Research Article

Internet Financial Risk Management in the Context of Big Data and Artificial Intelligence

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In recent years, the emergence of big data and artificial intelligence technology has made Internet finance a brand new development model in the new era. As an emerging financial format, Internet finance plays an important role in providing people with convenient and efficient services. However, due to the late start in this regard and the imperfect related policies and regulations, China is currently still in the development stage, resulting in its risk management system not being mature and complete and lacking uniformity. There are also many regulatory deficiencies, which are not conducive to the healthy, stable, and continuous growth and progress of Internet finance. In the new situation, it is of great significance to strengthen the research on the security of China's Internet finance. Therefore, how to effectively manage Internet financial risks in the context of big data and artificial intelligence has become a topic of research. This study uses questionnaire analysis and data analysis to understand the distribution of risks and the importance of risk response measures through questionnaire surveys. According to the survey results, in the eyes of most interviewees, the ratios of operational risk, credit risk, platform operation risk, and lack of law and reputation risk in high-risk areas are 0.15, 0.3, 0.29, 0.51, and 0.1, respectively. The risks of these first-level indicators need to be particularly important and need to be effectively avoided to manage Internet financial risks. In addition, the most important risk response measures are the construction of information security, followed by the improvement of relevant laws and regulations. In their view, only from these aspects can we effectively control risks internally and externally.

1. Introduction

At present, due to the incomplete risk control management system, a lack of professional talents, and the inadequacy of relevant laws and regulations, there are many shortcomings and deficiencies in online banking and traditional financial institutions. The emergence of big data and artificial intelligence has had a huge impact on the Internet finance industry. While the application of Internet information technology has brought people a lot of conveniences, some problems have also emerged. For example, a series of social phenomena such as credit risk and policy security risk will affect the Internet financial industry and even threaten the stability and security of the entire economic system.

At present, the research results on the combination of big data and artificial intelligence in Internet financial risk management are also relatively rich. For example, Lan believes that there are potential risks in the Internet finance industry, and it is necessary to establish big data credit investigations, strengthen international cooperation in big data supervision, and improve consumer rights protection mechanisms [1]. Fang pointed out that, in recent years, artificial intelligence and cloud computing technologies have gradually matured and been widely used in various industries and have played a major role in the development of the financial industry [2]. Therefore, this study combines the background of big data and artificial intelligence to conduct research on Internet financial risk management, which has important historical significance and research value.

Artificial intelligence has given different industries new modes of operation, and big data have provided new tools

for data analysis and decision-making of enterprises and individuals. Artificial intelligence and big data are also rapidly affecting the changes in the financial field. Big data can combine the analysis of historical experience data to quickly identify emerging risks and quickly block the occurrence of risks through artificial intelligence-assisted technology, thereby reducing financial risks for enterprises or individuals. This study manages financial risks through artificial intelligence and big data algorithms, to prevent financial risks, reduce the possible effects of risks on the financial market, and further promote the stability of the current financial market.

This study first explains the related concepts of big data and artificial intelligence. Then, the concept and current situation of Internet financial risk management are introduced in detail. Finally, in order to understand the distribution of various risks and the importance of risk response measures, this study carried out a questionnaire survey and obtained relevant survey results and analysis conclusions.

2. Related Theoretical Overview and Research

2.1. Big Data and Artificial Intelligence. With the rapid development of Internet technology and the advent of the era of big data, people's information processing and acquisition methods have undergone tremendous changes. In this case, a large number of user records are generated [3]. However, these massive, unstructured data have serious problems. How to effectively solve this problem and improve their utilization efficiency is one of the topics that researchers focus on.

Big data are a new product in the information age. They are massive and diverse, and their development is rapid. In today's society, where the network is developed, a large number of different types and quantities of different types of data are generated every day. These large numbers of complex, large and colorful, low-value density, valuable and invaluable, and other characteristics make people analyze them, so the big data analysis technology is produced in this way [4, 5].

The characteristics of big data are very prominent and unstable, and its manifestations are constantly changing with the amount of information, network scale, and technological development. The characteristics of big data analysis mainly include these aspects. One is the huge amount of information. The second is the huge amount of information. The third is diversity. In a large number of quantitative and unstructured databases, a considerable part of them is demanded by users, and these users often do not know what they have contributed to. Big data analysis is different in which it uses various technical means to screen and statistically classify a large number of huge and diverse data according to certain rules.

