Research on Market-oriented Allocation of Scientific and Technological Financial Factors

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Objectives: This paper combs and defines the related concepts of the elements of science and technology finance, and determines the composition of the innovation elements of science and technology finance and the market system of science and technology finance elements based on the correlation and function among the modules such as the goal, subject, object, environment and mode of the allocation of science and technology finance elements. It is proposed that the market-oriented allocation of scientific and technological financial factors includes two steps: one is the factor flow under the ecological environment of scientific and technological financial innovation and regional gravity, and the other is the factor distribution and combination under the market-oriented mechanism. Through the coordination between the government and the market, we have improved the supply and demand mechanism, competition mechanism, price mechanism and feedback mechanism of the market of scientific and technological financial factors, and established the market-oriented allocation mechanism of scientific and technological financial factors. From the aspects of improving the basic guarantee of environmental factors, promoting the free flow of capital factors, improving the efficient supply of labor factors, promoting the strong support of data factors, improving the pricing mechanism of technical factors, and strengthening the risk control system, this paper puts forward some suggestions to improve the market-oriented allocation mechanism of scientific and technological financial factors.

Key words: technology finance; innovative elements; element allocation; market-oriented allocation; configuration mechanism
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INTRODUCTION

The market-oriented allocation of factors is one of the two core points of China's economic system reform. The key role of the market should be fully released in the allocation of resources, and the role of the government should be brought into full play. The construction direction and reform task of the current factor market system aims to allocate resources efficiently, break its flow barriers, and then release the internal vitality of economic development. To reduce the mismatch of factors, we should improve the state of factor market, improve the ability of market self-regulation,

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improve the establishment and development of market mechanism, and strive for the Pareto optimal conditions of factor allocation. As an important link in the transformation of scientific and technological achievements, scientific and technological finance mainly discusses how to reasonably allocate scientific and technological and financial resources in the process of economic development. Since it was put forward in the early 1990s, after more than 20 years of development, China's science and technology finance has initially formed a financial support science and technology innovation system with the joint action of government financial funds, bank credit funds, venture capital, guarantee institutions and multi-level capital market. In the period of rapid development,[1-2] the benefits of the combination of science, technology and finance are generally on the rise, but the increase is not high There are great regional differences.[3-4] The development of science and technology finance depends on the development of science and technology industry and financial industry, which directly affects technological progress and technological innovation. At present, the serious brain drain of high-tech talents, the government's emphasis on capital investment, the low enthusiasm for innovation and investment, the imperfect security system and the system need to be improved still restrict the development of science and technology finance, and the market system and market-oriented allocation mechanism of science and technology finance elements need to be further improved. Therefore, on the basis of clarifying the classification of scientific and technological financial elements, this paper constructs a framework system for the distribution and flow of scientific and technological financial elements under the action of the market, analyzes the market-oriented allocation mechanism of scientific and technological financial elements, discusses the market-oriented allocation mechanism of scientific and technological financial elements, and designs the effective supply path of scientific and technological financial elements in the process of supporting scientific and technological innovation, In order to find the best way to organically combine science and technology and finance, promote their close integration and benign interaction, and promote the overall industrial structure to move forward to the high end.

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RESEARCH ON MARKET-ORIENTED ALLOCATION OF SCIENTIFIC AND TECHNOLOGICAL FINANCIAL FACTORS

In the process of modern economic transformation, both the government and the market play an indispensable role in the allocation of public resources, but they play their respective forces, but they intertwine, collide, promote or hinder each other. The boundary problem between the market and the government has aroused economists' long-term distress and lasting concern. E. Amiri believes that in order to optimize resource allocation, resources must be collected and integrated, and the government should provide effective technical guidance and strict management mechanism to intervene in resource allocation.[5] C. H.K. Lee also proposed that the best candidate for optimizing resource allocation is the government, which can timely and efficiently control the flow of resources through comprehensive information and information.[6] Hsu, Harrison and giffith studied the influencing factors and functions of the market on resource allocation, found that the level and speed of scientific and technological innovation of enterprises are related to the competitive factors in the market, and put forward the role of the market.[7-8] Chinese scholars have found that the role of government investment in scientific and technological innovation has leverage effect and spillover effect,[9-10] spillover effect and crowding out effect.[11] Hong Yinxing proposed that market-oriented allocation plays a key guiding role in the combination of labor, technology, capital and other production factors to achieve cooperative relations.[12] The factor marketization reform has made great progress in the construction of market system, factor participation in distribution and factor price formation, but the factor marketization reform in China is far from complete.[13] Gai Xiaomin and Xie Xianjun found that marketization can significantly promote green total factor productivity. The higher the capital and technical efficiency, the more reasonable the industrial structure can be; China's comprehensive index of market-oriented allocation of factors shows an upward trend, but the degree of market-oriented allocation of factors is uncoordinated with regional development.[14-15]

Chinese scholars have done a lot of research on

the resource allocation of science and technology finance. Through empirical analysis, Zhang Peng, Pang Jinbo and Shen Li found that the efficiency of China's financial resource allocation fluctuated obviously,[16] and the spatial distribution was uneven.[17-18] Zhou Xin, Wang Xianbing and Xu Shiqin analyzed the impact of different factors such as science and technology financial policy, scientific research fund intensity, scientific research fund intensity, [19]industrial fund scale [20]and venture capital on the allocation of science and technology financial resources[21].

Zhang Xuhui, Yang Zhen and Yan Junmei constructed a theoretical model of financial support for scientific and technological innovation based on the two themes of government and market from the perspective of the support and promotion mechanism of scientific and technological finance,[22] coupling mechanism [23]and the construction of regional scientific and technological financial system[24], and discussed the mechanism of the combination of science, technology and finance, and the mechanism of scientific and technological financial resources promoting scientific and technological innovation, It also puts forward suggestions on the mode and path selection of the combination of science and technology and finance. Meng Tian and Li Huajun explored the structural construction of scientific and technological financial innovation and development from the perspectives of system innovation, mechanism innovation, organization innovation and financial tool innovation, and put forward the ideas of scientific and technological financial innovation and development from multiple angles.[25-26]

To sum up, the existing research on the market-oriented allocation of factors mainly focuses on the current situation and shortcomings of allocation, government guidance and market allocation, allocation efficiency and measurement methods, and rarely focuses on the balance between innovation factor supply and allocation from the perspective of factor marketization. As far as the allocation of scientific and technological financial resources is concerned, the research on the development of scientific and technological finance mostly focuses on efficiency evaluation and qualitative analysis. There is no report on the literature to reveal the promoting effect or operating mechanism of scientific and technological Finance on scientific and technological innovation from the perspective of factor Marketization. It is necessary to further study the market-oriented allocation mechanism in the factor market of science and technology finance in different development stages of science and technology finance, seek the optimal mode of science and technology finance factor allocation under government policy guidance and market regulation, and explore the mechanism innovation of relevant elements of science and technology finance in the process of market-oriented allocation.

