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Bigtech-Companies Ecosystems Prospects in the Payment Sector

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ABSTRACT

The **relevance** of the article is determined by solving the problems of expansion of BigTech-companies' activities in the field of payments, which take place at present. The **aim** of the article to identify perspective directions of interaction of ecosystems with credit institutions in the payment sector. The authors used the following **methods:** system-functional, system-structural, statistical analysis and synthesis. The research analyzed current approaches to the definition of ecosystems and digital platforms and proposed the authorial interpretation; identified the main advantages associated with the participation of ecosystems in financial and payment intermediation; reviewed the models of provision of financial and payment services by ecosystems and identified the regulatory framework of their activities in foreign countries; proposed criteria for assigning a company to an ecosystem in Russia and marked out prospects of ecosystem activities in the payment sector. It is concluded that an ecosystem is a new institutional unit that has advantages in comparison with traditional financial institutions: the presence of a global customer base, the possibility of rapid implementation of network effects, the lack of excessive regulatory burden. Objective criteria that allow to assign a company to an ecosystem are: general and specific criteria that take into account the country characteristics of doing business, the level of development of the financial market, information technology, etc. Regulation of activities of ecosystems of the BigTech-companies allows to minimize basic, global and country risks by improving financial regulation and antimonopoly legislation, developing of unified standards and requirements for cross-border activities of ecosystems of BigTech-companies. The main scenarios of interaction between traditional financial institutions and ecosystems in the Russian financial and payment markets are: preservation of the dominance of traditional financial institutions; cooperation between banks and ecosystems; competition between banks and ecosystems; transition to a financial ecosystem dominance scenario.

Keywords: ecosystems; digital platforms; technology companies; BigTech-companies; credit institutions; financial services; payment instruments; payment services

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INTRODUCTION

In recent years, technological changes related to the introduction of breakthrough technologies in the field of big data, cloud technologies, distributed ledgers, artificial intelligence, the Internet of things, etc. are contribute to the overall process of transition to platform business models and formation of ecosystem by large technology companies. Features of the platform business model, which uses both technological and behavioral innovations, lead to qualitative restructuring of business processes, contribute to productivity growth, creation of new value objects/goods/services, the emergence of new payment instruments and payment mechanisms on a platform basis.

Many large technology companies (further — Bigtech-companies) and some transnational banks concentrate large amounts of data to realize network effects. They also have sufficient financial resources to implement both financial and non-financial innovations that allow them to use the key advantages of new business models compared to traditional business models of credit organizations. As a result, the digital platforms of individual producers are often integrated into the ecosystems of largest technology companies, which become centers for managerial, technological and financial decisions.

Currently, the ecosystems of Bigtech-companies provide users with access to a wide range of products and services in information technology, e-commerce, finance, etc. Thus, in the financial sphere, two main areas of ecosystem activity can be identified — payment

sector and other financial services (savings, investment, insurance, etc.). The object of our research is the activity of ecosystems of Bigtech-companies in the payment sector.

The topical issues of the development of ecosystem activities in the sector of payments are:

• development of criteria for assigning a company to an ecosystem;

• analysis of possible models for ecosystem payments;

• determination of the place and role of technology and Bigtech-companies in the payment sphere as a competitor of banks and other payment service providers, etc.

Thus, due to the development of their own payment instruments, the ecosystems of Bigtech-companies can become large players in the market of payment services. On the one hand, this will allow them to increase their autonomy from traditional payment intermediaries — banks and non-bank payment service providers by increasing the margin of their business. On the other hand, through economies of scale, the ecosystems of Bigtech-companies can affect the entire payment landscape, significantly changing the role of various payment intermediaries in the global payment services market in general and in individual countries in particular.

The aim of the research is to identify perspective directions of interaction of ecosystems of technological companies with credit institutions in the payment sector. To achieve this aim, the following tasks were solved:

• analysis of current approaches to defining ecosystems and digital platforms and their author's interpretation;

• identification of key benefits and risks of ecosystem participation in financial and payment intermediation;

• analysis of the main models of the provision of financial and payment services by ecosystems;

• identification of the regulatory framework and its activities in foreign countries;

• proposal of criteria for assigning a company to an ecosystem in Russia;

• identification of ecosystem perspectives in the payment sector.

REVIEW OF THE LITERATURE

Currently, research on ecosystems and digital platforms is mainly presented in the works of international financial institutions, publications of foreign authors, as well as in reports of central banks, including the Bank of Russia. Ecosystems are more popular than digital platforms. There are few works focusing on digital platforms.

In scientific works an "ecosystem" is most commonly defined using a descriptive approach. Thus, in the annual economic report of the Bank for International Settlements[1] the definition of "ecosystem" is reduced to the identification of its key elements and features, which include: advanced data analytics, network externalities and related activities. In a number of researches, ecosystem elements are considered in relation to their interrelationships and interdependencies [1, 2]. At the same time, the authors do not identify objective criteria for assigning companies to an ecosystem, which is a prerequisite for regulating their activities.

The European Banking Association (EBA)[2] report gave a rather detailed analysis of the nature of digital platforms and their functioning features. The study considers various approaches to business modeling of digital platforms and identifies the risks of their functioning. "Digital platform" in this publication is interpreted as a link between financial institutions, firms and customers to create value of their interaction. A similar approach has been adopted by the economists of the Bank for International Settlements [3]. And in a study by the European Insurance and Occupational Pensions Authority

[1] Big tech in finance: opportunities and risks. Bank for International Settlements. 2019. URL: https://www.bis.org/publ/ arpdf/ar2019e3.html (accessed on 01.09.2022).

[2] Report on the use digital platforms in the UE. Banking and payment sector. European Banking Authority. 2021. URL: https://www.eba.europa.eu/sites/default/ documents/files/document_library/Publications/Reports/2021/1019865/EBA% 20Digital%20platforms%20report%20-%20210921.pdf (accessed on 01.09.2022).

(EIOPA),[3] the term "platform" is used as technical infrastructure.

A separate direction of the research is modeling the options of interaction between traditional players of the financial market — banks, non-bank credit institutions, etc. — and new players — the ecosystems of technology companies and digital platforms of non-credit organizations. Thus, the Financial Stability Board (FSB)[4] examines the most likely scenarios of interaction between them: direct competition, partnership, mediation, etc. In turn, the authors of the annual economic report of the Bank for International Settlements[5] justify the idea that in the future, Bigtech-companies and credit institutions will compete in the financial market. Dutch economists L. Spek and S. Phijffer indicate that partnership and mediation are the most likely options for interaction between Bigtech-companies and financial institutions [1].

Assessment of the benefits of the penetration of Bigtech-companies into the financial industry is discussed separately in the reports of the Financial Stability Board.[6] The Board reports analyze the benefits from the end-user and client experience. In contrast, the European Commission research[7] identified the main advantages of penetration for Bigtech-companies. The studies by international organizations do not normally analyze the benefits of Bigtech-companies entering the financial market for the state, business and its players.

