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Research on Financial Risk Transmission and Prevention of Fission Innovation Enterprises Empowered by Big Data - Taking Taobao Ecosystem as an Example

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Abstract: To explore the financial risk transmission mechanism and effective prevention paths of fission innovation enterprises under the empowerment of big data, this study takes Taobao Ecosystem as the research sample, aiming to fill the research gap in the integration of big data, fission innovation and enterprise financial risk management. Adopting the research methods of literature review, case analysis and system dynamics, this study first combs the relevant theories of big data empowerment, fission innovation and financial risk transmission, then identifies the key elements and transmission paths of financial risks in Taobao Ecosystem's fission innovation process, constructs a risk transmission model based on big data empowerment, and finally analyzes the formation mechanism of various risks. The results show that big data empowerment has a dual impact on the financial risk transmission of fission innovation enterprises; the core nodes of risk transmission in Taobao Ecosystem include platform enterprises, settled merchants and upstream and downstream partners, and the transmission path presents a network diffusion characteristic. This study clarifies the key control points of financial risk transmission, and puts forward targeted prevention and control strategies, which provides a reference for fission innovation enterprises to use big data to optimize financial risk management.

Keywords: Big Data Empowerment; Fission Innovation; Financial Risk Transmission; Taobao Ecosystem

1. Introduction

1.1 Research Background and Significance

Digital economy has promoted the deep integration of big data technology and enterprise innovation activities, and fission innovation has become a core growth driver for platform ecosystems to expand scale and enhance competitiveness. Fission innovation relies on low-cost and rapid iterative expansion based on internal resources of the ecosystem, forming a multi-level business network with interactive connections. The Taobao Ecosystem, as a typical representative of China's e-commerce platform ecosystems, has gradually formed a complex network involving platform operators, settled merchants, upstream and downstream supply chain partners, and service providers through continuous fission innovation. Such expansion model while stimulating vitality also amplifies financial risk correlation among various subjects. The e-commerce industry is facing the characteristics of coexisting high growth and high risks. The average customer acquisition cost in the industry has continued to rise, and the profit margin gap between head enterprises and small and medium-sized merchants has expanded significantly. Head platforms maintain a gross profit margin of more than 20% relying on scale effects, while the net profit margin of small and medium-sized merchants is generally less than 3% due to cost pressure. At the same time, policy supervision in the digital economy field is becoming stricter. Antitrust and data security regulations have increased the compliance costs of platform ecosystems, and financial risk transmission paths have become more complex. Big data, as a core empowering tool, can improve the efficiency of risk identification but may also accelerate cross-subject risk diffusion through data links.

This research has important theoretical and practical significance. Theoretically, it enriches the research system of financial risk management in the context of digital economy,

and clarifies the internal mechanism of big data empowering fission innovation and affecting financial risk transmission. Practically, it identifies key risk points and transmission paths in the Taobao Ecosystem, and puts forward targeted prevention and control strategies to provide reference for fission innovation enterprises in the ecosystem to optimize financial risk management. It also helps regulatory authorities understand the risk characteristics of platform ecosystems and maintain the stable development of the e-commerce industry.

1.2 Review of Domestic and Foreign Research Status

Foreign research on big data empowerment and financial risk management focuses on technical application and model construction. Scholars use machine learning algorithms to construct multi-dimensional early warning models based on financial and non-financial data, verifying that big data-driven models have higher accuracy in risk identification than traditional models. Research on fission innovation mainly focuses on business model iteration, emphasizing its advantages in rapid market expansion and cost control, but less attention is paid to the correlation between fission expansion and financial risk transmission.

Domestic research has gradually deepened the integration of big data and enterprise financial management. Relevant studies point out that data-driven risk management can effectively improve the timeliness of early warning, but most of them focus on single enterprise risk analysis and lack research on risk transmission in the ecosystem. Research on fission innovation in the e-commerce field mainly discusses business models such as "chain movement 2+1", and holds that the high dependence on incentive mechanisms will lead to cash flow instability. However, there is a lack of systematic analysis on how big data empowerment affects the financial risk transmission of fission innovation enterprises in the ecosystem.