RELATED CONCEPTS AND ALLOCATION MODES OF MARKET-ORIENTED ALLOCATION OF SCIENTIFIC AND TECHNOLOGICAL FINANCIAL ELEMENTS

Science and technology finance is an innovative activity aiming at science and technology industry. For the composition of innovation elements, most scholars believe that innovation elements include three elements: innovation subject, resources and environment. The three refer to the implementers, participants and promoters of regional innovation including universities and scientific research institutions; Foundations and conditions including capital, information and other elements; Elements of innovation environment including internal and external innovation environment.[27-28]

Through relevant research on innovation elements, Ling Feng and Qi Yong pointed out that it is composed of innovation subjects, resources and environment[29]. Among them, the three refer to innovation related institutions including scientific research institutions and scientific and technological enterprises; Resource allocation objects that promote innovation, including capital and talents; Market, culture and institutional environment supporting innovation. On the basis of summarizing the previous views, combined with the five elements of land, labor, capital, technology and data proposed in the opinions, this paper divides the elements of science and technology finance into three categories: subject elements, resource elements and environmental elements. Among them, the main elements include scientific and technological enterprises, colleges and universities, scientific research institutions, government institutions, financial institutions and

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intermediaries; Resource elements are object elements, which are composed of innovative scientific and technological resources such as labor elements, capital elements, technical elements and data elements; Environmental elements include policy environment, market environment and innovation culture.

In the elements of science and technology finance, the allocation subject and object exist relatively. In China's regional innovation system, the activity of main elements will have a certain impact on the entry and flow form of resource elements, and then occupy the core position in the distribution of resource elements, allocate resource elements in specific forms, and give full play to the innovation efficiency. In the allocation system of scientific and technological financial elements, its allocation subject is the core composition, has a good initiative in the system, can have an important impact on the allocation efficiency of elements, and will play a decisive role in its allocation quantity and use. Under the influence of the allocation mechanism of elements, the allocation subject can allocate, combine and use the allocation object, feed back and improve its allocation mechanism, and fully mobilize the enthusiasm of the allocation subject. The optimal allocation of elements is to improve the allocation of elements, cooperate and cooperate with each other, and then allocate elements efficiently on the premise of fully reflecting the comparative advantages formed by division of labor and cooperation. The elements of scientific and technological finance have the dual characteristics of Finance and scientific and technological innovation, showing distinct characteristics such as liquidity, synergy, strategy, vulnerability and income uncertainty, regionality and spillover.

The combination of the above scientific and technological financial elements provides important financial support for the main body of scientific and technological innovation activities, especially R & D investment activities, and forms the scientific and technological financial element market in the factor trading market. The factor market system of science and technology finance is composed of various factor markets and goods and services, mainly including labor, capital, technology, data and environmental factors. As an important part of the financial factor market, the scientific and technological financial factor market can not only promote the development of industrial scientific and technological innovation, provide quantitative tools and fast channels for financial capital, profit seeking capital to invest in industries and the real economy, but also promote the construction of multi-level capital market, broaden financing channels and improve the proportion of direct financing, It is the supply and circulation system of scientific and technological financial elements. From the perspective of production factors, the market of scientific and technological financial factors includes capital factors, technical factors, labor factors, data factors, environmental factors and so on. In different stages of scientific and technological innovation, the roles of various scientific and technological financial elements are also different.

With the joint action of the government and the market, the government has effectively integrated the innovation elements in the science, technology and financial elements market, promoted the innovation subject to absorb and obtain innovative talents, technology and investment elements, formed a driving force in the innovation work, promoted the flow of knowledge achievements in the overall innovation chain, and continuously improved the innovation system elements, Through scientific distribution and use, we can increase the value of innovation elements, make the growth of some values feedback for other innovation subjects, establish a virtuous cycle, play a good role in promoting the long-term effective supply of innovation elements, and effectively promote the efficient supply of newly developed industrial innovation elements. "Drive" needs to vigorously integrate resource elements from the supply side, accelerate the development of emerging industries in the time dimension, so that "innovation" is no longer limited by the slow process, but becomes an endogenous normal mechanism. The innovation factor supply system divides various structural changes such as technological reform, real-time feedback of policy regulation and control, competition of innovation subjects and factors into the overall framework, and effectively interprets the dynamic process of the innovation driving function of the factor supply system.

ANALYSIS OF MARKET-ORIENTED ALLOCATION MECHANISM OF

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SCIENTIFIC AND TECHNOLOGICAL FINANCIAL FACTORS

Scientific and Technological Financial Innovation Ecological Environment and Factor Flow under Regional Gravity

The uninterrupted driving energy of regional innovation comes from various order parameters in the region, including regional culture, regional strategy, regional competitive advantage and regional management mechanism, and has the "attractor" of innovation action. The subsystems of each regional innovation are gathered in this "attractor" through mutual combination and joint work.[30-31] Regional innovation ecosystem has many characteristics, such as hierarchy, integrity, complexity, stability, dissipation and dynamic balance. It is a system created by the composite organization and environment of technological innovation in a certain spatial region, through the mutual influence and common dependence of innovation material, innovation energy and innovation information flow. Its main content forms a centripetal force by adding income layer by layer to promote the convergence and concentration of economic behavior in the system area. Even under the strong interference of internal and external factors, the innovation ecosystem can maintain the stability of system structure, system state and system behavior through robust control.[32] There is isomorphism between regional innovation system and natural system. The improvement of common knowledge area and interaction intensity among innovation subjects has a positive effect on the realization of innovation activities. The competition and cooperation among innovation subjects have the principle of optimality. The restrictive factors of regional innovation ecosystem are mainly composed of market factors, technical factors and institutional factors, and the scale and goal of innovation subject action are restricted by market scale and market goal; the positive feedback of the market represents the incentive mechanism of the system, and the negative feedback represents the constraint mechanism of the system.[33]

