Research on the Application of Artificial Intelligence in Risk Management —— Take the Banking Industry As An Example

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Abstract. Artificial intelligence technology can mine and analyze the data, and be applied to the field of risk management. It can accurately predict the customer risk, fraud, credit, etc., so as to help banks to better identify the potential risks of customers. This paper introduces the application of artificial intelligence in banking risk management, found that the current bank bank risk control management system management organization is not sound, the lack of intelligent management means, personnel post responsible for the system is not perfect, in view of the above problems, yes, the development trend of artificial intelligence technology in banking application research, build the bank intelligent risk control management system, upgrade intelligent management means, network personnel setting, in order to for our country banking using AI technology to better improve risk management ability to provide reference.

Keywords: artificial intelligence; risk management; banking industry; management means

1 Introduction

In recent years, with the rapid development of financial technology, AI has gradually integrated into the daily operation and management of commercial banks, such as the application of face recognition technology to identity verification, intelligent risk control and other aspects, using artificial intelligence technology to rate the risk on customers, and raising the entry threshold of customer. It plays an important role in improving the risk management level, optimizing the customer experience, and

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improving the internal operation efficiency. Risk is a kind of uncertainty, which refers to the possible adverse effects on the economy, market, reputation and other aspects of the enterprise (organization) under certain conditions. Risk is universal, objective and variability. Risk management is to identify risks among the uncertainties faced by an enterprise (organization) and try to reduce them to an acceptable degree. Risk management is an important function of commercial banks, the core competitiveness of commercial banks, the source of value creation and value appreciation, and the premise and guarantee for the steady development of various businesses. Under the deepening of global economic integration, financial liberalization and interest rate liberalization, great changes have taken place in the global banking operating environment. Compared with the past, banks face more uncertain factors and face more complex risks. Commercial banks must enhance their awareness of risk prevention, improve the level of risk management, and strengthen the construction of risk management capacity. The risk management of commercial banks involves many links, such as customer selection, product pricing, credit approval, post-loan management and so on, among which the application of artificial intelligence is more and more widely used in customer selection, risk pricing, credit approval and other aspects. In the operation and management of commercial banks, risk management includes not only customer selection in advance, but also product pricing and credit approval afterwards. The traditional risk management of commercial banks is mainly realized through the pre-loan investigation, in-loan review and post-loan supervision of customers. In addition, commercial banks can also realize automatic credit approval through artificial intelligence technology, and carry out real-time monitoring of risks, adjust the credit lines in real time, and reduce the risks of commercial banks. By using artificial intelligence technology to carry out customer selection and product pricing, commercial banks play an important role in improving risk identification ability, optimizing customer experience, and improving internal operation efficiency[1]

2 Analysis of the Current Situation of Banking Risk Control and Management

In this paper, a statistical analysis of the types of risk events of a bank in the past five years. It can be seen that risk events in recent years are mainly concentrated in assets and settlement business, mainly at the branch level, but the number of risk events in recent years is declining. The details are shown in the table below:

Table 1. Proportion of risk event types in a certain bank in the past 5 years

Operational risk time	Each dimension	Quantity proportion	Proportion of Amount
Classified by business	Account business	17.36%	8.36%
	Asset Business	40.65%	33.41%
	liability business	30.23%	41.52%
	settlement business	11.76%	16.71%
Classified by Institution	Head Office	0.56%	5.36%
	branch	12.36%	13.78%
	Branch Office	87.08%	80.86%
Classified by personnel	middle management	9.63%	26.58%
	executive director	23.65%	33.36%
	Grassroots employees	66.72%	40.06%
Classified by time	2019	33.65%	30.36%
	2020	25.25%	27.21%
	2021	19.86%	21.46%
	2022	12.32%	13.53%
	2023	9.01%	77.44%

In 2019, China's commercial banks experienced the wave of fintech. As a commercial bank with the early application of AI, since the bank has become an AI laboratory, the proportion of risk events has decreased year by year, and the decline trend is obvious. But the actual number remains high. Through the above bank cases, the current risk control of banking management are analyzed[2]

