Modern Technologies and Modern Scoring in Modern Uzbekistan: Tasks, Methodologies, Problems

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Abstract

The article discusses the issue of the need to modernize credit risk management tools in the framework of modern digitalization of the economy and the introduction of innovative approaches to solving problems related to financial and banking services using the example of the banking system of modern Uzbekistan. Today, the functions implemented by the banking system require the introduction and use of modern innovative financial technologies, which is especially important for developing economies. Today, in Uzbekistan, the level of development of the banking system, the focus of the country, business and the population on the active use of financial innovations have created a peculiar picture of the use of credit scoring models in risk assessment.

The author of the article mainly analyzes the state of the applied credit scoring systems and predicts further development and improvement of the mechanisms for applying scoring models against the backdrop of the latest intellectual analytics technologies and proposes proposals for increasing the level of capitalization, profitability and competitiveness of the subjects of the banking system. As a recommendation, it is proposed to actively introduce artificial intelligence and "Data mining" technologies as a means of managing credit risks in the very near future.

Keywords: credit scoring; scoring systems; scoring model; scoring methods; scoring tasks; problems of scoring systems

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Introduction. The modern world economy, modern banks, modern technologies - these phrases are no longer just a set of words or expressions that have come into fashion, but there is a sense of our modern life in terms of economic support. Today, in the context of the dynamic development of economic life, in society, the propensity for well-being and raising the standard of living is growing more and more. The basis of all kinds of goods is the monetary means that a person earns with his mind, labor. However, it is not always successful to accumulate sufficient funds to create the desired comfort. In such cases, those organizations come to the rescue that can provide, under certain conditions, financial services to the population. These are mainly banks and other financial and credit organizations. So, when providing financial services, how will such organizations be able to insure themselves against all sorts of unforeseen risks? The answer to this question seems to be very simple. However, the scientific substantiation of the problem in an exhaustive version does not yet exist and requires continuous study.

Today, the world community lives in a space where everything modern connects it with the latest achievements of science, technology and the progress of mankind. Accordingly, everything is being updated; everything is developing for the benefit of the prosperity of society and the comfortable life of the population in the spirit of globalization. The socio-economic image of Uzbekistan is also being updated. The ongoing reforms comprehensively cover all spheres of the country's economic life. And here, it is appropriate to note that the world experience is also taken into account, which allows accelerating the processes of modernization and transformation of economic sectors. Considering the dynamics of the development of banking services, it should be emphasized that the process of a phased set of banking services standard occurs under the influence of several factors that are manifested in the market by an increase in the volume and expansion of the range of services. At the same time, among the influencing factors, along with competition, the process of mastering new technology is now developing at a high speed, there is a constant updating of the database and the invention of new banking products.

Today, the banking system of Uzbekistan, in which lending has a special status in creating conditions for economic benefits for the population, also keeps pace with the times, acquiring a modern look of service and a modern essence in its activities. Today, when lending, unlike in the past, about 15-20 years ago, the client clearly feels many factors that testify to the results or achievements of the latest technologies. These advantages are primarily in the convenience, comfort and speed of performing transactions with financial services. Accordingly, the issues of improving the application mechanisms, modernizing methodologies and updating the technologies of scoring systems are becoming increasingly important in the scientific community. This article is an attempt to highlight the problem from the standpoint of the need to further improve the mechanisms for using scoring models as an important tool for regulating the level of risks in banking and financial institutions.

Literature Review. Modern technologies from the standpoint of their application in scoring systems require a wider study. Accordingly, in many scientific and popular science publications, modern scoring is considered in close contact with the latest technologies, including artificial intelligence, since big data and data analysis are considered the most promising financial technologies in reality. In addition, in scientific circles, mobile technologies, artificial intelligence, digitalization, robotics, biometrics, and cloud technologies are increasingly occupying space. After all, all innovative developments that are used in banking and financial organizations change the principles of formation of credit policy, risk assessment policies, which has a beneficial effect on the growth of lending to resource sectors of the economy, speeds up the

transfer of capital and its return, increases the confidence of the parties and transparency of transactions.

