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Application of Artificial Intelligence in the Economic Sphere

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Annotation: The use of information processing tools is a new step in improving business efficiency through the introduction of modern technologies, including digital transformation tools. The use of artificial intelligence systems makes it possible to operate with huge memory arrays, which is relevant for the financial sector. Using machines to make managerial decisions, to optimize customer service, calculate the effectiveness of investments without the impact of the human factor or its minimization means making decisions based only on information without a personal approach, which often leaves a negative imprint. The advantage of using artificial intelligence now is that data collection does not stop and the larger the database, the more efficient the system, therefore, those banks that postpone the decision to implement artificial intelligence systems in their work risk not catching up with more knowledge-intensive competitors.

Keywords: artificial intelligence, bank, efficiency, globalization, client

The widespread use of machines has radically changed the life of modern man, his perception of reality, the world around him. Sometimes a machine and the software in it reacts more subtly to changes taking place in the world than a person, whose decisions are influenced by mood, well-being, experience in various fields. Machines that analyze information without personal overtones can do some activities better than humans. The use of information processing tools is a new step in improving business efficiency.

The business models that exist today lead us to the further use of the collected information for making managerial decisions, for entering the business into the digital economy and the virtual environment.

The use of artificial intelligence systems in the banking sector is relevant today, but not many banks can translate into reality projects related to such expensive high-tech technologies.

The term "artificial intelligence" can be considered from two positions:

1) as an independent science that studies the creation of machines equipped with programs that imitate intellectual activity;

2) as the ability of software to perform actions similar to the activity of the human brain.

A historical digression into the use of artificial intelligence systems can be presented as follows.

• The prerequisites for the development of artificial intelligence systems in their current form appeared in 1830, when C. Babbage proposed the concept of a complex digital calculator for calculating the game of chess, then in 1914 its development was revised by the Spaniard L.T. Quevedo into a device for the simplest chess endgames.

• In the summer of 1956, the first working conference was organized, in which McCarthy, Minsky, Shannon, Tyurin took part - this date can be considered the beginning of the development of artificial intelligence in its current capacity.

• In the 80s. of the last century - the use of branches of artificial intelligence to organize decision-making at the level of a human expert (example: Citibank Investment Bank (Citibank)).

• In 1987, a working group was launched to organize the fight against debit card fraud at ATMs and stores through the use of artificial intelligence systems (example: Security Pacific National Bank). Fundamental changes in information processing and management decision-making did not occur due to high costs, extensive time losses and general inefficiency of research. Nevertheless, the first developments in the field of artificial intelligence gave a new vector for the development of banks in terms of the use of artificial intelligence, in particular, when searching for non-standard movements of funds in customer accounts and notifying a specialist about them for further control.

• 1990s. can be characterized as a period of stagnation in the field of artificial intelligence and its application in the banking sector.

• In 2010, artificial intelligence systems began to be used to model trade competition in financial markets.

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To date, interest in artificial intelligence has grown significantly, and, consequently, financial investments in this area have also increased1 (Fig. 1) [1–5].

The growth in the cost of artificial intelligence technologies, reflected in fig. 1 is associated primarily with the physical possibility of implementing projects in this area:
– growth of capacities and speed of hardware and software;
– wide development of cloud technologies;
– widespread use of fiber optic communication and Wi-Fi technology;
– the spread of the Internet of things [6];
– decrease in the cost of computers;
– increasing education in the field of artificial intelligence;
- fundamental changes in the quality of customer service and ways of working with them - the use of software tools for collecting information about users through applications and websites, access to which is provided from tablets and smartphones, which have gained wide popularity [6, 7].

Based on the foregoing, it can be noted that the 2010s. are characterized by wide interest and active implementation of systems based on artificial intelligence both in Internet companies (example: Google, Facebook, Yandex) and the release of these systems into the business environment (example: MTS, Megafon, Gazprom Neft), and banking including (example: Sberbank, Raiffeisenbank). A histogram with predictive estimates of income from the implementation and use of artificial intelligence systems is shown in fig. 2.

Classification of artificial intelligence systems according to the direction of use in the banking sector, world experience.