2.1 The Management and Organization of The Bank's Risk Control and Management System Is Not Sound

With the social progress of science and technology reform, the business of banks is diversified. Especially under the impact of Internet finance, the various businesses of Chinese banks are gradually extended to online. These traditional businesses continue to emerge as derivatives as fintech advances. Chinese banks are facing more and more new risks, which puts forward higher requirements for the continuous upgrading and innovation of the intelligent risk control system of banks[3]。

In recent years, the state has vigorously promoted inclusive finance and issued a series of policies to promote the development of inclusive finance. However, with the large opening of the scope of credit granting, the explosive growth of data and the endless introduction of business varieties, the possibility of unknown risks in the risk line of NB banks is also increasing. The new risk points bring challenges to the risk employees of banks and bring impact on the traditional risk management system. In commercial Banks, the risk management department is the bank of various risk identification, assessment and control department, is the core of the risk management system, its main responsibility is according to the strategic objectives determined by the board of directors, establish and implementation of internal control system, monitoring and evaluation of the effectiveness of internal control, supervision and management of the implementation of internal control system[4]. However, there are serious defects in the organizational structure of risk management in China's commercial banks. From the perspective of organizational structure, there are many problems of the risk management organizational structure of China's commercial banks, such as multiple levels, unclear responsibilities and unclear authorization. Specifically speaking, first, the establishment of risk management departments is more complex. At present, China's commercial banks generally set up internal audit, risk management and legal affairs and other functional departments. However, there is no clear functional division and mutual relationship between these departments, and mutual constraint and functional crossover between departments; second, there are unclear responsibilities between risk management departments and business departments. In China's commercial banks, some business departments tend to "emphasize business over risk", and lack due vigilance and awareness for the risks in their own business, and even collude between some business personnel and customers; third, the internal management and control mechanism of the bank is not sound. Although China's commercial banks have established functional departments such as internal audit, risk management and legal affairs, they do not play sufficient roles in internal control and risk management. In the operation of commercial banks, there is a lack of clear and effective accountability mechanism and measures to supervise and inspect the implementation of responsibilities; fourth, the internal control system is not perfect. At present, China's commercial banks have not formed a complete, effective and comprehensive risk management system and system, and some enterprises have not established a perfect, systematic, scientific and internal control mechanism with their own development characteristics; fifth, the risk management department is not independent. At present, China's commercial banks have not established specialized, independent or relatively independent risk management institutions. In most cases, commercial banks are organized and carry out risk management by each business department, and there is a serious lack of system and mechanism to evaluate and monitor the risk status of the whole bank [5-6]

2.2 Lack of Intelligent Management Means

In the risk management of commercial banks, information asymmetry and information lag are one of the important reasons for the occurrence of operational risk, moral hazard and reputation risk. Due to the current commercial bank internal control risk management means is relatively backward, lead to some risk, such as credit risk, operational risk, etc., in the face of different business, different departments of comprehensive authorization, in the current risk control system, difficult to real-time collection and analysis of various business management data, lead to operational risk or moral hazard problems found time late. In the approval of credit business, the approval process of loan business is monitored and given early warning. When the system shows that the loan has been approved, the customer manager will be reminded in time and carry out corresponding operations. At the same time, through the business monitoring and early warning, it is difficult to timely find out the problems existing in the loan operation and solve them in time. In the process of daily operation and management of commercial banks, there are problems such as unscientific and unreasonable business decisions. In the decision-making process, the management is likely to be optimistic and confident, and the management makes optimistic and confident decisions to market changes. Commercial Banks should be introduced in the process of daily management intelligent risk management system, and combine with the daily management work, convert all kinds of information, data into knowledge, according to the external environment and the actual situation of bank risk real-time monitoring, timely find abnormal situation and put forward the corresponding solutions, in order to achieve the purpose of risk prevention and control[7]。

In addition, due to the characteristics of commercial banks and the influence of the external environment, there are still many problems in the internal control of commercial banks in China. Such as the lack of a sound organizational structure and scientific management system, business process is not clear, job responsibilities are not clear, job rotation is not strict, mutual restriction mechanism is not perfect, the lack of staff training and incentive mechanism. These problems have restricted the risk management ability and level of commercial banks to a large extent. The operation of intelligent risk control and management system into practical operation, the most important thing is to realize the intelligent operation of all business processes. Efficiency is the core of intelligent risk control and management. But because the bank daily business taste is various, and in the focus of each business process link, requirements and way there are certain differences, the bank intelligent risk control management system from the overall level is difficult to efficient management and process unity, risk management in the business process collaboration still has larger promotion space, risk monitoring process there are many plugging points, risk warning feedback quality and efficiency is not high, these are bank difficulties in intelligent risk control management process in recent years[8-9]。

