the financial industry of this integration grouping.

The supranational level of financial innovation regulation is represented by the Bank for International Settlements and the *Financial Action Task Force (FATF)*. They comprehensively try to support the development of national regulatory ecosystems by organising research, harmonising definitions of key categories, and adapting the provisions of key documents and infrastructure to the specifics of financial innovation. In this context, the *Basel AML Index*²¹, which currently covers 203 jurisdictions, deserves special attention, as measurement is fundamentally important for improving the effectiveness of regulatory influence on the development of national financial ecosystems.

The supranational regulation of the market circulation of financial innovations covers mainly the banking sector and in its substantive nature reflects the evolutionary development of the Basel standards for regulating the activities of financial institutions in terms of bank capital formation, risk assessment of banks and the ratio between bank assets and capital.

From history, we know that institutional and regulatory failure to control the market circulation of financial innovations is always caused, on the one hand, by existing regulatory shortcomings in the regulation of financial markets, and, on the other hand, by the excessive social value attached to finance²². This state of the global financial ecosystem is quite natural, as of 2019, according to the Bank for International Settlements, only 31 countries are implementing national strategies to support financial technologies adopted at the legislative level²³. Based on this, creating a regulatory regime favourable to the development of financial innovations should become an integral component of the overall macroeconomic policy of any state, especially given the long-term nature of building a financial ecosystem of innovation.

It is worth noting that the institutional and regulatory architecture of the global ecosystem of financial innovations, in the context of a significant deepening of global economic asymmetries, should necessarily be used to

¹⁹ Directive 2007/64/EC of the European Parliament and of the Council of 13 November 2007 on payment services in the internal market amending Directives 97/7/EC, 2002/65/EC, 2005/60/EC and 2006/48/EC and repealing Directive 97/5/EC. URL: <https://www.legislation.gov.uk/eudr/2007/64/contents> (accessed 01.01.2022).

²⁰ On payment services in the internal market: Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015. URL: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2366> (accessed 01.01.2022).

²¹ *What's behind the Best AML Index?* URL: <https://index.baselgovernance.org/methodology>

²² Engelen E., Ertürk I., Froud J., Johal S., Leaver A., Moran M., ... & Williams, K. After the great complacency: The financial crisis and the politics of reform. Oxford University Press. 2011: pp. 132–135.

²³ Di Castri S., Kulenkampff A., Hohl S., Prenio J. The suptech generations. FSI. October 2019. URL: <https://www.bis.org/fsi/publ/insights19.pdf>, P. 3.

address the most pressing problems of socio-economic development of states and regions.

If we return to financial innovations themselves, they are now acquiring not only a technological dimension, but also encompass the national regulatory environment formed in different countries of the world, the transformation of which is determined, among other things, by the priorities of sustainable development and political discourse²⁴. It is no coincidence that in many developed countries of the world, one can observe a steady increase in the level of decentralisation of the institutional and regulatory architecture of national financial innovation ecosystems. First of all, we are talking about the dynamic development of decentralised finance in recent years, which R. Auer, B. Haslhofer and S. Kitzler qualify as a qualitatively new financial paradigm. Its main fundamental principle is the transfer of lending, investment, cryptocurrency and digital financial asset exchange operations to the technologies of distributed ledgers and smart contracts as a guarantee of eliminating traditional centralised intermediaries²⁵.

Although decentralised finance is still a niche segment of the global financial technology market, it has significant potential for global expansion. Suffice it to say that the global market for decentralised financial technologies was only USD 55.6 billion in 2022. However, by 2030, it is projected to reach more than USD 337 billion with an annual capitalisation growth rate of 28.2 % in 2022–2030²⁶. At the same time, the global system of decentralised finance is currently characterised by a safety net that lacks protection against criminal misuse of capital, investment fraud, or fraudulent transactions. At the level of software interoperability of decentralised finance subsystems, there is a need for their institutional support from international exchange platforms.

At the same time, the widespread use of blockchain technologies, which are based on the postulates of the network economy concept, ensure the implementation of the principle of decentralisation of activities with a radical revision of many corporate strategies and business models. In particular, in the global financial sector, both public and private, as well as consortium types of blockchain technologies can be used for different purposes (Table 3).

²⁴ Allain-Dupré D. Decentralisation trends in OECD countries: a comparative perspective for Ukraine. *Presentation Regional Development Policy Division*: 22 p. OECD. 2017. URL: <https://www.oecd.org/regional/regional-policy/Decentralisation-trends-in-OECD-countries.pdf>.

²⁵ Auer R., Haslhofer B., Kitzler S., Saggese P., Victor F. The Technology of Decentralised Finance (DeFi). BIS Working Papers. 2023. № 1066. 36 p. URL: <https://www.bis.org/publ/work1066.pdf>.

²⁶ *Decentralised Finance Technology Market Size Report*. 2030. URL: <https://www.fortunebusinessinsights.com/decentralized-finance-technology-market-107823>.

