Chapter 52
Financial Technologies Ensuring Information Transition

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Abstract *Goal*: The goal of this chapter is to substantiate the need for the transformation of the financial system for the digital transition of society. The implemented state policy of informatization of all spheres of public life dictates the need not only for resource support of informatization events, but also requires restructuring of traditional financial mechanisms of maintenance of these processes. Today's changes are impossible without a clear and efficient financing vehicle, fully adapted to the needs of digital economy and taking account of all possible complexities of remote account management. New financial instruments should be not only efficient, but also well protected from unauthorized use aimed at stealing funds from customer and state accounts. *Methodology*: in the process of the research, the principles of systematization and logical analysis of the text, the methods of graphic and tabular data analysis, horizontal and vertical analysis, the methods of generalizing and generating ideas have been used for the processing and assessment of statistical material. *Results*: In accordance with special features of a new model of ecosystem of the digital transformation of society, we need to search for new solutions both in the area of financing and in the area of finance services of occurring changes. Existing financial

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mechanisms do not have enough potential and capabilities for the prompt response to the needs of the financial market. All of the above gives rise to the emergence of new forms of provision of services to the customers—digital, online banks, the number and scale of which are constantly growing. *Recommendations*: The primary areas of digitalization of the financial sector that were discussed in this paper will promote accelerated transition of society to the communication platform. The development of existing and the introduction of new information tools for the provision of financial services online allows expanding capabilities of the financial sector for the provision of services for business in a digital environment. However, in order to achieve efficient use of new financial instruments, one should primarily create a new financial infrastructure that would allow keeping digital platforms operational and maintaining digital interaction.

Keywords Information society · Digital financial instruments · Budget allocations · Digital economy

JEL Codes O13 · O32 · Q13 · Q16 · P52

52.1 Introduction

The ongoing processes in the modern world demonstrate that a new approach is being formed to the consideration of the fundamentals of management in the international market, and a new redistribution of spheres of influence in the geopolitical space is taking place. In the context of universal informatization, such resources as intellectual capital, information technologies and communications, infrastructure support assume prominence. The world is moving towards a service economy, because business is increasingly providing services by means of information and communication channels of transfer of information, technologies.

The ICT market forecast defines it as growing, which is confirmed by Gartner experts. Possible hacker attacks, system hacks can not reverse the positive dynamics of market growth over the past years (Table 52.1).

The dynamic pattern of global sales of IT technologies shown in Table 52.1 proves that these instruments are in demand by all categories of users around the world. The market has been consistently growing since 2017 by 3.2–4.5% per yer. The segment of corporate software is growing most of all. According to forecasts of market analysts, by the end of 2019, the volume of sales of IT services will grow by 4.7% and amount to more than a trillion dollars, even despite the slowdown in global economic growth. In fact, society is moving towards a new round of its development; all interactions evolve into the cyberphysical space, abandoning the tangible platform and substituting it for the digital platform. But before changing to it, one should built it, ensure sustainable instruments for work and control in it, prepare other market entities to the transition to it. All of the above will require immense financial investments that are beyond the scope of the private sector; therefore, informatization becomes a strategic vector of

Table 52.1 Dynamic pattern of the global market of information technologies

Name of ICT	Sales in 2017, billion dollars	Growth, %	Sales in 2018, billion dollars	Growth, %	Sales in 2019, billion dollars	Growth, %
Data centers	181	6.4	192	6	195	1.6
Corporate software	369	10.4	405	9.9	439	8.3
Hardware	665	5.7	689	3.6	706	2.4
IT services	931	4.1	987	5.9	1034	4.7
Communications services	1392	1	1425	2.4	1442	1.2
Total	3539	3.9	3699	4.5	3816	3.2

Source Gartner: in 2019, international IT market will grow by 3.2%. Access mode: https://www.computerworld.ru/news/Gartner-v-2019-godu-mirovoy-rynok-IT-vyrastet-na-32 (Accessed: 10.10.2019)

development of the state, its formation and maintenance are laid down in the expenses of the state budget and subsidized centrally.

