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Main trends of development of banking innovation in the digital economy

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***Abstract* — The article is devoted to the description of innovative technologies on the basis of which banking products (services) are created or their sales channels are formed. It is established that a number of banking innovations are just beginning to be used by Russian banks, and some have already become quite widespread. The introduction of innovations, as a market embodiment of a new idea, increases the competitiveness of banks and also makes it possible to survive in a complex economic environment.**

Keywords* — *banking innovations, digital economy, financial technologies, big data.

I. INTRODUCTION

Radical changes in the sphere of financial technologies affecting the entire infrastructure of the financial market associated with an increase in the level of automation, openness and customer focus. The introduction of big data processing technologies, artificial intelligence, new analytical tools and cloud services contributes to the transition to a new level of customer service. Today, almost financial transaction can be carried out using a mobile device, and is widely used a completely new type of financial transactions between devices without human intervention. In this regard, the topic of banking innovation becomes particularly relevant, being discussion in foreign countries, and for the most part, it reduces to the recognition of the need for a widespread transition of banking to digital technologies.

II. MATERIALS AND METHODS

So, the last American innovation in the USA is called digital socialism [1]. Socialism of the new digital age operates through the Internet, for which there are no borders, creates intangible services within a closely integrated global economy, stimulating personal independence and preventing centralization.

According to a number of foreign authors, in the modern world market with a prevalence of technology, fear is a great incentive for banking innovations. The overwhelming majority of representatives of traditional financial institutions (about 80 percent) believe that part of their business runs the risk of being lost in the autonomous Financial Technology (FinTech) companies. Such companies are more responsive to the changing needs of consumers, find new ways to make things easier and faster with less "resistance" from obstacles that prevent banks [2].

As domestic researchers believe, the creation of banking innovations is possible as a result of the innovation activity of the subjects of the banking system, which includes three groups of innovation processes [3]:

1) the formation and introduction of new ways and organizational forms of banking services:

- rejection of the branch network in favor of electronic banking;
- introduction of postal and banking services;
- the introduction of institutions of remote access to non-current accounts (remote lending, etc.).

2) the formation and introduction of new financial and organizational tools, as well as an innovative combination of existing financial and organizational banking tools.

3) dynamic selection of stages of development of the life cycle of the innovation activities of the banking system subjects (from the birth of the idea or its borrowing from the adjacent field to the creation and development of methods for using the appropriate tool, to its innovative transformation under the influence of changes in the realities of banking practice when introducing a new tool).

III. RESULT AND DISCUSSION

All these groups of innovation processes form the basis of global technological trends either way, without which the functioning of a modern bank is probably impossible.

In the framework of this study, the authors studied the main directions of development of financial technologies proposed for implementation in the territory of the Russian Federation, and also paid attention to the study of world trends in this field. First, let us turn to the Russian practice and consider the main directions of development of financial technologies for the

period 2018-2020, formulated by the Bank of Russia taking into account international experience (Figure 1).

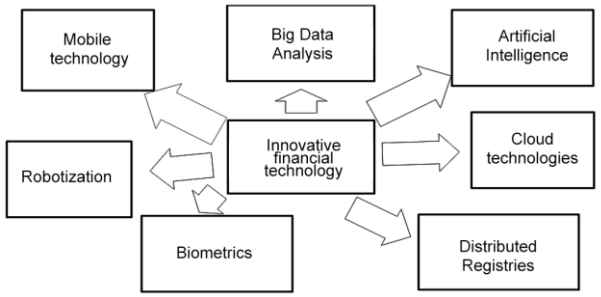

Fig. 1. Promising financial technologies (according to the Bank of Russia)

It is important to note that the Bank of Russia follows global trends recognizing the above-mentioned technologies as necessary for use by Russian banks. Thus, artificial intelligence contributes to the overall optimization of technological processes in banking already helps to automate the same type of operations with the help of chatbots. Robots are 50-90% less expensive than hiring full-time and freelance employees, and in this regard, banks will strive to invest more in artificial intelligence in an attempt to improve their efficiency while maintaining a high quality of customer service [4]. In order to implement this direction, it is planned to create a platform for remote identification, which will provide remote services to individuals using a unified identification and authentication system, as well as a biometric system (storage of biometric personal data). This concept, according to the non-commercial partnership "National Council of the financial market", can be implemented in the form of a state identification system based on biometrics, shown in figure 2.