The science and technology financial innovation ecosystem not only includes the subjects such as government, enterprises, universities, scientific research institutes and science and technology intermediaries, but also includes science and technology investment resources, talent resources, condition resources, achievement resources, policy resources and other objects. The scientific and technological financial innovation ecosystem contains self consistent performance, feedback performance and robust performance. Through mutual influence between its subject, object and system environment, it has developed into an ecosystem with local regional characteristics and showing the unique state of technological progress in each region. Under the guidance of the national science and technology strategy, the high-tech parks in the region promote the continuous innovation behavior of innovative enterprises by building high-quality incubation conditions, promote the government, colleges and universities and financial institutions to invest in innovation policies, R & D funds and innovative talents, and attract science, technology and financial intermediaries to provide high-quality personalized services. Under the influence of the Internet, big data and market competition, system innovation subject factors and system innovation object factors have a variety of cross communication and interaction, form synergy, save the cost of exchange, and finally become a complete individual with stable regional innovation function and a certain degree of economic progress, And further produce continuous attraction and influence on the collection of various elements.

The attraction of regional innovation promotes enterprises to gather together, and the demand of innovation subjects represented by high-tech enterprises for scientific and technological financial resources continues to increase, which improves the total demand and resource price of regional scientific and technological financial resources, and attracts the attention of other regional scientific and technological resources. The excessive collection of scientific and technological financial resources in the region will reduce the cost of high-tech enterprises and increase the income of innovation subjects, reduce the total amount of scientific and technological financial resources, and reduce the attraction of the region to some extent. However, each regional gravity is determined by its relative gravity in the country's overall innovation mechanism, which generally changes one after another. In this way, a forced system can be generated on the basis of market-oriented resource allocation: if we want to

increase the relative gravity of the region or ensure the original relative gravity of the region, we should improve the comprehensive supporting software equipment and hardware facilities in the region, and focus on high-quality resources by increasing the factor price, which will increase the innovation cost. With the increasingly fierce competition for high-quality scientific and technological resources among and within regions, the accumulated advantages began to be gradually separated from the low-cost resources. Innovative enterprises focused on improving the total factor production efficiency and net profit, so as to promote the innovative subjects and their regions to make continuous efforts to expand the market and accelerate development. Just like the Matthew effect, the policies proposed by a regional government are affordable and the salary is reasonable. Therefore, before there is a vacancy in the regional science and technology human resources, the personnel who have not yet entered are affected by the personnel who have already entered and are trying to enter. There are corresponding resources entering and leaving in different regions. If one place comes in, another place flows out, showing the gravitational synergy between regions. Each region will compete and chase each other, so the relative gravity between them will change one after another, resulting in the spontaneous flow of factors following the market law.

Factor Distribution and Combination under the Market-oriented Mechanism of Scientific and Technological Resources

Each factor market complements each other,[34] In the process of factor reform, market mechanism plays a key decision-making role in both resource allocation and pricing behavior, and promotes the arbitrary flow of various production related factors such as labor, innovation and capital while supporting each other.[35-36] If the free channel of factor circulation can be opened horizontally in the institutional system, it will be of great benefit to improve the efficiency of resource allocation in the international and domestic markets and the division of labor in the global value chain.[37-38]

Resource allocation is a process in which economic subjects with different resources confirm the ownership of resources and power and exchange resources. The focus of its allocation is power replacement. If the economic subject can use or distribute the factors of production, it means that the subject has the property right of the means of production, and the property right is the core of all transactions. The allocation process of scientific and technological resources is also the process of the confirmation and exchange of the rights of economic subjects. The allocation of rights is the core issue of resource allocation. Market economy is an economy centered on the confirmation and transfer of rights, which is established in the process of continuous confirmation and exchange of power. Property rights give economic subjects the right to use or operate factors of production, and become the starting point of market transactions. The rule system based on property rights can restrict and manage the allocation of resources and enable them to carry out activities within a legal and reasonable scope. Therefore, it is necessary to strengthen the construction of property right system, improve the mode of resource allocation, and innovate and develop the scientific and technological system. Scientific and technological resources should not belong to private ownership, and their value should be shared by the public. However, under the role of history, some scientific and technological resources are attributed to administrative departments, which is unreasonable.

A clear definition and planning of property rights can correctly guide the flow of resources through the change or fluctuation of factor value in the market, maintain the rational utilization efficiency of resources, and analyze the transaction revenue of economic subjects. Because the factor markets complement each other, if one factor market moves too slowly, it will inevitably affect the development of other factor markets and hinder the normal play of market regulation function. The establishment and improvement of the modern property right system has fundamentally laid the realistic foundation for the birth and gradual development of the factor market. The organic coordination between the optimization of resource allocation and the production of social incentive mechanism is an inevitable choice for seeking high-quality development. The legitimate and compliant protection of property rights not only contributes to the steady development of the economy, at the same time, it is also an

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inexhaustible source of strength to ensure high-quality development in a long period of time.

Hayek economics regards the market as a computer full of precision components. It collects and reasonably distributes resources of different levels in all aspects, while taking into account the due interests of resource holders.[39] Science, technology and finance promote innovation subjects to trade and circulate resources, and the regional internal price system is more and more closely related to science, technology and finance. The elements of science and technology finance, such as labor, capital, data and technology, obtain the return of social utilization through a variety of different ways, such as science and technology R & D personnel, financial science and technology investment, venture capital, commercial bank loans, science and technology financial intermediary services, etc. Under the promotion of market competition, scientific and technological innovation has made continuous progress and development, and the new market rules and systems have also promoted the perfect construction of regional scientific and technological innovation system. Under the framework of market rules, innovation subjects can show their skills and give full play to their practical strength. In such an environment, all innovation subjects carry out activities around their own interests without being troubled by political factors. Many aspects can check and balance each other and develop together, which promotes the improvement and establishment of coordination mechanism and adds vitality to regional innovation.

