Research on the Innovation Path of Big Data + Business Finance Integration in Chinese Economy

Wenjun Gan

Xiangtan University, Xiangtan, 411100, Hunan, China

Keywords: Digital economy, Big data, Business finance integration, Innovation path

Abstract: With the rapid progress of new technologies such as big data technology, the digital economy is on the rise globally. Although China is currently the second largest economy, its traditional economic growth method has gradually peaked, and the transformation of digital economy is imminent. Chinese enterprises should accelerate the implementation of “big data + business financial integration” management model innovation, in line with the economic transformation, improve enterprise efficiency. However, at this stage, the degree of “big data + business finance integration” in Chinese enterprises is relatively low, mainly due to three major limitations from the introduction, personnel and technology. To address this, this paper proposes an innovative practice path of “top-level design guarantee - organizational function improvement - intelligent big data system construction”, which starts from three aspects: government, technology and enterprises, and aims to support Chinese enterprises' “big data + industry and finance integration” comprehensively. The program is designed to support Chinese enterprises in the construction of “big data + financial integration” pattern.

1. Introduction

With the accelerated transformation and upgrading of China's economy, the trend of digitalization has become the core of the new economic development, and data and information are subsequently transformed into important production factors. As the most dynamic part of the microeconomic body, Chinese enterprises are facing the development requirements of digitalization and informatization. The business finance integration is a new financial management model of modernization and informatization that emerges from this background. Combined with big data technology, business finance convergence will be able to make the information of enterprise economic activities accessible, stored, analyzed and assisted in decision making through the proliferation and penetration of finance functions, and finally achieve the goal of value-added in the digital economy through the integration of business and finance processes. By studying the application of big data technology in business-finance integration and combining the investigation and analysis of the current situation of business-finance integration in Chinese enterprises, this paper proposes the practical innovation path of business-finance integration, which is “top-level design guarantee - organizational function improvement - intelligent big data system construction”.

2. Big Data + Business Finance Integration Related Concepts

2.1 China's Economic Background and the Development Trend of the “New Economy”

After more than 40 years of reform and opening up, China's economy has surged forward with remarkable achievements. China is already the second largest economy in the world, the top manufacturing country, the top trading country in goods and the top foreign exchange reserve country. However, in recent years, China's economic growth has slowed down and seems to be starting to enter a bottleneck. With the economic model of relying on cheap labor and high inputs of production materials peaking in the past, the transformation of China's economy is imminent, and a “new economy” is urgently needed to support the transition of the traditional economy to high-quality development[1].

The “new economy” with Chinese characteristics has the following seven basic features:

knowledge-based, innovative, green, shared, open, digital and personalized, among which the digital economy is the core[1]. General Secretary Xi Jinping proposed to grasp the development trend and laws of the digital economy and promote the healthy development of China's digital economy, which is enough to see its importance[2].The digital economy widely applies digital technology, generates data and information elements, and further gives rise to new industries, products and business models[1]. Therefore, as the basic cell of China's economy, traditional enterprises must change their development mode and accelerate digital transformation and upgrading in line with the background of the industrial economy moving towards the digital economy.

2.2 Big Data Technology

The 21st century is the era of great development of data and information. The increasing maturity of Internet technology has further given rise to new industries and products of all kinds under the Internet. The emergence of e-commerce, intelligent manufacturing, Internet finance, social networking, online education, social media, etc. has given a new look to traditional industries through the full use of Internet technology. At the same time, these new products of the Internet era are also generating data like crazy, and all kinds of data are rapidly expanding and getting bigger. Data is information, and information is the most valuable resource in the business market. For the huge amount of data, it needs enough advanced means to extract and analyze it, and draw effective information from it to help make decisions and create value, so big data technology was born.

Big data technology adopts distributed architecture, relying on the distributed processing of cloud computing, distributed database and cloud storage, and virtualization technology to perform distributed data mining on massive data. Briefly, in the business world, the use of big data is the use of common software and hardware to obtain, store and eventually analyze the application of “data collection”.