A sufficient number of publications are devoted to identifying, assessing and minimizing the risks that arise when ecosystems enter the financial market. Possible risks are detailed in the researches of the Bank for International Settlements [4] and the Financial Stability Board.[8] Thus, the leading economists of the Bank for International Settlements in their work "Regulation of Bigtech-companies in finance" divide the risks into two groups: traditional and innovative risks that have arisen due to the increasing activity of Bigtech-companies in the financial market [5]. At the same time, the publications lack analysis of risks from the point of view of the triad of involved entities "State-business-consumer".

It should be noted that all the works devoted to the topic of minimization of risks associated with the activities of the Bigtech-companies in the financial market focus on adaptation of the existing financial regulation to the new realities. In this case, regulation is considered by the authors in terms of attributing it to a certain risk group (traditional or innovative risks) or to a certain object of regulation (a company or its financial services activities). The first approach is reflected in the report of the Financial Stability Institute (FSI) [6]. The second — in the studies of the Fintech Task Force of the European Parliament and the publications of the economists of the Bank for International Settlements [2, 7]. Thus, the economists of the Financial Stability Institute note that risk monitoring and identification should focus on economic functions and operations and/or services provided by the

[3] Request to EBA, EIOPA and ESMA for technical advice on digital finance and related issues. URL: https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/210202-call-advice-esas-digital-finance_en.pdf (accessed on 01.09.2022).

[4] BigTech in finance: market developments and potential financial stability implications. Financial Stability Board. 2019. URL: https://www.fsb.org/wp-content/uploads/P091219–1.pdf (accessed on 01.09.2022).

[5] Big tech in finance: opportunities and risks. Bank for International Settlements. 2019. URL: https://www.bis.org/publ/arpdf/ar2019e3.html (accessed on 01.09.2022).

[6] BigTech in finance: market developments and potential financial stability implications. Financial Stability Board. 2019. URL: https://www.fsb.org/wp-content/uploads/P091219–1.pdf (accessed on 01.09.2022); BigTech firms in finance in emerging market and developing economies: Market developments and potential financial stability implications. Financial Stability Board. 2020. URL: https://www.fsb.org/wp-content/uploads/P121020–1.pdf (accessed on 01.09.2022).

[7] Proposal for a regulation of the European Parliament and of the Council on contestable and fair markets in the digital sector (Digital Markets Act). European Commission. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020PC 0842&from=en (accessed on 01.09.2022).

[8] BigTech firms in finance in emerging market and developing economies: Market developments and potential financial stability implications. Financial Stability Board. 2020. URL: https://www.fsb.org/wp-content/uploads/P121020–1.pdf (accessed on 01.09.2022).

company, but regulation and supervision — directly on the company as an economic unit. The authors of the papers discussed above thought that there is a need for international standards on financial regulation (especially in the payment sector) of Bigtech-companies to prevent the risk of fragmentation of the regulatory framework depending on jurisdiction [2, 7].

In Russia, the concept of ecosystem has become used relatively recently, and the work of domestic authors in this field is based on foreign research. Fundamental research which is devoted to the role of ecosystems and digital platforms in the financial sector, including the payment sphere, as well as to the regulation of their activities in Russia is non-present. At the same time, the publications of the Bank of Russia (in particular, the reports "Ecosystems: approaches to regulation",[9] "Management of risks of participation of banks in ecosystems and investments in immobilized assets" [10]) focus more on the study of operating practices and the proposal of a regulatory regime for Russian and foreign ecosystems in the Russian financial market, and less — on the research of issues related to the regulation of the activities of Bigtech-companies' ecosystems in the payment sector.

INTERPRETATION OF ECOSYSTEMS AND DIGITAL PLATFORMS

At present, in the vast majority of countries, the concepts of "ecosystem" and "digital platform" are not enshrined in law. In this regard, there are differences in the interpretation of these concepts at the level of both international financial institutions and national central banks and separate research economists.

According to the European Insurance and Occupational Pensions Authority,[11] a digital platform is the technical infrastructure needed by several participants to connect and interact with each other, and for the creation and exchange of values. According to the research by the European Banking Association,[12] the digital platform allows at least one financial institution directly (or indirectly, using a regulated or unregulated intermediary) sell to customers and/or sign a contract with clients for financial products and services within a separate jurisdiction or single economic zone. The term "platform" can be used in a broad and narrow sense.

In a narrow sense, the mobile banking application can be described as a platform, as well as the online interface of the payment institution, focused on the client. In a broad sense, the digital platform creates values for interaction between one or more financial institutions (and possibly other firms) and customers.[13] At the same time, in a study of the international consulting company Deloitte[14] similar interpretation is given to the term

[9] Ecosystems: approaches to regulation. Report for public consultation. 2021. URL: https://www.cbr.ru/Content/Document/File/119960/Consultation_Paper_02042021.pdf (accessed on 01.09.2022).

[10] Management of risks of participation of banks in ecosystems and investments in immobilized assets. Report for public consultation. 2021. URL: http://www.cbr.ru/Content/Document/File/123688/Consultation_Paper_23062021.pdf (accessed on 01.09.2022).

[11] Request to EBA, EIOPA and ESMA for technical advice on digital finance and related issues. URL: https://ec.europa.eu/info/sites/default/files/business_economy_euro/banking_and_finance/documents/210202-call-advice-esas-digital-finance_en.pdf (accessed on 01.09.2022).

[12] Report on the use digital platforms in the UE. Banking and payment sector. European Banking Authority. 2021. URL: https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2021/1019865/EBA% 20Digital%20platforms%20report%20-%20210921.pdf (accessed on 01.09.2022); Request to EBA, EIOPA and ESMA for technical advice on digital finance and related issues. URL: https://ec.europa.eu/info/sites/default/ files/business_economy_euro/banking_and_finance/documents/210202-call-advice-esas-digital-finance_en.pdf (accessed on 01.09.2022).

[13] New forms of interaction are emerging between financial institutions (credit institutions, payment institutions, e-money institutions, etc.) and non-financial organizations. Source: Report on the use digital platforms in the UE. Banking and payment sector. European Banking Authority. 2021. URL: https://www.eba.europa.eu/sites/default/documents/files/document_library/Publications/Reports/2021/1019865/EBA% 20Digital%20platforms%20report%20-%20210921.pdf (accessed on 01.09.2022).

[14] Realizing the digital promise. Transformation in an ecosystem of regulators, BigTech, FinTech and more. Deloitte. Institute of International Finance. URL: https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Financial-Services/gx-realizing-the-digital-promise-transformation-in-an-ecosystem.pdf (accessed on 01.09.2022).

"ecosystem". Thus, a broad approach to the platform's interpretation leads to blurring the lines between the individual concepts of "digital platform" and "ecosystem".

In our opinion, it is more reasonable to attempt to disclose the concept of "ecosystem" through a set of key elements and features that companies need to have in order to be included in this category. Key elements/features to be highlighted are:

1) advanced data analytics;
2) network externalities;
3) interrelated activities.