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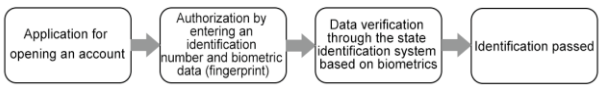

Fig. 2. Remote identification of the Bank's client: state identification system based on biometrics

In the sales channels of banking products (payments / settlements) as an innovation is the procedure of remote identification of the client in order to open an account, offered by the non-commercial partnership "National Council of the financial market". Online identification, in this case, is carried out by means of an interbank public or private identification system using an electronic certificate. The scheme is shown in figure 3.

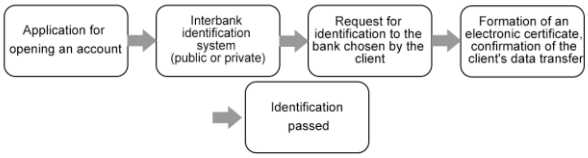

Fig. 3. Procedure of online identification of the bank's client

A feature of this procedure is the presence of interbank customer identification system, which accumulates information about all customers. If the client had applied to the Bank earlier and apply again, the Bank can obtain all the necessary information about the client, as well as further verify the information provided by the client when opening an account with previously known data about the client. The procedure allows to simplify and speed up the process of customer identification, as well as to minimize the risks of providing false information from potential customers. It assumes the obligation of banks to provide information about customers in the specified interbank system.

Security has always been a matter of concern for banks, so these companies will always look for ways to add new levels of security to their services. It is projected that in 2018 the cost of implementing next-generation authentication methods (fingerprint, face recognition, user identification by voice) will increase by 20%. This is due to the desire of banks to win the "digital trust" of their customers [4].

As is known, the use of Blockchain technology is not limited to payments. For example, Barclays Bank assumes the use of a blockchain in stock exchanges with Barclays. UBS Bank is conducting experiments on the use of the blockchain for the creation of an issue of bonds, interest calculation, payment of coupons. The software on the blockchain was specifically set up to automatically handle the flow of information and money between the Issuer and the buyer. The test required the creation of a virtual coin - "bandcoin", which allowed transferred the cost between the parties. Bondcoin is tied to real currencies and connected to a Central Bank account instead of a new virtual currency [5].

Banks had been using application programming interfaces for many years, but API – software intermediaries that connect and operate applications including mobile ones, with server–based office systems, - will increasingly be used to provide new services. As noted by The Financial Brand portal, API interfaces "provide opportunities to implement innovative contextual solutions that would have little chance without banking services in an open format" [4].

Mobile technology is one of the fastest growing segments of digital technology. Today, customers can use their mobile devices for quick access to news, mail, photos, taxi services, etc. They expect the same level of access and convenience from banks without compromising security. This expectation fundamentally transforms banking operations from industry functions to payments, lending, and data deployment [6].

Mobile banking can no longer be attributed to fundamentally new technologies, but it will become easier to use and provide users with more functionality. Consumers will increasingly prefer mobile banking because their digital, user and customer experience will eventually become more perfect

and filled with information. This implies a coordinated digital banking interaction between the consumer and the business, payments between consumers in one click, new opportunities associated with cryptocurrencies, biometric authentication systems that do not require a password, services and offers tied to the geographical location, dialog interfaces, etc.

Developing mobile technologies, Barclays Bank implements the concept of electronic (digital) wallets. Barclaycard (UK) is developing the Grab Go app, which turns the customer's smartphone into a "pocket check" so that the retail customer can scan the items he wants to buy. When the product is selected, a mobile payment is initiated and the customer leaves the store without having to wait in the queue for payment, without visiting the cashier. Payment is taken smoothly and seamlessly using pre-loaded card data in the background [7].

Another direction of innovative development of banks outside the Russian Federation related to the introduction of innovative products is the expansion of the list of consulting services by credit organizations. For example, the British bank Barclays was one of the first among banks offering comprehensive online consulting services. The bank offers seminars that discuss important issues for the business: how to handle its cash flow or how to succeed in international trade. The Let's Talk program is another example of a consulting service that helps start a new business [8]. Another example of bank modernization is the provision of personal finance management services (PFM). PFM helps banks to know their customers better and is also used for sales [9].

