

Research on Technology and Finance Policy Optimization Based on Quantitative Analysis Method

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Abstract: Policy is the soul of technology and finance. Technology and finance policy is an indispensable prerequisite and foundation for the rational allocation of scientific and financial resources, and it is the institutional guarantee for the industrialization development of scientific and technological enterprises. With the promulgation and implementation of a series of policies, the development of technology and finance in China is becoming more and more mature, and the ecological system of technology and finance is becoming more and more perfect. Based on the quantitative analysis method, this paper hopes to make quantitative analysis from the aspects of policy subject, theme and function, and actively explore the mechanism and path of the close combination of science and technology and finance, introduce and implement technology and finance's support policies, gradually build a sound technology and finance policy system, and continuously increase technology and finance's investment.

1. Introduction

In recent years, in order to promote the development of science and technology finance, Chinese government departments at all levels have successively issued relevant policies and regulations to go beyond the existing boundaries of policy areas and the responsibilities of individual departments, and it needs the coordination between vertical governments and horizontal departments, taking into account the coordinated promotion of different policy objectives. Financing and developing innovative technology and finance products for high-tech enterprises. Policy is the soul of science and technology finance. Science and technology finance policy is an indispensable prerequisite and foundation for the rational allocation of science and technology and financial resources, and is the institutional guarantee for the industrialization development of science and technology enterprises[1]. The sound and perfect science and technology finance policy system is an important guarantee for the implementation of the national science and technology finance development strategy. As the technology, method and means to achieve the policy objectives, the choice and application of policy tools play a fundamental role in the implementation of policy[2].

With the promulgation and implementation of a series of policies, the development of science and technology finance in China has become increasingly mature, and the ecosystem of science and technology finance has become increasingly perfect. For example, the government has continuously increased its support for innovation and entrepreneurship by using tax incentives and guidance funds, and the funding channels for venture capital have become increasingly rich. At present, science and technology finance mainly refers to the systematic and integrated institutional arrangement formed between science and technology innovation activities and financial resource allocation after a country's social and economic development has reached a certain stage[3]. However, in practice, the formulation and implementation of science and technology financial policies are often limited by the lack of understanding of market laws, inadequate grasp of market information and uncertainty factors in the process of policy implementation. Due to the imbalance

and heterogeneity of resource endowment, scientific and technological innovation capacity, and financial development level, the flow of science and technology financial resources in the region is not smooth and the sharing is not high[4-5].

Translate text information into data and conduct quantitative analysis. It is expected that from the aspects of policy subject, theme and function, we can conduct quantitative analysis through the mutual conversion between text information and data, actively explore the mechanism and path to realize the coordination of technology and finance's policies, it is necessary[6]. The problems, development and evolution of China's S&T financial policy are further optimized through analysis and discussion to promote the development of China's S&T financial policy.

2. Analysis on the Development of Technology and Finance

In recent years, the government attaches great importance to the cause of scientific and technological innovation, and technology and finance has made remarkable achievements in its development, mainly reflected in the continuous development of science and technology guarantee business, the gradual advancement of science and technology insurance business, the expansion of capital market financing scale, and the outstanding achievements of venture capital funds, but it also faces the following difficulties[7]. In order to make the contents of technology and finance's policies more strictly and comprehensively reflected and the variables of policy research more accurately expressed, this study will analyze the policy text from three dimensions: policy strength, policy objectives and policy measures of technology and finance's policies. According to the specific situation of policy measures and the different implementation standards, the quantitative standards of policy measures are formulated, as shown in Table 1.

Table 1 Technology and Finance Policy Quantitative Standard Manual

Primary index	Secondary indicators	Score	Criteria
Policy strength		2	Opinions and replies of the government and various departments
		1	Notice from the government and various departments
Policy objectives		2	Detailed description of strong tone such as “no less than/more than” and “strictly use”
		1	“According to”, “strengthen”, “increase” and other general descriptions
Policy measures	Venture capital	2	List specific measures and specify strict implementation standards for each item.
	Technology guarantee	1	List basic measures without explanation.

The source of funds for science and technology finance depends largely on government support, while the funds from financial institutions and capital markets, especially private capital, are relatively small. Due to various reasons, the number of well-known enterprises, colleges and research institutes, State Key Laboratory, engineering technology research centers and other research and experiment bases with absolute competitiveness in China is not large, the scale is not large, the level is not high, and private technology enterprises are small, and the product technology content is low[8].