Financial provision of informatization of Russian society is recognized as one of strategic areas of development and is an objective of national standing. A number of regulatory documents in this area have been drawn up and approved: Information Society Development Strategy in the Russian Federation for 2017–2030; Innovation Development Strategy of the Russian Federation until 2020; The Concept of the Long-Term Socio-Economic Development of the Russian Federation until 2020; National Program "Information Society" for the period from 2011 till 2024; National Program "Digital Economy of the Russian Federation" until 2024; Information Security Doctrine of the Russian Federation and others.

According to the national program "Information society", the total amount of budget allocations for the events of interest for the period from 2011 till 2024 was 824.5 billion rubles (Fig. 52.1).

The diagram of financing of the process of formation of information society in Russia presented in Chart 52.1 shows that the volume of budgetary funds allocated for the events of interest has a positive trend, and the forecast of future development has a bottom-up linear dependency.

In fact, all government institutions today have websites through which one can receive certain services; there are governmental online service portals; the funding and financing sector provides customers with the maximum possible list of remote services; the business sector switches to cashless payments and a web ordering system; social sphere expands the online space (telemedicine, distance education system, online booking and registration systems). The population receives many operations and services remotely. In general, there is a replacement of social life with a virtual one, the maintenance of which requires new financial instruments to service these processes and operation of the entire digital economic system.

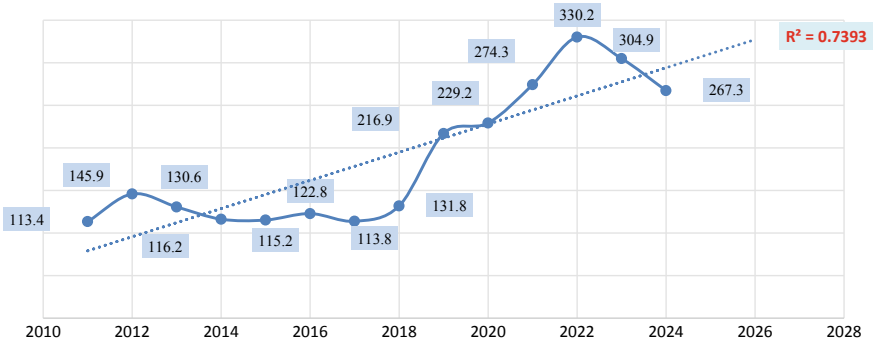

Fig. 52.1 Volume of financing according to the national program "Information society"

52.2 Materials and Method

Theoretical and applied issues of financial support for the information transition of Russian society were discussed in papers of such authors as Fedotova [1], Fedotova et al. [2], Yakunina et al. [3] who defined the primary areas of digitalization of the banking system of Russia.

The issues of legal regulation of introduction of information technologies into the financial sector are discussed in papers of the following economists: Plotnikov et al. [4], Fedotova et al. [5], Lasco et al. [6], Méndez Reátegui et al. [7], Nasir et al. [8], [9, 10], Federal Law [11].

Nevertheless, despite the abundance of publications on related topics, issues of financial support for the information transition of society are still understudied. There are many unresolved problems in the process of development of the optimization model of ecosystem of the digital transformation of the financial sector contributing to the establishment of "intelligent" and "sound" partnership relations in the processes of the use of information resources for the benefit of society. This chapter deals with these issues. The research is conducted using methods of graphical presentation of information, trend analysis, method of comparison, analogy and systematization.