Banking innovation, implemented as a product (service) "Expanded Agricultural Banking", is being introduced by DenizBank (Turkey). The lending application from DenizBank shows that banks may be at the center of the lifestyle ecosystem, going far beyond the traditional banking application. The app gives an idea of crop rotation, gardening, watering and fertilizer, and also allows you to analyze and buy agricultural machinery. These non-banking opportunities are provided in the app through strategic partnerships with regional experts who are available to assist farmers in need by phone.

In Poland, mBank creates business-ecosystems under the name "mPower Business Starter", which combines government, banking and accounting services for registering an entrepreneur. Due to the implementation of this event, the process of creating a new business has been significantly reduced from 10 days before the introduction of innovation to less than 10 minutes - after [7].

Interesting is such a direction of development of innovative banking products as "data monetization". Banks have large analytical departments and access to the necessary information. Forming economic and financial analytics, they can offer it to entrepreneurs through their market research services. [10].

At the junction of biometrics and cloud technology is such an innovative product being introduced in India - a digital locker or DIGILocker. It is a centralized system for storing and using documents on the Internet, providing secured space for storing important documents in a digital format. The purpose of its implementation is to minimize physical documents, easy access through a web portal and mobile applications, reducing administrative overhead of document storage. The digital locker has many useful features for online storage, digital signatures and the online exchange of important electronic documents. The digital locker has security features for online documents. A user of a digital locker can share stored documents with government agencies (such as the tax authorities) and government agencies. Digital Locker users can download, read, sign electronic documents and share digital documents using a username and password during registration. [11].

One of the promising areas for the development of digital banks is credit auctions, which are the implementation of innovative channels for promoting banking products. The loan auction process uses an online network of lenders and borrowers to effectively work the parties. A loan auction can also unite several lenders to finance a loan [12] as part of the so-called syndicated lending. Alternative sources of financing for companies create new competition for banks. Platforms such as AngelList allow investors to join syndicates, which then offer funding to startups in exchange for equity participation. Although these applications are still at an early stage of development, they offer types of new investment models that are implemented using platforms [13]. AngelList is a crowdfunding platform operating on the principle of equity financing. Its main goal is to bring together the desire of investors to invest money and the desire of entrepreneurs to get money for business development [14]. It seems that banks will become active participants in crowdfunding platforms as investors or their administrators, offering proven methods of data protection in these platforms and analytical / consulting services to platform participants.

Despite the fact that P2P lending is to some extent considered as "social lending" and usually this term refers to the issuance and receipt of loans by individuals directly, without using traditional financial institutions as an intermediary, modern banks are increasingly beginning to search for their niche in this segment. Usually, P2P lending is implemented using special Internet sites where user can act both as a lender and as a borrower. But with the participation of the bank, new technologies can be combined with the old financial models, with the emergence of hybrid systems that incorporate all the best. A good example is Metro Bank and Zopa, who joined forces to work together in the UK. This innovative transaction allows Metro Bank retail customers to use P2P lending as an alternative investment tool with the expectation that it will provide a higher return on savings. The innovativeness of the transaction lies in the fact that P2P lending absorbs another class of financial instruments - loans. But it's all a matter of choice: if customers know they can put money in Zopa, why not give them the opportunity through a bank to ensure their safety [15].

Foreign authors pay special attention to the integration of social media and banking services, for example, the movement from Internet banking to banking services on Facebook or Twitter. Clients can, as before, interact with people in the bank but do it more flexible in time and space. The future is the integration of Big Data with customer relationship management systems (CRM). This will help to better understand the needs of customers and provide them with personalized service, because Big Data as a set of approaches, tools, and methods for processing structured and unstructured data of huge volumes and considerable diversity allows to collect data from various sources: communication in social

networks, operations on credit card, social reputation services like Klout, etc. Another trend in the modern world is the development of loyalty programs based on mobility, data on the location and use of game resources, such as, for example, Foursquare. In the distant future, the concepts of "smart cities" and "Internet of things" will allow us to offer financial services everywhere: everything will be interconnected in all populated areas, which will facilitate operations for customers, outlets and city services [16].

