



Research on the Mechanism of Government Support for Sci-Tech Finance from the Perspective of Resource Allocation—A Case Study of Guangdong Province

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Abstract. The development of sci-tech finance is inseparable from government support. The government may play a more critical role than the market, especially in the initial stage. This paper first reviews the research literature related to sci-tech finance and resource allocation during the transformation of government functions. It divides the exploration of Guangdong Province in the government mechanism of sci-tech finance in recent years into three aspects: guidance-incentive mechanism, service-guarantee mechanism, and supervision-constraint mechanism. Then, from the perspective of resource allocation, this paper points out five main problems in the government mechanism of sci-tech finance in Guangdong Province: the macroscopic management system is too scattered, the multi-level investment and financing system should be improved, the status of the national strategic emerging industries is not prominent, the regional agglomeration effect of resources has not been brought into full play, and high-quality external resources from Guangdong-Hong Kong-Macau Greater Bay Area are not introduced. Finally, the paper provides targeted suggestions for directions of improvement and policy recommendations.

Keywords: sci-tech finance · resource allocation · government · mechanism · case study

1 Introduction

Science and technology are the primary productive force, and scientific and technological innovation has become the core motivation of the economic growth in China. As the vanguard of China's economic system reform, in 2021, the regional innovation capability of Guangdong Province ranked first in the country for five consecutive years. As an essential factor contributing to the change of economic development and the upgrading of industrial structure, sci-tech finance has been constantly tried by Guangdong Province,

which has achieved preliminary results: the construction of the province's policy environment on sci-tech finance has been continuously optimized; the depth and breadth of the integration of science & technology and finance has been continuously expanded; the intensity of financial investment has been dramatically increased, and the integration of factors of sci-tech finance has been accelerated. In the file "Policies and Measures on Further Promoting Scientific and Technological Innovation", Guangdong provincial government emphasized the direction of policies and measures of implementation around the topic "promoting deep integration of sci-tech and finance" and put sci-tech finance in the critical position of the innovation-driven development strategy of the whole province. Taking Guangdong Province as an example, this paper discusses the practices and problems of the government mechanism of sci-tech finance from the perspective of resource allocation based on the construction of characteristic science and technology financial model of "one project, two platforms, four systems, and multi-linkage" in Guangdong Province, which is representative in the country.

2 Literature Review

2.1 Sci-Tech Finance

"Sci-tech finance", originates from "the combination of science -technology and finance", which was first used by Science and Technology Bureau of Shenzhen Municipality in 1993, has gradually become a new hot spot in policy, capital market, and innovation practice during the past decade. Chinese scholars also defined its theoretical connotation from different angles.

At present, the highly recognized definition is put forward by Zhao et al. (2009) in China's first book on the financial system of science and technology: "Sci-tech finance is a systematic and innovative arrangement of a series of financial instruments, financial systems, financial policies and financial services which promote the development of science and technology, the transformation of achievements and the development of the high-tech industry. It is a system composed of various subjects such as governments, enterprises, markets, and social intermediaries that provide financial resources to scientific and technological innovation activities and their behavior in the financing process of scientific and technological innovation. It is an important part of the national scientific and technological innovation system and financial system."

Based on this, Hu and Jiang (2012), Li and Shu (2013), Wang and Shi (2013), and other scholars defined the concept of sci-tech finance from different angles, including factor supply, innovative format, core characteristics, economic paradigm et al. Fang (2015) believes that the essence of sci-tech finance is to cultivate high value-added industries, create high-paid jobs and enhance the overall competitiveness of the economy, which is a new economic paradigm that promotes the deep combination and integration of innovative elements including technological capital, innovative capital and entrepreneurial capital.

2.2 Resource Allocation

Resource allocation is the process of selecting, arranging, and collocating scarce resources among possible uses in order to achieve the highest efficiency (Wang, 2008).

There are two ways of resource allocation: plan and market. In the way of plan, through investigation and research, the national planning departments plan the allocation of resources using administrative orders according to social needs and set up planned quotas to manage and allocate resources. The market model of resource allocation, the famous “invisible hand” put forward by Adam Smith (1776) in the *Wealth of Nations*, mentioned that resources play a fundamental role in the market through supply and demand, price, competition et al. without any artificial plan and regulation, which is also the realization form of the law of value.