However, no matter how it is interpreted in the scientific literature, in its essence, the scoring system is formed on two components - this is a credit pipeline and an analytical scoring system. The banking system of Uzbekistan today strictly adheres to these components, since such a system is the core of management in the process of making a final credit decision and analytical material for building scoring models. If the credit decision management system allows the use of scoring models for considering borrowers, then the analytical system develops scoring models and creates conditions for evaluating the effectiveness of the implemented scoring models.

The Bank is a link between the owners of capital and those in need of capital. The main product of relations in this process on the part of banking organizations is a loan, the value of which includes the relationship between the lender and the borrower, in the provision of financial assistance from the bank in return for interest paid by the borrower. However, in such monetary relations there are certain risks, as a result of which sometimes many credit organizations suffer losses, primarily due to non-repayment of loans [3, 18]. Non-return as a process requires a thorough approach using an economic analysis of the client's condition from the standpoint of his creditworthiness. It is the analytical system that allows developing scoring models and creates conditions for evaluating the effectiveness of the implemented scoring models.

The creditworthiness of a client (borrower) is one of those new concepts that the new economic era has literally introduced into our lives. Despite this, today, it is already safe to say that it has taken its place in it firmly and forever. [6, 56]. This is about credit scoring. Nowadays, credit institutions have automated the entire risk management system through a credit scoring model. And this process is constantly being improved.

According to existing literature, credit risk management occupies a special place in the effective management of the banking system. Credit risk means non-fulfillment or untimely fulfillment by the client of his credit obligations. Credit risk factors are both external and internal. External factors are related to the possibility of realization of credit risk due to the inability of the borrower to repay the debt to the bank. While internal factors are associated with the mistakes of credit managers, the risk analysis department or other employees that were made during the application process or the assessment of the borrower [9, 286].

But with all this, many researchers point to a number of shortcomings of the credit scoring system. For example, V. Ten in his article notes that "the problem of scoring is quite relevant in the banking system, because this model is the main indicator of risk assessment when making a credit decision. However, such decisions are not always ideal, since the system makes decisions that may not correspond to the actual state of affairs, due to which the bank may issue a loan to an insolvent client or, conversely, not issue a good borrower" [11, 50].

The author of Gorelaya N.V., who highlights the weaknesses of scoring systems, is of the same opinion. In her opinion, during the application of scoring systems, the same level of the overall value of the indicators and the amount of points scored are achieved under the influence of completely different factors [4].

Based on the analysis of scientific literature, it can be stated that many studies have been devoted to assessing the creditworthiness of a prospective client-borrower, among them those in which credit scoring systems are directly studied. For example, scoring systems as a method for

predicting and determining the financial condition of a client and as a tool for banking analysis are considered in the article, where the author presents a classification of scoring models based on two parameters, that is, according to the method of their construction, as well as according to the criteria of the data used [13].

The classification and systematization of scoring systems according to the parameters of intended use have recently been covered in those works that analyze existing ones and propose new models. Thus, the three most well-known methods for assessing possible credit risk are discussed in the article "Credit Risk Assessment: A Challenge for Financial Institutions", where the authors propose an assessment method, scoring models and loan portfolio models. [5].

In the dissertation research by Khrestinin V.V., devoted to the problem of assessing solvency, the complexity of the scoring system approach and criteria-based analysis are considered as important factors influencing the results of scoring systems. By the way, the author proposed a methodology developed by him for analyzing the borrower's creditworthiness, taking into account the impact of the industry sector of the enterprise on the level of credit risk [12].

The position of the mentioned authors deserves attention in the sense that they analyze the advantages and disadvantages of scoring systems and propose a scientifically based methodology for a combination of the above methods, so that, in their opinion, credit risk is most effectively reduced.

Materials and methods. The methodological basis for studying and researching the topic was the methods of generalization and comparative analysis of scientific literature on scoring and the mechanisms of its application, as well as statistical reports, publications on the latest technologies in the banking sector.

In addition, when studying the problems, regarding our article, we considered the available popular scientific publications, scientific publications, and also by studying the results of the survey conducted in some banks of the republic, summarized the measures to organize the risk management process in the banking system. As a result of comparing the applied scoring methods of the credit risk management system to prevent and prevent adverse factors in financial transactions, it was possible to outline the overall picture of the challenges ahead in solving risk management problems in banking and financial institutions.