2.3 The Concept of Business Finance Integration

As an original proposition in the Chinese accounting community, business-financial integration is not very mature at present, and there are three major types of understanding of its substance in general: one is value creation theory, and a representative view is that “business must create and realize value” as proposed by Xie Zhihua (2021)[3], that is, “business “is the business of the enterprise, while “finance” is understood as the value created by the enterprise, and “business-financial integration” means that all business activities of the enterprise must be able to create value. The second is the theory of information integration, which is also the common understanding in the current business practice, that is, business information and financial information must be unified management, so as to achieve the integration between business and finance. The representative view of this theory is “business-finance integration is an information system” proposed by Tang, Gu-Liang and Xia, Yi-Fei (2018)[4] who believe that the finance department is not directly involved in business activities, but through this management accounting information system, it provides information for managers and employees in all aspects and parts of the enterprise to make decisions based on. The third is the organizational integration theory, which is the integration of the finance department and the business department in terms of behavioral purposes and processes. According to Wang Bin (2018)[5], “business operations pull financial development, and financial development supports business operations”, as the organization operation and value creation process is divided into business operations and organization management, financial management is the core of the organization management system, and business financial integration is a natural attribute and inevitable requirement of the organization.

In this paper, after fully understanding the above three views and combining the development requirements of enterprise digital transformation, we believe that business-financial integration is not the independence of one of the above, but the proliferation and penetration of financial functions, so that the information of enterprise economic activities can be accessed and processed in a timely manner, which essentially requires the integration of business processes and financial processes to serve the creation of enterprise value. In other words, business finance integration is

based on organizational integration, information integration as the means, and value creation as the goal.

3. The Development Status of "Big Data + Business Finance Integration" in China

3.1 Description of Current Status

In the current practice, enterprises apply big data technology to achieve business financial integration management to an uneven extent. Some of the enterprises with better economic benefits and larger scale have already explored the relevant areas. Baoshun Science and Technology[6] innovates the division of authority and responsibility through the amoeba business model and establishes a shared data center combined with big data technology to finally realize the integration management of the whole process of business finance; Fuzhou Great Northern Agriculture[7] implements the financial dynamic management of the whole process of operation through data sharing and implements the enterprise's "sales-oriented, customer-centered, high-quality core and low-consumption standard The company's business strategy goal is "sales-oriented, customer-centered, high-quality, and low-consumption". On March 1, 2018, at a press conference of the State Council Information Office, Zhang Mao, director of the State Administration for Industry and Commerce, pointed out that there are 17.83 million legal entities of small and micro enterprises in China, accounting for 99.8% of all legal entities of large-scale enterprises, and that small and micro enterprises have become the main force of Chinese enterprises. However, MSMEs generally have a low level of informationization and a serious disconnection between business activities and financial processes, etc. The results of a questionnaire survey on MSMEs in Chengdu in 2021 showed[8] that over 90% of MSME managers make business decisions based on experience rather than corporate data analysis, and over 80% of MSME managers find it difficult to obtain decision support information from financial reports. Information; about 85% of MSMEs have been punished by tax authorities for compliance issues, most of these enterprises have not purchased ERP systems, and their accounting computerization work is mainly done by free or pirated software.

This shows that the current level of digital business-financial integration of Chinese enterprises is uneven and the overall quality is poor. Although some large enterprises have the foresight to use big data technology to realize the strategy of "business finance integration", on the whole, the breadth, depth, and degree of adaptation of large enterprises' practice to their own are relatively insufficient, and there is still room for improvement. The level of small and micro enterprises is generally lower and the problem is serious.

3.2 Cause Analysis

The deployment of "big data + business and financial integration" is a long-term investment, although its preliminary practice is difficult, risk factors and high cost, but once enterprises find the appropriate digital business and financial integration, will achieve a high degree of integration of enterprise business flow, financial flow and information flow, to build a business line as the core, financial means, decision-making This is extremely important for risk avoidance, orderly operation and monitoring of the external environment of enterprises in the digital economy. However, the realization of "big data + business financial integration" requires not only the care and cultivation of management with strategic vision, but also sufficient material foundation, broad information channels, advanced technical means and high-quality cross-border talents are necessary. The current situation of enterprises in establishing, improving and refining "big data + business financial integration" is not ideal, more or less due to the absence and inadequacy of some of the above factors. Specifically, the reasons for hindrance can be categorized as the following three according to the different levels of work deployment.

