DIRECTIONS OF DEVELOPMENT OF BANK TECHNOLOGIES APPLIED IN THE RUSSIAN MARKET OF RETAIL CREDIT SERVICES

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Abstract. The relevance of the research is determined by the focus of the banking segment on digitalizing banking services, the gradual transition from the development of banking products based on the needs of certain social strata and groups to individual selected products, taking into account the behavior and structure of the client's balance, which involves the active development of "data collection" technologies and introduction of advanced systems of protection of the client's funds and confidential information.

In this article, we present new banking technologies that can increase the efficiency and security of lending. In addition, we consider the mechanism affecting technologies, supply on the markets of IT services, their prospects for further application and development. There are comments of experts and bank employees about prospects of these technologies. The study of modern technologies applied by individual banks in Russia allowed the authors to identify key trends in the technological re-equipment of banks as well as explore the advantages and disadvantages of already tested and mastered technological solutions

Keywords: commercial bank, lending to individuals, biometric technologies, Big Data technologies.

1. Introduction

The banking services sector in Russia has undergone significant changes over the last decade. This period particularly, was characterized by a gradual transition from standard methods of assessing customers to innovative methods. The new approach was a reaction to the processes of digitalization of significant amounts of data and increased competition from banking and non-banking (in some cases-non-credit) organizations to serve the financial needs and personal funds of customers. A peculiar indicator of the changes that have occurred is the volume or package of documents requested by the bank to make a decision on loans. Previously, for commercial loans, commercial banks required a minimum of 2-3 documents, among which there must have been a certificate of income and a passport, today banks can issue similar loans upon the provision of only a passport [1]. From the point of view of previous credit technologies and techniques, such an approach significantly increased credit risk, since there is no data on the basis of which it is possible to assess the solvency of the borrower, his credit history. However, modern banking technologies already allow assessing the solvency of customers based on open public data, thus simplifying the procedure of issuing a loan to the customer and providing a more reliable picture of the payment discipline of the potential borrower to the Bank [2].

2. Conditions, materials and methods of research

In order to determine the prospects of using the selected technologies, the article discusses foreign experience, comments of experts and bank employees on the future of the presented technologies. The authors assess the Russian market of modern banking technologies in the retail services segment and outlined prospective directions of development of this market. The article contains graphic materials illustrating certain provisions of the conducted research. The purpose of the research is to study the modern technologies used in the retail banking services segment, to make a presentation on the mechanism of their operation and to evaluate the prospects of application of the studied technologies in the Russian banking sector. Research methods: the theoretical methodology of the research include the philosophical method of cognition, scientific methods: abstraction, induction and deduction, idealization, historical method of cognition. The analytical part of the work is based on the methods of selective observation, comparison, system and situation analysis, as well as particular methods of Economics.

3. Results and Discussion

Credit technology of a bank is a certain set of techniques and methods that allow a credit institution to make a decision on granting a loan to a borrower, to determine the terms of issue and risks for the product. This definition can be seen in both a narrow and a broad sense [3]. In the narrow sense, bank's credit technology considers practical activities in the bank itself: from the moment of receipt of the application to the decision by the credit institution to issue / refuse to grant a loan, as well as the period the borrower of uses the loan. In a broader sense, credit technologies cover not only the processes of the bank's decision to issue and monitor the loan, but also the processes of attracting potential borrowers, developing loan products and "post-credit" customer service in the future. The latter is especially important to banks, as the cost of attracting new customers is higher than the costs of retaining current ones, as a

consequence, in the interest of credit institutions, to maintain good relations with solvent borrowers, to offer them new products that meet their needs and interests.

Before considering credit technologies, it is necessary to evaluate the main credit products offered by banks in the retail segment. According to the indicators of net assets for November and October 2017, it is possible to allocate 5 leading banks of the Russian banking sector [4]: Sberbank, VTB Bank of Moscow, Gazprom bank, VTB 24 and Russian Agricultural Bank. The main directions of lending to individuals offered by the above credit institutions are presented in Table 1.