INNOVATION OF MARKET-ORIENTED ALLOCATION MECHANISM OF SCIENTIFIC AND TECHNOLOGICAL FINANCIAL ELEMENTS

The allocation mechanism of scientific and technological financial elements refers to the relationship formed by the combination of different subjects, subjects and objects in the allocation process of scientific and technological financial elements, as well as the relevant institutional and functional arrangements. The allocation mechanism of scientific and technological financial elements plays a decisive rol
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e in all stages and subjects in the process of scientific and technological innovation, as well as the allocation mode of scientific and technological financial elements in various uses and fields. It is an internal resource function and distribution mechanism. The allocation efficiency of scientific and technological financial resources largely depends on the operation of the mechanism. Only when the market as a whole shows the trend of efficient operation, can we prove that all the measures acting on the allocation reform of factor market are correct and effective.[40-41]

Coordination Mechanism for Allocation of Scientific and Technological Financial Elements

The subject status of the government and the market are different in the process of resource allocation. From each link of the scientific and technological innovation route, the allocation of scientific and technological financial elements needs different forms of coordination between the government and the market. "The dynamic role of the government based on the market mechanism" should focus on "a delicate balance between the market and the government."[42] Generally speaking, the scientific and technological innovation route is mainly composed of three links: upstream, midstream and downstream. The upstream link refers to knowledge innovation, the midstream refers to technology incubation and the downstream refers to technology application.

Technological innovation comes from knowledge innovation. In the upstream link, the knowledge innovation stage has obvious policy guidance, and the main body responsible for the allocation of scientific and technological financial elements is the government. Local governments usually formulate science and technology policies and medium and long-term science and technology plans consistent with the overall interests according to the national macro policies and overall planning and in combination with the economic situation of their own region. When formulating policies and plans, the government should clarify the priorities and priorities, control the allocation direction of resources, and transmit supply and demand information based on planning indicators. In order to ensure the smooth implementation of basic research, the government should ensure sufficient capital and resource

investment in the upstream link. At the same time, in the upstream link, the law of market value also plays a very important role and significance. Scientific research institutes and universities must integrate their R & D work into the development frontier of the market, fully follow the law of market value and consider the needs of the market when developing scientific and technological achievements.

The intermediate stage of scientific and technological innovation is the reproduction link of technology. At this stage, knowledge-based innovation has gradually evolved into technological innovation. For a long time, domestic scientific and technological innovation has been divorced from the transformation of market value and achievements, which cannot realize the real transformation of scientific and technological achievements. Therefore, both the government and the market need to pay full attention to the transformation of scientific and technological achievements in the middle reaches in terms of factor allocation. The enterprise is the leader of factor allocation in the incubation stage of the midstream link. Because if the new technology formed by incubation wants to realize the industrial and market value, its commercial value must be determined through enterprises. At the same time, the incubation link of new technologies has a relatively high demand for funds. The market can allocate the elements of science and technology finance through the role of value and the law of supply and demand, and connect the actual needs of enterprises with the research direction of scientific research institutes and colleges and universities, so as to avoid the fault and disconnection between technological innovation and knowledge innovation, and ensure that the incubated new technologies can be applied to the practice of enterprises, And it has good market prospect and commercial value. The government still needs guiding investment in this link to promote the cooperation between enterprises and R&D institutions through financial support for some science and technology projects, so as to accelerate the incubation of new technologies. Due to the lack of mature specialized institutions engaged in venture capital in China, the guiding investment of the government in this link is similar to that of venture capital. At the same time, the government can also configure the labor factors of science and technology finance by establishing intermediary institutions such as science and technology consulting and evaluation institutions, promote the cooperation between enterprises, scientific research institutions and colleges and universities, and then enhance the derivation and Realization of scientific and technological achievements.

In the downstream technology application link, the market value and economic benefit output of scientific and technological achievements research become more intuitive. At this stage, we should give full play to the role of market competition and price mechanism to realize the rational and efficient allocation of scientific and technological financial elements. Through the market, the labor factors and capital factors are guided to the subjects of scientific and technological activities with high economic benefits, so as to promote the virtuous cycle of scientific and technological financial factors. Enterprises become the main body of investment in this link. The government does not need and cannot provide all capital investment, but it is still necessary to intervene. In this link, the government can usually provide support for high-tech enterprises through preferential tax policies to promote and guide the development of high-tech.

Based on the above analysis, scientific and technological innovation is a process that takes knowledge innovation as the starting point and finally creates economic value and benefits through technology incubation and application. In each link and stage of scientific and technological innovation, there are differences in the focus and investment intensity between the market and the government. It is necessary to coordinate the role of the market and the government in combination with the laws of different links and stages, so as to complement their advantages, so as to further realize the effective allocation of scientific and technological financial elements. The key point of establishing the coordination mechanism of market-oriented allocation of scientific and technological financial factors is to clarify the respective roles of the market and the government, and design how to adjust each other in the case of government failure or market failure. Government intervention has a positive regulatory effect on the performance path of organizational heterogeneity cooperative innovation, and it is not always

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effective.[43-44] In many cases, the effect of enterprises' allocation of scientific and technological innovation resources is better than that of the government. The government has an inclusive development boundary for market failure. It should pay attention to the regulatory role of the market and give full play to the autonomy and priority of the market[45].In the process of actually operating the mechanism of science and technology financial market, we need to give full play to the guiding and regulatory role of the government, so as to make the science and technology financial factor market better realize that the market determines and promotes the free flow of factors among departments and enterprises, and improve the total factor productivity of science and technology finance.

