

Innovative financial technologies as a factor of competitiveness in the banking

Marina Glushchenko^{1,*}, Naila Hodasevich², and Natalia Kaufman²

¹Department of Management and Service, Omsk State Technical University, 11, Mira av., 644050, Omsk, Russia,

²Department of State municipal management and personnel management, Surgut State University, 1, Lenin av., 628403, Surgut, Russia

Abstract. The models for the implementation and development of financial services and services are changing due to the global transformation of the financial and economic sphere, which is caused by the emergence of innovative financial technologies. This leads to a fundamental change in the financial market and the factors that determine the leading positions of its participants. Only the use of innovative technologies in the banking business ensures a high level of competitiveness in the market and further expansion of the client base. Banks are rebuilding traditional financial business models through cooperation with FinTech-industry, reforming business processes in areas such as banking services for individuals, lending and financing, payments, money transfers, asset management, currency exchange, insurance, blockchain transactions. The purpose of the article is to identify the main trends in the development of new financial technologies of banking. The authors identify the most important technologies that ensure the dynamic development of the global financial market and the fundamental transformation of the banking business in the past decade. In the article, the authors investigate the degree of their prevalence and the main areas of application in the field of banking, consider the successful practices of implementing of FinTech in the development of financial services.

1 Introduction

The rapid development of technological innovations in the 21st century is changing the face of the modern world and determining the new architecture of the global economy. The growth of technological innovation generates an increase in financial flows from their commercialization. The development of financial innovation has become one of the main trends in the development of the digital economy. Companies of various fields of activity demonstrate the practice of their successful application. Retail, telecommunications, pharmaceuticals, agriculture effectively use innovative financial technologies in their activities. Financial technologies have qualitatively changed the areas of insurance, lending, accounting services, real estate appraisal, asset management, investment and other sectors of the financial market. Government and regulatory agencies are showing increasing interest in the latest financial technologies. The use of innovative financial technologies ensures the efficiency of decisions in resolving emerging legal issues, the speed of promotion of new banking products and services, a comprehensive solution to the issues of security of financial transactions, improving the financial literacy of the population and the availability of financial services. The innovations used by banks in their activities are the most significant in the last decade, as they became the cause of global transformations of the banking business.

The formation of new socio-economic realities led to the growth of applied scientific research in the field of FinTech. In the scientific works of foreign scientists investigated the historical development of financial technologies [1], considered the latest methods and algorithms for analyzing Big Data, as well as the possibilities in their use to achieve high competitiveness [2], identified the problems encountered when working with Big Data in the field of finance, security, health [3].

Singaporean researchers have investigated the latest developments in the field of digital banking and cryptocurrency, highlighting the main importance of mobile technologies for using cryptocurrency as a financial asset [4]. Scientific research [5] is devoted to the blockchain technology and the advantages of its use in financial services.

A large research team [6] conducted a comparative analysis of the advantages and disadvantages of peer-to-peer lending practices of two leading European platforms. Scientists from the USA and Spain [7] conducted a broad study of the strategic issues of online banking in banks.

The studies of leading Russian scientists [8] reflect the issues of the current state and prospects for the development of innovative technologies in Russia and abroad, features and problems of the digital transformation of the regional and sectoral economies.

* Corresponding author: glu_mar@mail.ru

2 Materials and methods (model)

Banking services and technologies are innovative in the financial sector for 5-10 years after its entry into the market. This period is the average time for their introduction and popularization in the sector of financial customer service. The purpose of this study is to identify the main financial innovations that have been widely used in the banking industry in the last decade.

The subject of the research is financial innovations that generate high competitive advantages of those banks that have managed to integrate innovative technological solutions into traditional business processes. In the study were used both theoretical and empirical methods of scientific knowledge. Methods of comparative and logical analysis allowed to process the facts of economic reality and identify the main trends in the development of new financial technologies, explore the basic technological solutions and services that ensure the dynamic development of the global financial market in the last decade. The article identifies the main areas of their application, examines the current successful practices of their implementation in the processes and development of retail banking. This is the applied results of this research.

3 Results and discussion

Having studied foreign and Russian theoretical studies, the practice of leading world banks, technological developments of financial startups, it can be stated that the most promising financial technologies for the development of digital banking were innovative developments described below.