3. Quantitative Analysis of Technology and Finance's Policy Text

3.1 Analysis from the Overall Evolution of Policy Texts

Technology and finance's policy texts are multidimensional and contain rich information. In order to explore the development trend and evolution process of technology and finance's policies, the collected policy text information of Changzhou technology and finance was transformed into data, and the policy text was quantitatively analyzed by analyzing the data. There are only two titles in the policy document of “technology and finance”, and there are more than 70 published policies that include “technology and finance”. It can be seen that in the past few years, the number of policy texts about “technology and finance” published by Changzhou City is small, which needs to

be further expanded and the technology and finance Center with Changzhou's international influence should be established[9].

The supply-side policy mainly provides policy support for the fund suppliers, including venture capital institutions, banking financial institutions, science and technology insurance institutions, internet financial institutions, multi-level capital markets, etc. The policy text contains rich information and has multi-dimensional characteristics[10]. In order to meet the needs of studying the evolution, development trend and quantitative analysis of technology and finance policy, a policy analysis framework as shown in Figure 1 is established, and the policy text information is converted into data for quantitative analysis.

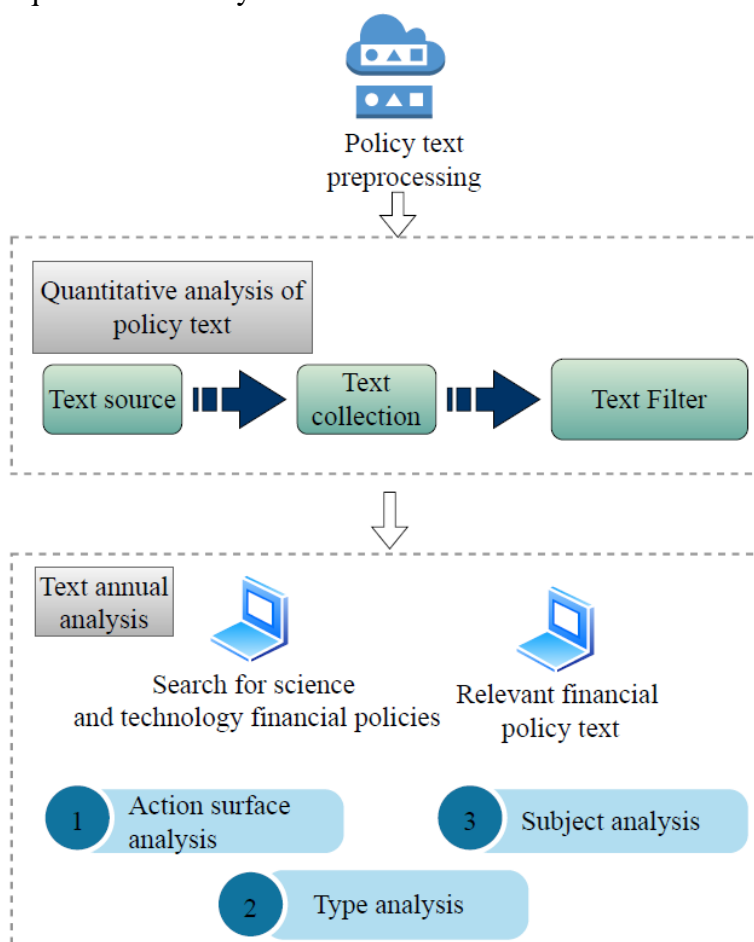


Fig.1 Text Analysis of Science and Technology Finance Policy

From the correlation between the comprehensive score of S&T financial policy and S&T output, the S&T output of the three places is highly correlated with the input of S&T financial policy, indicating that S&T financial policy plays an important role in promoting the development of S&T innovation is transformed into a two-dimensional data panel by introducing the time dimension and using the ideological structure of “first sum then divide” to analyze the annual quantity distribution of the science and technology finance.

3.2 From the Annual Quantitative Analysis of Policy Texts

With the continuous development of economy, we can see that Changzhou Municipal Government issued more and more policies on technology and finance in, showing an upward trend year by year, and most of the financial policies issued were in response to the development of national technology and finance policy, which promoted the vigorous development of national technology and finance policy. However, technology and finance's policy input has a negative and significant relationship with science and technology output, while science and technology capital input has a negative and insignificant relationship with science and technology output, which shows that under the synergistic effect of capital input, human input and policy input, the government,

enterprises and other institutions may ignore science and technology innovation because of the urgent demand for economic growth, thus causing the decline of science and technology output.