Fairness and efficiency are essential issues in resource allocation. The former refers to fair and reasonable distribution, while the latter emphasizes the effectiveness of the distribution process and results. In the context of the new era, “efficiency first besides fairness” in the process of resource allocation should be timely adjusted to “fairness-based and efficiency-oriented” (Li, 2009).

2.3 Operation Mechanism of Sci-Tech Finance

The operation mechanism of sci-tech finance refers to the mechanism of allocating science and technology financial resources, determining the proportion of resources, behavior, and operation efficiency of each part within the sci-tech finance system. There are three main kinds of the mechanism: market mechanism, government mechanism and social mechanism. The market mechanism of sci-tech finance plays a leading role in allocating science and technology financial resources. Sci-tech finance affects the allocation of resources by three mechanisms: supply and demand, price, and competition. The market is the most basic and dynamic resource allocation mechanism. Resources can achieve the balance of supply and demand through price signal adjustment in the market, leading to maximized efficiency (Shao, 2014). Sci-tech finance is the product of the innovation practice of socialism with Chinese characteristics, but because our market system and mechanism are not perfect, we cannot allow the market economy to promote the integration of science & technology and finance like the developed countries but need the government to play a guiding role to promote market operation (Deng, 2013).

The government mechanism of sci-tech finance is to make up for the market failure or market imperfection caused by information asymmetry and the attribute of public goods of science and technology activities through the macro-control function of the government. Domestic and foreign Scholars have studied the government mechanism of sci-tech finance from different perspectives, including participation mode, function, and policy choice (Cui et al., 2020; Yang & Shen, 2021). Shen (2012) pointed out that as the regulation and control of sci-tech finance market mechanism and the assistance of social mechanism, local governments should change their functions as soon as possible, focusing on guidance, service, supplement, and supervision. Ma et al. (2016) summarized the sci-tech financial behaviors usually taken by local governments in technological innovation clusters in China, including introducing innovation sources for enterprises, focusing on supporting large enterprises, public services, emphasizing the organizational mechanism of corporate operation, and improving the science and technology financial network et al. Wang (2017) mentioned that the four main measures of our government support to the development of sci-tech finance include financial industry agglomeration,

debt financing risk control, direct financing, and the construction of sci-tech finance service platforms.

The social mechanism of sci-tech finance is an important supplement to the market mechanism and government mechanism, which refers to the mechanism of social participation in the allocation of sci-finance resources under the specific institutional system and cultural background. Because our culture attaches greater importance to emotion and relationships, compared with western countries with more emphasis on law, social mechanism plays a very important peripheral role in our country. This kind of social mechanism, which compensates the “double failure” of the market and the government through the functions of relationship network and trust, generally acts on the financing of technological small and medium sized enterprises but is not suitable for large-scale high-tech enterprises (Yang, 2011).

From research above, we can see that the optimal allocation of resources is the internal driving force and the main goal of the development of sci-tech finance. Most of the existing literature regards sci-tech finance as a specific resource and studies the allocation efficiency and mechanism of sci-tech finance resources from a micro point of view. For example, Chen (2012) put forward his opinion of sci-tech finance resources in his master’s degree thesis. Sun and Wang (2018), Li and Wen (2019), and other scholars used multi-stage data envelopment and dynamic index models to measure and evaluate the allocation efficiency of sci-tech finance resources in various provinces and cities in China. However, as a necessary means of regulation and control in the operation mechanism of sci-tech finance in our country at the present stage, the government mechanism needs us to study the allocation of relevant resources from a macro perspective. This paper chooses to proceed from the overall situation, taking the exploration of Guangdong provincial government’s support for the development of sci-tech finance in recent years as a starting point, and then discusses the connotation, problems, and countermeasures of the government mechanism of sci-tech finance from the perspective of resource allocation.

3 The Practice of the Government Mechanism of Sci-Tech Finance

3.1 Guidance-Incentive Mechanism of Sci-Tech Finance

3.1.1 Innovating the Mode and Key Direction of Financial Investment in Science and Technology

In order to guide the allocation of government resources and social resources, change the investment structure and using method of financial science and technology funds, improve the allocation efficiency of limited financial resources and support the work of sci-tech finance within its jurisdiction, Guangdong Province has set up a special fund for the combination of sci-tech and finance, which focused on helping provinces and cities with science and technology credit risk reserves, post-subsidy risk compensation, venture capital collaboration, the construction of sci-tech finance service system and other projects, leading financial institutions and social capital to invest more in scientific and technological companies which are in their start-up mid-term stage. From 2014 to 2020, this special fund has allocated a total of 1.354 billion yuan, promoted cities to allocate over 1 billion yuan on the supporting risk reserves, and led all kinds of social

capital to invest more than 3 billion yuan in the field of scientific and technological innovation.

