

# Literature Review and Frontier Progress of Internet Financial Risk Management

Xiaoyi Jia\*

Faculty of Arts and Science, University of Toronto, Toronto, ON, Canada, M5S 3K4

\*corresponding author's email: jxyii00613k@gmail.com

**Keywords:** Internet Finance, Risk Management, Literature Review

**Abstract:** With the rise of various Internet financial platforms at home and abroad, the Internet financial industry is gradually maturing, but the risks also follow. No matter the Clients of Consumer, Business or Government customers, once the risks of Internet finance occur, they are bound to cause profit losses, thus threatening the healthy development of Internet finance and even causing social unrest. Firstly, this paper categorizes Internet finance and its products and summarizes the financial risk of the dangers of the Internet. On the basis of summarizing a large number of domestic and foreign literatures, this paper analyzes the current situation of Internet financial risk management research models and algorithms, and on the deep analysis of Internet financial risks related cases at home and abroad, then this paper puts forward the financial risk management to improve the Internet financial related laws and regulations and perfect the system of Internet financial risk management strategy, etc. Finally, the development trend of Internet financial management is prospected.

## 1. Introduction

Internet finance is a new financial business model for traditional financial institutions and Internet enterprises to realize financing, payment, investment and information intermediary services by using Internet technology and information and communication technology. Internet financial products are generally divided into five categories: payment, loan, financial management, network securities and other emerging Internet financial innovative products that have not yet formed a scale.

Over the past three decades, the environment and rules of the world economy and financial markets have changed dramatically. Although the development of Internet finance is an inevitable trend, risk management should not be ignored in the process of development. Internet finance combines the Internet and its technologies, and the openness and virtuality of the Internet make the development of Internet finance face great risks, such as security risks and reputation risks. The risk management of Internet finance can better avoid the occurrence of Internet financial risks, create a healthy and stable environment for the development of Internet finance, and enable users to better enjoy Internet financial services, so as to achieve better development of Internet finance.

## 2. Current form of Internet Finance

The current pattern of Internet finance consists of traditional financial institutions and non-financial institutions. Traditional financial institutions mainly focus on Internet innovation, e-commerce innovation and APP software of traditional financial services. Non-financial institutions mainly refer to e-commerce enterprises that make use of Internet technology for financial operation, online lending platforms in P2P mode, online investment platforms in crowdfunding mode, mobile financing apps in the field of wealth digging, and third-party payment platforms.

In China, at the beginning, the early network was not very developed, we used the form to fill in all aspects of the applicant information. After manual review and approval, it took a long time in between. Later, with the progress of science and technology development, the Internet is widely used, and the approval does not need cumbersome steps, only some personal information is provided,

which will be approved in a shorter time and the process becomes convenient. It has promoted the increase of applicants and the emergence of more Internet finance platform APPs.

Since the 1990s, Internet finance has developed rapidly in developed countries and regions. The traditional business of foreign commercial Banks has realized banking functions through terminal devices such as the Internet, mobile phones and PDAs. Credit card companies and pure network Banks have also emerged gradually. The start-up time and development of third-party payment in foreign countries are far ahead of that in China. For example, payment platforms such as PayPal allow users to complete online receipt and payment or even cross-border transactions through email registration. P2P lending model was first established in the UK. It takes advantage of the low cost and high efficiency of Internet technology to match the credit needs of borrowers and borrowers. So far, Europe and the United States and other developed countries are still a lot of P2P lending institutions. Xuan Zhang (2016) proposed that foreign forms of Internet finance mainly include crowdfunding, P2P online lending, third-party payment platforms, digital currency, big data finance, information-based financial institutions and financial portals, etc.[1]

### **3. Risk and Classification of Internet Finance**

The core of Internet finance is the Internet and its technology. With the support of the Internet and Internet technology, financial institutions can provide customers with a variety of financial services and promote the transformation of financial institutions' business model. For customers, the way people choose financial products is also diversified, which greatly facilitates the needs of customers. However, in the network environment, the openness and virtuality of the network make Internet finance have great risks, which will have a huge impact on the development of Internet finance. Xiaodong Ji et al. (2020) used the method of combining AHP and FCM to analyze the dynamic evolution of Internet financial risks from four aspects: Internet technical risk, financial business risk, legal risk and operational risk.[2]