The severity of the issue under consideration comes precisely from the progressing state of the lending process in the economic life of society. After all, today the financial services provided to the population around the world have expanded so much that without organizing a scientific approach, without an analytical analysis of financial transactions, and, accordingly, without the use of information technology, it is impossible to insure against risks. Scoring systems used today in lending, to some extent, can claim to be the main means of improving the quality of risk management. In this regard, this article attempts to highlight the problem from the standpoint of the need to further improve the mechanisms for using scoring models as an important tool for managing the level of risks.

Results. Loans, installments, a pawnshop are the main attributes of the monetary and financial relations of our time. People who deal with financial, credit or banking organizations will certainly come across these concepts. Namely, when performing these operations, the borrower has to provide his personal data, which is required by the credit scoring model. By collecting elementary information about the prospective client, scoring models conduct an analysis-

assessment of creditworthiness for "suitability" or "unsuitability" for obtaining a loan. Here the question arises: "how realistic are the client assessments carried out by scoring methods. Is this assessment always fair, and does it always guarantee risk minimization for both parties?

If we approach the search for an answer, again, from the standpoint of modernity, it should be noted that today credit institutions are striving to use more and more complex structures in customer segmentation. Despite the significant costs, they are investing a lot of resources to create their own evaluation and analytical divisions. They introduce state-of-the-art IT technology into the work of these departments, with the help of which big data analytics, machine learning and artificial intelligence tools perform miraculous results.

An analysis of the scientific interpretation of scoring systems shows that at present the efforts of many economists who study the problems of scoring systems are aimed at improving models, deepening their specialization in assessing and analyzing clients, improving the mechanisms for their application, developing models based on the latest achievements. technologies, in general on the modernization of systems. So this is the requirement of the time. Everything must be modern, including the credit scoring system. By virtue of this interpretation, it is necessary to determine what tasks should be solved so that scoring systems keep pace with the times.
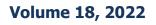
In the course of researching the topic, as part of the development of scientific recommendations for improving the mechanisms for applying credit scoring systems based on the latest technologies in the banking system of Uzbekistan, the author compiled a questionnaire that could help clarify the picture of the application of scoring models in lending, as well as identify tasks , methodologies and problems of modern technologies used in modern scoring.

Before proceeding to the analysis of the responses received, it should be noted that banks in Uzbekistan, despite the fluctuations and crisis circumstances, are active in the economic sector of the country. Today, the banking system of Uzbekistan solves problems of a socio-economic nature, the essence of which is to provide the population of the country, in the conditions of the global economic crisis, with the necessary, as well as missing financial resources, by investing in the commercial environment and actively participating in settlement transactions for international transactions. At the same time, the issue of replenishing the country's budget at the expense of bank deductions from profits is not lost from sight.

Despite the difficulties in the context of the pandemic, the profitability indicators of the country's banking sector for 2020–2021 significantly increased: ROA - by 18.5%, ROE - by 38.8% [14]. Moreover, throughout the country, the volume of cash loans issued in such areas as mortgages, the development of family, women's, and youth entrepreneurship, and so on, has grown, and there has been an increase in banking assets.

Now, summarizing the results of our study on the questionnaire, we can state that the banks of Uzbekistan use a variety of credit scoring systems. They also use different statistical and sometimes combined models.

The applied models can process several input data parameters at once, analyzing more than twenty parameters. This is, first of all, a credit history - CIAC (credit information and analytical center), IPSA (individual pension savings account), personal data - SPC (state personalization center), relations with the bank - ABS (automated banking system) and application parameters: amount , security, etc., debts under the CEB (compulsory enforcement bureau), payment systems HUMO, UZCARD. It should be specially noted that an insurance policy of non-repayment of a

loan is accepted as additional types of identification and reduction of default risks.

To the question "What is the risk in the output in the scoring model and what percentage of NPL is taken as the norm in your system?" the generalized answer looks something like this: 2% NPL of the total aggregate loan portfolio is incorporated as a norm in the system. this rule does not include the risks associated with fraudulent activities.

Regarding the effectiveness of scoring models in Uzbekistan, according to specialists of credit institutions, the average default rate is 1.7%, of which 0.3% is a fraud, and the data processing speed is about 6-8 minutes.