At the same time, Guangdong Province gives one-off risk compensation to banking institutions that carry out inclusive science and technology credit business, according to the actual investment of science and technology credit, and encourages banking institutions to improve financial support to scientific and technological enterprises in order to promote the means and process of resource allocation to properly take the scientific and technological small and medium-sized enterprises in the province into account, expand the universal range of the allocation of sci-tech finance resources, and effectively promote the transformation of scientific and technological achievements, releasing the problems of financing difficulties, slow financing and expensive financing for scientific and technological enterprises. Since 2018, Guangdong Province has guided nearly 20 banking institutions to support more than 50 billion yuan of technological small and medium-sized enterprises in the province, giving full play to the government's leading role and realizing the fairness and efficiency of resource allocation to a certain extent.

3.1.2 Promoting the Innovation of Products and Services of Banks and Other Financial Institutions

In 2012, the Science and Technology Commission of Guangzhou City (now Science and Technology Bureau of Guangzhou Municipality) and Panyu District Government in Guangzhou jointly promoted the establishment of the first pilot science and technology bank in Guangzhou-Bank of China Guangzhou Branch Panyu Tianan Science and Technology Sub-branch. They set up a "joint science and technology loan risk reserve" to provide characteristic science and technology credit services for local technological small and medium-sized enterprises and provide official guidance to financial innovation resources. After the replication and promotion of the whole province, the Bank of China Guangdong Branch has set up 22 science and technology sub-branches in Guangdong, covering the core cities of Guangdong-Hong Kong-Macau Greater Bay Area in Guangdong Province, which accurately served nearly 7000 high-tech enterprises and nearly 70% of the new third board listed enterprises in the province, and provided nearly 30 billion yuan of credit loans to more than 3000 technology entrepreneur enterprises, practicing the innovative cooperation model of "risk-sharing between government and bank" and "collaboration of investment and loan" in the background of the new era. In 2015, China Construction Bank Guangdong Branch also reached strategic cooperation with the Science and Technology Bureau of Guangzhou City to launch "FIT Guangdong" comprehensive financial services to tailor sci-tech financial programs for high-tech enterprises in the province. At present, "FIT Guangdong" has been updated to the fourth generation, continuously providing more technological data integration new platforms, new tools, and new products, serving more than 30,000 high-tech enterprises in the province, providing financial support of 151.829 billion yuan for the province's high-tech enterprises, and promoting more efficient, fairer and more sustainable allocation of relevant scientific and technological resources and financial resources.

3.1.3 Guiding the Coordinated Development of State-Owned and Private Venture Capital

In 2000, Guangdong Province prepared to establish the first provincial state-owned science and technology financial group in China-Guangdong Yueke Financial Group Co., Ltd. Over the years, Yueke Financial Group has actively played the role of the main platform, main channel, and main force of state-owned investment groups, undertake the management of government funds and social funds, expand venture capital, and continue to innovate and expand venture capital business through the establishment of parent funds and the issuance of venture capital bonds, et al., providing comprehensive financial services for scientific and technological innovation in Guangdong Province. The Group has successively set up venture capital funds such as seed funds with differentiated and diversified investment positioning, angel funds, college students' venture capital funds, Guangdong Science Innovation and Entrepreneurship Mother Fund, industrial funds, M & A funds, and other venture capital funds, covering the whole process of the growth of technological small and medium-sized enterprises. Until June 2021, Yueke Financial Group has managed and participated in 99 funds with a total size of more than 64 billion yuan, providing investment and financing services for more than 2000 sci-tech enterprises and promoting more than 70 enterprises to achieve IPO listing or listing on the "new third board".