At the same time, in the rapid development of the information age and the development of computer and network technology, artificial intelligence and other related high-tech are also developing rapidly. With the continuous progress of the electronic information industry and the "Internet +" era, people have higher requirements for intelligent products [6, 7].

The development of artificial intelligence technology is based on computers. It can draw conclusions by processing and analyzing data, or use other methods to transform the results into the required information and output to decision makers. For example, it can identify target objects and make decisions based on images and choose accordingly [8, 9].

The development of artificial intelligence technology is the continuous progress of human civilization, and the level of social intelligence is getting higher and higher. It not only plays an important role in the industrial field but also is widely used in scientific research and daily life [10–14]. With the mutual penetration and integration of computers, automation, electronic information processing, and other disciplines, many new high-tech achievements have been produced after they are applied to people's eyes or other places. Some emerging technology products include robotics, and biomedical research [15, 16]. It may become a very critical and indispensable issue full of opportunities and challenges in the development of artificial intelligence technology, which also gives it a huge potential in future social development [17–20].

Artificial intelligence technology is an emerging high-tech application in the computer field. It can carry out various complex calculations through its own powerful computing capabilities [21, 22]. At present, there are mainly the following kinds of intelligent algorithms that people are familiar with, based on basic theories such as fuzzy mathematics and neural networks, with the genetic algorithm as the core principle [23–25]. Among them, genetic methods include many types, such as simulated annealing, natural elimination, and evolutionary strategies. It has a strong local search ability in computer systems [26, 27]. Figure 1 shows the relationship between big data, artificial intelligence, Internet of Things, and cloud computing.

2.2. Research on Internet Financial Risk Management. Internet finance refers to an emerging business model in which traditional financial institutions rely on modern information technology, communication technology, and other network tools to build e-commerce platforms to provide customers with various transaction information services [28–30]. At present, China has begun to appear in three types of third-party payment, online loan home, and crowdfunding financing [31, 32].

In recent years, Internet finance has also risen rapidly and is active in the economic field in various forms. For example, P2P online loans are loans between individuals [33, 34]. The market share of third-party payment in China in 2011, 2014, and 2020 is shown in Table 1.

Internet financial risk management is the use of scientific methods to reduce or eliminate negative risk results, improve the operation and management of insured units, and promote the stable development of the macroeconomic environment [35–38]. At present, many areas of China's Internet financial industry's management are lacking, which brings great hidden dangers to the industry. Once these hidden dangers break out, they will have a major negative
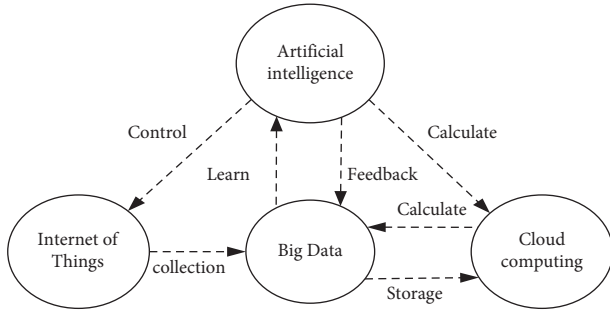
FIGURE 1: The relationship between big data, artificial intelligence, Internet of Things, and cloud computing.

TABLE 1: China's third-party payment market share in 2011, 2014, and 2020.

Means of payment	2011 (%)	2014 (%)	2020 (%)
Alipay	46	50	48
Tencent finance	21	20	34
Others	33	30	18

impact on society. Financial risks on the Internet are shown in Figure 2.

Financial risks on the Internet are divided into these categories.

One is information security risks. The foundation of Internet finance is the development of information technology, and information carries the development of Internet finance like blood. Therefore, the most important task of understanding Internet risks is to ensure information security [39, 40].

The second is credit risk. The behavior of one or more parts of online financial activities that may fail creates credit risk. For example, if the borrower does not repay the full amount within the agreed period, it faces credit risk.

The third is operational risk. High risks are usually caused by human factors, such as employee negligence at work, leading to certain changes in the company and possible losses, or deliberately using certain methods to invade illegally or using commercial systems to gain advantages [41]. On the one hand, these problems are caused by the imperfect operating rules and regulations of Internet finance companies and weak supervision. On the other hand, due to the backlog of technology, the security of the enterprise system cannot be guaranteed, which gives unintentional people the opportunity to take advantage.