Taking into account the requirements of the time, we studied issues regarding the use of modern technologies in modern scoring models. This is especially true for technologies such as artificial intelligence, predictive analysis, data mining and big data. It should be noted that the combination of credit scoring with artificial intelligence is considered in favor of the Python program.

As you know, in the banking system, the risk management department is becoming increasingly important. In this regard, to the question "in what other departments and on the basis of what systems is predictive analysis used?" received an almost generalized answer, according to which, at the moment, it is only scoring that provides for the implementation of risk management in the department.

In the models of the scoring system used in Uzbekistan, according to the data from the generalized answers, the loan portfolio is analyzed quarterly according to historical data, and weights and scores for each attribute are determined. However, if we analyze the dynamics of overdue credit obligations and non-performing loans, the rapid decline in real incomes of the population, the rate of depreciation of the national currency, the increased incidence of fraud, and the like, it can be argued that the risks in the banking environment are increasing, threatening the state of stability of the financial and credit system of the country. Moreover, the negative impact of risks on the banking system can be observed in the growth of the debt load of economic sectors, the number of individuals. Thus, credit risks for the modern banking system of the Republic of Uzbekistan pose the greatest threat.

In this regard, for a clearer idea of the problem we are investigating, we decided to ungroup it into three parts and show the essence of the issue in a more specific way. These are the tasks on the agenda, the methodologies of application and the problems that exist in the applied mechanisms of credit scoring models.

Tasks: The most common methods for assessing credit risk in the practice of foreign banks, and recently in Uzbekistan, have become combined methods of applying scoring models, which, taking into account their significance for certain groups of borrowers, allow assessing the creditworthiness of a particular borrower by a number of parameters. As you know, under the creditworthiness of the borrower, in the practice of the banking system of the country, it means the ability of the client to pay off his debt obligations in full and on time. However, there is a completely different interpretation of this concept in foreign countries, especially in Western banks, where creditworthiness is interpreted as a desire associated with the potential to repay an obligation on time. According to this definition, the main task of scoring is not only to find out the state of the client in the ability to repay the loan or not, but also to determine the degree of reliability and commitment of the client. This means that scoring also evaluates how worthy a

client is of a loan.

From the standpoint of modernity, the scoring system as a method for predicting and determining the financial condition of a client and as a tool for banking analysis faces the challenges of modernization, digitalization and intellectualization. In fact, in the existing credit scoring systems, the implementation of statistical methods in the practice of analyzing and evaluating creditworthiness involves the processing of a huge amount of data that is not well structured. Based on this, the effective and most profitable implementation of the available data becomes impossible without the use of modern information processing technologies, which include the methods of intelligent technologies [2].

Thus, in terms of the actual tasks of modern scoring, first of all, the modernization of methods for applying scoring models, the digitalization of their programs and, of course, the intellectualization of the technologies used are determined.
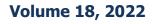
Methodologies. In the process of assessing the reliability of the borrower, as in many countries, Uzbekistan uses a variety of methods, depending on the effective impact on the overall picture of lending. In the practice of modern banking activities in the country, evidence-based methodologies are used to combine various models of scoring systems in order to reduce credit risk as efficiently as possible. It is mainly discriminant analysis, logistic regression and artificial neural networks that stand out as the foundational techniques used in credit scoring. At the same time, each technique is interpreted according to its purpose. Thus, discriminant analysis provides a result by which the groups of "reliable" and "unreliable" are determined. Logit regression applies the logistic possibility of further accumulation. Artificial neural networks represent an artificial intelligence platform.

The scientific literature summarizes the characteristics of relatively popular assessment methods that are relevant in the study of scoring systems. These are the "Rule of Five Cs", "PARTS", "Z-model of Alzman", "Scoring method" [8].

In the banking sector of Uzbekistan, there is a logical pattern: if the bank proceeds to assess the borrower using scoring models, then the product becomes mass. For example, after the scoring model was introduced in mortgage lending, the product became available to a wide segment of the population. Most banks, despite the mention of "express loans" and "scoring systems", still profess a subjective approach and try to analyze in as much detail as possible not very transparent borrowers, preferring the most reliable among them. As a result, the scoring system is used, as a rule, in the so-called "mass" issuance of loans.