1. Customer service.

Casisto, the financial assistant, works like Apple's Siri assistant. Work can be organized from any device in text or voice form.

Moneystream is a tool for analyzing movements on client accounts with anticipation of upcoming expenses and organizing notifications about them.

Wallet.AI is a test version of an assistant that, when granted access, can test the client's spending, giving advice on whether it is worth organizing a meeting or going to the store, or whether it is better to save money for a more necessary transaction for the client.

2. Credit sector.

Lending Club is an online platform for finding an investor or borrower and checking them for good faith.

Kabbage is an organized system of lending to small businesses and individuals.

LendUp (LendUp) is an organized system of microcrediting individuals in the form of an advance payment to wages.

Zest Finance (ZestFinance) - automatic preparation of credit ratings.

Affirm is an organization of instant credit when buying in stores.

Prosper Daily is a personal finance service, client account fraud alerts and real-time cash flows.

First of all, qualitative changes are waiting for customer service, which in the future will allow to adapt banking instruments to customer wishes. Banks can also use artificial intelligence systems to assess and manage risks, when investing in securities, when organizing robotic online consultations, etc.2 [8]. We assess the areas of use of artificial intelligence systems in the field of financial organizations as follows.

1. Customer service.

Systems based on natural language. The main and indisputable advantage of using such systems will be the leveling of the language aspect of the problem of communication with the client. If the geographic aspect is not important now (through the use of the Internet and the provision of services digitally), then the problem of the language barrier remains. In addition to the fact that the use of the natural language of the client (including dialects) facilitates work with the client, increases the level of comfort, and, accordingly, the level of trust in the bank, a part of disabled clients with various types of impaired function (translation into Braille cipher, fingertip alphabet) is covered.

Chatbots are an imitation of human speech behavior during communication. Such systems can be implemented in automated call centers, customer support centers online on the website and through a mobile application. They can be implemented in the form of SMS messages or in text format in the form of correspondence on the site [9].

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Robotic assistants. Such systems can be implemented in customer support centers: informing about products and services, conducting payment transactions, recommendations on investing funds, providing statements and other documentation at bank branches and offices, when analyzing candidates and their qualities when hiring, and can also be used as a service for managing an investment portfolio.

Alternative financial advisors - robo-advisers or algorithmic trading. The main direction of this type of artificial intelligence is online trading. They can provide real-time advice, monitor, open / close accounts, assess risks, process a large number of transactions at a time, without compromising the quality of information processing, and thus develop an optimal investment strategy. Such systems can work in the form of mobile applications installed on a client's smartphone or tablet.

2. Intrabank operations.

Search in the state space is the application of mathematical methods for calculating artificial intelligence problems. The method can be used in the algorithmization of filling out documents, checking the client base, conducting operations on accounts, when it is possible to divide the main task into several subtasks and work on each one separately (graph theory), highlighting the final hypothesis and moving towards it in two ways: exhaustive enumeration or heuristic search.

Machine learning is the improvement of statistical methods, when already known statistical methods are used to find patterns and create more accurate forecasts based on them. It has become possible to use multilayer deep learning systems based on large-sized neural networks. Such systems provide an iterative selection of coefficients with enumeration of functions and analyze the results with a decrease in the standard deviation.

Heuristics is the application of a method for analyzing economic decision-making processes based on experience (relationship of logical techniques) obtained by a machine over a certain period. It is used when it is impossible to solve the problem with exact mathematical calculations. Despite the complexity of interpreting the obtained solutions to economic problems, heuristic methods (brainstorming, focal objects, inversion, etc.) can be used to make managerial decisions in financial organizations in the future [8].

Complex mathematical calculations can be applied to calculate futures. A machine equipped with an artificial intelligence system is able to give an accurate calculation of a futures contract online or with minimal time losses with a large number of restrictions and any value of parameters. The more complex the calculation, the lower the risks, including when calculating various financial instruments and stock indices [10].

The complex structure of artificial intelligence systems in banks can be represented graphically (Fig. 3).