Table 1 - Key areas of the retail credit segment of the leading banks in terms of net assets in Russia

Type of credit	Sberbank	VTB, Bank of Moscow	Gazprom bank	VTB 24	Russian Agricultural Bank
Consumer credit, including:	+	+	+	+	+
refinancing	+	+	+	+	+
Car Loans	-	-	+	+	+
Credit cards	+	+	+	+	+
Mortgage credit	+	+	+	+	+

Table 1 shows that all the leading banks are developing the main directions of lending to individuals. The exception is the auto loan segment, from which Sberbank left in 2014 due to the rather low demand for this product [5]. Nevertheless, the Bank did not completely reject this product: Sberbank developed this segment through a subsidiary bank Setelem, while offering its clients a chance to apply for a consumer loan instead of a car loan on special terms. As for the Bank of Moscow, after its final transition to the control of VTB Group in 2016, the bank does not develop the car loan segment, it is being handled by another bank of the group - VTB 24. However, in line with VTB Group's strategic objective, to add VTB 24 to the Group within the framework of the model "Single bank", we can say with confidence that the VTB Group will also continue to develop the segment of car loans within the established single credit institution [6].

Modern technologies used by banks have significant potential in the field of both initial assessment and identification of the client, and monitoring of failures and "backlog" of these customers. Some Russian banks particularly are already using face recognition technology and biometric technologies. During the analysis of the current product line of JSC "Russian agricultural Bank" revealed that almost all loan products require the provision of 100% security[7].

For example, a bank within the VTB Group Post uses the VisionLabs LUNA face identification platform [8]. According to representatives of the Post Bank, the use of biometric technologies in 2016 prevented the commitment of potentially fraudulent transactions amounting to about 1.5 billion rubles. 4.5 thousand violations related to incorrect use of the client's photo were prevented. In addition, the system identified more than 9,000 fraudulent loan applications, including attempts to process applications with lost or stolen passports. It should be noted that the VisionLabs LUNA technology in the Mail Bank is implemented and used on almost all cameras, while it allows you to compare photos with high accuracy regardless of the rotation of the head, makeup, lighting level or camera resolution [9].

Tinkoff Bank also has its own facial recognition technology. The difference between the use of Tinkoff Bank’s technology from the rest is primarily its necessity: since the Bank together with Rocket Bank completely abandoned offices and territorial branches for customer service, the problem of visual identification of the client emerged. To do this, a mobile application is used to take photos of the client, converts the resulting image into an impersonal code, which is then checked with the database of the Bank. Thus, the bank confirms the identity of the borrower and reduces time in processing the transaction.

As the country's largest bank, Sberbank has been using biometric technologies in the retail segment since 2014 [10], and recently acquired 25.07% of VisionLabs, which develops biometric technologies. Sberbank and VisionLabs plan to jointly create an effective platform for biometric identification of customers. It is assumed that the functionality of face recognition technology will expand substantially to a full-fledged biometric system that can recognize not only the face of customers, but also their voice, retina and other biometric indicators. There are plans to create a biometric identifier that will enable Sberbank's customers to be identified to obtain services of the bank using biometric data. In general, the market for facial recognition technology and biometric metrics is in the developmental stage and is expected to grow, which determines their increasingly active introduction into banking activities. This will allow banks to effectively identify clients (and potential borrowers as well) and reduce credit risks, time for customer service.

Further, credit process involves working with data collected about the prospective borrower. Previously, all the necessary data was provided by the client himself, through the provision of a package of documents and by interviews when completing the application. Now technologies help to simplify this procedure. The key direction in this area is the variety of products, technological solutions, united by a single name Data or Big Data.

The issue of Data-technologies application is actively developed abroad. Thus, according to McKinsey, a survey of American banks in 2017 showed that 76% of them use Big Data to attract customers, build better interaction

and support loyalty, while according to Gartner, globally, over 1/3 of the banks invest in development of these technologies [1]. The given / this/ these data allow us to estimate the presence of interest in the international banking sector to the technological solutions of BigData.