It should be noted and some features of the methodology for lending to legal entities. The assessment of the creditworthiness of legal entities using certain methods and the decision to issue a loan based on the assessment can be considered as a tool for minimizing credit risks. However, the methodology used by the banks of the republic cannot always be called scoring. The fact is that the corporate lending market in Uzbekistan is young, the necessary credit history has not yet been accumulated in this direction, and the work of credit bureaus cannot yet be called as efficient as possible.

In methodological terms, scoring is applicable only to standard applications and, when making a decision, uses a finite number of factors provided for in the development of the program, which means that the specifics of the borrower are not taken into account, possible additional factors that are very important for a legal entity, and for which the credit an analyst would pay attention.

This means that modern requirements for credit risk management systems involve the modernization of scoring system methodologies using intellectual analytics tools, since managing mass factors with individuals and multi-profile factors with legal entities will sometimes be beyond the power of credit bureaus. In our opinion, it is in such cases that artificial intelligence algorithms make it possible to process information in large volumes much faster and with better quality, as well as analyze customer behavior and model their profile with higher accuracy.

Problems. For modern scoring, the issue of efficiency and reliability are extremely important. Accordingly, the use of modern technologies as a guarantor of effectiveness and strength is considered a matter of the agenda. Today, scoring models are not able to fully and objectively assess the borrower's business. Therefore, sometimes it happens that the scoring system refuses "good" borrowers, and, on the contrary, gives a positive answer to "bad" or even fraudsters. This principle of the methodology of scoring systems is undesirable for both banks and clients. This is the main problematic issue in scoring systems.

Employees of credit institutions argue that many borrowers assessed by the scoring model find themselves in the so-called "gray zone", and it will be impossible to make either a positive or a negative decision on them. This is a result of the fact that scoring systems can produce an unlikely result only on the basis of long-term statistics. Scorecards compiled with the support of statistical methods are used when lending to a legal entity only as an additional tool, and they are not used anywhere on their own.

In Uzbekistan, when lending to a legal entity, scoring is practically not used. "This is primarily due to the difficulty of the process of assessing the financial condition of legal entities that, by their activities, operate in different sectors, and each of them has a different scale. Moreover, in addition to scoring systems, to determine the risks of lending to legal entities, monitoring of their financial condition is used by assessing the value of the business and its assets" [1].

In essence, the scoring model has two main advantages: high processing speed and low cost. But, unfortunately, the quality of verification with this approach is reduced. A correct and timely assessment of the creditworthiness of bank customers who applied for a loan will reduce the bank's losses associated with credit risks. In this regard, in order to increase the validity and efficiency of decision-making on issuing a loan, modern tools of "Data Mining" technology should be used, the results of which are relatively reliable and fixed.

Now, briefly about the "Data Mining" technology from the standpoint of determining the edge of our interest in terms of the useful qualities of the technology in the banking management system as a tool for managing credit risks. Despite all the attractiveness, of the "Data Mining" technology tools for use in the banking sector, those that have specific targets are considered relevant. The tools of the "Data Mining" technology are peculiar in their own way and, in our opinion, are becoming increasingly relevant in banking management over time. A classic example of the application of "Data Mining" in practice is the solution of the problem of the possible insolvency of bank customers. "Data Mining" process personal data, and the results obtained are used further to make decisions.

The mass application of big data technology, like "Data Mining" in the field of banking management, is hampered by the fact, at least for now, that large financial investments are required. In this case, there is clearly a shortage of qualified specialists. Moreover, it is necessary to develop or acquire new, additional software that would improve the mechanisms for applying

risk assessment in various areas of banking.

Discussions. Considering the issues of the relationship between modern scoring and modern technologies, based on the research materials, it should be noted that in Uzbekistan, using the example of credit scoring, which is increasingly used by banks when lending to individuals, there is a tendency to accelerate the renewal of scoring models, the latest technologies are being developed and more flexible forms of analytical data. However, the analysis of the application of scoring models in the banks of the Republic of Uzbekistan revealed the fact that they do not have enough elements of modern technologies. Scoring models are mainly used in assessing the credit risks of individual borrowers. And in foreign practice (USA, UK, South Korea, Singapore), credit scoring models are also used to assess the quality of borrowers - legal entities. In addition, in economically developed countries, credit scoring models have proven to be effective tools for assessing the quality of a borrower, containing strictly formalized algorithms for grouping borrowers according to various criteria (reputation, bankruptcy, fraud, creditworthiness, and others). Scoring is used by analytical agencies that provide services to microfinance organizations, for example, Scortech [10] and Cube Scoring [7].