3.2.1 Introduction of Restrictions: Cost and Risk "Double High"

First, the deployment of business financial integration requires huge upfront costs (organizational reform costs, adaptation costs, R&D costs, human resource costs, system operation costs, etc.), and even under the assumption of continuous business operation and profitability, it will take decades or more to recoup the huge upfront investment. However, the average lifespan of Chinese companies in the Fortune 500 list published in 2016 was only 33.37 years, a large gap with both the United States (84.64 years) and Japan (76.25 years). The most competitive Chinese companies are still "short-lived", so it is conceivable that the overall life expectancy of Chinese companies will be even shorter, with the average life expectancy of micro and small enterprises being only 3 years by 2021. This "short life" phenomenon will make the deployment of "big data + business financial integration" may not be able to recover the benefits generated during the survival period, and the risk of future revenue is greater. And for micro and small enterprises, in addition to the high cost, there is also the problem of lack of cash flow. Micro and small enterprises, especially technology-based enterprises, which are widely promoted in the new economy, have negative net income in the early stage, and the information and data they can provide are not detailed and specific enough to reflect the potential future economic benefits; financial institutions are reluctant to lend for their growth prospects and risks, which ultimately makes it difficult to finance micro and small enterprises. The vicious circle of "lack of funds to build business and financial integration - unable to achieve effective and comprehensive information supply - financial institutions are afraid to lend - more lack of construction funds" is generated.

Secondly, because of the lack of unified and standardized reference for the paradigm of using big data technology to build business finance integration, Chinese enterprises need to design by industry or even by enterprise; and there are differences in the maturity of big data technology in different enterprises, so it is like crossing the river by feeling the stones for enterprises. Once the implementation path is improper, the huge investment will be wasted and even cause negative impact on the stability of the organization structure.

3.2.2 People Constraints: Process Identity and Financial Escalation.

In terms of human resources, the implementation of "Big Data + Business Finance Integration" is also hindered by the following two problems.First, the focus of this management mechanism is to build a converged finance that can truly serve the business process, i.e., the arrangement of finance work should be oriented to the links and chains of business activities, and set and match them in sequence. Therefore, clear business lines within the enterprise, interlocking business points on the business line, and clear separation of authority and responsibility of business personnel are the necessary foundation for achieving business-financial integration. However, at present, many Chinese enterprises have a vague logic of value creation; low management efficiency, separation, fragmentation and even fragmentation of each business, single-minded and one-sided understanding of business personnel, and insufficient cooperation; and rarely define the ratio of authority and responsibility for their own work from the strategic level, and clarify the role of their own work for the overall operation of the enterprise. These will lead to the actual implementation of business and financial integration of many obstacles, the management is difficult to delineate the value of the business chain, the boundary of each business point in the business chain, business personnel for the work of unclear positioning may lead to short-term management chaos; if the enterprise lacks sufficient confidence and financial support, internal grievances, low morale will force enterprises to give up the exploration of business and financial integration, have to return to the traditional business way.In addition, the quality of financial personnel will also face great challenges. So far, most of the enterprise finance is still stuck in the basic computer stage, the finance staff only according to the enterprise accounting standards, in manual or semi-automatic way to complete the "certificate, accounts, tables" of traditional accounting work. The financial function integrated into the business process has put forward new requirements for corporate finance, which needs to break away from the previous trend of accounting scenario-oriented, and make real-time records and accounting according to different business scenarios; at a deeper level, it also requires corporate finance to break away from the accounting function and transform to value creation, outputting

decision-aid information through data linkage interpretation. This requires the financial staff of the enterprise to fully understand the business logic based on the skilled use of big data technology to obtain and analyze data and output processed indicators, ratios and other data information according to the requirements of decision-making, which can be used to help business departments to evaluate performance and product forecasting. At present, the number of professionals in finance positions in enterprises is insufficient, and the shortage of high-level personnel makes it difficult to meet this requirement.

3.2.3 Technical Limitations: the Lack of Big Data Technology Use

The lack of big data technology is also a major problem in the implementation of "big data + business financial integration". On the one hand, this mechanism requires the financial and information systems of enterprises to record and store business data in real time, which means that software and hardware that can quickly capture the data generated in various parts of the business line are needed as support; on the other hand, enterprises are also required to analyze their own situation through the analysis and interpretation of internal and external data, so after capturing the data, they also need to be able to personalize and intelligently process the above data according to their business management needs. For the above data to be personalized and intelligent processing system. In general, a data integration and intelligent analysis system that supports data sharing and can assist enterprises to quickly collect, personalize and finally output structured information is needed. A system that can achieve this function has not yet appeared.