In order to understand the reasons for the increased demand for these technologies, it is necessary to take a closer look at the interest rate on a loan. There are many concepts and theories about interest of a loan. One of them is that the loan interest is understood as a charge for the use of foreign (attracted) funds over a certain period or the price of the debt capital. However, this concept does not fully correspond to the modern banking understanding of the interest rate. From the position of the bank, the amount of the loan rate is a payment for the risks that the bank takes over when issuing a loan to a client or a group of customers. Based on this concept, the interest rate of two seemingly identical borrowers may differ if the bank is aware of information that favors the solvency of one or each of the borrowers. In this situation, the asymmetry of information and its direct relationship with the interest rate are very evident. The more information the Bank has about the client, his / her solvency, payment discipline, the more obvious the risks in relation to such borrower and the more fair low interest rate the bank is ready to offer him. Otherwise, the rate will be high, because the bank, not having all the information of the borrower, is forced to include the rate of the probability of default on the loan in the event of any unknown/unexplained factor. This explains why the bank can offer more favorable conditions on the loan to its regular customer than to its counterpart on the same salary level, who is being served for the first time.

So, we found out that the lack of information affects the loan rate, but it also affects the bank's risk policy. The more the bank is aware of its current and potential borrowers, the easier it is to calculate the risk for each loan and assess the quality of the loan portfolio and So we found out that the lack of information affects the rate of the loan, but it also affects the bank's risk policy. The more The bank is aware of its current and potential borrowers, the easier it is to calculate the risk for each loan and assess the quality of the loan portfolio and its profitability. This is important both for strategic planning and for adjustment operational, current activities of the Bank. As a result, banks are interested in getting enough information about their clients.

Now consider the portrait of a modern borrower, a potential consumer of banking services in developed countries. He lives in the city, because most developing and developed countries are characterized by the process of urbanization, he has the ability to access the Internet, most of the goods and services are available remotely, he has a device or a access to it, he is an active user of mobile and online-banking, often pays cashless method using a bank card. Since such a borrower actively uses banking services, the Bank is aware of his preferences, his payment flows, expenses and revenues. Also, the borrower actively uses the Internet and leaves on the World Wide Web on various open resources their personal data: from contact to those that reveal his personal characteristics and manner of behavior (data on the timeliness of payment Public services, comments and forums on social networks, frequent visits to certain sites (history and cookies)). By combining information, known to the bank and received from open sources, the modern bank with the help of special technological solutions can make a map of needs and opportunities for each client, to define products interesting to the client, Understand its financial capabilities and payment discipline. It is the achievement of this result directed by BigData technologies and this is why the increased interest of the financial and credit sector to these technologies.

The study of the American agency Wikibon, the results of which are presented in Figure 1, were conducted on the prospects of BigData development.This is important, both for strategic planning, and for adjusting the operational, ongoing activities of the bank. As a result, banks are interested in obtaining a sufficient amount of information about their customers.

Now consider the portrait of a modern borrower, a potential consumer of banking services in developed countries. He lives in the city, because for most developing and developed countries there is a process of urbanization, he has the opportunity to access the Internet, most goods and services are accessible to him remotely, he has a device or access to it, he is an active user of mobile and online- banking, is more often paid in a non-cash way using a plastic card. Since such a borrower actively uses banking services, the bank knows its preferences, its payments flows, expenses and revenues. Also, the borrower actively uses the Internet and leaves his personal information in the "World Wide Web" on various open resources: from contacts to those that reveal his personal characteristics and manner of behavior (data on the timeliness of payment of utility services, comments and forums on social networks, frequent visits to certain sites (history and cookies)). Combining information known to the bank and obtained from open sources, a modern bank with the help of special technological solutions can draw up a map of needs and opportunities for each client, identify products interesting to the client, understand his financial capabilities and payment discipline. BigData technologies are aimed at achieving this result and this explains the increased interest of the financial and credit sector in these technologies.

Concerning the development prospects of BigData, a study was conducted by the American agency Wikibon, the results of which are presented in Fig.1 [11].