In addition, Yueke Financial Group also gives full play to the guiding and magnifying role of provincial state-owned assets, introducing local government funds and social capital to participate in the marketization of venture capital and funds through multiple channels and effectively promoting the expansion of monetary funds and foreign project investment around strategic arrangements such as regional innovation, the cultivation of emerging industries, and the construction of significant innovation platforms in Guangdong Province, which forms a strong support for innovation and entrepreneurship in the province and the development of technological small and medium-sized enterprises and improves the efficiency of resource allocation significantly.

3.2 Service-Guarantee Mechanism of Sci-Tech Finance

3.2.1 Establishing a Sci-Tech Financial Service System Covering the Whole Province

Since 2014, Guangdong Province has successively set up provincial sci-tech financial service centers and 33 municipal sub-centers to achieve full coverage of sci-tech financial services in the province. Guangzhou City, Dongguan City, and other municipal sub-centers have also actively deployed sci-tech financial service workstations in districts, counties, town streets, and high-tech industrial parks to ensure that the service force sinks to the forefront and solve the problem of "the last kilometer" of the landing of sci-tech financial services. In order to cooperate with the construction of offline sci-tech financial service center, Guangdong Province has set up a team of sci-tech financial ombudsmen at the same time, dramatically enhancing the ability of professional services such as venture capital, credit, financing through a series of measures such as strict selection, systematic training, and counterpart support, which has.

At the same time, in order to solve the problem of information asymmetry and intransparency in the financing process of sci-tech enterprises, Guangdong Province has also set up an online provincial sci-tech financial comprehensive information service platform to provide investment and financing integration, real-time information exchange, third-party credit evaluation, industry analysis, policy push, scientific and technological enterprise display, knowledge popularization and other diversified services for scientific and technological enterprises in the province, and share information through the electronic platform to realize the integrated management and efficient utilization of all kinds of resources.

3.2.2 Piloting Universal Sci-Tech Finance

Since 2017, the Guangdong Provincial Department of Science and Technology and the Guangdong Branch of China Construction Bank have carried out inclusive sci-tech finance pilot projects in Guangzhou City, Zhuhai City, Shantou City, Dongguan City, Zhanjiang City, and Qingyuan City. The newly developed “comprehensive innovation strength scorecard for small and micro technological enterprises” is used to evaluate the technical conditions and development potential of small and micro technological enterprises in many aspects, no longer relying solely on traditional financial indicators but appropriately reducing the loan access threshold and improving the loan quota through the new SME credit evaluation system for qualified small and micro technological enterprises.

At the same time, the Science and Technology Financial Integrated Service Center of Guangdong Province and various municipal sub-centers give full play to their role as a link, effectively interfacing with the branches of CCB Guangdong Branch at all levels, and take the initiative to carry out the promotion and training of inclusive sci-tech financial policies in areas where sci-tech industrial parks, incubators, mass innovation space, et al., where scientific and technological enterprises are concentrated, and set up a “dot-to-dot communication” service network for the pilot work of inclusive sci-tech finance to improve the coverage of policies and services continuously. By the end of 2019, Guangdong Province had established a total of 615 financing business outlets for small and micro technological enterprises and issued a total of 5480 loans to small and micro technological enterprises, with the amount of 5.59 billion yuan, effectively solving the financing problem of technological small and medium-sized enterprises, which paid great attention to the efficiency improvement on the basis of fair allocation of resources.

3.3 Supervision-Constraint Mechanism of Sci-Tech Finance

3.3.1 Improving the Supervision of State-Owned Venture Capital

Guangdong Province attaches great importance to preventing risks in sci-tech finance and strengthen the supervision and control of state-owned assets investment decisions in all aspects, in accordance with the requirements of the central government to strengthen the supervision of state-owned assets mainly by “managing capital”. In April 2018, Guangdong Province put relevant government funds into Guangdong Yueke Financial Group, which funded and guided social capital to jointly set up the Innovation and

Entrepreneurship Fund of Guangdong Province, which mainly invested in major scientific and technological fields of innovation, key technologies, and the transformation of scientific and technological achievements to support start-up investment and basic theoretical research. At the same time, Guangdong Province has adopted a series of measures, such as authorizing bank fund trusteeship, standardizing the investment decision-making process, implementing the project manager responsibility system, linking the results of performance appraisal with the return of state-owned assets and the salary of the person in charge, and establishing a strict mechanism of risk early warning, investment tracking, and operation monitoring to the established funds, to maintain and increase the value of state-owned assets and fully perform the government's functions of supervising the allocation of resources.