#### **3.1 Internet financial security risks**

The carrier of Internet finance must be the Internet, and the openness of the network makes the information generated in the process of Internet financial business transactions easy to be stolen, such as the security risks of online payment. People in the process of network payment, it is easy to be attacked by some criminals, they use a variety of fraud means and Trojan program to steal the network expenditure transaction data information, so that the property security of both sides of the transaction is threatened. For users, once their property suffers losses, they will inevitably reduce their trust in Internet finance, which is not conducive to the development of Internet finance. Zhongming Tan et al. (2020) demonstrated this conclusion through the spillover effect of spatial measurement, and indicated that Internet finance has strong spatial autocorrelation, significant positive spatial effect of financial risk and incomplete positive intermediation effect of interest rate.[3] Runjie Xu et al. (2020) constructed a network of Internet financial risk systems and analyzed the systemic risks of Internet finance from a systematic perspective. It is concluded that in the Internet financial network, the main object of financial risk contagion is the point around the center of the whole system.[4]

#### **3.2 Credit risk of Internet finance**

Credit risks of Internet finance are mainly manifested in two aspects: financial institutions and customers. For financial institutions, traditional financial institutions are authorized and can enhance their credit through effective supervision, while the emergence of Internet financial institutions has greater credibility risks. The virtual nature of the Internet makes all kinds of information on the Internet is likely to be false, the characteristic of many unscrupulous agencies that use the Internet to concoct all sorts of false information, said he is an authority, can provide large loans, deal with all kinds of business, the network commitment, verbal commitment is easy to attract people that are in urgent need of money, cheat their money. For customers, when they apply for financial services from financial institutions, many customers often make some false information to cheat the trust of

financial institutions, which affects the turnover of bank funds and is not conducive to the development of banking financial services. Jiameng Liu (2020) combined credit theory, information asymmetry theory, risk measurement theory and agency theory to analyze the current situation and problems of credit risk of a company's P2P, and specifically analyzed the factors affecting borrowers' credit risk. Moreover, factor analysis and logistic regression were used to conduct quantitative research on the information of borrowers disclosed by the company, so as to build an econometric model to predict the default probability of borrowers in online loan transactions.[5] ChengHua Geng (2020) through the analysis of Internet financial common credit risk measurement methods at home and abroad, found the logistic regression model to accord with the Internet of our country a better financial situation, and established in accordance with our country Internet financial risk measurement model, through the analysis of the company's profit ability, debt paying ability, growth ability, operation ability and corporate governance factors to predict the Internet financial credit risk of the company.[6] Waseem Ahmed Abbasi et al. (2019) built an Internet supply chain finance model based on the concept of supply chain finance and its credit risk and the hierarchical structure of the Internet of Things, and established a credit risk assessment model using support vector machine algorithm and Logistic regression, which is conducive to the modification and improvement of the existing credit assessment system.[7]

### **3.3 Legal risks**

As a new thing, Internet finance needs to rely on sound laws to provide guarantee for its development. But for now, China's Internet financial related laws and regulations is not perfect, Internet financial institutions legislation is not yet complete, also because of the imperfect, imperfect of the law and make the Internet financial face bigger risks, many criminals take advantage of the loopholes in the law, and use the Internet to fraud, which hinder the healthy development of the Internet financial. Peiyao Xiong (2019) analyzed and pointed out the necessity of the regulation of the criminal law of Internet finance, elaborated on the prudence of the regulation of the criminal law of Internet finance, and emphasized the need to strengthen the administrative supervision in a fair and rational way.[8]

## **4. Internet financial risk management strategy**

Yi Tang (2020) set up the Internet consumer finance from the microscopic view and the link between the theory, through the case analysis method to analyze the risk of the consumer finance companies and coping strategies, and using the comparative analysis and statistical analysis method, provides a method to cope with the Internet consumer finance risk and control scheme and Angle of the industry and enterprise enlightenment.[9] Wenyu He (2020) according to the theory of financial risk, using the fuzzy analytic hierarchy process (AHP) for technical risk, credit risk, legal and reputation risk, operation risk, industry risk and market risk index of six class, 18 second index has carried on the risk assessment, and give the Internet a sound financial credit system and regulating the behavior of the Internet financial law specific strategies to guard against risks.[10]

### **4.1 Improve laws and regulations related to Internet finance**

The development of Internet finance cannot be separated from laws. Sound and perfect laws and regulations can create a healthy environment for the development of Internet finance and effectively reduce the occurrence of risks of Internet finance. Therefore, in the process of developing Internet finance, it is necessary to combine the development of Internet finance in China, constantly improve relevant laws and regulations of Internet finance in the process of practice and strengthen the supervision of Internet finance based on laws. Those illegal ACTS will be severely cracked down and punished, so as to bring Internet finance on the right track and promote the healthy development of Internet finance. Yue Le (2020) by studying the governments financial risk regulation strategy of the Internet, with an emphasis on the United States, Britain and France, comes to the conclusion that our country can through the establishment of a sound financial risk supervision of legal system, perfect the supervision evaluation system, enhance supervision

coordination mechanism and the government strengthen macro-control to strengthen our country financial supervision of the Internet.[11]