Market-oriented Allocation Mechanism of Scientific and Technological Financial Elements

(1) Supply and demand mechanism

The allocation of scientific and technological financial elements will be affected by the change of market supply and demand mechanism. Supply and demand mechanism is the main mechanism of market-oriented allocation of science and technology finance, and the changes of other factors are centered on the relationship between supply and demand. The supply of scientific and technological financial elements is the willingness and condition to transfer the property right and use right of all scientific and technological financial elements shown by universities, scientific research institutes, scientific and technological financial service institutions and enterprises. The market demand for scientific and technological financial elements refers to the purchase requirements and ability of the factor demander, which can be divided into the use demand and speculation demand of scientific and technological financial capital elements, as well as the application (incubation) demand and purchase demand of scientific and technological financial technical elements. The demand of investors in science and technology finance includes the speculative demand for capital elements of science and technology finance and the purchase demand for technical elements of science and technology finance. The demand of financing parties of science and technology finance includes the use demand of capital elements of science and technology finance and the application demand of technical elements of science and technology finance. Driven by speculative interests and scientific research progress, the above needs jointly form the purchase demand of science and technology financial factor market and the driving force of factor circulation. The requirements and wishes of buyers and sellers in the scientific and technological financial factor market, that is, the supply and demand of the scientific and technological financial factor market, constitute the driving force for the market-oriented allocation of scientific and technological financial factors, and promote the operation of the scientific and technological financial factor market.

Forming a good relationship between supply and demand is the basic guarantee for the market-oriented operation of factors. At present, there are total constraints on scientific and technological financial resources, and demand is more active than supply, thus showing a phenomenon of "demand is greater than supply". First, investment institutions are generally willing to invest in mature projects, and the upstream or midstream projects in the R & D stage are not optimistic. Second, the supply and demand side of scientific and technological financial resources often has the phenomenon of information asymmetry and unimpeded. Technology-based small and medium-sized enterprises or entrepreneurial projects are thirsty for funds, but there is no way to turn to them for help; Venture capital institutions are eager to invest in a good project, but they suffer from no source of high-quality projects. Third, there is a lack of intermediate links in science, technology and finance, and there is a lack of specialized institutions or talents.

Like the factor market of scientific and technological resources, in the scientific and technological financial market, the supply and demand relationship of scientific and technological financial resources will also be affected by the competition relationship of participants and the fluctuation of market price. The change of supply and demand will affect the use price of science and technology finance to a great extent, and also affect the competition of different subjects, which plays a decisive role in the innovation behavior of each subject. If a high-tech project has great

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development space and prospects in the market, it will attract capital investment to a large extent. On the other hand, due to a large amount of capital investment in an industry, the price of relevant factors and products will increase rapidly, and the supply in the market will also increase. On the contrary, if the competitiveness of a high-tech project is relatively poor, the capital will be more inclined to withdraw from this field, which will reduce the price of investment in the project and greatly reduce the supply of similar projects in the market. At the same time, due to the characteristics of quasi public goods and positive externalities of science and technology finance itself, the government also plays a very important role in the supply and demand mechanism, and carries out macro-control in order to improve the supply and demand capacity of science and technology finance market, such as establishing public institutions specially responsible for venture capital, establishing loan funds for venture capital The establishment of special banks and capital markets for science and technology entrepreneurship is conducive to improving the supply and demand capacity and autonomy of participants in the science and technology financial market, and then help participants obtain more supply and demand resources in the market.

(2) Price mechanism

Price mechanism is the most critical link in the market mechanism, which plays a regulatory role in the whole factor market. In the process of competition in the scientific and technological financial market, some elements will change with the changes of market supply and demand price. These chain changes and connections are the price mechanism in the scientific and technological financial market. By observing the price of factors, it can guide the change of supply and demand of market resources to mobilize resources. The goal is to realize the effective allocation of resources in the scientific and technological financial market. In the market mechanism, price is like a conductor, which can play a very important guiding role in the market-oriented allocation of scientific and technological financial elements. In the trading market of scientific and technological financial factors, the price mechanism plays the role of information transmission, feedback and market guidance, and plays an important role in the allocation and decision-making of scientific and technological factors.

The information transmission function of the price mechanism of science and technology finance is that the price of science and technology finance can fully reflect the supply and demand of the market for the technical elements of science and technology finance; Price signal is the most sensitive and effective signal in the market signal. The development law derived from price signal directly reflects the development of high-tech market. The guiding mechanism of price is reflected in two aspects: on the one hand, the increase of science and technology financial price can guide more researchers or enterprises to participate in the development of high-tech industry; On the other hand, the decline in the price of science and technology finance will lead to the reduction of the supply of high-tech projects in the industry. Due to the differences of science and technology financial market, the form of its price will also change significantly in different financing modes. For example, in the scientific and technological financial market, the formation of general price will determine the investment form or financing cost according to the type of high-tech projects; The market price of science and technology finance takes the financing cost of science and technology loan as the expression form in science and technology loan, and the insurance rate and the expected income of innovation project as the main expression form in science and technology insurance and venture capital; In venture capital, the market price of science and technology finance mainly depends on the financing cost when enterprises obtain equity or finance according to a certain proportion.

Technology factor is the fundamental condition of the price mechanism of science and technology finance. The advanced nature, maturity and application prospects of the technology determine the price of the financing project, and also determine the willingness of the financial institutions to invest in capital. The price fluctuation of science and technology financial market will directly affect the capital structure of science and technology enterprises in the science and technology market, lead to the change of the overall market price, and finally affect the relationship between supply and demand in the whole science and technology market. As the relationship between enterprises changes, the price

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will also be affected. To a great extent, government departments will interfere with the conditions for science and technology enterprises to enter the market and the bank loan interest rate of science and technology enterprises in the financial market, so as to affect the price mechanism of science and technology financial market. In addition, the factors of the science and technology financial market will also have a certain impact on the price mechanism. The flow direction and scale of science and technology financial resources in the science and technology financial market can be indirectly affected by the government.

(3) Competition mechanism

For the allocation of scientific and technological financial elements, its competition mechanism refers to an action mechanism between the supply and demand sides of scientific and technological financial elements caused by the change of supply and demand relationship and price fluctuation in the market. This competition mechanism can reflect an internal relationship between the supply-demand relationship and price changes in the science and technology financial market, as well as the competition relationship of the participants. If the supply and demand in the market are out of balance, it will inevitably lead to competition, and competition will gradually make the supply and demand unbalanced and return to balance again.