3.3.2 Standardizing the Management and Use of Special Funds for Sci-Tech Finance

At the beginning of the establishment of the special fund for the combination of sci-tech and finance in 2014, the Department of Finance and the Department of Science and Technology of Guangdong Province jointly issued the "Measures of Guangdong Province for the Administration of Special Funds combining Industrial Technological Innovation with Sci-Tech Finance", guiding all cities to issue local measures of management on special matching funds to strictly standardize the management and use of special funds for sci-tech finance in governments at all levels. Special funds implement commitment letter and contract management and establish a performance management mechanism of performance target declaration and auditing, performance tracking supervision, performance evaluation, and performance accountability to maximize the efficiency of the use of government funds and optimize the resource allocation of sci-tech finance. In addition, Guangdong Province has also implemented the accountability system in the management of special funds, taking serious measures such as notification and criticism, suspension of project funding, termination of project implementation, recovery of allocated funds, disqualification of declaration to deal with violations and holding accountable to relevant people in accordance with the law, to ensure fairness and impartiality in the process of resource allocation.

4 Problems Existing in the Government Mechanism of Sci-Tech Finance

4.1 The Macroscopic Management System of Sci-Tech Finance is Too Scattered

There are institutional obstacles in the resource allocation of sci-tech finance. Fang (2010) pointed out that it is challenging to coordinate the allocation of scientific and technological resources at the macro level, and there are some undesirable phenomena such as decentralized resource management and apparent fragmentation from the central to the local level. The sci-tech financial system involves many service subjects. However, there is a lack of unified deployment of sci-tech financial work in Guangdong Province and a complex interest relationship among the subjects, which leads to the fact that most of the service subjects fight alone, lacking an effective linkage mechanism and

the perfection of the overall synergy of the government. At the same time, the work of sci-tech finance also involves many government departments, such as science and technology offices, finance offices, development and reform commissions, economics and information bureaus, industry and commerce bureau, finance bureaus, taxation bureaus et al. Guangdong Province has not yet formed an effective top-level design model of sci-tech finance. The division of functions and overall planning mechanism of various departments are unclear, and various resources cannot be coordinated and integrated, which significantly reduces the level of guidance, service and supervision of scientific and technological enterprises in the province and affects the efficiency of resource allocation.

4.2 The Multi-Level Investment and Financing System of Sci-Tech Finance Should Be Improved

Although Guangdong Province encourages various sci-tech financial service entities to increase their support to seed and start-up enterprises, but for the consideration of interest balance and risk control, banks and venture capital institutions are still more inclined to provide investment and financing services for mature projects or large and medium-sized state-owned enterprises. In contrast, technological small and medium-sized enterprises can only use the traditional physical mortgage, secured loans et al. due to their immaturity in intellectual property pledges and equity financing, having few financing channels, high threshold and poor effect, which shows the apparent lack of fairness in the allocation of resources.

4.3 Sci-Tech Finance Has not Highlighted the Status of National Strategic Emerging Industries

Strategic emerging industries should be placed in a more prominent position in China's economic and social development, which is conducive to grasping the significant opportunities of the new round of global scientific and technological revolution and industrial change and adhering to supply innovation and demand guidance, providing strong support for building a moderately prosperous society in an all-round way. Policies at the provincial level in Guangdong Province have also repeatedly proposed to improve the investment and financing policy system to promote the development of strategic emerging industries in the province. Currently, the sci-tech financial policies of Guangzhou City, Shenzhen City, Foshan City, Dongguan City, Zhongshan City et al. focus on strategic emerging industries. However, in terms of the whole range of the province, the guidance and distribution of technology, talent, capital, and other innovative factor resources in sci-tech financial work have still not highlighted the critical position of national strategic emerging industries and formed a new economic normal of key advantageous areas to promote independent innovation.