The sum of these key elements forms the so-called DNA ("data-network-activities") loop. In this case, loop elements generate a self-reinforcing cycle according to Metklaf's law, in which the utility of the network for its members has a quadratic dependence on the number of network members [8]. Thus, more data creates stronger network effects that generate more activity, leading to further data growth.

The Bank of Russia reflected its interpretation of the concept of "ecosystem" in the Strategy of development of the National Payment System for 2021–2023.[15] Thus, according to the Bank of Russia, an ecosystem is a set of services, including platform, one group of companies or companies and partners, allowing users to obtain a wide range of products and services, satisfying the vast majority of customer's daily needs, in a single, seamless integrated process. In this case, producers of products and services are able to directly or indirectly use the aggregate data available in the ecosystem on customers and their consumer behavior. Later, the Bank of Russia in the Report of Public Consultation "Ecosystems: approaches to management"[16] tried to reveal the essence of an ecosystem and its elements and clarified that an ecosystem may include closed and open platforms. One of the main disadvantages of the research is the lack of an objective criterion for assigning a company to an ecosystem.

Our research shows that the concept of "ecosystem" is broader than that of a digital platform. An ecosystem may include several digital platforms, but may also evolve on a single platform. However, the existence of an ecosystem without a digital platform is currently difficult to imagine, as there is currently no alternative technical and institutional framework for interconnecting services within an ecosystem and seamless switching between them. At the same time, a digital platform may exist outside an ecosystem. In the process of evolution, a digital platform can (but does not necessarily) be transformed into an ecosystem. Where a digital platform is converted to an ecosystem or an ecosystem is built on a single digital platform, the definitions remain separate and should not be identified. In this regard, a digital platform is likely to describe a company's technical infrastructure, while an ecosystem reflects the functionality and relationships of elements[17] within a company and/or between companies implemented on a technical basis.

In our research, we will use a broad definition of a digital platform, but clearly differentiate between platforms and ecosystems. By digital platform we will understand technical and organizational infrastructure, that allows a financial institution(s) directly or through an intermediary/intermediaries sell to customers and/or contract with customers to provide financial products and services, including offering payment services and instruments. The exception to the broad definition of a digital platform, in our opinion, is:

1) online banking tools and mobile banking applications used by a financial institution to provide financial services in a fully digital way;
2) crowdfunding platforms;
3) platforms used for P2P lending.

[15] Strategy of development of the National Payment System for 2021–2023. URL: https://www.cbr.ru/ Content/Document/File/120210/strategy_nps_2021–2023.pdf (accessed on 10.09.2022).

[16] "Ecosystems: approaches to management". Report of Public Consultation. 2021. URL: https://www.cbr.ru/Content/Document/File/119960/Consultation_Paper_02042021.pdf (accessed on 10.09.2022).

[17] Key elements include: advanced data analytics; network externalities; related activities.

These tools and/or platforms are generally either covered by existing regulation or require special regulatory regime.

An ecosystem will be understood by us as a new institutional unit that includes a network of financial and non-financial services provided on a platform basis by a group of companies that together create an integrated business environment generating new values for its customers. At the same time, from the Russian practice perspective, an ecosystem is understood as an ecosystem of a technology company, from the foreign experience perspective — an ecosystem of a Bigtech-company, due to the absence of large technology companies on the Russian market, comparable in capitalization and scope with the foreign ones.

Also in our research, we will not divide ecosystems into business ecosystems, banking ecosystems and other,[18] since no matter what a company's main activities are, they should all be subject to the company's criteria for assignment to an ecosystem and regulated in this way.

Ecosystems have a number of advantages over traditional financial institutions in providing financial and payment services to both end-users (households) and small and medium-sized businesses and the State. Thus, in terms of end users (households), the main advantages of using ecosystems are:

- low financial services cost achieved through the availability of own financial services and additional margins from the total presented activities within an ecosystem;
- high speed of financial services provided by interoperability of ecosystem services and seamless switching between them, online access to products and services presented on a single digital platform, a minimum set of data and documents required to identify and obtain services;
- providing individual offers of financial products due to high technological capabilities in the fields of artificial intelligence, Internet of things, big data, etc.;
- increasing the availability of financial services in areas with poor financial infrastructure and increasing the involvement of economic agents who do not have the full package of documents needed to appeal to the traditional financial institutions.

For small and medium-sized businesses, the following ecosystem benefits can be highlighted:

- affordable loans both in terms of cost of borrowing and credit/ credit line application procedures and receipt of funds;
- access to the platform of a large technology company that contributes to the growth of business.

It should be noted that the prerequisite for obtaining credit for small and medium-sized companies within an ecosystem is their operation on the platform of a Bigtech-company, which has a lot of data on the borrower and, through credit scoring and machine learning methods, prevents the risks associated with non-return of funds and loss of profit.

Bigtech-lending became particularly popular during the COVID-19 pandemic, as it allowed companies to compensate for the decline in transactions caused by the pandemic by about 20% [11]. On a global scale, the volume of loans issued by Bigtech-companies in 2020, increased by 40% and amounted to more than 700 bln USD [12]. The largest markets for Bigtech-lending in 2020–2021 were China, the USA, the UK, etc. [13].

The main advantage of ecosystems in providing financial services for the State is also the possibility of obtaining credit resources from a Bigtech-company, especially during economic and financial crises. For example, during the COVID-19 pandemic in some jurisdictions, Bigtech-companies participated in government credit schemes [14, 15].

The above benefits of ecosystems for economic agents are based on the specific characteristics of large technology firms as opposed to traditional financial institutions (*Table 1*).

As can be seen from *Table 1*, the main characteristics of ecosystems which differ from

[18] Several authors divide ecosystems into groups and consider each group separately. For example, the work on business ecosystems [9], banking ecosystems — publication [10] etc.

the ones of the traditional credit organizations such as banks are: global customer base; network effects; nanotechnology; less regulation. However, due to less regulation, ecosystems pay less attention to confidentiality and protection of personal data than traditional financial institutions, which have a lot of experience and knowledge in regulation and risk management. In this regard, the entry of ecosystems into the financial market raises risks for both ecosystems and end-users, businesses and the State.

PAYMENT INSTRUMENTS AND ECOSYSTEM SERVICES, LEGAL BASIS FOR THEIR PROVISION OF PAYMENT SERVICES

Currently, the largest ecosystems in the world are considered to be American companies Google, Apple, Meta, Amazon and Chinese companies Alibaba and Tencent.[19] The main sphere of activity of these companies is information technology, retail, social networks, etc. rather than financial services. However, these Bigtech-companies due to the wide use of digital platforms, the use of advanced information technology, the steady expansion of customer audience, more investment, as well as being integrated into related industries in recent years, have become significant in the financial and payment markets. Every year the share of financial services offered by large technology companies is increasing. According to the analysis by the economists of the Bank for International Settlements, more than 10% of the revenue of Bigtech-companies comes from the activities of the financial sector [4].

Table 2 presents the main activities of ecosystems of Bigtech-companies in the financial sphere.