#### **4.2 Strengthen the training of Internet financial management personnel**

The quality of Internet financial risk management is directly related to the professional quality and business ability of Internet financial management personnel. In order to improve the level of Internet financial risk management and reduce the occurrence of Internet financial risks, it is necessary to strengthen the training of Internet financial risk management personnel. For Internet financial management personnel, the ability training should be continuously strengthened to improve the professional ability of those engaged in Internet financial business; At the same time, quality education should be strengthened to improve their professional quality, so as to cultivate a team with strong business ability and high professional quality for Internet financial risk management. In addition, excellent personnel can be arranged to study abroad to learn advanced foreign experience and technology, so as to improve China's Internet financial risk management level. Shengdong Mu et al. (2019), by analyzing the driving force and role of interest rate on Internet finance, constructed 9 evaluation indexes for professionals of Internet finance in the form of questionnaire survey to identify interest rate risk, and analyzed the core indexes influencing the measurement of interest rate risk of Internet finance. Based on the machine learning algorithm.[12] Xiaomeng Ma (2019) compared the performance analysis of the credit risk prediction model with the Logistic prediction algorithm by using the MLIA algorithm and the weighted sum method of decomposition of the objective function into several basis functions, and concluded that the prediction effect of machine learning on the MLIA financial credit risk prediction was better.[13]

#### **4.3 Improve the risk management system**

In order to better reduce the risks of Internet finance, we must do a good job in risk management and constantly improve the risk management system of Internet finance. First of all, the Internet financial risk management work should be put on the agenda, a sound risk management system should be established, and the Internet financial risk management work should be carried out comprehensively. Second, we should have a comprehensive understanding of the market and the Internet financial environment, do a good job in risk assessment, and establish an effective risk assessment mechanism to reduce the risks of Internet financial funds. In addition, modern management means should be used to do a good job in the management of Internet finance and reduce the occurrence of risks in Internet finance. Liyi Ma (2020) uses type I error rate to determine the optimal model and constructs the risk warning model of P2P lending platform. It is concluded that the index of registered capital, the change of business scope and the platform background have great influence on the accuracy of P2P risk prediction, and the decision tree model is more accurate than the support vector machine model and the naive Bayesian model.[14] Yonggang Ma and Xiaomei Wang (2020) analyzed the basic situation of a P2P company, the company organization chart, company operation mode and the company's risk management, and according to the current situation of the development of P2P industry in our country, puts forward a P2P industry should have compliance rules and regulations, promoting the construction of credit system and speed up the system, adhere to the principle of small scattered and strengthen microfinance four Suggestions of risk control.[15] Jingyi Zhao (2020) based on financial risk evaluation index system and the integrated use of big data and model, puts forward to comprehensive Internet financial legal system construction as the macro security, targeted to carry out financial risk "after-sales service", and establish the risk early warning, analysis, prevention and resolution mechanism, cooperate to standardize the order of the Internet financial markets at the same time, as the risk prevention to provide the corresponding guarantee financial risk can better deal with the Internet.[16]

### **5. Case study of Internet Risk management**

In 2013, Zhongshuan.com, the most short-lived P2P lending company in the history, declared bankruptcy because a project was launched only one month ago. It failed to timely find that the

mortgage property of a financing project of about 3 million yuan had been mortgage to many people at the same time, causing huge losses. Many online lending platforms do not have financial licenses and are registered in the names of "consulting companies" and "network information service companies". The government and relevant departments should improve the supervision policies and system of Internet finance and the credit system of online lending companies or platforms.

In America, P2P industry Lending Club was forced to close down in 2008 because it failed to meet the compliance requirements. Half a year later, after modification, it met the requirements and continued to handle business for customers. This incident is due to the strict requirements of the regulatory authorities, the threshold of P2P network lending company will be raised, strict control of P2P companies at all stages of the process and timely follow up business changes. The business restart of Lending Club is also inseparable from the internal platform risk control and supervision, and the company's active adjustment and compliance of the management system.

Through the analysis of loss cases related to Internet finance at home and abroad, what they have in common is the lack of sound and perfect risk management mechanism and system. We need to improve and implement the management mechanism of Internet finance to improve the benefits brought by Internet finance.

## 6. Conclusion

At present, various forms of Internet finance involve risk management, but they involve different fields of Internet risk management. As to platform for Internet financial products and payment types the Internet financial products, their reputation risks are mainly concentrated in the platform of management and operation, such as account security. For loan product, risk management is the core of the core, concrete embodiment in the risk management level affects the company/income, risk management level of the platform itself is the company/platform focus from the traditional financial operation mode, directly determining the future product development potential, and risk management level affects the company/platform brand image, whether these will no doubt for the users choose to use such products have a significant impact. The reason why we want to study the risk management of Internet finance industry is that risk management is the core competitiveness of Internet finance.