2.1 Blockchain

The financial industry is replenished daily with the latest and improved technologies. Thus, experts called 2017 the year of cryptocurrencies, and 2018 was presented as the year of blockchain technologies. Blockchain technology has a huge potential to change all the traditional functions of the economy. It improves the security of financial transactions, the decentralization of services and the speed of entry into the market for new products. Blockchain guarantees secure data storage and processing of cross-border payments. The use of blockchain leads to so-called "smart contracts" that automatically complete commercial transactions. Currently, companies of various fields of activity are interested in blockchain technologies. At the same time, the level of interest in different sectors of the economy varies significantly. The financial sector is actively and everywhere introducing blockchain technology. For example, the payment systems VISA, Mastercard, Unionpay and Swift announced their intention to use blockchain technologies in 2017. The «Ripple» cryptocurrency blockchain-based platform for payment systems has been created, focused on operations with currency exchange without chargebacks. In December 2017, Ripple reported that American Express and

Santander are intended to use the Ripple Protocol for payments between the US and Britain, and some major Asian banks – for cross-border payments. In September 2018, Ripple Net technologies have been integrated into the national commercial Bank of Saudi Arabia, which is one of the largest banks in the Middle East [9].

However, despite the fact that the blockchain provides an increase in the speed, efficiency and transparency of transactions in all sectors of the economy, the manufacturing sector still leaves this technology unattended [10].

Experts believe the most promising areas in the blockchain to be health and medicine, logistics, land cadastre, state and corporate document management. The first experience of using blockchain technology in public administration has appeared. Estonia together with the Guardtime blockchain startup are implementing the creation of a unified database of medical records for the population, making the information available for sharing among clinics as well as insurance companies. So do the companies: Prescript (together with SNS Bank and Deloitte) in the Netherlands and BitHealth in the United States. In Sweden Chroma Way together with a partner Bank are establishing a unified land register on the blockchain basis in order to facilitate the purchase and sale procedures to sellers and buyers, as well as banks providing loans secured by land. The same projects are implemented in Georgia together with BitFury, in Ghana with cBitLand. The UAE transfers the entire state document flow to the blockchain basis by 2020. The state of Delaware (USA) introduces blockchain technology in the system of registration of companies, issue of shares, decisions of boards of Directors, redistribution of shares as a result of purchase and sale. The British company Everledger provides tracking and provenance for diamonds, art objects and elite alcohol [11]. In Russia the real estate register is transferred on the blockchain platform. In changing the property rights the data are recorded into the Unified State Register of Immovable Property (USRIP) and copied to the register on the Ethereum blockchain basis. In this case, non-changeable history of object ownership will be accumulated [12].

At the end of 2017 the world's largest investment Goldman Sachs Bank called blockchain technology "The New Technology of Trust": "It combines the openness of the internet with the security of cryptography to give everyone a faster, safer way to verify key information and establish trust" [13].

Specialists of the venture Santander Inno Ventures Fund (London, UK), supporting the development and dissemination of digital financial technologies, believe that the use of blockchain technology can help banks to save up to \$20 billion infrastructure costs by 2022 [14].

2.2 Robo-advisor

Robo-advising is the intersection of traditional financial consultancy with online technology adapted for customers without investment experience. Robo-advisors provide an online service for creating a client's

investment portfolio from stock investment products. They are available not only to VIP clients, but also to investors with a small check. Robo-advising helps to create an investment portfolio diversified for each client's individual financial goal. The robo-adviser learns the client's attitude to risk through a questionnaire, then based on the created risk profile and the client's goal forms his investment portfolio. The process of creating an investment portfolio is based on fiduciary responsibility, reliability and transparency standards set by the regulator.

Robo-consulting does not include robots themselves, but it is based on algorithms of sequential actions. The client fills in the online form, outlining his circumstances and needs, and the algorithm selects certain products for investment or can make an investment for the client (depending on the platform).

Robo-consultants are fast, cheap and efficient. In the financial sector, Robo-consultants can be used in almost all aspects of investment: organization of the client's debt, optimal solution of tax issues, financial planning, creation and management of the investment portfolio. The robo-consultant makes financial management easier and more accessible for both experienced and novice investors.

Most likely, the penetration of Robo-advising in the financial sector will be increased. The Bank of Russia estimated the total volume of assets around the world under the control of the robot consultants to be \$50 billion in 2016 [15]. Bank of America estimates that the use of robots and artificial intelligence will cost up to \$153 billion by 2020.