Existing studies have laid a theoretical foundation for this research, but there are obvious gaps. First, most studies focus on single enterprise risk management and ignore the network characteristics of risk transmission in the ecosystem. Second, the dual impact of big data empowerment on financial risk transmission has not been fully explored. Third, case studies on typical e-commerce ecosystems are insufficient, and the particularity of financial risk transmission in fission innovation has not been deeply analyzed. This research fills the above gaps by taking the Taobao Ecosystem as the research object.

1.3 Research Content and Methods

This research takes fission innovation enterprises in the Taobao Ecosystem as the research object, and focuses on exploring the financial risk transmission mechanism and prevention and control paths under big data empowerment. The research content mainly includes four parts: first, defining core concepts and constructing a theoretical support system based on relevant theories; second, identifying the elements and paths of financial risk transmission of fission innovation enterprises empowered by big data; third, analyzing the current situation and causes of financial risk transmission in the Taobao Ecosystem through case studies; fourth, putting forward enterprise-level and ecosystem-level financial risk prevention and control strategies.

Three research methods are adopted in this research. The literature review method is used to sort out relevant theories and research results of big data empowerment, fission innovation and financial risk transmission, laying a theoretical foundation for the research. The case study method takes the Taobao Ecosystem as a sample, collects financial indicators and operational data of relevant subjects, and analyzes the characteristics of risk transmission. The system dynamics method is used to construct a financial risk transmission model, identify key variables affecting risk diffusion, and simulate the transmission process of different types of risks.

1.4 Research Innovations and Limitations

The innovations of this research are reflected in two aspects. First, the research perspective is innovative. It breaks through the limitation of single enterprise research and explores financial risk transmission from the ecosystem perspective, focusing on the network diffusion characteristics of risks among multiple subjects in fission innovation. Second, the research content is innovative. It systematically analyzes the dual impact of big data empowerment on financial risk transmission, clarifies the interaction mechanism between big data technology and risk transmission elements, and enriches the research on financial risk management in the

digital economy era.

This research also has certain limitations. On the one hand, the research sample is limited to the Taobao Ecosystem, and the research conclusions may not be fully applicable to other types of fission innovation ecosystems. On the other hand, the risk transmission model constructed based on system dynamics does not consider extreme external impact factors, and the simulation results need to be further verified by more empirical data. Future research can expand the sample scope and optimize the model to improve the universality of the conclusions.

2. Relevant Theoretical Basis

2.1 Definition of Core Concepts

Big data empowerment refers to the process of integrating multi-source heterogeneous data through data collection, processing and analysis technologies, optimizing resource allocation, decision-making efficiency and operational capabilities of enterprises, and providing support for business innovation and risk management. It is characterized by real-time, comprehensiveness and predictability, and can break the information asymmetry in the process of enterprise operation.

Fission innovation refers to the innovative model in which the parent body in the ecosystem derives new business entities or business formats through internal resource allocation and organizational iteration, and realizes scale expansion at low cost. Different from incremental innovation, it has the characteristics of rapid iteration, network diffusion and resource sharing, and is widely used in e-commerce platform ecosystems.

Financial risk transmission refers to the process in which financial risks spread among different subjects, links or regions through specific carriers, leading to the expansion of risk scope and the intensification of risk impact. In the ecosystem, it shows the characteristics of multi-path, multi-node and interactive diffusion, and the risk of a single subject may trigger systemic risks.

The Taobao Ecosystem is a complex network system centered on Taobao platform, including platform operators, settled merchants, upstream suppliers, downstream logistics enterprises, financial service providers and consumers. It forms a collaborative operation mechanism through data links and business cooperation, and realizes value creation and scale expansion through continuous fission innovation.

2.2 Theoretical Support System

The stakeholder theory provides a theoretical basis for analyzing multi-subject risk transmission in the ecosystem. Stakeholders in the Taobao Ecosystem include platform enterprises, merchants, suppliers and other subjects with mutual interests. The financial risk of any subject will affect the interests of other stakeholders through the business chain and capital chain, which determines the network characteristics of financial risk transmission.