52.3 Results

In recent years, the financial market has identified several key development trends within the scope of overall informatization of the social system. The main ones of them include the following: reduction of the cost of services of financial institutions, transformation of the existing business models of market participants, expansion of the range of remote financial services provided, increase in the number of operators providing payment services in addition to banks, partnership of loan institutions

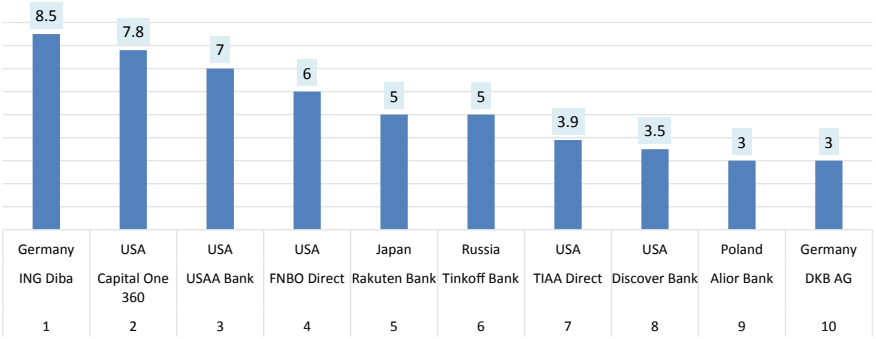

Fig. 52.2 TOP 10 of leading digital banks of the world according to the size of customer base at year-end 2018, million persons

with high-technology companies. These trends prove bear evidence of the fact that financial sector evolves and is adapted to the ongoing changes.

Modern banks all over the world are currently expanding the market of mobile and contactless payments, P2P services, digital currencies, etc. Banks are exploring the possibilities of using blockchain technologies, big data, etc. Virtual, digital banks make their appearance, handling all matters and services online (Fig. 52.2).

Digital banks are gaining more popularity and expanding their customer base. The TOP 10 banks included Russian bank "Tinkoff Bank", which has been one of the first banks to develop this service format. At its core, Tinkoff is a high-technology company with banking license, which employs up to 70% of IT professionals who create the best digital products in Russia every day. Digital banks are ahead in the financial services market due to the principles of customer-centricity, personalization of offers, and mobility. Such a bank should constantly develop according to the rate of changes in the environment; it is necessary to constantly create new financial products, be on the trend of recent changes and discoveries.

A digital bank offers most of its products and services in digitalized form with the use of digital channels. The infrastructure of such a bank is optimized for digital communications and is ready (together with a corporate culture) for a rapid change of technologies. The number of digital banks in the world is constantly growing—and the highest dynamic pattern is demonstrated by organizations that have absolutely no own offices and ATMs.

According to the data from the research, the key technologies of digital transformation in Russia were the analysis of big data (Big Data), robotization (RPA), chat bots, Optical Character Recognition (OCR), Artificial Intelligence (AI), Internet of things (IoT), Virtual and Augmented Reality (VR and AR), and blockchain. The most popular technologies in banks are AI (72%), Big Data and predictive analytics (61%), robots (56%), chat bots (56%) and optical character recognition (44%).

Modern banks are leaders in terms of the use of chat bots on an industrial scale (60% of banks use them). Financial sector was outperformed only by the telecommunications sector with its 75% figure. The third position is held by the retail sector

(50%). 45% of banks use four to 10 robots. One such robot on average replaces a minimum of 4.5 FTE (full time employees). Thus, the average market figure due to robotics is 4.5 FTE per robot. It turns out that one robot can replace 4.5 FTE; the greatest effect from the introduction of robots was noted by the heads of telecommunications companies, where one robot on average replaces more than 10 full time employees, as well as the heads of retail companies, where robotization allowed an average reduction of eight FTE per robot.

The key problem in the introduction of financial technologies into the advances sphere consists in the absence of the financial platform for remote service. In this regard, the Bank of Russia intends to take several measures in terms of strategic goals set by the state.

Thus, Russian megaregulator of financial market—the Bank of Russia defined the following long-range development goals (Fig. 52.3).

The presented development goals of the Russian financial sector call for a new digital approach to the operation of financial companies. For this reason, the existing model of management of the banking sector will be completely restructured.