There are many forms of competition in the scientific and technological financial market. One is the competition between the demanders of science and technology finance. It is a kind of competition between different science and technology enterprises in the science and technology financial market in order to obtain potential investors to provide investment. The motivation for the competition among the demanders of science and technology finance is that the factor resources of science and technology finance can meet the needs of scientific research, production and technology industrialization, and bring more profits than the research and development of scientific and technological achievements. Under the pull of this competition, the cost of science and technology financial financing will also increase. The second is the competition between technology and financial suppliers. In the field of venture capital, if the financing enterprises have very good growth potential, the corresponding venture capital institutions compete to provide venture capital to such enterprises in order to obtain higher investment return. In the specific operation of science and technology financial market, transactions can generally be carried out through bidding, agreement transfer, bidding auction and so on. Either way, the supply of capital factors with lower prices will be more competitive in the market. The third is the competition between suppliers and demanders. In the market competition, the most basic form is the competition between supply and demand. At the same time, it can also reflect the opposite relationship and movement between supply and demand. On the one hand, the owners of scientific and technological financial elements want to sell their scientific and technological resources at a high price in order to obtain greater profits; On the other hand, the transferee of scientific and technological financial elements wants to buy Scientific and technological resources at a lower price to reduce the cost of scientific research and production.

The result of the above competition is to make the market follow the law of value, and then form the corresponding market price. Competition plays a significant role in promoting scientific and technological financial activities. For the demander, its core competitiveness depends on the intensity of desire to attract the elements of scientific and technological financial capital and the competitive strength of the project itself. In essence, it depends on the demander's marginal output in technical elements. If it has higher marginal output, it will have stronger market competitiveness. Competition will cause prices to fall or rise. On the one hand, the reduction of price is conducive to reducing the financing cost of demanders, so that they can obtain the required science, technology and financial factor resources at a lower cost. On the other hand, the increase of price is conducive to give full play to the role of factor resources to the greatest extent. Fund demanders will also make more scientific and reasonable arrangements for their own production and scientific research activities, so as to improve the allocation power and efficiency of scientific, technological and financial factors.

Based on the above analysis, it can be seen that

in order to correctly reflect the value of scientific and technological achievements, it must be based on the competition between the supplier and the demander. The more intense the competition, the higher the efficiency of market resource allocation. Competition can gradually form a balanced scientific and technological resources and market price. Price is an important way and means of competition, which depends on the relationship between supply and demand. It can reflect the situation of supply and demand in the market, guide the relationship between supply and demand, and provide corresponding feedback information, so as to provide a reverse driving force for the movement of supply and demand. The competition depends on the market price. Therefore, the power of market operation comes from the joint action of competition mechanism, price mechanism and supply and demand mechanism. Under the joint action of the above three mechanisms, the scientific and technological financial market can enter the equilibrium state, give full play to the role of the allocation of scientific and technological financial elements, and achieve the optimal allocation efficiency.

(4) Feedback mechanism

The above competition, supply and demand and price mechanism together constitute the dynamic mechanism of market-oriented allocation of scientific and technological financial factors. Power mechanism is the primary stage to promote the operation of the system, provide inexhaustible power and energy for the operation of the system, stimulate and guide the power source and enhance the operation of the power system. The feedback mechanism of science and technology finance is the auxiliary mechanism of the whole system, which aims to ensure and maintain the operation of the system. However, due to the different purposes and functions of the system, the feedback mechanism has rich connotation, including information transmission, supervision and incentive. Feedback mechanism is the most critical part of the whole mechanism. It runs through all links of the system. For the connection between the power of the system, the supply and demand side and interest protection, feedback mechanism needs to be used for information transmission, monitoring, sorting, dissemination and feedback.

First, information transmission. In the field of science and technology finance, due to the differences in the innovation conditions of market factor distribution subjects, there are differences in the quality and quantity of information owned by each subject, and there is also an unbalanced distribution of information in the space-time dimension. The process of information transmission can be further divided into five different links: information acquisition, information transmission, information storage, information conversion and information processing. Through the transmission of information, the information of the innovation subject can flow and distribute. In practice, the relevant information of the scientific and technological financial market is usually integrated through the scientific and technological financial service platform to provide information transmission for scientific and technological enterprises, scientific and technological financial talents, financial investment institutions and intermediary service institutions, so as to turn scientific and technological achievements into capital as soon as possible. At the same time, the technology financial service platform also provides knowledge management and information interaction for complex technology financial activities, and realizes accurate docking and comprehensive management of data.

The second is behavior supervision. Effective supervision among market subjects is an important aspect of establishing and improving the market-oriented allocation mechanism of scientific and technological financial factors. The supervision of the market-oriented allocation of various scientific and technological financial factors can effectively allocate the human, material and financial resources required in the process of factor market allocation, coordinate the relationship between various institutions and departments in resource utilization and construction, clarify the rights and obligations of all parties, and avoid excessive concentration or dispersion of the market-oriented allocation of scientific and technological financial factors, Avoid the waste of resources and misappropriation for other purposes, so as to achieve the highest market-oriented allocation efficiency of scientific and technological financial factors. Generally speaking, as an important controller of all kinds of resources, the government can easily obtain all kinds of regulatory information. It is one of the

main bodies of the regulatory mechanism for the market-oriented allocation of scientific and technological financial elements. It can play a role of supervision and coordination when there are contradictions in the market allocation of scientific and technological financial elements. However, the effective role of supervision not only depends on the government, but also needs to pay attention to the market supervision subject independent of the government.

Third, policy incentives. The incentive methods in the allocation of scientific and technological financial elements mainly include policy guidance and fund subsidy. At this stage, domestic science and technology finance is in the early stage of development. Through the formulation of financial preferential policies and relevant legal documents, the government can actively guide the flow of science and technology finance elements, standardize the behavior of participants, protect the interests of participants, effectively reduce the risk of science and technology financial services and stimulate the enthusiasm of science and technology finance participants. In addition, provide certain support and support for scientific and technological innovation activities through direct or indirect means, such as the establishment of innovation fund and special fund, intellectual property mortgage fund support, etc., provide various public scientific and technological financial services for scientific and technological innovation subjects, and give full play to the strategic guiding role of scientific and technological finance. These measures can adjust and improve the market failure to a certain extent, and can further introduce funds, which can provide a very important driving force for the development of science and innovation.