As can be seen from *Table 2*, at present the main activities of large technology companies in the financial market are: opening deposits, lending, making payments, crowdfunding, asset management, insurance. While Chinese technology companies (Alibaba, Tencent) are represented by their services in all major areas of the financial market, American companies focus on payments. This is primarily due to the different models for embedding financial services in the non-financial sector, which will be discussed below.

The payment market is the only segment of the financial sphere in which all the Bigtech-companies considered by us are represented. This segment organically fits into almost any commercial activity and is critical for the creation of a client's "full cycle" within an ecosystem. It was payments that began the penetration of ecosystems into the financial sphere. Currently, in some jurisdictions, the share of payments by Bigtech-companies is significant [16]. For example, in China, Bigtech-companies account for 94.4 and 93.8% of payments in online and mobile payments respectively [17].

The provision of financial services, including the payment ones, by ecosystems is not possible under the traditional credit organization scheme because none of the above-mentioned Big-tech companies possess the traditional financial license in any national market (banking, brokerage, insurance, etc.) [18]. The following models for integrating payment services into the modern platform solutions of Bigtech corporate ecosystems can be identified:

1) partnership with classic financial market participants;

2) creation of a digital bank within its own settlement and payment system;

3) add-on to the existing retail payment system;

4) implementation of autonomous financial and payment services through issuance their own virtual currencies, such as global stablecoins, and development of decentralized financial

[19] These companies are the largest, based on the volume of capitalization and the size of the customer base: Apple — 2600 bln dollars, 1500 mln people, Amazon — 1264 bln dollars, 310 mln people, Google — 1551 bln dollars, 3.3 bln people, Meta — 606 bln dollars, 3.6 bln people, Tencent — 471 mln dollars, 1.27 bln people, Alibaba — 277 mln dollars, 1.28 bln people (the amount of capitalization — as at 04.05.2022, the customer base — as at 01.01.2022). Source: companiesmarketcap.com, company websites, 04.05.2022.

Table 1

Comparative characteristics of banks and BigTech-companies ecosystems activities in the financial and payment spheres

Factors	Characteristics	Banks	Ecosystems
End users' confidence	Size	+	+
	Brand awareness	+	+
	Customer loyalty	+	–
Financial sustainability factors	Investment potential	+	+
	Cheap financing	+	+
	Global customer base	–*	+
	Network effects	–	+
Operational activities and regulation	Nanotechnology	–	+
	Cross subsidization	+	+
	Overregulation	+	–

Source: compiled by the authors.

Note: * for most banks except large transnational banks.

Table 2

Main activities of BigTech-companies ecosystems in the financial sphere

BigTech-company	Main activities	Activities in the financial sphere*					
		Banking**	Lending	Payments	Crowdfunding	Asset management	Insurance
Google	Internet, advertising	–	–	+	–	–	–
Apple	Technology, software	–	–	+	–	–	–
Meta	Social media, advertising	–	–	+	–	–	–
Amazon	E-commerce, online retail	–	+	+	+	–	–
Alibaba	E-commerce, online retail	+	+	+	+	+	+
Tencent	Technology, games and messaging	+	+	+	+	+	+

Source: compiled by the authors.

Note: * financial services may be provided through the ecosystem and/or in partnership with financial institutions outside the ecosystem group in at least one jurisdiction; ** the main type of banking in most countries is the acceptance of deposits.

instruments, such as payment tokens for meta-projects within metauniverses.

Within the first model, based on a partnership with classic financial market participants, Bigtech-company Apple is observed to operate. An example of the company's payment instruments is the Apple Card, produced by Apple in partnership with Goldman Sachs Bank (USA). Implemented within the framework of this model, cooperation between financial institutions and Bigtech-companies benefits both sides. Bigtech-companies provide modern technology, big data processing capabilities, extensive customer base and marketing solutions. They also have single-sign on options and a set of preferences from integrated services. In addition, large technology companies are more flexible and subject to less regulation. In turn, financial institutions provide Bigtech-companies with the necessary infrastructure and traditional banking services.

Within the second model, Bigtech-companies create their own digital bank. Alibaba Group and Tencent and their digital banks MyBank[20] and WeBank, respectively, are examples of such a model of Big-tech companies. The features of digital banks are: integration into social networks; seamless multichannel; possibility of digital payments, etc. The use of this model by Chinese companies can be the basis for penetration of ecosystems into all segments of the financial sphere.

In the third model, Bigtech-companies create a kind of add-on to the existing retail payment system. Such Bigtech-companies as Google and Apple operate within the framework of this module. Examples of payment instruments of these Bigtech-companies are payment services Google Pay and Apple Pay respectively. For example, Google Pay and Apple Pay allow consumers to link a bank card to mobile or wearable devices (smartphone, tablet, watch, bracelet, etc.) working on Android and iOS operating systems respectively, and pay for goods and services online and offline.[21]

Within the fourth model, large technology companies produce their own virtual currencies and other decentralized financial instruments. At present, there is a tendency of the client's attachment to a company not only through "subscriptions" services, loyalty programs with the accrual of points, etc. but also using its own accounting units (the company's private virtual currency), which can be used both within and outside the ecosystem. The virtual currency of a company can be payment tokens used as an internal settlement tool in the ecosystem only of the company-issuer or the so-called stablecoins,[22] which can have universal circulation [19–21]. In both cases, such virtual currencies are produced using new emission and accounting technologies, such as distributed ledger technology or blockchains, which are most commonly used by large technology companies rather than traditional lending institutions. For example, a large-scale project to issue the global stablecoin (Diem currency) in 2020–2022 was prepared by Meta. If this company had issued its own currency, it would have been the first global private currency for retail payments by the Bigtech-company's ecosystem. Investment banks and other financial sector organizations such as JPMorgan Bank, Signature Bank, UBS, Deutsche Bank, Santander and others are also interested in the issuance of global stablecoins, and are trying to integrate new payment instruments into their ecosystems [21].

In most jurisdictions providing payment services on the basis of the payment services and tools used by Bigtech-companies requires a special permission (license, entry into the registry, etc.). Thus, in the USA and the EU countries, not being a credit organization, it is necessary to obtain the status of a payment

[20] Formally, MyBank is owned by Ant Financial (a subsidiary of Alibaba Group).

[21] For this type of payments used NFC technology (Near Field Communication) — a technology of wireless data transmission of a small range, which allows the exchange of data between devices located at a distance of about 10 cm.

[22] Steablecoins are a kind of virtual currencies that: 1) are released by clearly identified issuers on the blockchain in the form of negotiable digital monetary obligations or certificates of deposit; 2) support the exchange rate stability by tying to base low volatility or through algorithmic technologies; 3) can be used as a means of exchange and/or a means of payment, as well as a means of saving from persons other than the issuer. See details in: [20–22].

institution in order to engage in payment activities. Therefore, ecosystems in these jurisdictions create subsidiaries that obtain licenses for payment activities. In the USA, ecosystems operate under a license from a money transmitter service provider (money transmitter license),[23] that is required in each State, and licensing requirements may vary among States. In the EU countries, ecosystems operate on the basis of a payment service provider's license (payment license). It may be a payment institution licence[24] or an e-money institution licence,[25] except for Apple.