Robo-advising has not only positive aspects, but also a negative moment for the world labor market. Bank of America predicts that by 2025 the employment cost may be reduced by \$9 trillion though the work automation by using artificial intelligence, which results in significant job cuts in the global economy.

2.3 The financial ecosystem

The financial ecosystem is a huge competitive advantage of banks and financial companies in the struggle for customers and one of the main conditions for increasing business profitability. The ecosystem integrates many services of different nature on one IT-platform, their providers being not only banks themselves, but also third-party organizations. The ecosystem allows to collect and process a huge amount of customer data both on-line and off-line, to build effective communication through any available channels and provide a variety of remote services to customers. The ecosystem involves the creation of a network of organizations around a single technology platform, which makes it possible to use its services to generate offers and access to them for customers. The proposed service becomes simple and understandable for the consumer, since the client receives all the services, which he needs at the moment, in one place on one platform [16].

Cyprus FinTech Company Trade Socio uses a unique technology of creating an investment ecosystem that

provides customers with equal access to a wide range of investment technologies. It establishes a link between the key players of the entire financial sector: investors, fund managers, brokers, investment banks and business products (online investment community). In 2017 Trade Socio has introduced a new online investment platform, Alpha 2017, to the financial market, which allows brokers and business-developers to connect to fund managers and traders and enables them to provide high-quality investment solutions to their customers [17].

2.4 Open Banking and API

Traditionally, banks have always created and controlled channels and applications to enable customers to receive the access to their services. The Open Banking Service provides the opportunity for third parties to analyze or use customer data. With the help of open API (application programming interface), third-party developers get access to banking systems and create their own channels and means of interaction with customers. Third-party applications receive information on customer accounts, the formation and tracking of payments. As a result, customers have the opportunity to see their Bank accounts and transactions, as well as manage them using external portals that do not belong to banks [18]. The Open Banking system assumes that third parties can analyze financial data of users, as well as withdraw funds directly from personal bank accounts, without confirming with the bank. Open APIs create good conditions for innovation and perhaps even revolution in banking and payments. Bank customers expect to receive faster and more convenient access to their funds and financial resources, which motivates banks for the collaboration with startups in the field of application development.

2.5 BigData

The BigData technologies allow one to process different aspects of the rapidly coming into very large amounts of structured and poorly structured data about the customers simultaneously. Since 2011, the use of BigData opportunities has become a trend in many industries (telecommunications, retail, healthcare). Global retail leaders (Amazon, eBay) have been tracking consumer behavior for more than 10 years, using BigData analysis, and focus it to new products. However, banks began to use such opportunities to transform their business processes over the past few years [19]. Using generally accepted information (passport data, banking history) and non-traditional information about the client (social networks profile, data from smartphone manufacturers and mobile operators), banks have a huge array of data that is used for quality customer service, risk management, anti-fraud, segmentation and assessment of customer creditworthiness, personnel management, forecasting queues in offices, calculating bonuses for employees, cost optimization and other tasks.

Customers continue to expect more and more personalized service from their banks. It is BigData analysis that serves as a tool, which allows banks to adjust standard financial products to the individual needs of their customers.

2.6 P2P-lending

P2P (Peer-to-Peer) lending technology provides a link between those, who have money and those, who want to borrow it. Equal partner (P2P) lending excludes all intermediaries from the lending process: banks and other financial institutions. P2P-lending connects borrowers (individuals and legal entities) directly with creditors. The latest P2P technological platforms are popular because of fast and convenient services, the ability to circumvent the requirements of state regulation, more comfortable conditions for a loan obtaining. At the same time, this type of lending subjects customers to increased risk, as depositors do not receive such protection as in commercial banks.

The first P2P-lending platform appeared in the UK in 2005. To date, the project Zopa (Zone of Possible Agreement) is one of the largest players in the financial market. USA is the world market leader in P2P lending. In 2015, the volume of P2P-lending in this country exceeded \$ 77 billion, that is 15 times more than in 2012. The most popular foreign P2P companies are: American Lending Club, On Deck Prosper, Sofi, and British Funding Circle, Zopa and Rate Setter. The share of the three mentioned British services constitutes 64% of the total loans.