4.4 Sci-Tech Finance Has not Given Full Play to the Regional Agglomeration Effect of Resources

The regional effect refers to the advantages brought by the resource endowment conditions of the same region and the agglomeration effect refers to the advantages brought

by industrial clusters formed by enterprises, resulting in external scale economy effects, technological innovation effects, and financial overflow effects (Liu, 2016). Lu and Liu (2018) pointed out that the regional agglomeration of sci-tech finance includes science and technology agglomeration and financial agglomeration, through which the driving force and security force of regional economic growth can be maximized. After years of development, Guangdong Province has formed a large number of critical areas, critical industries of the regional agglomeration development pattern. Through the rational allocation of regional factor resources, to build industrial clusters and extend the industrial chain, to provide sustainable competitiveness for economy of Guangdong Province. However, Guangdong Province has not made good use of this existing advantage in the layout of sci-tech finance, and has made slow progress in structural optimization, coordinated development, resource allocation, and scale economy, which has not formed the resource agglomeration effect of sci-tech finance.

4.5 Sci-Tech Finance Has not Introduced High-Quality External Resources Such as Guangdong-Hong Kong-Macau Greater Bay Area

Guangdong-Hong Kong-Macau Greater Bay Area has a unique geographical advantage and a leading international scientific and technological innovation foundation. However, Guangzhou City, Foshan City, Dongguan City, and Shenzhen City only focus on their own development, lacking regional linkage and the integration of scientific and technological innovation elements, which makes it impossible to realize the exchange and optimal allocation of sci-tech financial resources. In addition, there are significant differences in the financial governance systems between Hong Kong, Macao, and the mainland and the relevant policies have not been wholly liberalized, which hindered and limited the cooperation and exchange of sci-tech financial funds, institutions, and enterprises in Guangdong-Hong Kong-Macau Greater Bay Area. The deployment of sci-tech finance in Guangdong Province is still prohibitive and hesitant to integrate resources in the province and attract high-quality external resources such as Hong Kong and Macao. There is still much room for development in the future.

5 The Improvement Direction of the Government Mechanism of Sci-Tech Finance

5.1 Coordinating the Allocation of Resources and Strengthening the Top-Level Design of Sci-Tech Finance

The work of sci-tech finance involves many essential government agencies, which have difficulties in the coordination and convergence, causing the inefficiency of resource allocation. Guangdong Province should innovate the macro-management system of sci-tech finance, establishing an inter-departmental decision-making information sharing platform as the support in order to promote comprehensive balance and strategic consultation on important issues on sci-tech finance through ministerial meetings, inter-ministerial joint meetings and other forms, and avoid undesirable phenomena such as fragmentation and multi-head management, and coordinate the work of science and technology finance from top to bottom, effectively solving the problems of dispersion, duplication, and inefficiency in allocating and integrating various resources.

5.2 Promoting Fair Distribution of Resources to Focus on Helping Technological Small and Medium-Sized Enterprises

In order to further promote the fairness of the allocation of factor resources, Guangdong Province should guide science and technology banks, securities, venture capital, and other financial institutions to tailor and design financial products according to the operation mode and equity structure of technological small and medium-sized enterprises, such as the first equipment insurance, sci-tech insurance loans, sci-tech project package loans, small and medium-sized enterprises collective bonds or collective bills, and so on. The government encourages financial institutions to actively develop universal sci-tech financial products such as “R & D loans”. At the same time, the government should set up special support funds for technological small and medium-sized enterprises, supporting re-loans, rediscount, and other funds and policies, lowering the financing threshold and risk of small and medium-sized enterprises to ensure that various resources of sci-tech finance benefit the vast number of scientific and technological small and medium-sized enterprises in the province and stimulate the innovative vitality of the whole province.

5.3 Giving Priority to Meeting Resource Demands and Promoting Key Industries to Tackle Key Problems

The “14th five-year Plan” period is not only the first five years after our country built a moderately prosperous society in an all-around way and achieved the first centenary goal, during which we should take advantage of the situation to strive for the realization of the second centenary goal. It is a critical period for our country to seize rare opportunities, withstand various challenges and expand new space for development. Guangdong Province should seize the opportunity to focus on major scientific and technological projects and the transformation and implementation of significant scientific and technological achievements, give priority to meet the demand for factor resources in critical industries such as the new generation of information technology industry, biological industry, high-value equipment and new materials industry, green and low-carbon industry, and actively use policy financial instruments and market-oriented means to give full play to the guiding role of monetary funds, to provide enterprises in key industries with solid sci-tech credit, venture capital and professional investment and financing services in multi-level capital markets, such as STAR board, second board, equity trading, and special bonds. At the same time, the government should support the establishment of science and technology branches, science and technology micro-loan companies, and other financial institutions covering the whole province and encourage financial institutions to develop credit products and new types of insurance aimed at enterprises in key industries in Guangdong Province, to achieve investment and loan linkage with venture capital and equity investment institutions and increase financial support to innovative enterprises in key industries in the province, and pay attention to the guidance and allocation of innovative factor resources, which will promote the smooth development of key industries and the transformation and upgrading of the province’s industries.