Remote servicing within the framework of the widely used Bank-Client system (Internet Bank, Bank-Online, etc.), as well as all kinds of info kiosks and touch terminals, remains an important direction for the development of innovations in the banking sector in terms of improvement of product channels and communication with the client. All of them have several advantages: simplicity and clarity in management, obtaining information or services without waiting in queues, the ability to use at any time of the day. It should be noted that this method deprives bank employees of the possibility of establishing personal contact with the client, and in this regard, a process of modernization of banks takes place, based on the introduction of remote visual communication with the client. Such an idea can be embodied in the form of video terminals, which will replace conventional ATMs. [17].

In General, the global trend is towards digital banking, which is the digitization (or movement on the Internet) of all traditional banking operations and programs that have historically been available only to customers at the bank premises. This includes activities such as cash deposits, withdrawals and transfers; checking / managing your account; applying for financial products; managing credits; paying your account. The digital banking system covers the digitization of each program and activity carried out by financial institutions and their clients [18].

With the globalization of the world economy and the expansion of the presence of transnational corporations in the world, platforms (for example, Ipagoo) form in the banking sector, destroying the traditional system banking model, due to the inability to control a particular country's central bank beyond its jurisdiction. Each bank is a manufacturer of products, with its own balance, distribution channel and cash management, while the company remains within one country. That is why any large banking group, like HSBC or Barclays, has a number of banks, one in each country. Ipagoo is a subversive system, as it allows a traditional bank with one balance in one country to become a European bank and serve 500 million people. Such a model is fundamentally different from the modern model of fragmented balances, with which it is difficult to work. The digitalization of the banking industry to date has nothing to do with innovation: banks are simply trying to reduce distribution costs by reducing the cost of access to the customer. Digitalization is one thing, and modifying the model in order to achieve the highest level of efficiency and flexibility that liberates the innovation process in this progressive way is quite another [15].

In conclusion, we note that the introduction of banking innovations in the Russian Federation will depend on the speed of closing the gap separating Russia from modern digital leaders. Thus, according to Digital McKinsey (a global expert group that brings together experts from McKinsey in digital technology), the digital revolution is undermining the foundations of the banking system and confronting traditional players with the need for radical reforms. Digital McKinsey points out in its report released in July 2017 «Digital Russia»: the success of the digital transformation of the Russian banking sector in the coming years will depend on whether banks can reduce the digital divide from industry leaders and become open to cooperation with fintech-companies and use the opportunities that are opening up due to the rapid transition of customers to remote service. Full and long-term partners of banks will be aggregators of user information (for example, social networks and telecom operators) that provide access to external customer data in order to improve the accuracy of credit scoring, cross-selling, etc. [19]. The active formation of innovative competitive advantages, ensuring the strengthening and expansion of the bank's market position, is one of the basic principles on which bank marketing is based. The latter involves the introduction of financial innovations to the market, satisfying and anticipating the needs of clients, as well as building mutually beneficial relations of the bank with customers based on the use of promising service technologies.

Much of the above, also emphasizes the shortcomings of the development of modern banks. Instead of focusing on new innovative channels for new products and services, banks added new channels as part of cost-cutting programs, introducing self-service and streamlining the operations of their branches. As a result, new call centers, online and mobile services appear in addition to the existing business processes, instead of developing them as full independent services.

Creating a banking brand specifically for the service channel is probably a way of guaranteeing that the bank will not lag behind innovations since each new brand is launched with a fresh infrastructure. The downside, obviously, is the inevitable increase in costs associated with the creation of new brands and banks from scratch. However, this means that each bank is focused on the future, and as old brands go out of use, the bank will be able to close them more easily [16].

To summarize, it is necessary to indicate that innovation responsibility and openness (the requirement for the bank to be a generator and leader in the field of economic innovation ideas and solutions) is one of the basic principles of its functioning and development.

IV. CONCLUSIONS

The current stage of development of the banking industry characterized by a high level of saturation of the market with financial products and services, resulting in the strongest competition between credit organizations. In such circumstances, the undisputed advantage will be those players who are able to develop and implement a product, operational and technological banking innovations. The analysis of the main trends in this area allowed the authors to identify the main trends in the global banking industry and come to the conclusion that the directions of development and implementation of banking innovations, designated by the Bank of Russia, correspond to the indicated trends. It is also important that the conclusion that operational, technological and product innovations can lead to fundamental changes in the nature of the activities of financial and credit institutions that have existed in an almost unchanged form for centuries.

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