The fourth is liquidity risk. When Internet finance companies carry out fund-raising projects, there may be liquidity risks because these financial companies have relatively dispersed sources of funds, a large customer base, a high degree of freedom in repayment, guaranteeing sources of funds, and high instability [42, 43]. If the customer group is repurchased once the amount is too large, Internet finance companies cannot meet the needs of customers, which will cause liquidity risks.
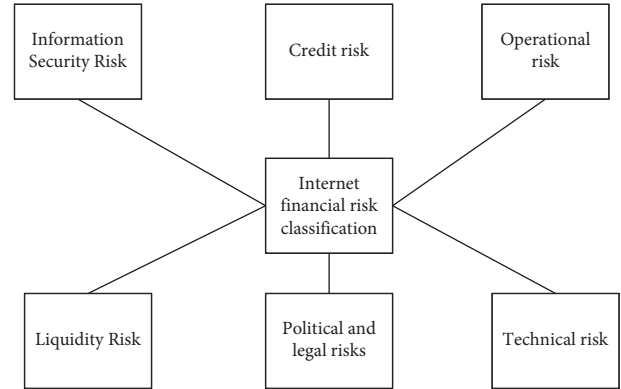

FIGURE 2: Internet financial risk classification.

3. Questionnaire and Research

3.1. Questionnaire Design Process.
Online questionnaires are simple and can survey more respondents in the shortest time. Therefore, this study takes the form of online questionnaires, distributes questionnaires to citizens, then collects the questionnaires filled in by citizens, kicks out invalid questionnaires that do not meet the requirements, integrates and processes the valid questionnaire data, and finally draws a conclusion. A total of 148 questionnaires were distributed, and 125 valid questionnaires were recovered. The method of distributing the questionnaire and the results collected are shown in Table 2.

Nowadays, there are many network tools that can conduct statistics on the results of questionnaires. For example, Questionnaire Star is one of the practical tools for processing questionnaires. Through the data processing of the recovered questionnaires, it can be seen that the collection of the questionnaires is good, and most of the citizens have filled out the questionnaires carefully.

3.2. Calculation Methods Used in the Questionnaire Survey.
Calculate and process valid questionnaire data. The specific calculation method is shown in formulas (1)–(3). Factors such as the number of surveys, the response rate, and the degree of variance all have an impact on the results of the survey:

$$\delta = \frac{\alpha}{\beta}, \tag{1}$$

$$F_{\min} = \min\left\{\frac{F_1}{F}, \frac{F_2}{F}, \cdots, \frac{F_n}{F}\right\}, \tag{2}$$

$$F_{\max} = \max\left\{\frac{F_1}{F}, \frac{F_2}{F}, \cdots, \frac{F_n}{F}\right\}. \tag{3}$$

3.3. Questionnaire Survey Content.
The information collected in the questionnaires was collated to investigate the responses to risks of different groups, such as ordinary people, students, and industry experts. Then, work with

TABLE 2: Questionnaire distribution method and collection results.

Questionnaire distribution method	Number of questionnaires issued	Number of questionnaires returned	Recovery rate (%)
Internet questionnaire	50	42	84
On-site questionnaire	61	51	83.6
E-mail	37	32	86.5

TABLE 3: Analysis of risk distribution.

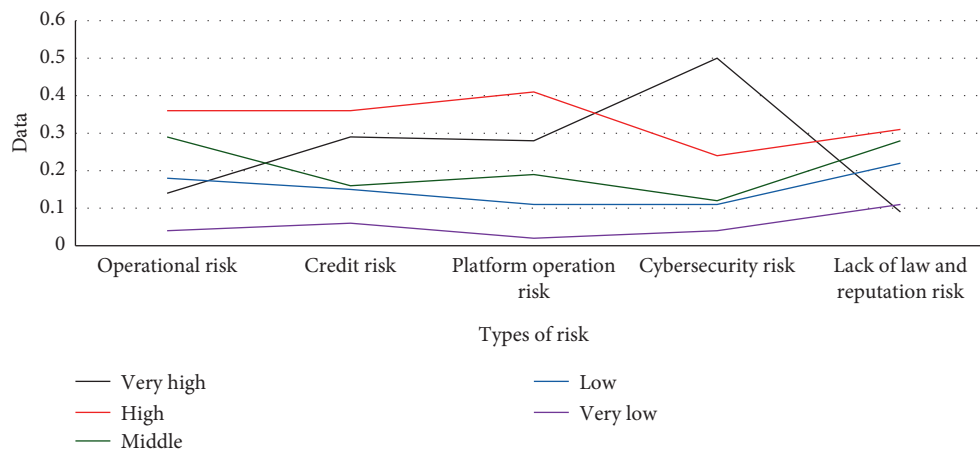| Part of types of risk	Very high	High	Middle	Low	Very low
Operational risk	0.14	0.36	0.29	0.18	0.04
Credit risk	0.29	0.36	0.16	0.15	0.06
Platform operation risk	0.28	0.41	0.19	0.11	0.02
Cyber security risk	0.50	0.24	0.12	0.11	0.04
Lack of law and reputation risk	0.09	0.31	0.28	0.22	0.11