5.4 Optimizing the Regional Layout of Resources and Help Improving the Quality and Efficiency of High-Tech Zones

In the planning and layout of sci-tech finance in Guangdong Province, the government should make full use of the existing regional clusters such as high-tech zones, industrial parks, and innovation bases to carry out the supporting construction of sci-tech financial system and promote science and technology agglomeration and financial agglomeration at the same time to maximize the regional agglomeration effect of sci-tech finance. Especially in the background of the new era when high-tech zones emphasize high-quality development, Guangdong Province should continue to promote the full coverage of state-level high-tech zones on cities and use the regional advantages of innovative resources agglomeration in high-tech zones, and lay out and build a number of sci-tech financial service institutions, such as equity financing, guaranteed loans, finance insurance, restructuring and listing to improve the sci-tech financial service system in the province. At the same time, Guangdong Province should deepen and promote the pilot work of sci-tech finance, encourage all high-tech zones in the province to set up special funds for innovation and development, unite policy banks and development financial institutions to provide financial concessions and credit support to technological small and medium-sized enterprises in high-tech zones, actively introduce social capital to stimulate financing vitality, and guide the centralized allocation of resources through the construction of diversified sci-tech financial service mechanisms, which will finally enhance the core capacity of innovation and entrepreneurship in high-tech zones in Guangdong Province and promote the overall improvement of quality and efficiency in high-tech zones.

5.5 Combining High-Quality External Resources to Build Guangdong-Hong Kong-Macau Greater Bay Area International Science and Technology Innovation Center

The construction of Guangdong-Hong Kong-Macau Greater Bay Area is an essential strategy for our country to implement the principle of “one country, two systems” and promote economic development in the new era. As an important window for the mainland to open to the outside world, Guangdong Province must firmly seize this important historical opportunity, sorting out its own sci-tech financial practices and achievements, and seeking opportunities for deep cooperation with Hong Kong and Macao, which have absolute capital market advantages and cutting-edge science and technology industries. What’s more, the province should also actively attract high-quality global resources to build a diversified, international and trans-regional investment and financing system for scientific and technological innovation, and give full play to the experimental and exemplary role of major platforms such as Shenzhen-Hong Kong modern service industry cooperation zone in Qianhai, demonstration zone of all-round cooperation among Guangdong, Hong Kong and Macao in Nansha, and demonstration zone of in-depth cooperation among Guangdong, Hong Kong and Macao in Hengqin to drive the nine cities in the Pearl River Delta to build characteristic industrial parks jointly, speeding up the construction of the “Guangzhou-Shenzhen-Hong Kong-Macao” Science and Technology Innovation Corridor, and building international science and technology innovation center in Guangdong-Hong Kong-Macau Greater Bay Area.

6 Conclusions

Based on fully affirming the representativeness and pioneer role of the government work of sci-tech finance in Guangdong Province, this paper summarizes the government practice of sci-tech finance in Guangdong Province in recent years, dividing the government mechanism of sci-tech finance in Guangdong Province into three aspects: guidance-incentive mechanism, service-guarantee mechanism, and supervision-constraint mechanism. At the same time, from the perspective of resource allocation, this paper points out that there are five problems in the government mechanism of sci-tech finance in Guangdong Province, including the macroscopic management system is too scattered, the multi-level investment and financing system should be improved, the status of national strategic emerging industries is not highlighted, the regional agglomeration effect of resources is not given full play, and high-quality external resources are not introduced. The Guangdong provincial government needs to evaluate the existing resources as soon as possible and take targeted measures to promote the work of sci-tech finance.

Due to the use of a single case qualitative study, there are some limitations in the process and results of this study. Further Studies can focus on making typical case studies in many domestic and foreign regions or conducting quantitative research combining cross-sectional data or time-series data to deeply analyze the government's resource allocation mechanism and efficiency to support the development of sci-tech finance.

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