In many countries of the world, banks develop their own scoring models for approving a loan to a borrower, choosing a lending model, optimizing the structure of a bank's loan portfolio, and assessing the likelihood of fraud on the part of the borrower. Here it is appropriate to note that the specifics of the application of credit scoring models in the banking sector of the Republic of Uzbekistan is manifested in the fact that credit bureaus purchase already developed models from specialized agencies and, one might say, do not create their own credit scoring models. Moreover, modern technologies are effective precisely when they are introduced precisely at the stage of programming and creating new models.

Another feature of the use of scoring models in the banking system of Uzbekistan is their dependence on the definition of the market strategy and credit policy of the bank. This approach to application has a significant impact on the intensity of launching new loan products on the market, on the degree of diversification of the consumer loan portfolio.

Conclusions. Thus, summarizing all of the above, it should be emphasized that the concept of modern scoring means the introduction of modern technologies into its methodology. This means that with the introduction of big data technologies and artificial intelligence, it is possible to take a step into a new phase of digital reality. Innovative scoring models help to significantly reduce costs, improve the experience of interaction with clients, increase their loyalty, and thus contribute to the active development of the bank as a whole.

Despite the fact that in scientific publications the interpretation of the issue of the benefits of scoring is varied, we believe that the main ones can be concentrated in the following provisions if they are integrated with the latest technologies:

➢ Scoring methods are absolutely objective, since the questionnaire contains those data that cannot be distorted or multiplied. Especially the seven classic criteria, which have been established since their inception, reflect only the reality and create a reasonable picture for decision making;

➢ Scoring methods are absolutely free from bias. Elements of discrimination are alien to scoring. Regardless of any signs, any applicant has the right to participate in them and receive a bank decision regarding himself;

➢ Scoring methods absolutely promptly perform the procedure of summarizing statistical data, according to the assessment of the prospective client. The applicant has the opportunity literally in one hour to find out the result of decision-making.

➢ Scoring methods are absolutely convenient for those settlements where the stable functioning of modern information technologies, the Internet is not guaranteed.

The advantages of "Data mining" technology are first of all clearly reflected in the latest developments in analysis and generalization, which can be listed as follows:

✓ creation of "profiles" of clients, through which a group of clients that are beneficial, according to various parameters, for the bank is determined;

✓ identification of hidden, sometimes not intended data, which are important for supplementing existing information;

✓ building logical chains for providing data on them that may be of interest to the banking system in terms of credit risk management;

✓ Notification, reminder, warning of ongoing changes regarding the applied data.

At the same time, it is necessary to note some factors reflecting the shortcomings of scoring systems and "Data mining" technology.

➢ at this stage, the cost of software is high;

➢ lack of IT specialists who would be closely involved in a full-fledged way on the process of managing credit risks;

➢ the backlog of users of software, both scoring systems and data mining technologies, from the development of high technology.

In general, it can be noted that in the management of credit risks within the framework of banking management, scoring methods and "Data mining" technologies, at the present stage, are indeed the core tools for analyzing, assessing and forecasting any risk. Especially in the lending process, the risk management system needs fast, reliable methods, models and technologies for analysis and evaluation.

In this regard, as part of innovative implementations, the banking management system of Uzbekistan needs a targeted development of a roadmap to expand the use of analytical systems and systems for collecting and storing data. Of course, big data technologies are primarily necessary for large financial institutions, however, the banking sector as a whole is a component of the entire financial chain.

Therefore, bank management will have to take into account the advantages of both scoring methods and "Data mining" technologies, and develop an appropriate plan for their improvement and updating. In addition, given the shortcomings of these tools in risk management, it is necessary to strengthen the material and technical part in order to more widely introduce modern methods and technologies to improve the credit risk management process.

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