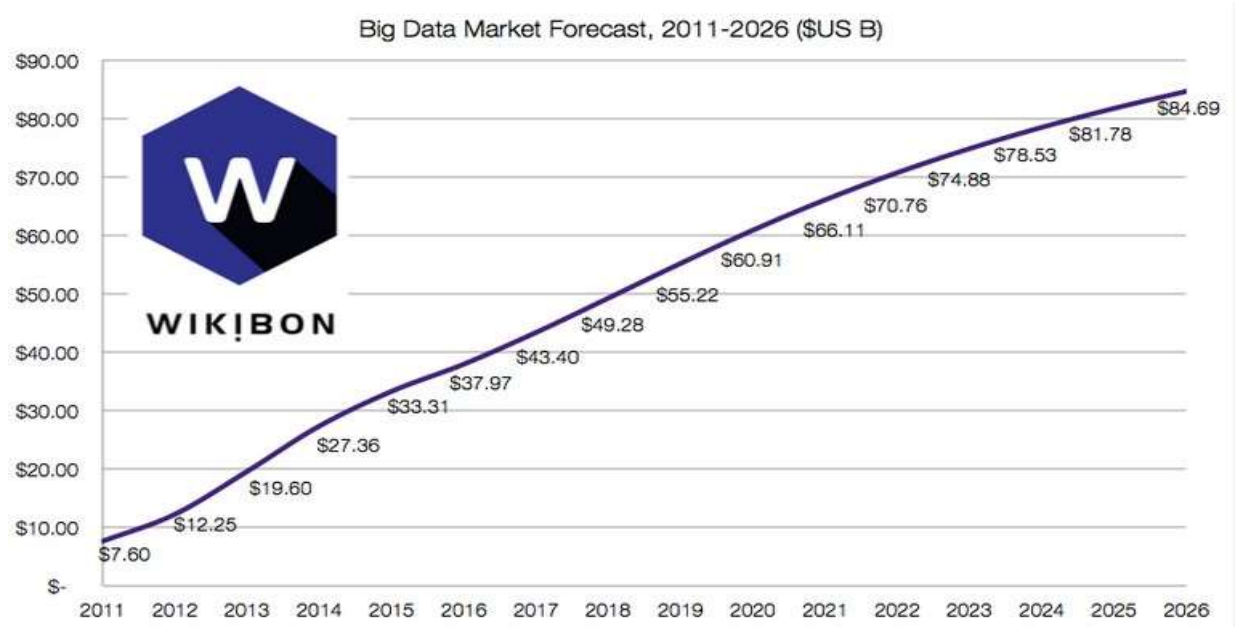

Fig.1 Forecast of Big Data market development for 2011-2026 ($US billions)

As shown in fig.1, the market is expected to grow steadily through 2026. In 2018, the market will add to the forecast level of 2017 13.5%, in 2019 – already 27%. With an average growth rate of 17% per year, the market will double every 6 years.

As mentioned earlier, Big Data is not a single technology, but a combination of technological solutions. Today, there are representatives of complex products on the market, as well as companies operating in separate areas, presented in Table 2 [10].

Table 2 – The Direction in which developers of Big Data solutions work

Sector	Functions	Examples of companies
Infrastructure providers	provide storage and preprocessing of data	SAP, Oracle, IBM, EMC, Microsoft
Data miners	develop algorithms that help customers extract value from large data	Yandex Data Factory, « Algomost, Glowbyte Consulting, CleverData
System integrators	deploy BigData analysis systems on the side of a client	"Force", "Croc"

Table 2 shows the three main groups of BigData solution providers. Infrastructure suppliers sell specialized DBMS, hardware and software and related analytical software. The greatest need for these products is experienced by companies with their own expertise in the field of analysis of large data. Data miners deliver solutions to retrieve information from the accumulated data. A special mention deserves services like (Big Data as a Service). Separate references should be made of services such As BDaaS (Big Data as a service). They allow you to upload the collected data to the cloud and get the result, which saves the potential user from the need to hire expensive staff and establish their own infrastructure. The peculiarity of system integrators is that they implement the BigData analysis system on the user side. System integrators are an intermediate link between business and technology.

