

Research Article

Innovative Service Model of Science and Technology Finance in China

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Abstract

This investigation analyses the financial dependence of the transformation of scientific and technological achievements, the effective connection between scientific and technological resources and financial resources, the development of emerging industries, the upgrade of technological levels and the optimization of industrial structures, and the financial support required for technological innovation and R&D of high-tech enterprises as well as small and medium-sized technological enterprises. It is pointed out that the improvement of financial products, the innovation of capital markets and the application of internet finance are the operational basis of the innovation service mode of science and technology finance. Correspondingly, the upper level design at the policy level provides the basis for the development of the appropriate service model of technological and financial innovation.

Keywords

Innovative Service Model, Science and Technology Finance, Improvement of Financial Products, Capital Market Innovation, Online Finance

1. Introduction

The Ministry of Science and Technology of China will coordinate the work involving venture capital, banks, capital markets, insurance institutions, bonds and other social financial resources to support the development of science and technology. The existing forms of financial science and technology include venture capital, bank science and technology loans, agricultural science and technology micro-loans, science and technology guarantee systems, multi-level

capital market cultivation, science and technology insurance, science and technology bond issuance, etc., as well as the "discount loan for promoting the transformation of scientific and technological achievements" which combines internal and public finance, and the way in which the transformation of scientific and technological achievements guides funds to drive informal finance. It explains the mutual support and promotion between technological innovation and financial

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deepening from many aspects.

2. Existing Development Problems and Solutions

However, the existing S&T financial service model is more limited to traditional and single loans, and the supply scale of venture loans for S&T enterprises is not large enough. The rapid growth of venture capital in China has allowed it to become the second largest recipient of venture capital after the United States, but it is still far from adequately addressing the urgent need to change the current mode of economic growth. The financial guiding fund of venture capital is implemented smoothly. The mechanisms of stage participation, follow-up investment, risk compensation and investment guarantee are reasonable, but the attraction of private capital is not enough. Science and technology insurance have achieved some success in the pilot process. The premium income and risk insurance amounts have reached a certain scale, but products are few and the radiation surface is narrow, which cannot meet the high-risk requirements of science and technology industry innovation. The "new three-board" pilot project of capital markets has achieved some results. There are 39 high-tech enterprises listed in the Zhongguancun Science and Technology Park, but the listed strength of high-tech enterprises in other regions of the country is not enough, and the support for the development of science and technology industry innovation is limited.

Therefore, the construction of a technological and financial innovation service model is an important link to solve the lack of funds in the process of independent innovation, transform scientific and technological achievements, and radically reverse the traditional industrial development model. Through financial deepening and financial innovation, we aim specifically at entrepreneurship, scientific and technological innovation, achievement transformation and sustainable development of scientific and technological talents, and design an appropriate scientific and technological financial service mode. It not only provides financial guarantee for the adjustment of industrial structure and the transformation of economic growth mode, but also provides a model for the theoretical evolution and practical operation of financial deepening.

3. Current Situation and Development Trend of Science and Technology Finance

There is much literature on the mode of scientific and technological financial services, which are discussed from the following aspects: (1) the interpretation of the concept of scientific and technological finance, the establishment of a credit guarantee and service platform; (2) financing with

intellectual property rights as pledges; (3) the establishment of scientific and technological banks; (4) the cluster development of financial enterprises; (5) the establishment of guiding funds for venture capital.

(1) Explaining the concept of science and technology finance and establishing a credit guarantee and service platform:

The establishment of a credit guarantee system is an important form of the scientific and technological financial service model. It integrates resources of scientific and technological enterprises and banks, guarantees, insurance, venture capital, etc. It preliminarily establishes a comprehensive financial service system that integrates policy, product, intermediary and information services, and forms a business model based on joint credit guarantee [1].

(2) financing with intellectual property rights as pledge:

With intellectual property rights as the pledge carrier, we can solve the financing difficulties of small and medium-sized technology-based enterprises, and build a market-oriented and popularizable intellectual property pledge financing model [2].

(3) the establishment of scientific and technological banks:

Establishing science and technology banks is a way to integrate small and medium-sized science and technology enterprises with financial institutions. The Silicon Valley Bank of the United States is a bank providing comprehensive financial services for science and technology and private equity institutions at all stages from the seed stage to the maturity stage. In terms of operation strategy, profit model, risk control, and relationships with venture capital institutions and corporate culture, it has made efforts to broaden science and technology small and medium-sized enterprises. The financing channels of the industry can be used for reference [3]. The first batch of science and technology banks of China officially appeared in Chengdu on January 10, 2009. The CBRC approved the first batch of science and technology banks of the Chengdu Bank High-tech Branch and the China Construction Bank Chengdu High-tech Branch and copied this model to Zhongguancun in Beijing and Pudong in Shanghai [4].