The risk management theory provides a framework for the research on risk transmission and prevention. This theory holds that risk management includes risk identification, risk assessment, risk control and other links. Combined with big data technology, it can optimize each link of risk management, improve the accuracy of risk identification and the effectiveness of control measures, and provide a systematic framework for the research on financial risk prevention and control of fission innovation enterprises.

The technology empowerment theory clarifies the mechanism of big data affecting financial risk transmission. This theory points out that digital technology can change the operation mode and resource allocation efficiency of enterprises. Big data empowerment can not only improve the ability of enterprises to identify and control risks, but also may accelerate the spread of risks through data sharing, forming a dual impact on financial risk transmission.

3. Financial Risk Transmission Mechanism of Fission Innovation Enterprises Empowered by Big Data

3.1 Identification of Financial Risk Transmission Elements

Financial risk transmission of fission innovation enterprises empowered by big data is composed of three core elements: subject, object and carrier. The identification of these elements is the basis for analyzing the transmission mechanism. Subject elements are the main bearers and transmitters of financial risks in the ecosystem. Platform enterprises occupy a core position and their financial risks can be transmitted to a large number of settled merchants through settlement systems and service agreements. Small and medium-sized

merchants have weak risk resistance and their operational risks may spread to upstream suppliers through payment defaults. Object elements show mutual conversion characteristics. For example, operational risks caused by inventory backlogs can be converted into liquidity risks through capital occupation. Carrier elements are the bridges of risk transmission, and data flow under big data empowerment has become a new core carrier, accelerating the cross-subject spread of risks through real-time data sharing.

3.2 Analysis of Financial Risk Transmission Paths

Under the empowerment of big data, the financial risk transmission paths of fission innovation enterprises in the ecosystem can be divided into direct transmission paths and indirect transmission paths. The intensity of risk transmission varies among different paths, showing obvious differences in the scope and speed of impact. Direct transmission paths mainly include capital flow transmission and data flow transmission. Capital flow transmission is realized through capital transactions such as settlement, payment and financing among subjects. Platform enterprises' adjustment of settlement cycles will directly affect the cash flow of merchants, leading to the spread of liquidity risks. Data flow transmission is a unique path under big data empowerment. The sharing of financial data, operational data and user data among subjects makes risk information spread in real time. A single merchant's operational risk can be quickly identified by the platform through data analysis, but it may also trigger risk warnings of related merchants, leading to the expansion of risk impact.

Indirect transmission paths mainly include supply chain transmission and market spillover transmission. Supply chain transmission refers to the spread of risks along the upstream and downstream of the supply chain. For example, upstream suppliers' production delays will lead to inventory shortages of merchants, affecting sales revenue and triggering operational risks. Market spillover transmission refers to the spread of risks through market expectations and competitive relationships. Negative events of some fission innovation enterprises will affect consumer confidence in the entire ecosystem, leading to reduced transaction volume and spreading market risks to other subjects. The boxplot shows that the intensity of direct transmission paths is significantly higher than that of indirect paths, and data flow transmission has the strongest risk transmission capacity.

4. Case Analysis of Taobao Ecosystem

4.1 Overview of Taobao Ecosystem and Characteristics of Fission Innovation

The Taobao Ecosystem has formed a complete industrial chain covering commodity sales, logistics distribution, financial services, and technical support after long-term development. The ecosystem takes Taobao and Tmall platforms as the core, with millions of settled merchants, tens of thousands of upstream suppliers and downstream logistics enterprises, forming a huge network of interests. The total transaction volume of the ecosystem maintains a steady growth, and the business scope covers various categories such as daily necessities, 3C products, and fresh food.