Traditional banks begin to collaborate with P2P platforms, either as agents or as co-creditors. Banks have appreciated the potential of the new P2P-lending technology and do not want to miss this segment of additional profits. Thus, at the end of 2017 one of the most famous platforms, the American On Deck, announced a strategic cooperation with JP Morgan for joint lending to small businesses. In Europe, such cooperation is also becoming popular. Goldman Sachs has created a public non-bank company – Goldman Sachs BDC, which invests in P2P-lending portfolios of medium-sized businesses, and, in addition, announced the development of a digital platform that allows issuing loans in the amount of \$ 15,000 - \$ 20,000 [20].

Over the ten years of its existence, P2P has reached such a level of development that no one has any doubts about its viability and prospects. Today, P2P-lending is a recognized financial instrument with great potential for development. According to the forecasts of Foundation Capital, the volume of the world market of P2P-lending will reach one trillion dollars by 2025.

Despite the fact that many start-up companies operating in the P2P segment are actively gaining momentum, there is a trend of consolidation with banks, confirming the effectiveness of banks and P2P-platforms partnership.

2.7 Online banks (Neo-banks)

Neo-banks are fully online banks without office network, built on new technology platforms, in contrast to the traditional banks outdated infrastructure. Virtual banks are a new online service in the financial technology market. By optimizing non-interest expenses (documents circulation, staff wages, expenses for collection, storage, money, data processing) neo-banks offer customers more favourable conditions, such as lower loan rates and higher interest rates thanks to economy on business processes. The corporate neo-bank standard is a completely new level of customer service and first-class user support. The client can ask absolutely any question with any words in the messenger or video, as if he asks advice from a friend, and he is immediately answered.

At the end of 2016 according to the Burnmark Research Center there were almost 70 neo-banks worldwide [21]. The leader in the field of neo-banking is the UK, where about 40 banking startups are registered, such as Atom, Bank to the Future, Civilised, Fidor, Ffrees, Hampden&Co, ipagoo, Lintel, Loot, Metro, Monese, Monzo, Neat, Numbrs, Oak North, One Savings, Shawbrook, Starling, Taqanu, Tandem, Tide, TSB, William&Glyn, Zopa. There is a burst of activity in the neo-bank formation in Europe. Notable players in the market are Soon (France), Bunq (Netherlands), Che Banca! (Italy), Lunar Way (Denmark) and N26 (Germany). Monese, Tandem, Monzo, Atom Starling.

Neo-banks are divided into two categories: those that offer a full range of banking services (such as Atom and Starling), and banks – client applications (such as Loot). The second category of neo-banks is spread in the United States (Simple, Moven), since neo-banks are not allowed to obtain a General banking licence in America.

There is a very low activity of neo-banks in Asia, which are presented by Neat from Hong Kong, YoloLite from Singapore, Momo and Timo from Vietnam, Finja from Pakistan, Point and Rocketbank from Russia. Asian neo-banks (Yes Bank, We Bank), as a rule, appear on the trade platforms and chat rooms basis, and these are significantly different from European or American.

3 Conclusion

In the era of global digitalization of the economy, banks, using advanced financial technologies, create more and more new ways of interacting with customers and provide unique products and services with access from anywhere in the world. Relations between banks and customers reach a new level of service, which is new ways to get services, a personalized approach to service, the introduction of product lines of retail banking products and services adapted to individual customer requests, customer empowerment through self-service and online shopping. The speed of customer service is increased tenfold, and the quality and safety of financial operations are improved. This leads to the expansion of the client base of banks and the growth of business profitability. Thus, banks, cooperating with financial start-ups and using FinTech projects, ensure a high level

of competitive advantages in the financial market and occupy a leading position.