2.3 The Personnel Post Responsibility System Is Not Perfect

Compared with the intelligent risk management system of international first-line banks, the risk management governance mechanism and organizational structure system of China's banks are not perfect enough, and the intelligent risk management often encounters non-necessary difficulties in practical operation. Bank risk managers have weak ability to intelligent risk management. In the face of complex and sudden risk control and management events, they often expose the weakness of the lack of complete response mechanism. At the same time, in the bank risk management system has not been fully realized intelligent. The intelligent progress of each risk management sector in the bank is uneven, and some risk management processes still adopt the traditional inefficient risk control mode. Intelligent risk management has a long way to go. The first line of defense in risk management is the business operations department, which directly faces risks from customers and the market. With the intensification of market competition, commercial banks have undergone profound changes in their business philosophy and business model, and there is an information asymmetry between the business operation department and the risk management department. The business operation department cannot timely understand the market information, communicate with customers, and lacks effective risk management means. In specific business operations, the business operation department can only handle the business according to its own judgment of customers and the market. Without sufficient information and evidence to support it, it will inevitably lead to commercial banks to bear certain risks. This situation has become more and more intense in recent years, and the risk management department has failed to timely and accurately identify and measure the risk of financial assets. Whether the internal control mechanism of commercial banks is sound directly affects the stable operation of banks.

The ever-changing financial environment and the continuous improvement of the progressive bank intelligent analysis system have put forward higher requirements for the professionalism of the NB bank risk management line staff. Risk line in many employees have worked in the bank for many years because of education, ability in the face of a large number of, complex data does not have qualified data analysis ability, also don't know how to extract useful information from large data center, affect the bank risk control management timely and effectiveness, this will make some intelligent risk control management measures can be effectively implemented[10]。

Talent is the most important thing in the process of building an intelligent risk control and management system. System development and other work requires a large number of data analysis talent. The application of various intelligent risk control and management systems also requires employees with data analysis ability to operate. At present, the construction and operation of the intelligent risk control platform of banks is in urgent need of professional and technical talents, big data analysis talents and data product innovations talents proficient in big data technology. At present, the risk line of the bank has begun to train data analysts, including junior analysts and intermediate analysts. Most of them are arranged in the risk line of the whole bank (excluding return visit special posts), and initially, a data analyst team has been established. With the arrival of the big data boom in China, the scarce resource attribute of big data talents is becoming more and more obvious. Compared with Internet enterprises, banks do not have the advantage of attracting big data talents, and even lack the flexible mechanism of introducing scarce talents.

3 Construction of an Artificial Intelligence Management System in Modern Banking

3.1 Build An Intelligent Risk Control and Management System for Banks

The key to the application of artificial intelligence in bank risk management lies in how to build an intelligent risk management system. At present, the most widely used artificial intelligence in the field of risk management is machine learning. When using machine learning models to analyze and predict data, it is necessary to collect, clean and integrate a large amount of data. Then, the model is trained by the machine learning algorithm, and the model is continuously updated and optimized according to the business needs to achieve the optimal decision result. In this process, artificial intelligence technology can help commercial banks to establish a sound risk management system, and realize risk identification, risk prediction and risk control through automatic monitoring, automatic early warning, automatic disposal and other functions. The constructed risk control and management system is shown in the following figure:

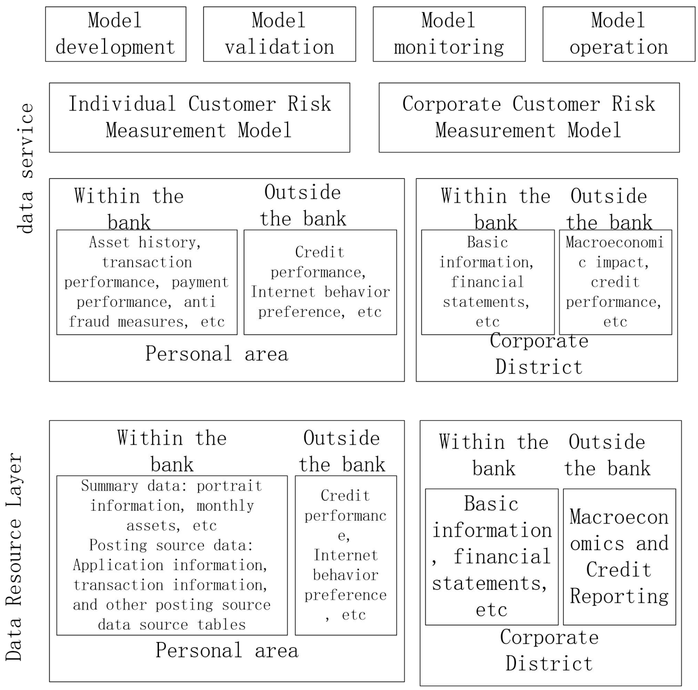

Fig. 1. Figure 1 Intelligent Risk Control Architecture Diagram

From the perspective of bank management, with the deepening of the application of artificial intelligence technology in the field of bank risk control, its advantages in the field of risk control will be further reflected. Firstly, artificial intelligence technology can help banks realize the accurate identification and analysis of customer information, enhance the judgment of customer credit status, risk preference and repayment ability, and improve the examination and approval efficiency; Secondly, artificial intelligence technology can help the bank to realize real-time monitoring and warning of customer account and capital status; Finally, artificial intelligence technology can also help the bank to realize the automation and intelligence of risk management.

3.2 Upgrade The Intelligent Management Means

In the process of intelligent development of risk management of commercial banks, it is necessary to further upgrade the intelligent management means, so as to better play the role of artificial intelligence. First of all, commercial banks should help themselves to build multiple intelligent systems through artificial intelligence technology, so as to achieve a high degree of integration and deep utilization of data. Through information exchange and data sharing between different systems, commercial banks can further strengthen data analysis and provide a basis for customer portrait and product innovation. Secondly, commercial banks should speed up the construction of intelligent risk control system. At present, the intelligent risk control system of commercial banks is mainly equipped with loan approval and post-loan management. These systems have problems such as inaccurate identification, long approval process and low audit efficiency. Through the introduction of artificial intelligence technology, the identification ability and risk prevention and control level of the intelligent risk control system can be effectively improved, and the comprehensiveness and accuracy of loan risk management can be enhanced.

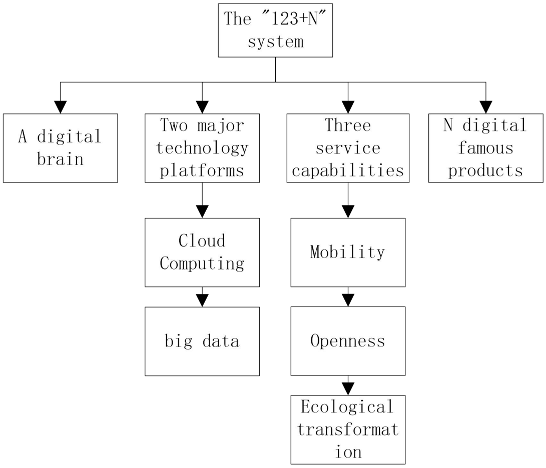

Fig. 2. Development System of Intelligent Management Methods

Finally, commercial banks should make full use of artificial intelligence technology to provide customers with more convenient financial services. With the advent of the 5G era, AI technology will further develop, which is both an opportunity and a challenge for commercial banks. The application of artificial intelligence in risk management is a process of continuous development and improvement. Under the influence of the rapid development of fintech and the intensified competition in the financial market, artificial intelligence technology is also facing a new round of upgrading. Artificial intelligence technology itself needs to be continuously improved and improved through continuous development. Commercial banks should also strengthen cooperation and exchanges with excellent enterprises and scientific research institutes in the field of artificial intelligence, and accelerate the research and development of artificial intelligence products with independent intellectual property rights. In the future, the application of artificial intelligence technology in risk management will become a normal trend, which will promote the risk management of commercial banks to the direction of intelligence.

