Research on FinTech Innovation and Risk Management under the Vision of Artificial Intelligence

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Abstract: At the present stage, artificial intelligence technology is developing rapidly, and all walks of life are undergoing profound changes. The financial industry, with its rich data and standardized processes, has become an important field for the application of artificial intelligence technology. This article analyzes the main manifestations of FinTech innovation driven by artificial intelligence, and discusses the technological, data, and other factors that affect FinTech innovation. Furthermore, it proposes corresponding technological, data, and other risk management strategies, aiming to promote the sustainable development of FinTech under safe and controllable premises, and provide theoretical and practical references for the healthy development of the financial industry.

1. Introduction

The integration of artificial intelligence and finance has given rise to the vigorous development of FinTech, bringing many innovations in products, services, and business models. However, in the process of FinTech innovation, various risks have also emerged, such as technical vulnerabilities, data breaches, and business violations. These risks not only affect the stable operation of financial institutions but may also impact the order of the entire financial market. In this context, in-depth research on FinTech innovation and risk management under the vision of artificial intelligence is of significant practical importance.

2. Main Manifestations of FinTech Innovation

2.1 Product Innovation

Financial institutions have developed a variety of new financial products with the help of artificial intelligence technology. Intelligent investment advisory products are a typical example. Financial institutions use machine learning algorithms to analyze customers' risk tolerance, investment preferences, and financial status, and automatically generate personalized investment portfolio recommendations for customers. These products do not require excessive manual intervention and can meet customers' needs for low-cost, high-efficiency investment [1]. There are also personalized insurance products. Insurance companies use artificial intelligence to process large amounts of customer data, and design insurance plans that meet the needs of different customers based on factors such as the customer's age, occupation, and health status. Customers can choose more suitable insurance products according to their own circumstances, changing the traditional situation of high standardization and insufficient pertinence of insurance products. In addition, digital currency is also an important manifestation of financial product innovation. Some financial institutions and technology companies issue digital currencies based on blockchain and other technologies. These currencies have the characteristics of decentralization and convenient transactions, and are gradually changing traditional payment and settlement methods.[2]

2.2 Service Innovation

Artificial intelligence has significantly improved the methods and efficiency of financial services.

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Intelligent customer service is a common form of service innovation. Financial institutions have developed intelligent customer service systems through natural language processing and other technologies. The system can understand customer questions and provide accurate answers, providing 24-hour service to customers, solving the problems of long waiting times and low service efficiency of traditional manual customer service. Customers can consult account information, business processing procedures, and other content at any time. Remote identity verification services are also constantly innovating. Financial institutions use computer vision technology to identify and verify customers' facial features, ID documents, etc. Customers do not need to go to offline outlets, and can complete identity authentication through mobile phones and other devices, and then handle account opening, loans, and other businesses, which greatly simplifies the business processing procedures. Real-time risk early warning services are also an important part of service innovation. Financial institutions use artificial intelligence to monitor and analyze customers' transaction data, credit data, etc. in real time. When abnormal transactions or potential risks are found, they can promptly issue early warnings to customers and financial institutions, helping customers and financial institutions to prevent risks.

3. Analysis of Influencing Factors of FinTech Innovation Driven by Artificial Intelligence

3.1 Technical Factors

The maturity of artificial intelligence technology is directly related to the promotion effect of FinTech innovation. When the accuracy of machine learning algorithms and the understanding ability of natural language processing reach a high level, financial institutions can more smoothly apply them to actual business. For example, in the intelligent investment advisory scenario, mature algorithms can more accurately analyze customer needs and provide investment and suggestions, thereby promoting the innovation of related financial products; conversely, if the technology is not mature enough, it may lead to more problems in innovative applications, thereby hindering the process of FinTech innovation [3].

The business of financial institutions often has a certain scale and may continue to expand with the development of the business, which requires the applied artificial intelligence technology to maintain stable operation and efficiently process information when the number of users increases and the amount of data grows. At the same time, financial business usually involves a large amount of funds and sensitive information. The artificial intelligence technology applied to it must have high security and be able to resist network attacks and prevent data from being tampered with or leaked. When technical security is guaranteed, financial institutions have the confidence to use it for the innovation of core businesses; and if there are security vulnerabilities in the technology, it may lead to serious consequences such as customer information leakage and capital losses. Financial institutions will not dare to carry out related innovation attempts due to excessive risks, which will affect the pace of FinTech innovation.[4]

3.2 Data Factors

The quality of data will directly affect the effect of artificial intelligence models, which in turn affects FinTech innovation. If the data collected by financial institutions is accurate, complete, and consistent, the artificial intelligence model can draw more reliable analysis results based on these data, providing strong support for the innovation of financial products and services. For example, in the credit assessment model, high-quality customer repayment records, income information, and other data can allow the model to more accurately judge the customer's credit status, helping financial institutions develop credit products that are more suitable for customers with different credit ratings; conversely, if there are errors, omissions, or duplicates in the data, the analysis results of the model will be biased, which may lead to innovative financial products that cannot meet actual needs, or even bring risks.[5]

When financial institutions have a sufficient scale of data, artificial intelligence models can mine more valuable patterns and information from it, thereby providing richer ideas for innovation. In the

field of consumer finance, a large amount of customer consumption data, behavior data, etc. can enable artificial intelligence to more comprehensively understand the consumption habits and needs of different customer groups, prompting financial institutions to innovate more targeted consumer credit products and services; if the data scale is too small, the model may not be able to fully learn effective information, making it difficult to support valuable financial innovation.[6]