4. The Innovation Path of "Big Data + Business Finance Integration" Proposed

To effectively promote the management mode of "big data + business finance integration", enterprises should do a good job of controlling risks, and then be able to skillfully apply big data technology to firmly grasp the internal and external trends of enterprises, realize the whole process of internal production and operation of enterprise finance and close monitoring of external stakeholders, and finally make decision information output. In the light of the current situation and hindering factors discussed in the previous section, we propose a systematic solution of "top-level design guarantee - organizational function improvement - intelligent big data system construction". This solution combines the macro environment, enterprise and technical support, and is of great practical significance for enterprises to promote the deepening and innovation of "big data + business finance integration" in the current Chinese economy.

4.1 Top-Level Design Guarantee: Government-Led Financial Support and Risk Control

To solve the two major obstacles of financial constraints and construction risks of "Big Data + business financial integration", it depends on the encouragement and support from the government, other market players and relevant departments. The construction of the management pattern of "big data + business finance integration" will have a huge external effect on the healthy, sustainable and stable development of the whole commodity market, capital market and even the national economy. However, the construction cost is high, the practice is difficult and may bring large operational risks, so we need to rely on all parties, especially the government departments for financial support and risk management assistance.

4.1.1 Financial Support

To provide enterprises with certain financial support to help overcome the high threshold of "big data + business financial integration" system deployment, we need to rely on financial subsidies under the policies and regulations of government departments. First, from a resource-based viewpoint[9], the direct subsidies given by the government to enterprises through policies and regulations for "big data + business financial integration" innovation will reduce the economic losses that enterprises may need to bear due to failure and indirectly give them confidence and motivation to build; in addition, from a signaling theory, enterprises receive In addition, from the signal theory, the "big data + business financial integration" construction subsidies received by

enterprises can weaken the information asymmetry between enterprises and market investors about innovation projects, and convey to the market the information that the innovation direction of enterprises is consistent with the policy guidance, and the innovation effect is guaranteed by government supervision, which is a favorable signal that will ease the financing constraints of enterprises and help enterprises to obtain innovation investment from external market for innovation investment. In general, government subsidies will directly supplement the economic costs of enterprises and indirectly relax their financing constraints, increasing the feasibility of external financing. Through the injection of funds from the government and the society, it will have a positive impact on the construction of "big data + business finance integration" from the financial aspect.

4.1.2 Risk Management

At present, in introducing and deepening the "Big Data + business financial integration" system, due to the lack of benchmark models and practical guidance, there is an operational risk in the practice of "Big Data + business financial integration". This risk will lead to operational risk of the whole enterprise, and in some important areas, it will also lead to risk contagion of the industrial chain. Therefore, reasonable and reliable means are needed to control and avoid this risk. Government departments can encourage cooperation among enterprises, universities, scientific research units, research institutions, etc., widely mobilize various resources such as human, material and financial resources, encourage "industry-university-research" cooperation, and let enterprises conduct "big data + business-financial integration" under the guidance and assistance of expert teams. "The early construction exploration and personalized system design. This cooperation mode not only enables enterprises to quickly get on the right track at the early stage of "big data + business financial integration" practice, but also allows them to adapt to changes in business processes and management model innovation at a later stage, and continuously explore and change customized "big data + business financial integration" mechanisms. "Even if the enterprise system eventually fails to adapt to the "big data + business financial integration" management model and the reform fails, it can still design a relatively mild and gradual exit mechanism under the advice of the expert team to buffer the shock that may be caused to the enterprise as a whole or the industrial chain. The government's encouragement of the industry-academia-research cooperation model and the intervention of the expert team will effectively control the risks that may occur in the process of building "big data + business-financial integration".