Table 3

COMPARISON OF THE TYPES OF BLOCKCHAIN TECHNOLOGIES USED
IN THE FINANCIAL SECTOR

Criterion	Blockchain type		
	Public blockchain	Consortium blockchain	Private blockchain
Degree of decentralisation	Decentralised	Multi-centre	Decentralised
Participants.	Free entry and exit	An ad hoc group of entities that have agreed to form a consortium	The central controller decides who is allowed to participate
Credit mechanism	Confirmation of work	Collective confirmation	Self-confirmation
Accounting mechanism	All participants	The participants decide on the results of the agreement	Determined independently
incentive mechanism	Required.	Possible	Not required
Key advantage	Self-created credit	Efficiency and cost optimisation	Transparency and traceability
Example of application	Bitcoin	Clearing	Audit
Workload	3-20 times/sec.	1000 – 10,000 times/sec.	-

Source: compiled by the author based on data from ²⁷

In the context of the study of the institutional and regulatory architecture of the global financial innovation ecosystem, the issue of regulating competitive interaction in the financial market during periods of particularly active implementation of radical financial innovations also deserves special attention. In particular, a number of Western scholars have argued that unregulated competition can lead to market equilibrium disturbances, as conditions can be created for certain entities that allow them to skim the cream on a large scale²⁸. In addition, the issue of fundamentally different requirements for traditional banking institutions and fintech companies to disclose private and public information is also extremely important, and thus may lead to market inefficiencies or cross-sectoral subsidies. In addressing

²⁷ Guo Y., Liang C. Blockchain application and outlook in the banking industry, Financial Innovation. Springer, Heidelberg. 2016. Vol. 2. Iss. 24. P. 1–12.;

²⁸ Gambacorta L., Khalil F., Parigi B. Big Techs vs Banks. Bank for International Settlements, Monetary and Economic Department. 2022. 42 p.

this issue, regulators should be guided by the principle of not discriminating against market participants who refuse to provide access to their own platforms for non-public reasons.

In conclusion, it should be noted that under the influence of the dynamic deployment of breakthrough institutional innovations in the last decades of the twentieth century, trends that have become a natural result of the evolution of corporate governance theories (financial economics, accounting, financial law, etc.) are increasingly beginning to crystallise in global financial markets²⁹. First of all, it is about: first, democratic countries' adherence to the doctrines of signalling to society and financial markets about reliable commitments to monetary and financial policy (in particular, central banks' short-term interest rates); second, the use of innovative market activity, the growth of their complexity as a safeguard against prudential failure of financial market regulators and a mechanism for systemic risk management; third, the intellectualisation of markets and the growth of public interest in their functioning.

Conclusions

The current system of regulation of financial relations in the current environment is undergoing dynamic diversification towards the formation of a holistic institutional and regulatory architecture of the global ecosystem of financial innovations, which not only significantly expand the resource capabilities of economic entities to overcome the discretionary restrictions imposed by market regulators, but also ensure the most productive use of financial capital and accelerate the recovery of national economies from recession. In our opinion, this highly complex process should take into account not only the impact of the entire set of factors of financial market development, but also the leading megatrends of the structural dynamics of financial and technological globalism.

Today, financial innovations are a powerful driver not only for the competitive development of national economies in the global environment, but also for the effective management of their own financial resources and business risks by economic entities in the face of instability and high volatility in the global economic environment.

The current institutional and regulatory architecture of the global financial innovation ecosystem covers the national, regional and supranational levels, each of which is characterised by its own dominant objects and mechanisms of regulation, regulatory authorities and the range of their functions, as well as the areas of regulation of legal relations arising

²⁹ Engelen E., Ertürk I., Froud J., Johal S., Leaver A., Moran M., ... & Williams K. *After the great complacency: The financial crisis and the politics of reform*. Oxford University Press. 2011.

in the process of innovation of the financial industry. The dominant instruments of the national level of regulation of financial innovations are regulatory sandbox regimes; legal regulation and modular licensing of fintech hubs, fintech incubators, exchange platforms and fintech accelerators; determination of the legal status of digital assets, institutionalisation of the market circulation of cryptocurrencies as electronic money, taxation of cryptocurrency transactions; state registration and licensing of crypto exchanges and cryptocurrency exchanges, etc. In turn, the regional level of the institutional and regulatory architecture of the global financial innovation ecosystem mainly covers issues related to the interstate unification of payment regimes in force in the territory of integration groups. Finally, the implementation of the standards of the Basel Committee on Banking Supervision, the Bank for International Settlements and the International Group on Combating Money Laundering in fintech operations carried out by market participants is subject to global regulation.

Given the deep contradictions between the national interests of states and the economic interests of financial innovation market participants, the priority today is to ensure a deep convergence of market self-regulation mechanisms, as well as national, regional and supranational regulation of the market circulation of financial innovations, which can have a positive impact on the scale and structural dynamics of innovation in the global financial industry.

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