3.3 Post Setting of The Branch Staff

In recent years, commercial banks have accelerated the intelligent transformation of their branches. With the support of artificial intelligence technology, the post setting of the staff in the branches has shown new changes. First, the reduction of customer service staff. With the rapid development of Internet finance and financial technology, major commercial banks are accelerating the intelligent transformation of their branches, and the channels for customers to handle business are becoming more and more diversified, thus reducing the number of staff in their branches. Second, the increase of management personnel. In order to improve the management level of branches, major commercial banks constantly explore new management methods in the personnel allocation of branches. In terms of post setting, the business outlets implement the post responsibility system and follow the separation of incompatible posts. The person in charge of the branch presided over the overall work of the branch, and is responsible for the staff management and business risk management of the branch. The lobby manager is responsible for the maintenance and consulting work of customers, guiding customers to fill in application materials, improve business efficiency and pays attention to the dynamics of the business site. The accounting supervisor and the in-process supervision are responsible for the effective supervision of the business of the branch, ensuring that the business operations of the branch are true, accurate, legal and compliant, responsible for reviewing and licensing the business within the authority, supervising the business operations and daily behaviors of the staff of all posts in the branch, and preventing risks. The general teller is responsible for accepting the daily business, doing the basic work of the counter operation, and being responsible for the cash, heavy empty and seals using the trunk. In line with the business idea of full marketing, the staff of the network have the most close contact with customers, bearing the responsibility of various performance indicators. In addition to the above basic positions, the business outlets also set up positions such as self-service equipment administrator, self-service equipment clearing machine and banknote post, online banking operator, online banking review staff, financial management and sales post. On the premise of the separation of incompatible positions. Personnel settings are shown in the following table:

Table 2. Position Settings for Branch Personnel

Basic positions	Part-time job	Number setting
Branch Supervisor	Core Level 2 Authorization Officer, Large Deposit Certificate Reviewer, Dynamic Password Lock Administrator, Mobile Card Opening Terminal Backend Management Post, People's Bank of China Account Management System Level 3	1

	Administrator, Institutional Credit Code Certificate Administrator, Network Verification System Administrator	
supervision in the act	Warehouse management authorization officer, financial risk control system branch operator A, position management position, corporate comprehensive service platform reviewer A, reconciliation review position, accounting business seal custodian, seal card (original) custodian, bank underwriting invoice review position, cash re empty system operator, anti money laundering editor position, account management branch verification position	2-3
Chief Accountant	Level 1 Authorization Officer, Heavy Empty Physical Custodian, Counterfeit Currency Physical Custodian, Financial Risk Control System Branch Operator B, Corporate Comprehensive Service Platform Reviewer B, Online Banking Specialist A, Financial Sales Specialist A, Self Service Equipment Specialist, Account Management Reviewer	1
Lobby Manager	Account reconciliation handling position, finance salesperson B, online banking specialist B	2
Integrated teller	Self service equipment sorting and cash adding post, sorting operation post, account management operator	several

Some commercial banks have established intelligent counters, whose staff guide customers to use self-service equipment for business; Some commercial banks have also reengineering the business outlets and realized the functions of intelligent counter and remote authorization; Some commercial banks begin to adopt unattended mode to provide customers with 24-hour service. Major commercial banks are actively exploring innovative marketing models, and further enriching customer service channels and means by combining artificial intelligence technology with customer marketing. For example, the concept of "intelligent bank" proposed by Bank of Beijing takes intelligent robot as a new self-service terminal; Agricultural Bank of China proposes the concept of "intelligent lobby" to realize intelligent and scenario-based customer service and management.

4 Conclusion

The development of artificial intelligence has provided a new technical means for the risk management of commercial banks, optimized the risk management process, improved the efficiency of risk management, and reduced the operating cost of banks. In the future, with the further development of fintech, the application of AI in risk management will be more extensive, and it may affect the future business strategy of banks. The application of artificial intelligence in risk management will better help banks to improve their risk control ability, but it will also face many challenges and problems.

For commercial banks, in the face of the opportunities and challenges brought by ARTIFICIAL intelligence, they should constantly optimize the technology application solutions, accelerate product innovation, continuously improve the training ability of professional talents, strengthen data governance, establish and improve the supervision mechanism, so as to deal with the possible conflicts between technology and rules in the future.

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