In China, the situation is different from that of the EU and the USA. Currently, foreign Bigtech-companies are not directly represented by their services in the Chinese financial market due to the regulatory restrictions. Chinese Bigtech-companies are required to have three licenses to operate in the national financial market: banking licence; payments licence and credit licence.

In Russia, to carry out payment activities, Bigtech-companies are required permission from the Bank of Russia and entry into the register of payment application suppliers and/or the register of foreign payment service providers. In February 2022, Bank of Russia registries included such Bigtech-companies as Apple, Google, Alibaba, Tencent, but only Google (Google Pay) and Apple (Apple Pay) provided payment services in the Russian market. These payment services included applications for business, trade/service enterprises and consumers and operated on the principle of add-ons to the existing retail payment system. Such an add-on allowed consumers to link a bank card to mobile and wearable devices and pay for goods and services either online or offline.

Introduction of payment services of ecosystems of Bigtech-companies[26] in Russia has allowed to provide end consumers with a wider range of payment methods, which in most cases proved to be more convenient, fast and safe in comparison with payments by bank cards.[27] In turn, for trade and service enterprises there was a need (due to maintaining competitive advantages) to provide the opportunity for customers to use the full range of payment methods (using both payment instruments and payment services). Connection of foreign payment services required a large-scale modernization of sales points in terms of connection and configuration of terminals of contactless payment, integration of payment services into applications and websites. It should be noted that before the appearance of foreign payment services contactless payments in Russia were available only through the use of a small number of cards with an NFC-chip,[28] and the infrastructure for the implementation of contactless payments in Russia was poorly developed. At the same time, the introduction of

[23] License of money transfer service provider allows to provide services on issue of payment instruments, money transfers, cashing of cheques, currency exchange, etc. The license is issued by a local state and a special bureau in the US Treasury — Financial Crimes Network (Money services business definition). URL: https://www.fincen.gov/index.php/money-services-business-definition (accessed on 01.08.2022). For example, in Texas, a license is issued by the Department of Banking. The minimum amount of company's share capital — 100 thous. USD. License fee is 2.5 thous. USD, guarantee fee — not less than 300 thous. USD (Requirements for Money services businesses). URL: https://www.dob.texas.gov/money-services-businesses (accessed on 10.08.2022).

[24] License of payment institution allows to provide acquiring and processing services. Source: Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2366 (accessed on 01.09.2022).

[25] License of the Institute of electronic money allows to provide services on issue of payment instruments, initiation of payments, acquiring and processing services, to carry out direct debits and credit transfers. Source: Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2366 (accessed on 01.09.2022).

[26] Apple Pay launched in Russia 4 October 2016, Google Pay — 23 May 2017.

[27] Convenience is ensured by the fact that bank cards are stored in the mobile phone application, and for payment it is necessary only to unlock the phone or enter a security code and bring it to the payment terminal. Payment is instantaneous, no PIN is required. When making a payment, payment data are transmitted via a secure protocol using a unique transaction code, which guarantees the safety of bank account data and card. Also, when paying online there is no need to enter bank account data and card.

[28] Total issued contactless cards (with NFC chip) in 2015 amounted to about 7 million units (2.9% of the total amount of bank cards in circulation in Russia), according to the Bank of Russia.

foreign payment services caused the intention among the leading Russian banks to instantly ensure that trading acquiring networks support contactless transactions, which was caused by high expectations associated with attracting high-yield users. The introduction of Apple Pay and Google Pay can be considered one of the main impulses for the distribution of POS-terminals for contactless payments and the growth rate of contactless settlements in the late 2010s in Russia.

At the same time, the emergence of payment services of foreign ecosystems on the Russian market stimulated the development of national payment services based on similar information technologies. In order to prevent the risks of the Russian payment market being dominated by foreign payment service providers, QR-code payments were introduced, implemented on the platform of the Fast Payment System of the Bank of Russia, national payment services, implemented on the basis of JSC "NSPK" (SBPay, MirPay), payment services of ecosystems of Russian companies[29] (SberPay, VK Pay etc.).[30] Thus, two main trends were observed on the Russian payment market in 2020–2022: 1) competition between the payment services of the foreign ecosystems and those of the Russian technology companies ecosystems; 2) competition between the payment services of ecosystems and the payment instruments of traditional financial institutions.

Since March 2022, the activity of foreign Bigtech-companies in the country was suspended due to the sanctions restrictions imposed by the governments of the developed countries and individual companies against Russia. Therefore, payment functionalities provided earlier by foreign Bigtech-companies have been naturally substituted by the payment instruments of the Russian financial institutions and national payment services implemented on the basis of JSC "NSPK".

The payment services of the Russian ecosystems and technology companies were also actively created and promoted. For example, there are such payment services as Tinkoff Pay,[31] GazpromPay[32] etc. However, the competitive environment in the Russian payment market has not yet developed. Transactions made with the use of the payment services of the Russian ecosystems and technology companies occupy 10% of the total volume of non-cash transactions, the share in 90% accounts for transactions, committed using of state payment services and traditional payment instruments.[33]

Currently, payments using the NFC-technology in the "SBPay"[34] application are being tested on the basis of JSC "NSPK". In the case of a large-scale implementation of the service among banks, this payment method can be a substitute for the global payment services Apple Pay and Google Pay, as from the point of view of the end user the algorithm of using the service is similar: it is necessary to bring the smartphone to the POS-terminal and confirm the payment.[35]

However, competition in the financial and payment systems can be expected to increase in the coming years, on the one hand, between the payment instruments of traditional financial institutions and the payment services of ecosystems, and on the other hand, between

[29] According to the Bank of Russia Russian ecosystems are: Sber, VK (Mail Group), Tinkoff, MTS, VTB, Yandex. Source: Ecosystems: approaches to regulation. Report for public consultation. 2021. URL: https://www.cbr.ru/Content/Document/File/119960/Consultation_Paper_02042021.pdf (accessed on 10.09.2022).

[30] Strategy of development of the National Payment System for 2021–2023. URL: https://www.cbr.ru/Content/Document/File/120210/strategy_nps_2021–2023.pdf (accessed on 10.09.2022).

[31] Payment service Tinkoff Pay. URL: https://www.tinkoff.ru/tinkoff-pay/ (accessed on 01.08.2022).

[32] Payment service Gazprom Pay. URL: https://www.gazprombank.ru/ personal/payment-service/gazprom-pay/ (accessed on 01.08.2022).

[33] How Russians pay after Apple Pay and Google Pay. Report by YKassa. URL: https://plusworld.ru/daily/platezhnyj-biznes/kak-platyat-rossiyane-posle-uhoda-apple-pay-i-google-pay/ (accessed on 01.08.2022).

[34] SBPay — mobile application for payment of goods and services in retail stores and the Internet within the framework of the Fast Payment System of the Bank of Russia.