All these developments in the field of artificial intelligence are applied or will be applied in the Russian banking sector. Experts agree that artificial intelligence is the future of the financial sector [8, 11].

Today, methods for constructing learning algorithms are used, huge neural networks are being built: deep neural networks, convolutional neural networks, deep belief networks, recurrent neural networks.

Systems based on natural language and its processing in the future are technologies that will imitate communication with people. Their purpose is reading and analyzing texts, machine translation, anti-spam, generating texts for posting on websites or standard letters.

The use of predictive analytics extends to the sphere of decision-making, forecasting further activities, for marketing activities, for banking credit services (scoring), for Business Intelligence - the translation of transactional business information into a human-readable form.

The use of biometrics in the banking sector is possible in terms of recognition and identification by physiological and behavioral data: voice, fingerprints, retina, DNA. At the same time, it is possible to develop in the field of machine recognition of faces and gestures, images and video information, handwritten information with its subsequent processing.

Experience in the use of artificial intelligence systems is small, it is mainly implemented by IT companies related to the Internet, the collection of analytics and statistics, as well as marketing activities. In financial institutions, artificial intelligence systems are not so widespread. Sberbank has become a pioneer of Russian banking artificial intelligence by launching, together with MIPT, the iPavlov system project for communicating with customers in their native language, then it is planned to launch the DeepReply platform to optimize the bank's work with customers. In 2018, the bank plans to issue loans to individuals based on decision-making by artificial intelligence. The result of the work will be a fundamentally new level of work with the client [12]. The main difficulty, as the chairman of the bank notes, is that it is impossible to fully understand how artificial intelligence works, even the founders of the neural network technology itself cannot

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decipher the decision-making mechanisms. Today, it is impossible to present a model based on neural networks to a regulator with a decision-making algorithm. Accordingly, all the regulatory features of the application of the same Basel are unsuitable, because they were based on the previous idea of the decision-making process, they were not based on the possibility of using artificial intelligence and neural networks3. From this we can conclude that in order to assess risks in modern conditions in accordance with international standards, the largest bank in the country plans to use systems based on artificial intelligence.

The use of artificial intelligence systems makes it possible to operate with huge memory arrays, which is very important for the financial sector. The use of machines for making managerial and other decisions, for optimizing work with clients, calculating the effectiveness of investments without the impact of the human factor or minimizing it, means making decisions based only on information without a personal approach, which often imposes a negative connotation, the corruption underlying reason for making a decision is leveled. The advantage of using artificial intelligence now is that data collection does not stop, and the larger the base, the more efficient the system. Consequently, those banks that delay the decision to implement artificial intelligence systems in their work run the risk of not catching up with more knowledge-intensive competitors. Through the interaction and learning of machines, natural language can be processed and decisions made faster and more accurately than was possible in the past.

Firms that do not adopt AI do so for reasons such as fear of failure, encrypted datasets, and regulatory compliance. According to the Narrative Science survey, 12% of the entire group did not use artificial intelligence systems because they thought it was too new, not tested enough, or were not sure about the safety. The complication of the structure of modern business and the structured tasks it solves requires the use of qualitatively new software features that provide a high degree of information protection, a fundamentally new way of processing and analyzing data, and a quick search for relevant information.

The processes of globalization of all spheres of society predetermine a high level of competition, the maintenance of which requires the use of powerful enterprise management systems, human resources and, accordingly, improving the quality of work and efficiency of organizations. The result of using artificial intelligence systems in business is a fundamental change in customer service and a radical increase in business efficiency through the use of modern technologies.

The use of artificial intelligence systems in business will lead to fundamental changes in customer service and a radical increase in business efficiency. The author's scheme of the multi-level structure of the application of artificial intelligence systems in banks today, tomorrow and in the long term is given.

Conclusions

The complication of the structure of modern business and the structured tasks it solves requires qualitatively new software features that provide a high degree of data protection, a qualitatively new way of processing and analyzing data, and a quick search for relevant information. The processes of globalization of all spheres of society's life provide a high level of competition, the maintenance of which requires the use of powerful enterprise management systems, human resources and, accordingly, improving the quality of work and efficiency of organizations.

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