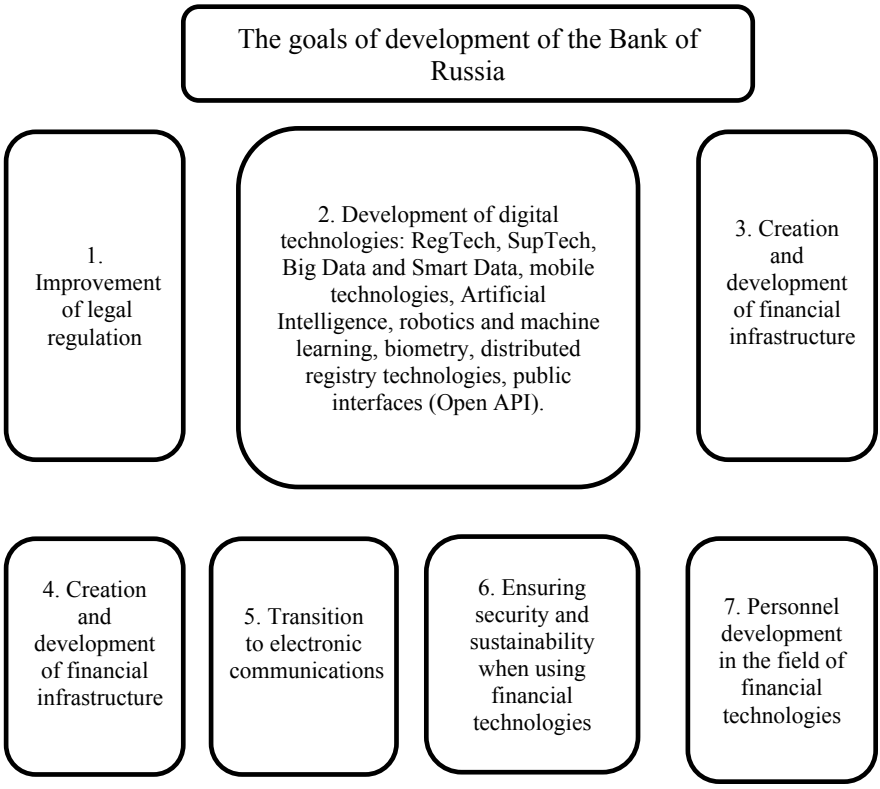

Fig. 52.3 Primary areas of the Bank of Russia in the field of financial technologies

First, legal regulation, which corresponds to the first goal of development of the financial sector. In this area, the most important tasks are as follows:

– define the legal status of the concept "digital financial technologies" which will be developed and used in the future digital financial environment, determine what means of payment will be used in this case;
– clearly indicate the basics of mining by designated institutions;
– determine the rule for attracting financial resources and cryptocurrencies.

Until these issues are resolved, there will be no clear financing vehicle in the information space.

The second area of development of the financial sector is the development and emergence of new digital technologies.

One of examples is RegTech (regulatory technology), a technology for improving the effectiveness of regulatory requirements and risk management. Usually, such technologies are used to identify customers, predict fraud by the nature of account transactions, compliance control.

Another example of promising technologies can be SupTech (supervision technologies) which are based on innovations (Big Data, machine learning, Artificial Intelligence, cloud technologies etc.). Their implementation improves regulation and supervision while simplifying administration.

In recent times, the analysts make a forecast for the prospects of application of technologies of the DARQ group, which includes distributed registry (D—DLT), Artificial Intelligence (A—Artificial intelligence), augmented reality (R—augmented reality), quantum calculations (Q—Quantum). According to 47% of respondents, Artificial Intelligence will have the greatest impact on the organizations. 19% of respondents distinguished quantum technologies as a priority, 17% of respondents emphasized the systems of distributed registry, and 15% of respondents emphasized augmented reality. This being said, 90% of managers are already experimenting with one or several DARQ technologies.