Whether the protection of data privacy is in place will also affect the application of artificial intelligence in FinTech innovation. Financial institutions must strictly abide by relevant laws and regulations and do a good job in data privacy protection when using data to promote innovation. When data privacy is effectively protected, customers are willing to provide more personal information to financial institutions, and financial institutions can also use data for the training and application of artificial intelligence models with confidence under the premise of legality and compliance, thereby promoting the smooth development of financial innovation. If data privacy protection is insufficient, and problems such as data leakage occur, it will not only infringe on the rights and interests of customers, but also expose financial institutions to legal risks, and their reputation will also be damaged, thereby restricting their enthusiasm for using data and artificial intelligence for innovation.

4. Management Strategies for Financial Innovation Risks under the Vision of Artificial Intelligence

4.1 Technical Risk Management Strategies

For algorithm risks, financial institutions should carry out algorithm optimization and verification. Financial institutions can organize technical teams to use multiple algorithm cross-validation methods, apply algorithms with different principles to the same business scenario, and compare and analyze the output results of each algorithm to discover possible deviations of a single algorithm. At the same time, the technical team needs to regularly review the algorithm's operating logic and data input, and check whether the algorithm has design vulnerabilities or adaptability problems caused by data changes [7]. In addition, financial institutions should also introduce algorithms with stronger interpretability, requiring technical personnel to ensure that the decision-making basis of the algorithm can be clearly presented during the algorithm development process, so that business personnel and regulatory authorities can understand the process of the algorithm drawing conclusions, thereby reducing the risks caused by algorithm opacity.

For model risks, financial institutions should establish a model monitoring and update mechanism. Financial institutions can arrange dedicated risk management personnel and technical personnel to form a monitoring team to monitor the operating status of the model in real time, including indicators such as the model's prediction accuracy and error range. When the monitoring data shows that the model performance is declining, the technical staff needs to analyze the reasons and adjust and optimize the model in a timely manner. In addition, the technical team should also regularly update the model's training data and parameter settings according to changes in the market environment and business needs to ensure that the model can adapt to new situations, thereby maintaining good prediction results and avoiding decision-making errors caused by outdated models.

Regarding system security risks, financial institutions need to strengthen system security protection. The technical department of the financial institution should use encryption technology to encrypt sensitive data in the system to prevent data from being illegally obtained during transmission and storage. At the same time, technical personnel should install and regularly update firewalls and intrusion detection systems to monitor the system in real time, so that they can detect and intercept unauthorized access and network attacks in a timely manner. In addition, the technical department should also formulate a system security emergency plan and conduct regular security drills to ensure that measures can be taken quickly to reduce losses when the system has security vulnerabilities or is attacked, thereby ensuring the stable operation of the system.

4.2 Data Risk Management Strategies

The technical department and business department of the financial institution need to jointly participate in the data collection process, clarify the standards and requirements for data collection, and ensure that the collected data can accurately reflect the actual situation. For example, when collecting customer income information, it is necessary to obtain it through formal channels and verify the relevant credentials. In the data cleaning process, technical personnel need to use professional tools to identify and process errors, omissions, and duplicate information in the data, such as deleting duplicate customer records and supplementing complete transaction data fields. At the same time, financial institutions should also regularly check and evaluate data quality, and promptly discover and solve data quality problems, providing reliable data support for artificial intelligence models.[8]

The technical department should use data desensitization technology to process customers' sensitive information, such as converting customers' ID card numbers, bank card numbers, and other information into codes that cannot directly identify personal identity. In terms of data access control, financial institutions should clarify the data access permissions of personnel in different positions. Only authorized personnel can access specific data, and data access logs should be recorded for easy traceability. In addition, financial institutions need to strengthen data security training for employees, improve employees' awareness of privacy protection, and avoid data leakage caused by improper human operation.

The compliance department needs to regularly review the laws and regulations and regulatory requirements related to data processing to ensure that the financial institution's data collection, storage, use, and other aspects comply with regulations. For example, when collecting customer data, it must clearly inform customers of the purpose of the data and obtain customer consent. The compliance department should also supervise and inspect the data processing process and correct violations in a timely manner. At the same time, financial institutions should also establish a data compliance risk early warning mechanism to identify and prevent possible compliance problems in advance, and avoid legal sanctions and reputation losses due to data violations.[9]

5. Conclusion

In summary, artificial intelligence has injected strong impetus into FinTech innovation, bringing significant changes in products, services, and business models. Technological, data, and other factors play a key role in it. At the same time, the technological, data, business, and ethical risks faced in the process of financial innovation cannot be ignored, and financial institutions need to take targeted management strategies to deal with them. With the continuous development of the financial market, FinTech innovation and risk management will face new opportunities and challenges. At this time, financial institutions should continue to improve their technical application capabilities and risk management level, and strengthen the training of compound talents. In addition, regulatory authorities need to improve relevant laws and regulations to adapt to the development needs of FinTech. Only through the joint efforts of all parties can FinTech promote healthy development in the balance of innovation and risk prevention and control, and contribute to the stability and prosperity of the financial industry.

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