The technology and finance system mainly includes science and technology guarantee, science and technology insurance, venture capital and capital market financing. The related policies such as financial support for scientific and technological talents, venture capital, financial intermediary services and credit preference for scientific and technological enterprises and high-tech products are still in the exploratory stage. According to the summary of the keywords of 57 technology and finance policies, the policies can be divided into four categories: rules and regulations, decisions and resolutions, development planning, management measures and guidance, as shown in Table 2.

Table 2 Distribution of Science and Technology Financial Policy Text Types

Text type	Coverage	Number of policies	Proportion (%)
Decisions	Decisions and resolutions	4	12.13
Development planning	Planning	5	12.41
Management measures	Methods and programs	7	18.32
Guidance	Implementation opinions	41	57.14

From the perspective of quantity distribution, the guidance category has the largest number, 41 items in total, accounting for 57.14% of the total number of texts, followed by the management measures category, 7 items in total, accounting for 18.32%. In addition, service outsourcing, market access, government purchase and performance evaluation are at the edge of the whole social network map, which shows that service outsourcing, market access, government purchase, performance evaluation and other key words appear less frequently in the same policy text is not significant, which indicates that the synergy mechanism of science and technology in capital investment, human investment and policy investment needs to be improved, so that capital investment can significantly promote scientific and technological output.

3.3 Optimize Technology and Finance Policy

Technology and finance Development Group is encouraged to operate according to the principle of marketization, and obtain the qualification of securities, banking, insurance and trust securities through the capital market or joint venture at an appropriate time, so as to build it into a comprehensive financial operation entity. Strengthen the coordination of supply-oriented, demand-oriented and environment-oriented policy tools, and appropriately increase the application of demand-oriented tools. When applying demand-oriented policy tools, it is suggested to strengthen the government procurement policy, use the “government market” to support the initial development of enterprises and ensure the capital operation. It is necessary to comprehensively deepen the system reform in technology and finance, accelerate the innovation of science and technology credit products and service models, encourage banking financial institutions to set up specialized or characteristic branches specializing in financial services for small and medium-sized science and technology enterprises, give play to the important supporting role of financial innovation in technological innovation and innovation and entrepreneurship, and boost the rapid development of small and medium-sized science and technology enterprises.

To realize the coordination of technology and finance's policies, it is necessary to go beyond the existing boundaries of policy areas and the responsibilities of individual departments, and it needs the coordination between vertical governments and horizontal departments, taking into account the coordinated promotion of different policy objectives. Financing and developing innovative technology and finance products for high-tech enterprises. Finally, set up an investment and financing leasing company, carry out venture capital financing leasing business, provide office products, equipment, instruments and other financing needs for small and medium-sized science and technology enterprises, and obtain stock options or equity of enterprises to form a risk-return matching operation.

4. Conclusions

In order to promote the development of science and technology finance, the government should establish a good management and operation mechanism, a sound policy framework and an effective operation platform. Encourage all kinds of scientific and technological financial institutions to carry out risk-income matching operation in accordance with the principle of marketization. From the perspective of the synergy of science and technology input factors, the synergy among all factors is the best, and each input factor can significantly improve the science and technology output. Considering that industry associations play an irreplaceable role in promoting the development of science and technology finance. As one of the demand subjects of science and technology finance, the number of science and technology small and micro enterprises has increased significantly in recent years. In view of the policy support needs of science and technology small and micro enterprises, we should also gradually establish an industry management system that can achieve information sharing and win-win benefits among different participants, give full play to the incentive role of policy tools, and mobilize the enthusiasm of science and technology enterprises and financial institutions to participate in scientific and technological innovation. Reform the existing talent evaluation mechanism, enhance the sense of honor and belonging of scientific and technological talents, improve the selection and appointment mechanism of scientific and technological talents, implement the system of open selection and competition for scientific and technological talents, and break the static selection and appointment system. Based on the quantitative analysis method, this paper has increased a lot of financing policies for technology-based enterprises, and the application of financing guarantee and risk compensation is still in the initial stage, which is seriously lagging behind the actual market demand. This aspect needs to be improved in the future policy formulation.

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