The fission innovation of the Taobao Ecosystem shows three obvious characteristics. First, business format fission. On the basis of the original C2C model, it has successively fissioned B2C, live e-commerce, flash sales and other business formats. The GMV of live e-commerce in the ecosystem accounts for an increasing proportion, becoming an important growth point. Second, organizational fission. The ecosystem has derived independent business departments and affiliated platforms, forming a collaborative operation pattern of multiple platforms. Third, service fission. It has expanded from commodity sales to financial services, logistics services, and digital marketing services, forming a one-stop service system for merchants.

Big data technology provides strong support for the fission innovation of the ecosystem. The platform uses big data to analyze user preferences and consumption behaviors, helping merchants carry out precise marketing and product innovation. At the same time, it builds a data sharing platform for upstream and downstream enterprises, optimizing supply chain management and improving operational efficiency. However, the rapid fission of the ecosystem also makes the correlation of financial risks among various subjects stronger, and the difficulty of risk management increases.

4.2 Current Situation of Financial Risk

Transmission in Taobao Ecosystem

The financial risk transmission in the Taobao Ecosystem shows a networked diffusion trend, and different types of risks interact and spread among multiple subjects. The data in the table is obtained through sorting out and analyzing the financial statements and operational reports of relevant subjects.

The accounts receivable turnover days and inventory turnover days of small and medium-sized merchants are significantly higher than those of head merchants, indicating that their capital turnover capacity is weak and operational risks are high. The financial risk of small and medium-sized merchants is easily transmitted to upstream suppliers through payment defaults, and to the platform through settlement delays. Platform enterprises have relatively stable financial indicators, but they still face the risk of being affected by the collective risks of merchants. Logistics enterprises have high asset-liability ratio, and their operational risks may spread to merchants through logistics cost fluctuations.

4.3 Analysis of Causes of Risk Transmission Problems

The causes of financial risk transmission problems in the Taobao Ecosystem are complex, involving internal management defects of the ecosystem and external environmental impacts. From the internal perspective, the first is the imperfection of the ecosystem governance mechanism. The platform's supervision of merchants' financial status is not in place, and there is a lack of effective risk early warning and interception mechanisms. The information sharing among subjects is not sufficient, leading to information asymmetry and increasing the difficulty of risk identification. The second is the imbalance of resource allocation in the ecosystem. Head merchants occupy a large number of traffic and resource advantages, while small and medium-sized merchants face excessive competition pressure, and their profit space is compressed, leading to the accumulation of financial risks.

From the external perspective, the first is the intensification of market competition. The e-commerce industry has entered the stock competition stage, and homogeneous competition has triggered price wars, which have significantly compressed the profit space of merchants. The continuous rise of customer acquisition costs has increased the operational pressure of merchants, especially small and medium-sized merchants, and accelerated the formation and transmission of financial risks. The second is the tightening of policy supervision. Antitrust and data security policies have increased the compliance costs of platform enterprises. The adjustment of tax policies has affected the profit model of merchants, and the increase of compliance pressure has led to the deterioration of the financial situation of some enterprises, triggering risk transmission.

In addition, the dual impact of big data empowerment also exacerbates the problem of risk transmission. On the one hand, the insufficient application of big data technology by some small and medium-sized merchants leads to backward risk identification and management capabilities. On the other hand, the real-time sharing of data in the ecosystem accelerates the cross-subject spread of risks. A single merchant's financial risk can be quickly transmitted to other related subjects through the data platform, leading to the expansion of risk scope.

5. Financial Risk Prevention and Control Strategies for Fission Innovation Enterprises Empowered by Big Data

5.1 Enterprise-Level Prevention and Control Measures

Platform enterprises should strengthen the construction of big data risk early warning systems, integrate multi-source data such as merchants' financial status, operational data and credit records, and use machine learning algorithms to construct risk early warning models. The models should focus on key indicators such as asset-liability ratio, cash flow and inventory turnover, and issue early warning signals in a timely manner when risks exceed the threshold. At the same time, platform enterprises should optimize the settlement system and credit management mechanism, set differentiated settlement cycles and credit limits according to merchants' risk levels, and reduce the risk of capital default.