Suggestions on Improving the Market-oriented Allocation Mechanism of Scientific and Technological Financial Elements

(1) Build a science and technology financial ecology and improve the basic guarantee of environmental factors

First, strengthen government and social supervision and build a market mechanism in line with China's national conditions. Strengthen the legislative guarantee of science and technology finance, create a good policy environment, and formulate clear laws and regulations on the capital investment, fund raising, liquidation and withdrawal of science and technology finance, as well as the main object, operation mode and organizational form of capital use. Through the government's control and regulation of the market, encourage benign competition, prevent market monopoly, realize functional supervision and substantive penetration supervision, and eliminate regulatory arbitrage. Give play to the scale advantage of capital accumulation, increase the supply of effective scientific and technological financial services, and improve the utilization efficiency of existing resources. Create a good faith environment, establish and improve the guarantee system and good faith system of scientific and technological small and medium-sized enterprises, and solve the problems of lack of information and lack of credit.

Second, build a multi-level science and technology capital market and strengthen the dynamic mechanism of market competition. Improve the factor market system, provide diversified financing channels for innovative enterprises with development potential, and meet the financing needs of scientific and technological enterprises at different stages and scales. Improve the property right system, establish a unified property right trading market such as OTC, repurchase and M & A, give full play to its functions in asset evaluation, asset transfer and transaction, and improve the financing proportion of intangible assets. We will continue to promote the construction of capital markets such as the SME board and the gem, broaden the exit channels of venture capital, and provide listing and financing facilities for small and medium-sized enterprises. Through the financing function of science and technology capital market, it provides opportunities for social venture capital and concentrates social idle capital into promising innovative projects and industries.

Third, improve the market ecosystem of scientific and technological financial factors and promote the symmetry of market transaction information. Strengthen the management and control of the investment environment, strengthen the data sharing system, increase the cooperation among financial institutions, create an operational capital investment management system, improve the level of bank supervision and prevent financial

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risks. Improve the availability and risk resistance of technology finance elements to meet the multi-dimensional needs of capital investors and users. Encourage the establishment of professional scientific and technological financial institutions and promote commercial banks to carry out scientific and technological financial business. Formulate a preferential loan system for scientific and technological small and medium-sized enterprises, and pay attention to the capital needs and financing problems of scientific and technological small and medium-sized enterprises. Vigorously develop scientific and technological financial intermediary service institutions, promote the equivalence of market transaction information, and ensure the orderly development of the market.

(2) Optimize the capital market structure and promote the free flow of capital factors

First, encourage venture capital and create a comprehensive science and technology financial investment service system. Give full play to the guiding role of government financial funds and guidance funds, and guide Angel funds and venture capital to accurately invest in the initial stage of scientific research enterprises with high R & D investment and good development vision. We will introduce favorable policies to promote equity investment at home and abroad, provide policy support for the whole process of science, technology and financial investment from establishment to exit, and safeguard the practical interests of market participants. Enrich the sources of venture capital channels, strengthen the talent training mechanism of venture capital, and establish a risk prevention mechanism to provide guarantee for the exit of venture capital. Promote the effective demand and supply of venture capital, and improve the operation efficiency and economic benefits of venture capital.

Second, promote the rapid development of science and technology credit and innovate the financing business model of science and technology small and medium-sized enterprises. Banks are encouraged to broaden service channels, establish specialized institutions for science and technology loans such as science and technology banks, improve the financial environment, make up for the shortcomings of the ecological environment of science and technology finance, and establish and improve enterprise credit system and credit guarantee institutions. Encourage science and technology-based small and medium-sized enterprises to strengthen enterprise operation and management, improve the financial system and strengthen the performance appraisal system, improve their own credit level and improve the approval rate of science and technology loans. Encourage third-party appraisal institutions of intangible assets to improve their professionalism and authority, vigorously promote intellectual property pledge loans, improve the supporting system for the approval of intellectual property pledge loans, and promote the healthy and orderly development of the intellectual property trading market.

Third, accelerate the promotion of science and technology insurance and innovate the service products and underwriting mode of science and technology insurance. Make full use of the prior risk financing function of science and technology insurance to ensure that enterprises carry out scientific and technological innovation and business activities. We will strengthen the publicity and promotion of science and technology insurance, and gradually and orderly carry out the pilot of science and technology insurance. Insurance companies are encouraged to carry out science and technology insurance business, innovate science and technology insurance products, develop professional and personalized science and technology insurance products according to the capital needs of science and technology enterprises in different links such as technology R & D, achievement transformation and commercial application, and attract financing enterprises to insure. Innovate the underwriting mode of science and technology insurance, encourage insurance companies and science and technology enterprises to establish long-term strategic alliance cooperation, and jointly promote enterprise science and technology innovation activities as a community of interests. Promote the implementation of science and technology insurance policies, simplify the application and operation process, and expand the scope of policies to benefit enterprises.

(3) Innovate scientific and technological financial services and improve the efficient supply of labor factors

First, vigorously develop scientific and technological financial service institutions and promote service product innovation. Guided by the

market demand, focusing on the capital demand of each stage of the enterprise life cycle, increase the investment of capital and talents, broaden the market business area, strengthen the optimization of fundamental scientific and technological financial products and the research and development of additional products, innovate transaction categories and transaction methods, build a diversified scientific and technological financial service system, and improve the overall service level of the scientific and technological financial factor market. Establish a multi-level service product supply system to promote the scientific allocation of scientific and technological financial elements. Actively build an online trading platform for science and technology finance, improve the trading function, operation level and profitability of the platform, comprehensively expand online science and technology finance business, and gradually optimize the online supply form of science and technology finance products.

Second, vigorously train professional scientific and technological financial personnel and give full play to their function of "adhesive" between technology and capital. In view of the current shortage of specialized talents in science, technology and finance, accelerate the absorption and training of professional management talents in venture capital, and focus on cultivating and introducing a number of high-quality compound venture capital management talents who understand both technology and management, market and finance. Optimize the training and improvement environment for scientific and technological financial personnel, strengthen the mutual exchange of talents, establish relevant subjects of scientific and technological finance in major colleges and universities, and implement special financial training in scientific and technological companies. Establish a recruitment, management and incentive system for outstanding talents in science, technology and finance, broaden the space for setting and improving posts in science, technology and finance, strengthen publicity, and create a social atmosphere that is inclusive and pays attention to talents.