[35] Strategy of development of the National Payment System for 2021–2023. URL: https://www.cbr.ru/Content/Document/File/120210/strategy_nps_2021–2023.pdf (accessed on 10.09.2022).

them and the new payment instruments (stablecoins and digital currencies), which can be produced both within and outside the ecosystems of the Bigtech-companies.[36] At the same time, there is not necessarily competition between ecosystems and traditional financial institutions for the provision of traditional payment instruments (payment services) as other ways of interaction between these companies and institutions might bring about far more benefits to companies and financial institutions as well as to end-users.

CRITERIA FOR ASSIGNING COMPANIES TO AN ECOSYSTEM IN RUSSIA

As mentioned at the beginning of this research, technology companies are considered as ecosystems in Russia due to the absence of Bigtech-companies. While not every technology company is an ecosystem, some companies have only some elements of ecosystems. For example, a company may be an ecosystem in one country but will not be considered an ecosystem in another country. This may be due to the features of the development of financial and payment markets, different degrees of introduction of new financial technologies, etc. and be conditioned by specific national regulatory framework.

In our opinion, two groups of criteria can be identified: general (qualitative) and specific (quantitative). The general criteria are relevant for analyzing a company of any country, the specific criteria — only of a particular country, taking into account the characteristics of doing business, the level of development of the financial market, IT-sphere, etc. *Table 3* presents the general and specific criteria that we propose to use to assign a company to an ecosystem in Russia.

As can be seen from *Table 3*, the first general criterion a company must have to be assigned to an ecosystem,— is functioning in the B 2C segment, i.e. a company must primarily provide goods and services to end users (customers) — individuals.

The second general criterion is the goal of a company. In the case of an ecosystem, one of the main objectives of the company's activities should be to maximize the overall network effect derived from the operation of each service within the ecosystem, which generates profits for the company. In other words, a company should aim to maximize the number of end users and suppliers of goods and services, and should be prepared for long-term investments and, short-term financial losses to provide unique technological solutions for segmented customers.

The next criterion is the level of technological development of a company. Although this criterion is included in the general criteria, it may have some country differences due to the overall level of technological development in the country and the level of investment in advanced technologies.

The fourth general criterion is the provision of payment services as a key element of systemic integration. In our opinion, a Bigtech-company cannot be recognized as an ecosystem, but only as having some elements of an ecosystem if the company does not provide payment services on its own. Otherwise, a company cannot provide closed-loop services without involving payment intermediaries located outside the ecosystem perimeter, i.e. the company cannot function as an ecosystem within a closed business cycle.

The fifth criterion for assigning a company to an ecosystem is its presence in several market segments. As noted above, technological effectiveness and the availability of payment services are criteria required for assigning a company to the ecosystem. Hence, a company should be represented at least in the financial sphere, as well as in the field of information technology. However, the main ecosystem activities may not be related to any of the above. So, we distinguish three options of a company's presence in several market segments (*Table 4*).

As shown in *Table 4*, a company's presence in three or more different areas of activity is required to be assigned to an ecosystem.

[36] We expect the return of selected foreign ecosystems to the Russian payment market after the termination of military action in Ukraine and the partial lifting of economic sanctions by developed countries.

Table 3

Criteria for assigning a company to an ecosystem

General (qualitative) criteria	Specific (quantitative) criteria
Functioning in the B2C segment	Capitalization volume
The goal of the activity – is to maximize the overall network effect, which generates profit of the company	Customer base size
Technology of business (use of artificial intelligence technologies, Internet of things, Big Data, blockchain, open API* etc.)	Number of services provided within the ecosystem in the financial and non-financial spheres
Provision of payment services as a key element of system integration	Number of companies connected to the platform
Presence in several market segments	Share of profit from main field of activity
Seamless switching between services within the ecosystem / digital platform availability	

Source: compiled by the authors.

Note: * Application programming interface (application software interface) – a set of tools and functions in the form of an interface for creating new applications, through which one program will interact with another.

Table 4

Options for a company's presence in multiple market segments

	1 option	2 option	3 option
Main field of a company's activity	Finance	Information technology	Retail, social media, etc.
Required fields of a company's activity	Information technology	Finance	Information technology and finance
Additional fields of a company's activity	Retail, social media, etc.	Retail, social media, etc.	

Source: compiled by the authors.

The last common criterion is the seamless switching between services within an ecosystem / the availability of a digital platform. These criteria can be called substitutional, as seamless switching between services within an ecosystem is ensured by the company's possession of a single digital platform. A single interface allows end-users to obtain the required services without leaving the digital platform perimeter and without having additional labor costs, in particular for making payments and other financial transactions.

The authors consider the following to be specific (quantitative) criteria: capitalization of a company, customer base size, number of services provided within an ecosystem, financial and non-financial spheres, number of companies connected to an ecosystem platform, share of profit from the main field of activity. Quantitative values for each of the criteria are reflected in *Table 5*.

In order for a technology company to be recognized as an ecosystem in Russia, it is necessary to comply with all the quantitative values reflected in *Table 5*. If you analyze the companies in Russia positioning themselves as ecosystems [Sber,[37] VK (Mail Group),[38] Tinkoff,[39]

[37] Annual Report of PJSC "Sberbank" for 2020. URL: https://www.sberbank.com/common/img/uploaded/_new_ site/com/gosa2021/yr-sber-ar20-eng.pdf (accessed on 01.08.2022).

[38] Annual Report of Mail Group for 2020. URL: https://corp.imgsmail.ru/ media/files/mail.rugrouparfy2020.pdf (accessed on 01.08.2022).

[39] Annual Report of JSC "Tinkoff" for 2020. URL: https://www.annualreports.com/HostedData/Annual Reports/PDF/LSE_TCSLI_2020.pdf (accessed on 01.08.2022).

Table 5

Specific (quantitative) criteria for assigning a company to an ecosystem in Russia

Quantitative criteria	Value*
Capitalization of a company	Not less than 5 bln USD
Customer base size	Not less than 10 mln people
Number of services provided within an ecosystem, financial and non-financial spheres	Not less than 10
Number of companies connected to an ecosystem platform	Not less than 5
Share of profit from the main field of activity	Not more than 98%

Source: compiled by the authors.

Note: * the values of quantitative criteria are determined on the basis of foreign experience of functioning of Bigtech-companies ecosystems, taking into account Russian practice.

MTS,[40] VTB,[41] Yandex[42]], according to the criteria set by us, all the companies comply with the ecosystem criteria.

MAIN SCENARIOS AND RISKS OF INTERACTION OF ECOSYSTEMS AND CREDIT INSTITUTIONS IN THE PROVISION OF FINANCIAL AND PAYMENT SERVICES IN RUSSIA

Based on the above research we have identified four main scenarios of interaction of traditional financial institutions (banks) and ecosystems of Russian technology companies and foreign Bigtech-companies on the Russian market (*Table 6*).

As can be seen from *Table 6*, we propose to identify four scenarios of interaction between financial institutions and ecosystems of technology companies and Bigtech-companies. In the first scenario, traditional financial institutions play a key role in customer relations and the provision of payment instruments, financial products and services. At the same time, technology companies within Russian and foreign ecosystems cooperate with banks in terms of innovative solutions, technological services and infrastructure to provide payment and other services (development of cloud computing, advanced Big Data analytics, etc.). The advantage of this scenario is the sustainability of business models of traditional financial institutions, their effective interaction with consumers and the provision of financial and payment services. The main disadvantage is the lack of competition for innovation among financial institutions.