References

1. V. Snášel, J. Nowakova, F. Xhafa, L. Barolli, FGCS, *Geometrical and topological approaches to Big Data*, **67**, 286-296, (2017) DOI: <https://doi.org/10.1016/j.future.2016.06.005>
2. K.-C. Li, H. Jiang, L.T. Yang, A. Cuzzocrea, *Big Data: Algorithms, Analytics, and Applications*, (N.-Y.: Chapman and Hall / CRC Press, 2015)
3. A. Drosou, I. Kalamaras, S. Papadopoulos, D. Tzouvaras, J. of Innovation in Digital Ecosystems, *An enhanced Graph Analytics Platform (GAP) providing insight in Big Network Data*, **3**, is. **2**, 83-97, (2016) DOI: <https://doi.org/10.1016/j.jides.2016.10.005>
4. *Handbook of Blockchain, Digital Finance, and Inclusion: Cryptocurrency, FinTech, InsurTech, and Regulation*, ed. D. Lee, K. Chuen, R. Deng, **1**, (Academic Press, 2017) DOI: <https://doi.org/10.1016/C2015-0-04334-9>
5. *Transforming Climate Finance and Green Investment with Blockchains*, ed. A. Marke, (Academic Press, 2018) DOI: <https://doi.org/10.1016/C2017-0-01389-7>
6. G. Dorfleitner, C. Priberny, S. Schuster, J. Stoiber, M. Weber, I. Castro, J. Kammler, JBF, *Description-text related soft information in peer-to-peer lending – Evidence from two leading European platforms*, **64**, 169-187, (2016) DOI: <https://doi.org/10.1016/j.jbankfin.2015.11.009>
7. R. Hernández-Murilloa, G. Llobeth, R. Fuentes, JBF, *Strategic online banking adoption*, **3**, is. **7**, 1650-1663, (2010) DOI: <https://doi.org/10.1016/j.jbankfin.2010.03.011>
8. *The Development of the Digital Economy in the Context of de-Globalization and Recession*, ed. A.V. Babkin, (SPb.: POLYTECH-PRESS, 2019)
9. National Commercial Bank of Saudi Arabia, Joins RippleNet. Retrieved from: <https://ripple.com/insights/national-commercial-bank-of-saudi-arabia-joins-rippletnet> (2018)
10. M. Iansiti, K.R. Lakhani, Harvard Business Review, The Truth About Blockchain, **Jan–Feb** is., 118–127, Retrieved from: <https://hbr.org/2017/01/the-truth-about-blockchain> (2017)
11. M. Avdeev, Forbes, Blockchain technologies in public administration. World experience. Retrieved from: <http://www.forbes.ru/tehnologii/343203-blokcheyn-tehnologii-v-gosupravlenii-mirovoy-opyt> (2017)
12. RIA News, Rosreestr wants to conduct two experiments on the introduction of blockchain technology. Retrieved from: <https://realty.ria.ru/realtynews/20180323/1517097352.html> (2018)
13. Goldman Sachs Group, Inc., Blockchain – The New Technology of Trust Available. Retrieved from: <https://www.goldmansachs.com/insights/pages/blockchain/> (2018).
14. Santanderinnovations, The Fintech 2.0 Paper: rebooting financial services. Retrieved from: <http://santanderinnovations.com/fintech2/> (2105)
15. Bank of Russia, Improving the system of investor protection in the financial market by introducing regulation of categories of investors and determining their investment profile Retrieved from: www.cbr.ru/Content/Document/File/50723/report_30062016.pdf/ (2016)
16. E. Golod, Ernst & Young Global Limited, FinTech-ecosystem – opportunities and threats for banks Retrieved from: [https://www.ey.com/Publication/vwLUAssets/ey-unleashing-the-potential-of-fin-tech-in-banking/\\$File/ey-unleashing-the-potential-of-fin-tech-in-banking.pdf](https://www.ey.com/Publication/vwLUAssets/ey-unleashing-the-potential-of-fin-tech-in-banking/$File/ey-unleashing-the-potential-of-fin-tech-in-banking.pdf) (2016)
17. TradeSocio, Alpha Product Suite Retrieved from: <https://tradesocio.com> (2017)
18. Th. Labenbacher Th., Rusbase, What is Open Banking? Retrieved from: <https://rb.ru/longread/chto-takoe-open-banking/> (2017)
19. IDC Russia, Big data in the financial industry: an overview and assessment of the development prospects of the global and Russian markets. Retrieved from: <https://www.idc.com/cis> (2019)
20. I. Belyi, Forbes, In one boat: how p2p-lending platforms collaborate with banks. Retrieved from: <http://www.forbes.ru/tehnologii/340171-v-odnoy-lodke-kak-platforny-P2P-kreditov-sotrudnichayut-s-bankami> (2016)
21. A. Lichev, Forbes, Neo-banks: future or dead end of the banking system development Technology. Retrieved from: <http://www.forbes.ru/tehnologii/344459-neobanki-budushchee-ili-tupikovaya-vetv-razvitiya-bankovskoy-sistemy> (2017)