(4) Build a technology finance platform to promote the strong support of data elements

First, build an investment and trading platform for science and technology finance and improve the efficient operation mechanism of science and technology finance. Change the state of information fragmentation and integrate relevant information resources such as technology, enterprises, funds and talents. While developing financial technology, we will gradually open up the establishment of equity crowd funding platform, organically combine the two, and reasonably analyze and evaluate the investment projects, connections and expected risks on the platform with the help of technologies such as big data, artificial intelligence and blockchain. Give full play to the flexible mechanism of market operation, cultivate new industries, new formats and new models of digital economy, and promote platform business innovation. Classify and classify transaction data, classify and define big data, determine the use authority and boundary, and explore a new path for platform business innovation and social parties to share "data dividend".

Second, pay attention to digital security and establish a legislative guarantee system for market-oriented allocation of data elements. The rights and interests protection law for data development, utilization and property right definition clearly divides the property right ownership and right change of scientific and technological financial data resources, so as to open and share social data resources and maximize the value of data resources. Relevant laws to protect citizens' personal information and effectively protect citizens' right to privacy from infringement are enough to draw a clear line between personal privacy and enterprise data, so as to avoid putting the cart before the horse and abuse of rights. Formulate relevant laws on illegal and criminal activities in the digital economy to effectively promote the healthy and orderly development of the digital economy industry.

(5) Get through the obstruction of achievement transformation and improve the pricing mechanism of technical factors

First, promote the implementation of policies and establish a legislative guarantee system for the market-oriented allocation of technical elements. Prosper the technology transfer and transformation market, promote the implementation of relevant policies on technology transfer and transformation, cultivate professional technology transfer institutions and staff, improve the combination

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efficiency between technology and capital, and promote the capitalization of scientific and technological achievements. Expand the opening up of the scientific and technological field, encourage international scientific and technological innovation cooperation and exchanges, and actively broaden the import channels and export markets of relevant technologies. Eliminate the existing disadvantages of scientific research management, encourage innovation integration and resource integration among different disciplines, regions, institutions and countries, and work together to tackle key issues and academic innovation research, so as to achieve a new level of humanities, science, engineering and social sciences.

Second, improve the technology pricing mechanism and make full use of the price discovery function of the market itself. Because technical products often have great risk and strong timeliness with their thinking beyond the times, it is difficult to measure and measure them with traditional universal methods in the process of value evaluation. In the actual transaction process, the results obtained by third-party institutions using traditional methods are difficult to be generally recognized by the market, and the reference value is not high. This situation is also because the value judgment of technology itself and additional resources is often determined by personal subjective consciousness. Therefore, the exante valuation of third-party institutions is not applicable to the technology trading market. When the market is active and mature enough, the transaction quantity and each transaction result will produce a fair judgment on the market value of technology. Under the operation of reasonable supply and demand relationship, the market will gradually form a real and referential price range

(6) Strengthen the risk control system to ensure the standardized operation of factor market

First, fully release the vitality of factors, and make dual efforts by the government and the market. Strengthen the establishment and implementation of government regulation, make the government actively guide and encourage in the process of scientific and technological innovation, and give practical and effective guidance and help in strategic layout, laws and regulations, normative standards and supervision and management, so as to raise the level of public scientific and technological services to a new level and build an innovation oriented market environment. Avoid the market negativity and frustration caused by the abuse of government rights, and give better play to the role of the government. Balance the relationship between innovation development and compliance management to ensure the legitimacy and compliance of market innovation behavior. Strengthen risk control and internal audit, implement the responsibilities of risk control subjects of different platforms, and ensure the standardized operation of each platform. Strengthen external market supervision, promote the legal construction in the field of factor trading, and standardize the development of factor market in the form of legislation.

Second, build a multi-level scientific and technological financial risk sharing mechanism to maintain a good order of the financial market. Establish a scientific and technological financial data information system, strive to improve the venture capital system, strengthen the scientific and technological financial credit guarantee system, and promote the popularization of scientific and technological insurance business. Optimize government financial investment and support methods, popularize venture capital plans and public sector venture capital funds, and strengthen scientific and technological financial incentives and risk compensation. Give full play to the leading role of government funds and policy finance, make up for the lack of market capital in early projects, and promote the effective utilization of enterprise capital investment. Improve the financial risk prevention awareness and legal awareness of innovation subjects, establish an effective guarantee mechanism of laws and regulations, and improve the current policies and systems related to science and technology finance. The financial supervision department shall strengthen management to prevent and control financial risks. Strengthen the protection of independent intellectual property rights, and design a system of financial support and financial services according to the characteristics of scientific and technological financial risks at different stages of the whole life cycle of the survival and development of scientific and technological enterprises.

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CONCLUSION

Market demand is the foothold of the market-oriented allocation mechanism of factors. To realize the market-oriented allocation of scientific and technological financial elements is to allocate elements based on the price system and the relationship between supply and demand in the market, realize the rational allocation of elements through the role of market operation mechanism, and continuously adjust and improve the structural mode of market-oriented investment and operation, so that a small amount of scientific and technological capital investment can produce higher value income output, Make different elements realize the application and transaction between different subjects in different time and space and at different stages under the action of market mechanism. The market-oriented allocation mechanism of scientific and technological financial elements includes the coordination mechanism, supply and demand mechanism, competition mechanism, price mechanism and risk mechanism in the allocation process of scientific and technological financial elements. By improving the policy environment, optimizing the capital market structure, strengthening the service support of financial service institutions, talents and platforms, strengthening financial risk control, and promoting scientific and technological financial capital elements, labor elements The circulation of data elements enables the capital elements of scientific and technological financial investors to flow to appropriate enterprises, so as to realize the fairness and efficiency of factor allocation. Future research work can also further focus on the interaction mechanism and allocation efficiency between data elements in the field of science and technology finance and labor, capital, technology and other elements.

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The authors declare no sponsored financial sources by any organization related to tobacco production for the undertaken study.

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