In the second scenario, technology companies within Russian and foreign ecosystems interact with customers, offer payment instruments, financial products and services on their own behalf, while banks provide infrastructure for payments. The advantage of this scenario is that ecosystems offer innovative solutions for the provision of financial and payment products and services. The main disadvantage can be seen as the increasing risks due to the entry of ecosystems into the financial market and the implementation of uncharacteristic activities.

In the third scenario, both the ecosystems of technology companies and traditional financial institutions offer payment instruments, financial products and services. The advantage of this scenario is that there is competition for the consumer between banks and ecosystems

[40] Annual Report of "MTS" for 2020. URL: https://s22.q4cdn.com/ 722839827/files/doc_downloads/2020/MTS-2020–20-F.pdf (accessed on 01.08.2022).

[41] Annual Report of VTB Bank (PJSC) for 2020. URL: https://www.annualreports.com/HostedData/AnnualReports/ PDF/vtb-bank_2020.pdf (accessed on 01.08.2022).

[42] Annual Report of "Yandex" for 2020. URL: https://ir-docs.s3.yandex.net/main/Yandex%2020-F%202020.pdf (accessed on 01.08.2022).

Table 6

Scenarios of interaction among banks and ecosystems of BigTech-companies and technology companies in Russia

	Scenario 1	Scenario 2	Scenario 3	Scenario 4
Market participants				
Traditional financial institutions (banks)	They provide PIs, financial products and services	They provide infrastructure for payments and financial services	They provide PIs, financial products and services on an equal basis with ecosystems	–
Ecosystems of technology companies and Bigtech-companies	They provide innovative solutions for payment and financial services; PM — opportunity to receive direct income	They provide PIs, financial products and services; PM — the possibility of broadening the activities	They provide PIs, financial products and services on an equal basis with banks; PM — the possibility of broadening the activities	They provide PIs, financial products and services
Consumers*	They are clients of banks and they trust them	They are clients of ecosystems but they trust banks	They are clients of banks or ecosystems depending on the degree of trust	They are clients of ecosystems and they trust them
Government	It performs regulatory and control functions, provides PS and is ready to replace the entire market **	It performs regulatory and control functions, provides PS		
Market factors				
Competition	Among banks, among ecosystems		Between banks and ecosystems	Between ecosystems
Possible risks (basic, global, country)	Lack of competition for innovation among banks	High barriers to ecosystem change, reduced financial stability of banks, replacement of Russian PS by foreign suppliers***, risks associated with consumer protection, reduced quality of services and financial security, financial crimes, etc.		
		–	Financial market fragmentation	Emergence of cash surrogates
Minimization of risks	–	Ecosystem management, licensing of their activities or other legal basis		

Source: compiled by the authors.

Note: * "to be a client" means to conclude a contractual relationship with this institution for the provision of services and their payment, "trust" means the client's consent to the provision of services and their payment, and confidence in the safety of funds, confidentiality of data and security of operations; ** Replacement of payment services of foreign ecosystems with state payment services is currently observed; *** here authors make particular assumptions about return of foreign ecosystems of Bigtech-companies in the medium or long term. PI — payment instruments, PM — payment market, PS — payment services.

that have their own online banks, insurance companies and asset management companies. At the same time, technology companies and Bigtech-companies are trying to retain customers by setting high barriers to switching [for example, providing incompatible with other payment systems and non-convertible payment instruments (own digital currencies)], which is the disadvantage of this scenario. Also, traditional financial institutions are losing financial stability due to the transition of part of the payment business to financial services of ecosystems, accompanied by the fragmentation of the financial market.

In the fourth scenario, payment instruments, financial products and services are provided by ecosystems. As a result, traditional financial institutions are losing their role in the payment market. This scenario is unlikely in the short to medium term because banks have many years of experience and skills to interact effectively with consumers in providing financial and payment services to them. However, this scenario can be implemented over a long period of time. This scenario is made possible by the fact that many technology companies and Bigtech-companies — social networks, mobile operators, retail companies — become much "closer" to their customers every year, unlike banks due to the growing number of daily transactions. The advantage of this scenario is that when customers interact with ecosystems, they generally do not have the interoperability and seamlessness problems that exist with banks. The disadvantages of this scenario are: the increasing risks in terms of consumer protection, reduced quality of services and financial security, growth of financial crimes; emergence of cash surrogates; reduced financial sustainability of traditional financial institutions, etc.

In scenarios where an ecosystem is a participant in the financial and payment markets,[43] implementation of the basic, global and country risks is possible.[44] Basic risks (risks associated with consumer protection, reduced quality of services and financial security, financial crimes, etc.) can be minimized at the level of individual countries, taking into account international experience in regulating the financial activities of large technology companies. For example, in Europe, Directive 2015/2366 (PSD 2)[45] imposes strict requirements on payment service providers for the initiation and processing of electronic payments and consumer protection. In the U.S., in addition to the license of a money transfer service provider, Bigtech-companies must obtain a FinCEN (Financial Crimes Network) license to provide financial and payment services, aimed at combating money laundering. Compliance with the conditions is monitored by the Internal Revenue Service (US Treasury Bureau).[46]

Global risks (risks associated with disruption of financial stability, decrease in the effectiveness of monetary policy, disruption of the stability of the international monetary system, etc.) characterize the cross-border operations of Bigtech-companies, in particular the issuance and operation of global stablecoins with digital assets. Minimizing such risks requires joint efforts by countries under the auspices of international financial organizations (International Monetary Fund, World Bank, Organization for Economic Cooperation and Development, Bank for International Settlements, Financial Stability Board, G20 countries, etc.) to develop common standards and requirements for cross-border activities of technology companies in the financial and payment spheres.

Country risks depend on the state policy, the level of economic and financial development, other specific characteristics of individual subjects and should be regulated at the State level. For example, until recently there were

[43] Scenarios 2, 3, 4 according to Table 6.

[44] Risk division conditional, based on the author's classification.

[45] Directive (EU) 2015/2366 of the European Parliament and of the Council of 25 November 2015 on payment services in the internal market. URL: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32015L2366 (accessed on 01.09.2022).

[46] Money services business (MSB) registration. URL: https://www.fincen.gov/ money-services-business-msb-registration (accessed on 01.09.2022).

no domestic ecosystems in Russia that could compete with foreign Bigtech-companies' ecosystems. So, the capitalization of the Sberbank ecosystem in 2021[47] amounted to 100 bln dollars, with the 110 mln people customer base,[48] while the capitalization of the Apple ecosystem was at 2 600 bln dollars, with the 1 500 mln customer base .[49] On this basis, there were risks associated with the replacement of the Russian services by foreign suppliers and the dominance of foreign Bigtech-companies. Currently, this risk is offset by the temporary withdrawal of western Bigtech-companies' ecosystems from the Russian market. Nevertheless, in the medium and long term, western companies may return, so this risk should not be neglected.