Besides, technologies for personalizing the needs and achieving a new level of digital proximity with a customer can be put to good use in the banking sector. The ability to analyze and interpret user actions, respecting their confidentiality, allows creating high-quality individual service that increases customer loyalty. 85% of bank managers believe that using digital demographics will help them better understand customer needs. Almost 30% of respondents expect an exponential increase in digital customer data that will be managed by their organization over the next 2 years.

The third area of development of the financial sector is the establishment of a new financial infrastructure which unites all participants of the digital financial environment and has additional features. Today, the existing financial infrastructure is being upgraded and supplemented with new platforms which expand its capabilities and comply with digital economy. The participants of this service and their functions are presented in Fig. 52.4. A specific feature of a new financial infrastructure consists in the presence of public interfaces (Open API), which make it possible to obtain information in systems through the use of data exchange protocols. The existence

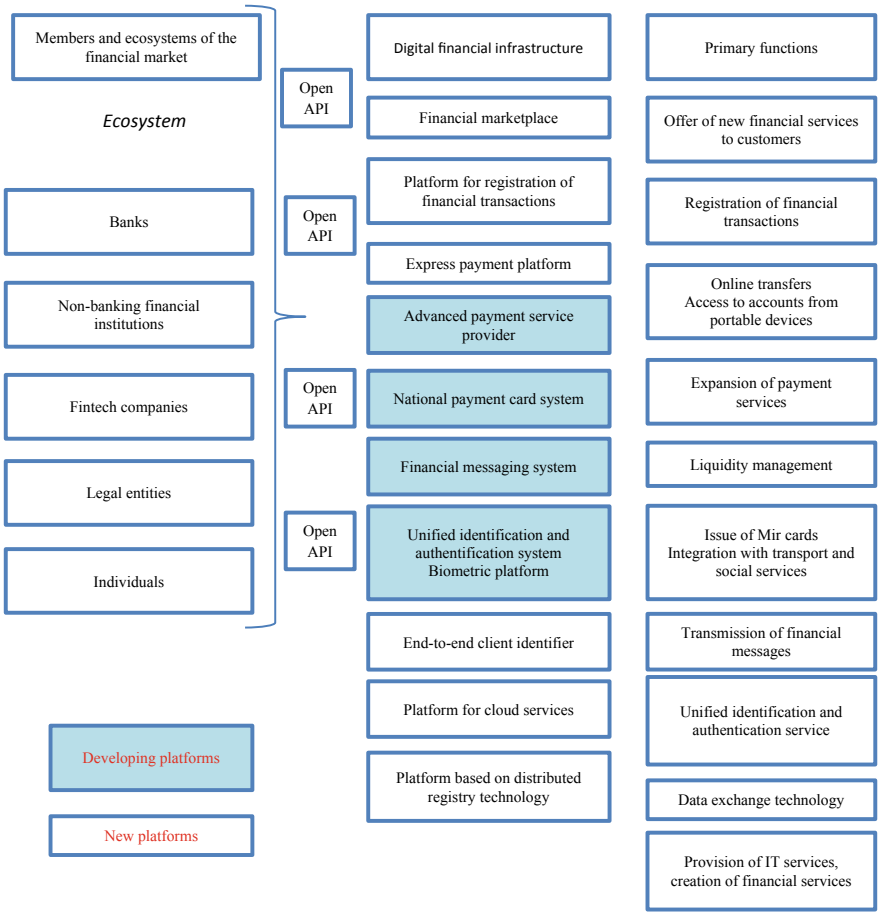

Fig. 52.4 The architecture of a new financial infrastructure

of such infrastructure will fundamentally change the financial mechanism and speed up the digitalization processes in the business environment.