FIGURE 3: Analysis of risk distribution.

TABLE 4: Analysis of the importance of risk response measures.

Respondents	Relevant laws and regulations	Information security construction	Raise public risk awareness	Improve information transparency
Experts	0.29	0.36	0.18	0.17
Financial industry staff	0.27	0.33	0.22	0.28
Ordinary people	0.34	0.32	0.17	0.15
Students of finance major	0.26	0.31	0.22	0.21

experienced industry experts to investigate relevant metrics and risk profiles.

4. Analysis and Discussion

4.1. Analysis of Risk Distribution. Firstly, experts and experienced financial industry professionals assess the risk of each first-level indicator and then calculate the average value of the risk level of each factor. The distribution of each risk is shown in Table 3.

As can be seen from Figure 3, in the eyes of the experts and experienced financial industry professionals in this interview, the ratios of operational risk, credit risk, platform operation risk, legal deficiencies, and reputation risk in high-

risk areas are 0.14, 0.29, 0.28, 0.5, and 0.09, respectively. It can be seen that the risks of these first-level indicators need to be particularly important and need to be effectively avoided to manage Internet financial risks.

4.2. Analysis of the Importance of Risk Response Measures. This questionnaire survey conducted a survey of experts, staff, students, and ordinary people in the financial industry on the importance of risk response measures. The survey results are shown in Table 4.

It can be seen from Figure 4 that, in the opinion of the interviewees, the most important risk response measures are the construction of information security, followed by the
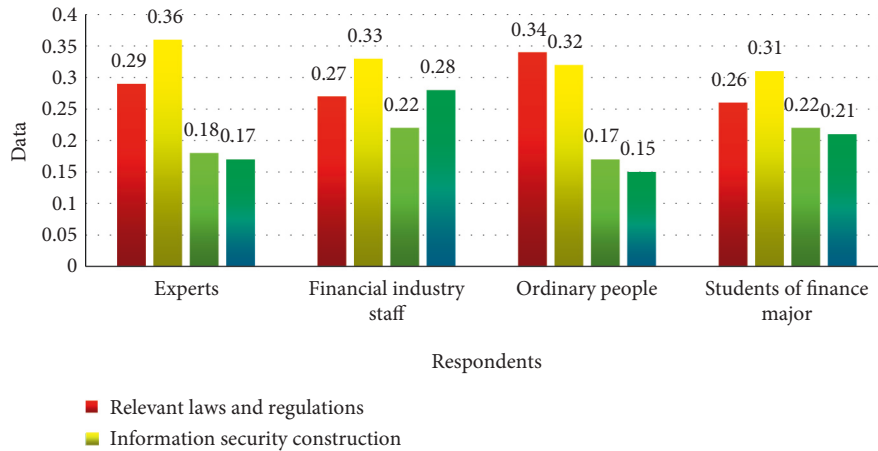
Figure 4: Analysis of the importance of risk response measures.

improvement of relevant laws and regulations. In their view, only from these aspects can we effectively control risks internally and externally.

5. Conclusion

Internet finance is a combination of the traditional financial industry and emerging network technology to form a new model, which has the characteristics of low cost, high efficiency, and convenient transactions. However, at the same time, in the process of rapid development, many problems have been exposed, and risk management problems have become increasingly prominent. The development of big data and artificial intelligence technology has brought huge opportunities and challenges to people, and they have penetrated into various fields, especially the field of Internet finance. Therefore, this study combines the background of big data and artificial intelligence to conduct research on Internet financial risk management, which has important era significance and research value.

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgments

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