There are also no such participants on the Russian payment market as the European payment institutions,[50] which prevents the development of competition between companies that are non-financial, but capable of providing financial or payment services. Accordingly, for consumers there are high barriers to switching among technology companies. In addition, in Russia there is no regulation in the provision of financial and payment services by the entities that do not have a bank license, which also creates risks of reducing competition in the supply of financial and payment services on the Russian market.

Minimizing the basic risks of ecosystems penetration into the Russian financial and payment market requires a comprehensive multi-level approach to regulating the activities of the ecosystems of technology companies both at the national and at the international level, based on improved financial regulation, antitrust legislation and data privacy regulation. In this case, specific commitments and constraints to the ecosystems of technology companies can be embedded both at the institutional level of a company and at the operational level of its activities. Obligations and limitations at the institutional level should include requirements for a company with a certain license or charter (for example, under current licenses, Bigtech-companies must comply with the consumer protection regulations and AML/CFT procedures (anti-money laundering and combating the financing of terrorism). At the same time, obligations and restrictions at the operational level of a company must contain requirements that must be met by all companies offering specific services (payment, investment, financial, consulting services, etc.).

In the case of ecosystems that issue payment instruments denominated in their own units of account (stablecoins or payment tokens), minimizing financial risks is a complex issue because of the cross-border nature of payment instruments. While some countries, such as the USA and the EU, are aiming to develop specific legislation to regulate the activities of and operations with stablecoins issuers, by contrast, China and Russia, seek to ban such activities and the use of stablecoins in payments [22]. In this regard, there is a need to develop international traffic regulation of the so-called global/significant stablecoins of Bigtech-companies in order to eliminate regulatory cross-country arbitration and prevent the risks of undermining financial stability, uninterrupted operation of payment systems, loss of monetary sovereignty, etc.

To minimize country risks in Russia, legislation is needed to ensure that non-financial companies operate as financial and payment service providers and promote competition among them. When providing non-financial companies with extensive financial and payment instruments, it is appropriate to legislate the obligation for such companies to obtain a license

[47] The volume of capitalization as at 04.05.2022, customer base — as at 01.01.2022.

[48] Market capitalization of PJSC "Sberbank". URL: https://companiesmarketcap.com/sberbank/marketcap/ (accessed on 04.05.2022); Reference information of PJSC "Sberbank". URL: https://mainfin.ru/bank/sberbank (accessed on 04.05.2022).

[49] Apple's market capitalization. URL: https://companiesmarketcap.com/apple/marketcap/ (accessed on 04.05.2022); Apple statistics. URL: https://www.businessofapps.com/data/apple-statistics/ (accessed on 01.07.2022).

[50] Payment institutions include non-bank payment service providers (payment institutions), account information services provider (AISP) and payment initiation service provider (PISP).

to carry out financial transactions (banking license, insurance license, etc.) or obtain the status as a non-bank payment service provider (NPSP), similar to payment institutions in the EU countries. Introduction of the NPSP institution in Russia is provided by the Strategy of Development of the National Payment System for 2021–2023.[51] Two types of suppliers are planned: NPSPs of the first type will only engage in the initiation of transfers requested by clients, and their net assets should be at least 5 million rubles; NPSPs of the second type, in addition to initiating transfers requested by clients, also provide for payments along with opening e-wallets. At the same time, they must have net assets of at least 50 million rubles.[52]

CONCLUSION

Currently there is no unified interpretation of the concepts of "digital platform" and "ecosystem". A number of researches equate these concepts because they are studied separately, outside the analysis of the causal relationships that lead to their emergence and subsequent development. Our research shows that the term "ecosystem" is broader than the term "digital platform". An ecosystem cannot exist without a digital platform, while a digital platform may exist outside an ecosystem. An ecosystem can be defined as a new institutional unit that includes a network of financial and non-financial services provided on a platform basis by a company or group of companies that together create an integrated business environment generating new values for its customers.

Ecosystems as new institutional units have a number of advantages over traditional financial institutions in the provision of financial services for both end-users and small and medium-sized businesses, and for the State due to the global customer base, implementation of network effects, less regulation, etc. At the same time, the entry of ecosystems into the financial market raises financial risks both for the ecosystems themselves and for other market participants, as a result of less rigid monitoring and supervision by financial regulators.

The provision of financial and payment services in the ecosystems of Bigtech-companies can be based on the following models:

a) partnerships with classic financial market participants;

b) creation of a digital bank within its own settlement and payment system;

c) add-ons to the existing retail payment system;

d) implementation of autonomous financial and payment services through issuance of their own virtual currencies and development of decentralized financial instruments within the metauniverses.

Regulation of the activities of Bigtech-companies at the global and state level allows to minimize the main types of financial risks at the global and local level through:

a) improvement of financial regulation, antimonopoly legislation and data privacy regulation;

b) development of common standards and requirements for transboundary activities of Bigtech-companies in general and global/significant stablecoin turnover in particular;

c) making necessary amendments to State legislation, including consumer protection.

Identification of objective criteria that make it possible to assign a technology company to an ecosystem institution is a prerequisite for ecosystem management. Such criteria may be general (qualitative) and specific (quantitative) criteria. The general criteria are relevant for assessing the assignment of a company to an ecosystem in any country, while the specific criteria — of a particular country only, as they take into account the characteristics of doing business, the level of development of the financial market, information technology, etc.

Successful development of ecosystems in Russia requires flexible regulation of their

[51] Strategy of development of the National Payment System for 2021–2023. URL: https://www.cbr.ru/Content/Document/File/120210/strategy_nps_2021–2023.pdf (accessed on 01.09.2022).

[52] Regulation of the institution of non-bank payment service providers: proposals of the Bank of Russia. URL: https://www.cbr.ru/press/event/?id =12619 (accessed on 01.08.2022).

activities, allowing to increase competition in the financial and payment services market by legislating the obligation to license financial transactions by ecosystems (banking license, insurance license, etc.) or to become a non-bank payment service provider (NPSP), similar to the payment institutions in the EU countries.

The conducted research concluded that the main scenarios of interaction of traditional financial institutions and ecosystems of technology companies and Bigtech-companies in the Russian financial and payment markets are:

a) maintaining domination of traditional financial institutions;

b) cooperation of traditional financial institutions and ecosystems;

c) competition between traditional financial institutions and ecosystems;

d) transition to dominance of ecosystems in the financial market.

Among certain scenarios of interaction of traditional financial institutions and ecosystems in the short term, the first scenario seems most likely to be implemented in Russia, since it provides for the minimum necessary institutional and regulatory changes. At the same time, in the medium and long term, the second and third scenarios are more promising as they improve the quality and availability of payment and other financial services. In general, the scenarios of interaction of traditional financial institutions and ecosystems in Russia and foreign countries match, but the prospects and implementation time of each scenario vary among countries.

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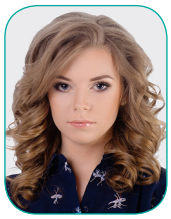

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