Research on Innovation Mechanism of Network Loan Clustering Based on CAS Theory

Xu Rongzhen[1,a] ， Wang Meiqi[2,b,*] and He Mengke[3,c]

[1] Tianjin University of Science and Technology, China

[2] Tianjin University of Science and Technology, China

[3] Tianjin University of Science and Technology, China

[a]xurzh@tust.edu.cn, [b]Maggie9372@163.com, [c]1164199652@qq.com

*Corresponding author

Abstract. Small scale and large number of online loan companies provide new channels for financing of small and micro enterprises from the perspective of cost and risk. However, China's online loan industry has been in a state of loose and disorderly, with frequent problems. This paper discusses the current dilemma facing the net lending industry, explore the network clustering development model, which is based on the perspective of complex adaptive system for network clustering innovation loan pattern, and discussed with the *CAS* theory net credit cluster characteristics, in order to make the main body form a coordinated and orderly, efficient operation of the market operation mechanism. This paper holds that it is of great practical significance to gather into a sharable information resource and a network loan cluster system with a perfect social credit information system, and to build an operation mechanism suitable for the clustering of China's network loan market. Finally, relevant policy suggestions are put forward for realizing small but not weak, flexible and convenient financing needs of small and micro enterprises.

1. Introduction

With the rise of the concept of *mass entrepreneurship and innovation*, the innovation and entrepreneurship of the general public has become a new engine to support regional economic development. Small and micro businesses play a leading role in the development of innovation and entrepreneurship. However, small and micro businesses are generally weak in risk resistance, and the traditional large financial institutions that occupy a dominant position are prone to abandon high-risk small and micro customers. However, the existence of online lending creates a good operating environment and favorable conditions for small and micro businesses. However, due to the lack of supervision and the particularity of the institutional environment, China's online loan companies have been in a loose and disorderly state due to their small size and large number. How to give play to the advantages of online loan industry and realize the small but not weak of online loan companies has become a difficult problem of supervision at present.

In recent years, the rapid development of Internet lending and the various problems caused by it have attracted wide attention from all walks of life, and scholars have conducted in-depth research on it from three perspectives.(1) From the perspective of the causes of online lending risks, Lee[1], Ding Jie[2]believe that information asymmetry is the key cause of online lending risks.(2) From the perspective of risk management and control, first, Li Peng[3]and Li Xin[4]analyze the existing risks in China's online loan industry and identify the influencing factors of online loan risks. Second, Song Lin [5]concentrated on the study of risk control and comprehensive evaluation of the business operation platform of China's online loan companies.(3) From the perspective of supervision, Chang Zhen Fang[5]and Fang Fang[7]proposed the supervision ideas for the risks involved in the development of P2P online lending and promoted the innovation of financial supervision in China.

It is not difficult to find from the above research on network loan risks and supervision that most of the scholars are independent online loan companies as the research subject, but the literature on risk control and supervision oriented research from the perspective of the whole industry is relatively rare, and the current situation of the weak risk control ability of online loan companies due to their large number, small scale and poor coordination is still not solved. In order to respond to the *double creation* to form a multi-participatory, efficient coordination of work ideas, which requires the participation of multiple subjects in the online loan industry, so as to become the internal motive power engine for the development of the online loan industry, which is conducive to stimulating the power and vitality of the online loan market. Therefore, in this context, this paper mainly relies on the *CAS* theory to analyze the characteristics of the cluster innovation mode of network lending, so that all the subjects can form a market operation mechanism of coordinated, orderly and efficient operation, and give play to the Internet financial advantages of network lending.

2. Analysis of the plight of online loan industry

China's online lending industry presents the current situation of large quantity, small scale and scattered distribution. It has the advantages of flexible operation, low investment threshold and good liquidity.However, due to the limitations of scale, the industry information of China's online lending companies is isolated and non-shared,and it also has the disadvantages of poor cooperation between online lending companies, serious information asymmetry and weak risk control ability. If the small and loose net loan companies merge into a single monopoly compony, although has the advantage of unified management system, convenient and effective supervision, and high information transparency, but net borrowing main body is a small micro enterprise loan industry, considering the asymmetry of benefits and costs, merging online loan companies into a single monopoly company will make them face disadvantages of high transaction costs, low income, low efficiency and risk concentration.