(4) the cluster development of financial enterprises:

Industrial agglomeration with SME clusters as its external form will also optimize the financial ecology by influencing the financial development environment and promoting the integration and innovation of the financial industry. The agglomeration of SMEs will optimize the financial environment. When the cluster reaches a certain scale, the high productivity and innovation ability in the industry will be realized [5]. The financial enterprise cluster is an intermediate network organization for the production and transaction of complex financial products. Its asset specificity, enterprise capability, uncertainty and transaction frequency determine the efficiency boundary of the financial enterprise cluster. It has the advantages of regional financial innovation, financial risk mitigation and production and operation efficiency [6].

(5) the establishment of a "Venture Capital Guidance Fund"

The "Venture Capital Guidance Fund" is a kind of financing method established by the government to guide the extensive participation of private funds in the initial stage of development of science and technology enterprises. Compared with North America and Europe, China lacks a sound service system for start-up projects [7]. China's financial market needs to be further improved in order to form a healthy venture capital market. Venture capital plays an obvious role in the development of high-tech enterprises and sustainable economic growth, but there is no favorable institutional arrangement for the mechanism of venture capital in China [8, 9]; from 1983 to 1992 in the United States, the contribution rate of venture capital to industrial innovation reached 8% [10], and the high return of venture capital was always developed. Along with the stock market, rapid capital turnover can promote enterprise innovation and technological innovation [11]. At the same time, a perfect risk exit mechanism has been set up. The main exit channels of venture capital in the United States are IPO and M&A, while in Germany, the main exit channels are stock repurchase [12]. Through the decision-making model of venture capital based on information entropy, the matter-element extension method, and the pricing model of binary tree options, we preliminarily screen the venture projects, evaluate the dynamic profit evaluation function of venture capital in the implementation process, and provide a decision-making basis for the follow-up investment, which can largely solve the adverse selection problem in the process of venture capital [13, 14]. Through the option pricing model, the risk of venture capital projects is evaluated and controlled [15, 16].

Most of the scientific and technological financial service models analyzed in these documents are singular, and there is still a certain gap between the comprehensive scientific and technological financial service model and the existing scientific and technological financial demand in China. The need for financial innovation design based on the comprehensive scientific and technological financial service model is urgent.

4. Innovative Service Model of Science and Technology Finance: Operation and Design

The financial service mode of science and technology is to provide financing for science and technology enterprises in all aspects. Whether it can meet the actual requirements of promoting the development of scientific and technological enterprises, the transformation of scientific and technological achievements, and the upgrading of industries has become the core of measuring the efficiency of the scientific and technological financial innovation service model [17, 18]. According to the existing model, all the ways to provide financing for science and technology enterprises are called

science and technology finance, and this model mostly exists in the form of loans and financial subsidies, and less as insurance and securities. According to the standards of developed countries, not only should loans and financial subsidies belong to the category and paradigm of innovation, but also science and technology insurance and capital markets such as Nasdaq. However, China's science and technology financial services started late, the existing system of science and technology financial services is not perfect, and the development of insurance and capital markets can also belong to the category of financial innovation. According to the reality of our country, the improvement of financial products, the innovation of capital markets and the application of Internet finance are the basis of the operation of the innovative service mode of science and technology finance.

Various forms of science and technology finance in China include: venture capital, bank science and technology loans, agricultural science and technology micro-loans, science and technology guarantee systems, multi-level capital market cultivation, science and technology insurance, science and technology bond issuance, etc., as well as "promoting the transformation of scientific and technological achievements discount loan" which combines science and technology, and the way in which the transformation of scientific and technological achievements guides funds to drive informal finance.

5. Conclusion

To design an innovative financial service mode of science and technology to meet the demand for funds for transformation of achievements and sustainable development of science and technology enterprises, especially the start-up capital demand of small and medium-sized science and technology enterprises and the investment demand of key technology developments. At the same time, it is necessary to meet the financial requirements for the transformation of intangible assets such as inventions and patents into enterprise assets. This study analyses the characteristics, constituent factors and related influencing factors of financial products provided by the innovative financial service model of science and technology, identifies the cost range, distinguishes the commercial profit space and the level of policy subsidies. According to the operating characteristics, asset status, return on income, cash flow direction and risk degree of small and medium-sized technology-based enterprises, corresponding financial products should have long-term and high-risk compensation arrangements. Therefore, we should pay attention to the price and value factors of innovative financial products to ensure the sustainability of suppliers. In the process of determining the value of financial products, risk-free interest rates, inflation rates, risk factors within the science and technology industry, term factors, default risk factors and force majeure risk factors should be considered. This investigation analyses the impact of various factors on the value of financial products, and defines the quantitative criteria for the

demarcation line between commercial profits and policy subsidies of innovative scientific and technological financial products. Thus, it can not only guarantee the profit level of the supplier of science and technology finance in order to sustainably support the development of science and technology enterprises and the effective transformation of scientific and technological achievements, but also provide quantitative criteria for the government to formulate industrial restructuring policies.

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Conflicts of Interest

The authors declare no conflicts of interest.

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