Settled merchants should improve their own financial management capabilities and strengthen the application of big data technology in risk management. Head merchants should optimize their capital structure, control asset-liability ratio within a reasonable range, and

avoid excessive dependence on short-term financing. They should also strengthen supply chain management, use big data to predict market demand, optimize inventory levels, and reduce operational risks caused by inventory backlogs. Small and medium-sized merchants should focus on improving capital turnover capacity, strengthen accounts receivable management, and use big data tools to carry out precise marketing to reduce customer acquisition costs and improve profitability.

Upstream and downstream enterprises in the supply chain should strengthen data collaboration with platforms and merchants, build a shared risk management platform, and realize real-time monitoring and early warning of supply chain risks. Logistics enterprises should optimize their asset structure, improve operational efficiency, and use big data to optimize logistics routes and inventory allocation, reducing operational risks and cost pressure. Financial service providers should innovate financial products and services, provide customized financing and risk management solutions for fission innovation enterprises, and help enterprises improve their anti-risk capabilities.

5.2 Ecosystem-Level Collaborative Prevention and Control Mechanism

It is necessary to construct a collaborative risk prevention and control mechanism led by the platform and participated by multiple subjects. The platform should take the lead in establishing an ecosystem risk management alliance, formulating unified risk management standards and norms, and coordinating the risk prevention and control work of various subjects. The alliance should establish a risk sharing mechanism, clarify the risk liability of each subject, and avoid the spread of risks caused by the collapse of a single subject.

Strengthen the construction of the data sharing and security mechanism. On the premise of complying with data security regulations, establish a standardized data sharing platform to realize the safe and orderly sharing of financial data, operational data and risk information among subjects. Improve data security protection capabilities, strengthen the supervision of data collection, processing and sharing, and prevent data leakage and abuse. The platform should establish a data audit mechanism to ensure the authenticity and accuracy of shared data, providing a reliable basis for risk identification and management.

Establish an industry self-regulation and external supervision coordination mechanism. The ecosystem should actively cooperate with regulatory authorities, accept policy supervision, and standardize operational behaviors. At the same time, establish an industry self-regulation organization, formulate self-regulation rules, and strengthen the of enterprises' behaviors. Strengthen the communication and cooperation between the ecosystem and industry associations, research institutions and other organizations, share risk management experience and technology, and jointly improve the level of risk prevention and control of the entire industry.

6. Conclusion

This research takes the Taobao Ecosystem as the research object, explores the financial risk transmission mechanism and prevention and control paths of fission innovation enterprises under big data empowerment, and draws the following core conclusions. Big data empowerment has a dual impact on the financial risk transmission of fission innovation enterprises. It can improve the efficiency of risk identification and management, but also accelerate the cross-subject spread of risks through data sharing, making the risk transmission show networked diffusion characteristics.

The financial risk transmission of fission innovation enterprises in the ecosystem is composed of subject, object and carrier elements. The core subjects include platform enterprises, settled merchants and upstream and downstream partners. The risk transmission paths are divided into direct paths and indirect paths, among which the data flow direct path has the strongest transmission intensity. The financial risk transmission in the Taobao Ecosystem is affected by internal governance defects and external environmental impacts. Small and medium-sized merchants face the most prominent risk pressure, and the risk correlation among various subjects is strong.

To effectively control financial risks, it is necessary to adopt a combination of enterprise-level measures and ecosystem-level mechanisms. Enterprise-level measures focus on strengthening big data risk early warning, optimizing financial management and improving operational efficiency. Ecosystem-level

mechanisms focus on building collaborative risk prevention and control alliances, improving data sharing platforms and strengthening industry self-regulation. The research conclusions provide a reference for fission innovation enterprises in the e-commerce ecosystem to optimize financial risk management and promote the stable development of the digital economy.

Future research can expand the research scope, select multiple different types of fission innovation ecosystems for comparative analysis, and improve the universality of the conclusions. At the same time, we can further optimize the risk transmission model, introduce extreme external impact factors, and carry out more in-depth empirical research to provide more comprehensive and effective risk prevention and control suggestions for fission innovation enterprises.

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