Therefore, how to regulate and maintain the vitality of online loan companies and realize their small but not weak, large but not rigid, flexible and stable to meet the demand of small and micro credit has become a dilemma.

3. Cluster innovation model of online loan

Enhanced network industry loan risk control ability, improve the trade efficiency, reduce transaction costs, need to be mature large data technology and professional credit rating as the support, need to network industry as a whole loan risk control and supervision, across regions in the whole information space online integrated cross-industry, form a long-term mechanism of the orderly development of net credit market in China.

Therefore, this article puts forward the *PGP (peer to group to peer)* network credit cluster is optimized to upgrade the existing net lending industry, is based on the network industry loan predicament, adapt to the complex Internet financial background, under the concept of "double gen" policy advocacy, implemented by various main body participation, mainly includes: the cluster platform company, net lending, regulators, and both borrowers and lenders. At the same time, in order to realize network clustering quality improvement and brand innovation, also must have the advanced technology of big data company, credit rating companies and funds strong guarantee company jointly build up mutual cooperation, mutual benefit and win-win results between different subjects to spatial cluster, it features with the *CAS* theory has a very good fit, its main body framework is shown in *Fig.1*.
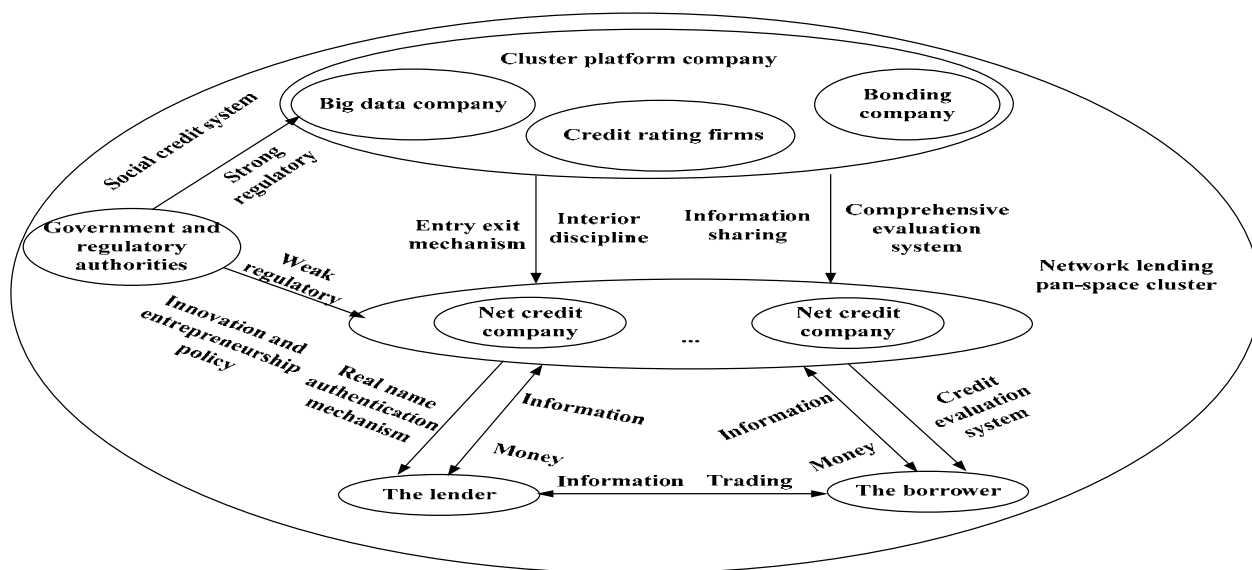
Fig. 1. The main architecture of the network loan cluster

4. Analysis of characteristics of network loan clusters based on CAS theory

The theory of complex adaptive system was first proposed by John Holland in 1994, and its core concept is *adaptive causes complexity*. The subjects in complex systems can quickly learn and adapt to the surrounding environment through the active and non-linear interaction of certain rules, providing a new perspective and theoretical support for the study of the development mechanism of complex systems.