4.2 Organizational Function Improvement: Enterprise-Oriented Business Process Re-Engineering and Financial Function Innovation

4.2.1 Business Process Reengineering

The organizational prerequisite for conducting business finance integration is the separation of business lines within the enterprise and the interlocking of business points on each business line. In order to achieve this goal, a business process reengineering (BPR) process must be carried out. The core of BPR is to set up the organizational structure of the enterprise for business process-oriented reorganization; that is, to clarify the logic of value creation, build the main business chain of the enterprise and start business management in this way. For example, in the traditional manufacturing industry, the core value creation process is divided into raw material procurement, product production and product sales. Unlike the traditional functional division organization, the manufacturing enterprise under BPR will mainly set up raw material procurement line, product production line and product sales line. For example, the product sales line will be divided into "accepting orders - preparing sales orders - approving credit sales - supplying goods according to sales orders - shipping goods according to sales orders - recording sales (or processing and recording sales returns and discounts)", so as to realize the value-added business of the enterprise. Standardized management with a core line of activity. For different industries and even different enterprises, the division of business process lines and business links may vary due to the differences in value creation methods, and enterprises should conduct personalized business process

reengineering according to their business characteristics and value-added logic.

4.2.2 Financial Function Innovation

First of all, after the enterprise has carried out a clear business process line and the division of each link on the line, it is necessary to embed the finance work in each link of each line. In order to achieve the integration of business flow, financial flow and information flow, finance should not be overly independent and departmentalized, but should be integrated into each business line and each business link, so as to ensure the integrity, authenticity and real time of information capture and recording. In addition, financial personnel should be able to skillfully use the data platform built under the big data system, and with the help of this platform, financial and non-financial information in business activities should be collected, stored and analyzed in a timely manner, so as to finally realize the transformation from accounting-based to value-creating, and play a practical role in the implementation of risk control, cost control, operation performance management and decision support.

4.3 Intelligent Big Data System Construction: "Extended Erp" Big Data System on the Cloud

In order to realize "big data + business financial integration" management in the digital economy, a data integration and intelligent analysis system that supports external (upstream and downstream) data collection and internal data sharing, and can organize and categorize the above internal and external data, personalize processing and finally output structured information is essential. Combined with the trend of "cloud" transformation in various industries in the digital economy, building a cloud-based ERP system, extending to SRM and CRM, will be one of the most responsive to the development of the times. First of all, the cloud big data system has the characteristics of flexibility, versatility and lightness, based on the cloud service providers deployed in the cloud server side of the system, enterprises can access the Internet cloud server through PC, tablet PCs, smart phones and other terminal devices, access to application services. This model, on the one hand, will be the enterprise in the "big data + business financial integration" construction process may encounter technical barriers and R & D costs through a professional, market-oriented way to solve; on the other hand, the cloud service providers can always improve the deployment of the system according to changes in business and management needs of enterprises, accurate, real-time to Meet the individual management requirements of enterprises. Second, this system combines traditional ERP management with SRM and CRM management, in which ERP focuses on internal material changes, while SRM and CRM focus on external core stakeholders - the movement of suppliers and customers. Through this cloud system built with big data, it can widely collect and master the information inside and outside the enterprise, unite its own materials and upstream and downstream departments for intelligent calculation and analysis, organically and linkage interpret and report the performance situation, external opportunities, market trends and other information hidden in the data, and assist the enterprise's historical performance evaluation, production and operation arrangement, budget management setting, R&D direction and investment project selection The company can also make decisions such as the direction of R&D and investment projects.

Combined with the above three points, in order to realize "big data + business financial integration" management, enterprises first need sufficient government financial support and scientific risk control, so that "big data + business financial integration" can enter the enterprise; after that, in internal management, enterprises After that, in terms of internal management, enterprises should reconstruct a logical business value creation chain and embed financial functions to realize the unification of information flow, financial flow and business flow within the enterprise, and construct an appropriate organizational structure for the implementation of "big data + business financial integration"; and the "extended ERP "Big data platform" can not only serve the internal resource management and financial embedding of enterprises, but also make analysis by collecting data from suppliers and customers, uniting internal and external information of enterprises, and

finally realize the output of value information, so that the ultimate “Big data + business financial integration” management is The ultimate purpose of “data creating value” can be implemented.