To sum up, in the process of developing Internet finance, risk management of Internet finance is of great importance and must be attached great importance to. Based on the Internet and Internet technology Internet finance, facing the risk of network security risk, reputation risk and legal risk, therefore, in practice, we should be targeted, to improve people's understanding of the Internet financial risks, to perfect the relevant laws and regulations, to further implement the real-name system, so as to build a healthy for the development of the Internet financial environment and promote the development of Internet financial stability.

Through the above literatures, it is found that the current research on Internet finance risks is focusing on Internet finance risk models and theoretical suggestions, but the implementation of Internet finance risk management is relatively slow. Many literatures lay emphasis on theoretical research and are seldom used to guide practical business scenarios. Not only that, we need to do more practical exploration on the risks of Internet finance. Alibaba, Tencent, JD and other Internet finance leading enterprises have layout in Internet finance risk management, risk control and other aspects. They constantly iterate the risk control algorithm, model and related data products, etc. The accuracy and efficiency of the algorithm are greatly improved than before, reaching the international leading level.

## References

- [1] Xuan Zhang. (2016). Case study of P2P operation model of American Prosper (Master's thesis, Liaoning University).
- [2] Xiaodong Ji, Ye Xue & Chongyi Xue. (2020). Analysis of the dynamic evolution of Internet financial risks under blockchain technology-based on the AHP-FCM model. Enterprise Economy

(06), 38-44. doi:10.13529/j.cnki.enterprise.economy.2020.06.005.

[3] Zhongming Tan, Qian Liu & Jie Li. (2020). Will Internet Finance Accelerate the Accumulation of Regional Financial Risks?—Based on the Research of Spatial Spillover Effects. *Finance and Economics* (04), 51-59. doi: 10.19622/j.cnki.cn36-1005/f.2020.04.007.

[4] Runjie Xu, Chuanmin Mi, Rafał Mierzwiak & Runyu Meng. (2020). Complex network construction of Internet finance risk. *Physica A: Statistical Mechanics and its Applications*.

[5] Jiameng Liu. (2020). Research on the Internet Financial Credit Risk of A Company Based on P2P Network Lending Platform (Master's thesis, Xi'an Shiyou University) <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFDTEMP&filename=1020061024.nh>

[6] Chenghua Geng. (2020). Research on the Credit Risk of Internet Finance Companies Based on Principal Component Analysis (Master's thesis, Shandong University). <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFDTEMP&filename=1020067020.nh>

[7] Waseem Ahmed Abbasi, Zongrun Wang, Yanju Zhou & Shahzad Hassan.(2019). Research on measurement of supply chain finance credit risk based on Internet of Things. *International Journal of Distributed Sensor Networks* (9).

[8] Peiyao Xiong. (2019). On the "two-sidedness" of criminal laws and regulations on Internet finance. *New West* (03), 85-86.

[9] Yi Tang. (2020). Research on Risk Control of Internet Consumer Finance in my country (Master's thesis, Jiangxi Normal University). <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFDTEMP&filename=1020638475.nh>

[10] Wenyu He. (2020). Internet finance risk identification and preventive countermeasures-based on fuzzy analytic hierarchy process. *Journal of Heihe University* (06), 54-56.

[11] Yue Li. (2020). Government supervision of Internet financial risks (Master's thesis, Shandong Normal University). <https://kns.cnki.net/KCMS/detail/detail.aspx?dbname=CMFDTEMP&filename=1020029017.nh>

[12] Shengdong Mu & Zhengxian Xiong.(2019).Internet financial interest rate risk measure based on genetic rough set reduction. *Service Oriented Computing and Applications*(4).

[13] Xiaomeng Ma & Shuliang Lv.(2019).Financial credit risk prediction in internet finance driven by machine learning. *Neural Computing and Applications*(12).

[14] Liyi Ma, Yane Wang, Chengmei Ren, Hui Li & Yingxia Li.(2020). Early Warning for Internet Finance Industry Risk: An Empirical Investigation of the P2P Companies in the Coastal Regions of China. *Journal of Coastal Research*(sp1).

[15] Yonggang Ma & Xiaomei Wang. (2020). A Brief Talk on Internet Financial Risks—Analysis and Research on the Current Situation of Risk Management of a P2P Company. *Modern Business* (21), 74-75. doi:10.14097/j.cnki.5392/2020.21.030.

[16] Jingyi Zhao. (2020). Internet finance financial risks and prevention and control. *Taxation and Economics* (04), 57-62.