4.1 Multi-subjectivity

The *CAS* theory indicates that to become a complex adaptive system, it needs to have multiple subjects and elements. The network loan cluster presents the situation of multiple subjects coexisting. In cluster mode duties as shown in *Fig.1*: (1)The subjects to the cluster company from the overall control of the network company operating condition, which focus on credit, brand management, establish a unified, standard within the cluster of self-discipline organization and the professional credit evaluation system. (2) Each online loan company shall timely and comprehensively disclose transaction information and business status and other relevant information to the cluster platform company. (3) The government and regulatory departments should actively respond to the innovation and entrepreneurship strategies, establish sound supporting policies, implement the legal status of online loan clusters, and strengthen supervision. (4) Investors pay attention to the reliable appreciation of assets, strengthen their risk education, improve their financial professional quality, and reduce the risk caused by adverse selection.(5) Financing personnel pay attention to project planning and implementation, and provide online loan companies with as comprehensive and effective credit information as possible. All the subjects conduct transactions, supervision, resource sharing and other behaviors under the clustering mode, which reveals the dynamic and integrated nature of the innovation mode of network loan cluster and highlights multi-subjectivity.

4.2 Environmental complexity

The orderly development of the innovation system of network loan clustering is inseparable from a good and stable external environment. Good financial ecological environment including the healthy and orderly macro economic environment, the perfect legal laws and regulations environment, innovation of social and cultural environment, is the foundation of network cluster pattern orderly development loan, provides the network business credit industry development space, and promote the generated randomly over time, uncertainty, dynamic change, the dynamic and uncertainty increased the complexity of the cluster innovation network credit model.

4.3 Active adaptability

Each subject in the network loan cluster has certain activity, which can be well reflected in the interaction between each subject and various environmental factors in the network loan industry, the exchange of information resources between each subject and the transaction of network loan business. At the same time, due to the complexity of the clustering environment of network loan, the main body of network loan cluster adjusts its behavior according to the change of environment by active learning and feedback, so as to make the operation mechanism and service of network loan adapt to the current economic environment.

4.4 Emergence

Emergence refers to the mutation in performance and structure of a complex system as a result of learning and adapting to changes in the environment. The process of the network loan cluster is not a simple cluster of the main bodies, but a collaborative cluster structure system established on the basis of common development. The interaction between the main bodies will promote the occurrence of competition and cooperation, and make the network loan service produce a qualitative leap and improvement.The emergent characteristics are absent in the initial construction of network loan cluster, and most obvious when the cluster is mature and stable. At present, few scholars study the development of network lending from the perspective of clustering, which is still in the preliminary formation stage and lacks of emergence.

5. Cluster operation mechanism of network loan based on CAS theory

Based on the complex adaptability of the network loan cluster, the operation mechanism is analyzed and explored from the perspectives of power, risk control and supervision, so that the subjects can adapt to each other, learn actively and develop harmoniously in the network loan cluster.

5.1 Dynamic mechanism

Dynamic mechanism refers to that all participators of the network loan cluster has the motivation to promote economic transformation and upgrading.By coordinating the interaction rules among the participants and improving the interactive environment to enhance the comprehensive competitive strength of the subjects. Under the guidance of policies, the dynamic mechanism of online loan clusters is to form a cluster structure system of mutual cooperation established by each online loan company based on its core business, so as to form a constraint and incentive effect driven by the goal of consistent interests and shared risks, and promote mutual learning and cooperation between subjects. The higher the cooperation degree of the subjects in the cluster, the more it can promote the innovation and development of the subjects in the cluster, alleviate the failure of two-layer entrusted agent in China's network loan, and form an effective principal-agent chain.

5.2 Risk control mechanism

Risk control mechanism refers to that risk managers of network loan clusters adopt various measures and methods to reduce the risk of network loan clusters under the complex system, which is the inevitable choice for the standard development of network loan clusters. In the cluster mode, the risk control system is constructed by big data resources and professional risk control technology : The government and regulatory departments formulate relevant laws and regulations to supervise the subjects in the cluster comprehensively and timely, so as to provide a good institutional environment for the online loan industry to control risks. The cluster platform company macroscopically controls the operation status of various online loan companies, establishes default database, discloses problematic online loan companies and customers, and establishes a unified professional credit rating system and a standardized online loan company operation system, so as to realize internal self-discipline of the cluster and maintain market order.