As indicated in table 2, Russian company are also actively exploring the market of BigData products. Nevertheless, mostly Russian banks actively use foreign products and solutions in the field of "BigData". Information from open sources on the use of BigData solutions by Russian banks is presented in fig.2 [10,11,12].

Fig.2 The main products of BigData, used by Russian banks

As can be seen in Fig.2, banks acquire various software and analytical solutions in the field of BigData. Some BigData solutions can be effectively used to improve scoring quality. However, if we talk about new technologies applicable to scoring it is worth mentioning the technology called Machine Learning. This is a technology based on artificial intelligence, the peculiarity of which is the training in the application of solutions a lot of similar tasks, instead of a direct solution to the problem, typical of the programs following the algorithm. The opinions of experts are divided on its application in the scoring evaluation. Thus, according to the analysts of banks, such technology is applicable for more complex tasks, and its used in scoring evaluation– "shooting from a cannon on sparrows". However, a number of experts do not support this position and believe that it is foolish to deny progress. If the data appears, it should be analyzed. The question here is to what extent the banking community is ready to invest in innovation.

4. Conclusions

1.Summing up, it can be noted that the considered modern banking credit technologies are digitally oriented and at the present stage of development of the banking system do not reveal their full potential. Banks use only certain functionalities, while achieving significant results through the use of improved technologies. The facial recognition technology is already actively used by many Russian banks to identify the client (the borrower) and identify fraudulent transactions. The use of biometric data technologies is not currently widespread, but in the near future may become one of the elements of the credit process and Internet banking, completely replacing authorization by login and password.

2.Technology in the field of BigData hold great potential in overcoming the problems of information asymmetry and risk management. Their active development and implementation will bring banking services to a new level. The use of Machine learning technology in scoring models or in underwriting to minimize risks for each borrower is also a manifestation of high-tech future banking services. The presented technologies does not only improve retail lending, but also make the process less risky, faster and more convenient for the client. Particulary in the future, using the above technologies, the scenario of obtaining loans without documents is possible, thus all necessary information on the borrower can be collected instantly from the moment of his entrance to the institution before his appeal to the specialist in front of the office. This reduces both the borrower's waiting time and the time of servicing the loan specialist, which optimizes the bank's operational activities. If the data appears, it needs to be analyzed. Here the question is how much the banking community is ready to invest in innovations.

3.Summing up, it can be noted that the considered modern banking credit technologies have a digital orientation and at this stage of the development of the banking system do not disclose their capabilities completely. Banks use only certain functionality they need, while achieving significant results through the use of more advanced technologies. Face recognition technology is already actively used by many Russian banks to identify the customer (borrower) and identify fraudulent transactions. Technologies for the use of biometric data are not currently widespread,

but in the near future they can become one of the elements of the credit process and Internet banking, completely replacing authorization with a login and password.

4.Technologies in the field of BigData open huge opportunities in the field of overcoming the problems of information asymmetry and risk management. Their active development and implementation will bring the banking service to a new level. The use of Machine learning technology in scoring models or underwriting to minimize the risks for each borrower is also a manifestation of a high-tech future of banking services. The presented technologies does not only can improve retail lending, but also make the process less risky, faster and more convenient for the client. In particular, in the future, using the above technologies, a scenario of issuing loans without documents is possible, and all the necessary information on the borrower can be collected instantly from the moment of entering the institution before contacting a specialist in the front office. This reduces both the borrower's waiting time and the time of the loan officer's servicing, which optimizes the bank's operational activities.