The fourth area of development of the financial sector is the improvement of systems for ensuring security and sustainability when using financial technologies. Increased cyber attacks by external contractors force public authorities to carry out constant monitoring of the level of economic security of digital platforms. In order to improve technological security, the strategy for the development of the system of provision of information security (SPIS) of the Bank of Russia and information security of the banking sector and other sectors of the financial market of the Russian Federation for 2018–2022 has been developed.

All of the above activities should be carried out in strict accordance with the General strategic goal of social and economic development of the state—improvement of the quality of life of population. All transformations should be aimed at improving

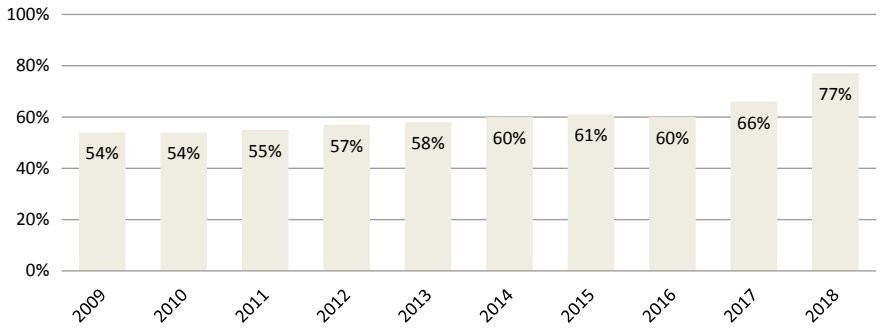

Fig. 52.5 State share in the banking sector, 2009–2018

the availability and comfort of provision of financial services to the public. The state takes on enormous importance in the digitalization of the country's economy; it is obvious that only sustainable economic development can become the basis for the development of institutions of digital economy. Against this background, there is an extremely topical issue of overcoming the negative phenomena in the financial sector, since it is the reliability of banks that is one of the most important factors determining the development of any national economic system. However, the problems of the banking sector still disturb Russian business community (Fig. 52.5).

Presented Graph 52.5 demonstrates the positive dynamic pattern of the state's share in the banking sector. This factor is an indicator of greater concentration of the policy of management of the financial sector of Russia. Granting the powers of a financial mega-regulator to the Bank of Russia narrows the boundaries of private enterprise in the financial sector. There are several reasons for that. First, the Central Bank continues to regulate the activities of commercial banks by means of rehabilitation of banking institutions, so by the early 2019 the state's share in the banking sector has already increased to 70%; moreover, according to analysts, this trend will continue for 3–4 years (the highest figure among all market sectors in Russia). Second, the aggravation of relations with the European Union and geopolitical tension stimulate the search for new national security solutions, including economic security of banking institutions. Third, the use of banking financing channels by terrorist organizations forces the government to regularly monitor the flow of financial resources to accounts with Russian banks and to demand justification for the origin of such funds. Fourth, the emerging digital platforms of online payment and remote maintenance of accounts in many cases become the targets of cyberattacks and cybercrimes, which forces us to constantly work on a system for improving not only banking, but also national security.

52.4 Conclusion

In conclusion of this research, we point out that information transition of Russian society to digital platforms of provision of services and performance of transactions is unavoidable. This process is already underway and will be completed soon, but financial provision is necessary for its successful implementation. In recent years, the main trends have been observed in the financial sector, that will contribute to the prompt completion of information transition.

The banking sector is currently lacking experts who would be the masters of new high-tech tools. The introduction of the concept "Human+" in the banks will provide every expert with the opportunity to show their worth and be successful, but this requires continuous improvement and training of employees. At the same time, it is necessary to improve the internal protection of in-house information systems from external unauthorized intrusions.

By creating ecosystems around themselves, banks must increase the stability of cyberspace in order to protect everyone. Despite the global trend towards Open Banking (banks open access to a portion of their information assets, and third parties gain access to data). In addition, the banks are not making enough efforts to ensure that their partners are worthy of the trust of end customers.

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