5.3 Supervision mechanism

The supervision mechanism refers to the complete and effective legal and policy support provided by the government and the supervision department under the complex system, which is an important means to guarantee the orderly operation of the market. In order to give play to the unique advantages of cluster mode, the government and regulatory departments should provide policy support and guidance, actively promote leading enterprises to play a leading role. At the same time, it is necessary to actively respond to the innovation and entrepreneurship strategies, establish sound supporting policies, implement the legal status of the network loan cluster, strengthen the supervision of all subjects in the cluster, establish an entry and exit mechanism in line with the clustering, implement the real-name system principle of both parties, and promote the healthy and orderly development of online loan clusters.

6. Conclusions and policy recommendations

Starting from *CAS* theory, this paper analyzes the complex adaptability of online loan cluster, expounds the network credit cluster has the adaptability of subjectivity, the complexity of environment, the more active and characteristics, and then discusses the net credit cluster complex system operating mechanism, risk control mechanism and supervision mechanism. Through the above research, in order to form the coordinated, orderly and efficient operation mechanism of the operation mechanism of the network loan cluster, and finally realize the financing needs of small, flexible and convenient network loan companies to meet the financing needs of small and micro enterprises, the following policy recommendations are put forward:

6.1 Cultivate the competitiveness and professional quality of online loan clusters

First, use cluster advantage to introduce each professional talent. In order to ensure the healthy development of the cluster, professionals from various industries are needed, including professionals in the financial industry, so as to provide professional financial knowledge and accomplishment for the subjects in the cluster. Professional talents in the Internet industry provide professional big data support technology to maintain the normal operation of online lending platforms; Professional talents in the legal industry, making relevant laws and regulations on cluster operation.

Second, establish the sense of sharing the abundant resources of the cluster. The subject in the cluster should cultivate the ability of autonomous learning and establish the consciousness of resource sharing. The development of small scale and immature model of network loan companies should learn from the network loan companies with strong comprehensive strength within the cluster, realize efficient knowledge transfer, establish the cluster knowledge network structure, improve the consciousness of innovation and entrepreneurship of each subject, and strengthen the overall competitiveness of the cluster.

6.2 Establish the risk management and control system of network loan under the cluster mode

First, establish an information sharing platform within the cluster. The *CAS* theory indicates that the role of agents in the network loan cluster and the flow of resources are complex. As the only intermediary who masters the information of both parties in the transaction, the network loan company is the most capable and most appropriate intermediary agency that should provide information matching and information confirmation services to both parties. Within the cluster company is responsible for the cluster network credit evaluation and disclosure of corporate information, realize the trade openness and completeness, and set up the cluster internal public information sharing platform.

Second, establish a complete social credit system. The Internet financial become indispensable credit trading mode, the traditional banking sector is also in the introduction of the Internet technology actively, intention to achieve comprehensive development. Network with the traditional banking credit cluster only build up bonds of cooperation and share the information resources, to

achieve a win-win situation. Cluster platform, therefore, the company should be coordinated the government, Banks, financial institutions, credit reporting agencies and other relevant departments, the use of big data technology effectively to collect data from different sources, build the information sharing mechanism, establish a cluster internal body connected to the social credit system, to solve the social credit system is imperfect and the disadvantages of limited data source, contribute to the overall effective development of net lending industry.

6.3 Formulate policies, regulations and supervision policies for network loan clusters

First, recognize the legal status of the network loan cluster. The government and regulatory authorities measure the comprehensive competitiveness and satisfaction of online loan companies from the perspective of cluster, excluding the specification is not stable platform, make network main body internal credit cluster of barriers to entry, clear the main body role, functions and responsibilities, clear its business boundaries. At the same time, it recognizes the legal status of the network loan cluster, promotes its connection with the traditional credit investigation system in China, clarifies the role of information intermediary of the network loan companies in the cluster, and supervises and promotes the unified management and deposit of funds with commercial banks.

Second, supporting government support policies. The government's restraint and supervision on the industry of online lending will inevitably affect the clustering development of online lending. It is necessary to put forward supporting policies to promote its mature development. The government and regulatory departments actively respond to innovation and entrepreneurship strategies, establish sound supporting policies, promote the effective connection between China's online loan industry and traditional financial industry. Establish a complete information disclosure mechanism, establish corresponding supervision and incentive system for the information sharing platform in the cluster, supervise all subjects in the cluster to share information comprehensively and timely, and realize the maximum transparency of information.

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