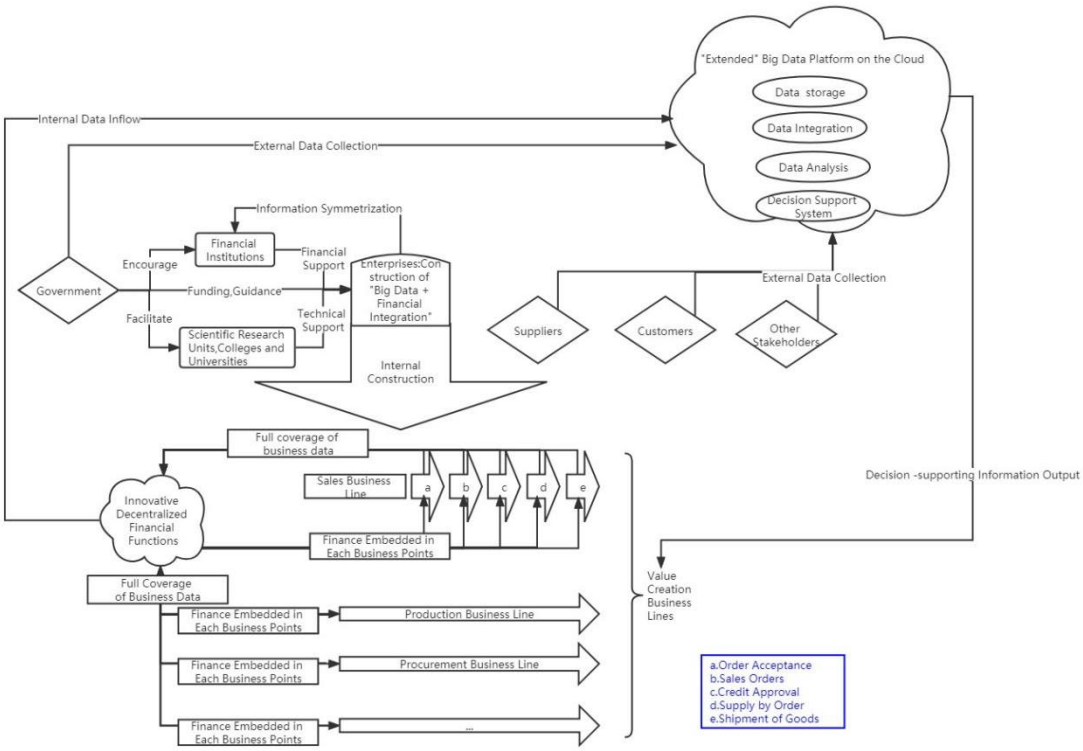

Fig.1 The legend of the big data + business financial integration” pattern.

5. Conclusion

The pattern of “Big Data + Business Finance Integration” for Chinese enterprises is shown in Fig.1. It requires not only process reengineering and financial innovation from the enterprises themselves, but more importantly, financial risk guarantee from the government and technical “extended ERP” data system construction. The program focuses on the combination of external environment - internal transformation - technical support of the three dimensions of the linkage, together to serve the digital economy of Chinese enterprises “big data + business financial integration” pattern construction. The government, enterprises, technology units and even the whole society should keep cooperating and trending to overcome the obstacles that appear in the construction path of “Big Data + Business Finance Integration” for the transformation and development of China's digital economy.

References

[1] Ren Baoping,He Miao. The dilemma of high-quality development of China's new economy and its path selection[J]. Journal of Northwestern University (Philosophy and Social Science Edition),2020,50(1):40-48.

[2] Thirty-fourth collective study of the Political Bureau of the CPC Central Committee (2021-10-19) [2021-12-17].

[3] Xie Zhihua,Gao Yan,Yang Longfei. Business finance integration under new technology conditions[J]. Finance and Accounting,2021,16:9-14.

[4] Tang Guliang, Xia Yifei. The theoretical framework and practical elements of “business finance integration” in enterprises[J]. Finance Research,2018, 2:3-9.

[5] Wang B. On business finance integration[J]. Finance Research,2018, 3:3-9.

[6] Zhu An-Lun,Ma Yong. Baoshun Technology: Exploration of business finance integration under “Amoeba + Big Data”[J]. Finance and Accounting,2019(7):20-22.

[7] Liu Xiaoxuan,Zheng Xiuying. The practice of financial dynamic management of Fuzhou Dabei Nong under big data[J]. Finance and Accounting,2016(19):36-38.

[8] Qiu K, Liu L F, Zhang L L. The construction of a shared financial cloud for business-financial integration of micro and small enterprises[J]. Journal of Finance and Accounting,2022(5):38-46.

[9] Yan Ruosen, Chen Jing, Li Hao. Research on the impact of government subsidies on corporate innovation investment based on the mediating effect of financing constraints and corporate risk-taking[J]. Journal of Management,2020,17(8):1188-1198.