References

1. Tavasiyev, A. M., 2017. Banking. In 2 h. Part of 2. Technology at the service of clients. M.: YURAYT: 301 p.
2. Lozgachov, I., Borisov, A.2018. Experience of countries on implementation of qualitative new and modern service in the sphere of banking and state services. Actual scientific researches in the modern world, 1(33):63-67
3. King, B.,2017. The Bank 3.0. Why today Bank - this is not where you go, but what you do / Brett king [trans. from English. M. Matskovskaya]. – M.: Olimp-Biznes:520 p.
4. Rating (ranking) of banks: financial rating on net assets [Electronic resource]. - Access mode: http://www.banki.ru/banks/ratings Oh.
5. Sberbank has stopped issuing car loans: the Internet portal of the fgbi "Redaktiya" Rossiyskaya Gazeta. URL: https://rg.ru/2014/12/22/sb-site-anons.html Oh.
6. Barberis, I., Chishti, S. Fintech, 2017. the fintech book: the financial technology handbook for investors, entrepreneurs and visionariesGuide to the latest in financial technology . M.: Al'pina Pablisher:343p.
7. Titov A.B., Kosyanova V.N., Miheenko O.V.,2017. Innovativebanking product in market of financial services (on the example of Bryansk regional branch of "ROSSELKHOZBANK"),23(272):44-51.
8. Mail Bank has disclosed the results of implementation of biometric technologies: the official website of "Mail Bank". URL: https://www.pochtabank.ru/news/450177 Oh.
9. Information on the accession of VTB24 Bank: VTB Bank of Moscow official website. URL: https://www.bm.ru/ru/informatsiya-o-prisoedinenii-banka-vtb24 Oh.
10. Sberbank has invested in face recognition technology. URL: https://www.vedomosti.ru/technology/articles/2017/11/17/742077-raspoznavaniya-lits Oh.
11. Yudenkov, Yu. N., 2016. Internet technologies in banking: prospects and risks: educational and practical guide / Yu. N. Yudenkov, N. Ah. Tysyachnikova, I. V. Sandalov, S. L. Ermakov. 2nd ed.,erased. - Moscow: KNORUS: 320 p.
12. Franks B., 2014. Taming the big data tidal wave. Finding Opportunities in Huge Data Streams with Advanced Analytics [[translate from English A. Baranova]. M.: Mann, Ivanov and Ferber,352 p.
13. Logvinov, B. B., 2017. international banking business: textbook / B. Logvinov – M.: YURAYT:180 p.
14. Big data for the banker: the official website of the "Vedomosti" newspaper . URL: https://www.vedomosti.ru / partner/articles/2017/10/23/739068-uznat-vse.
15. Davis, W.,2017. The happiness industry. As Big Data and new technologies are helping to add emotion to the goods and services / W. Davis [transl. from english K. Shashkova]. - Moscow: Publishing House "E": 288 p.
16. Roundup of Analytics, Big Data & Business Intelligence Forecasts and Market Estimates, 2015: Forbes official website. URL: https://www.forbes.com/sites/louiscolumbus/2015/05/25 roundup-of-analytics-big-data-business-intelligence-forecasts-and-market-estimates-2015/#27d8003444f3.
17. Melnikova N.S. 2017. The methodology of determination of efficiency in business process reengineering in commercial banks based on the systematic approach. Research Result. Economic Research. Volume 3. Issue 1. URL: http://rreconomic.ru/en/journal/annotation/1023/18.
18. Murphy, Kevin P., 2012. Machine Learning: A Probabilistic Perspective / Kevin P. Murphy – Cambrige: The MIT Press:1104 p.
19. Schmarzo, B., 2016. Big Data MBA. Driving Business Strategies with Data Science. Indianapolis: John Wiley & Sons Limited.
20. Mayer-Schönberger, V., Kenneth, K., 2014. Big data. A revolution that will transform how we live, work and think / Victor Mayer-schönberger, Kenneth Cukier [translate from English I. Gayduk]. - M.: Mann, Ivanov and Ferber:240 p.
21. Ortiz-Salgado, Rodrigo, and Alfredo García-Carmona. "Enfoque decolonial y producción de conocimientos en dos universidades estatales chilenas." Opción 34.86 (2018): 481-516.
22. Lyytinen, K., & Yoo, Y. (2002). Ubiquitous computing. Communications of the ACM, 45(12), 63-96.