

Science and Technology Innovation Development Status and Policy Optimization Research in Wenzhou

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Abstract

With the continuous development of the global economy and the increasingly fierce competition, local governments play an important role in promoting economic growth and enhancing competitiveness. As an important window of China's reform and opening up and an economically developed region, Wenzhou has unique experience and characteristics in terms of innovation policies, R&D investment and innovation performance. This paper aims to explore the relationship between Wenzhou's innovation policy, R&D investment and innovation performance, examine the implementation status of existing science and technology innovation policies, explore the incentive effect and mechanism of regional innovation policies on enterprise science and technology innovation, and thus put forward Wenzhou's scientific and technological innovation . development path.

Keywords

Innovation Policy; R&D Input; R&D Output; Innovation Performance.

1. Introduction

Technological innovation is an important driving force for social progress and economic growth. In an era of increasingly fierce global competition, local governments need to formulate innovation policies and increase R&D investment to achieve sustainable innovation performance. Both theoretical research and empirical research have proved that R&D activities will cause market failure, and enterprises cannot enjoy all the results of R&D activities, so that the R&D investment level of enterprises cannot reach the optimal level, so it is necessary for the government to intervene in it . Based on the perspective of R&D investment, this paper explores the relationship between innovation policy and technological innovation, and their important role in promoting future development.

2. The Mechanism of Innovation Policy Supporting Technological Innovation of Enterprises

Innovation policy refers to a series of policies and measures implemented by the government to promote scientific and technological innovation. These policies and measures include financial support, tax incentives, intellectual property protection, industry-university-research cooperation mechanisms, and more.

2.1. Financial Support Mechanism

The government supports the scientific and technological innovation activities of local enterprises through various financial funds. Financial support mechanisms include the establishment of scientific and technological innovation funds, scientific and technological achievements transformation funds, technology business incubation funds, etc., providing financial subsidies, research and development funds, etc., which can effectively reduce the research and development costs of enterprises and enhance the motivation of enterprises to

innovate. It includes the establishment of scientific and technological innovation funds, scientific and technological achievements transformation funds, technological business incubation funds, financial subsidies and the provision of research and development funds, etc. First, the establishment of a science and technology innovation fund means that the government provides financial support for local enterprises through the establishment of a science and technology innovation fund for carrying out scientific and technological innovation activities. The Science and Technology Innovation Fund can be used to support the expenditures of enterprises in scientific research projects, new product development, technological transformation, patent applications, etc., which will help reduce the research and development costs of enterprises and improve their technological innovation capabilities. Second, the establishment of the scientific and technological achievements transformation fund means that the government provides financial support for local enterprises through the establishment of the scientific and technological achievements transformation fund, which is used to transform scientific research achievements into practical applications and economic benefits. The scientific and technological achievements transformation fund can be used to support enterprises in the industrialization of scientific and technological achievements, technology transfer, technical consultation, technical services, etc., which will help improve the economic and social benefits of scientific and technological achievements. Third, the establishment of technology business incubation funds means that the government provides financial support for technology-based enterprises in the start-up stage through the establishment of technology-based business incubation funds, which are used to incubate, cultivate and support the development of technology-based enterprises. The science and technology business incubation fund can be used to support the expenses of research and development, production, market development, personnel training and other aspects of technology-based enterprises, which will help improve the viability and development potential of technology-based enterprises. Fourth, the provision of financial subsidies means that the government provides direct financial support for local enterprises through the establishment of various financial subsidy policies, which are used to reduce the R&D costs and operating costs of enterprises and enhance the innovation motivation of enterprises. Financial subsidies can take various forms, such as research and development subsidies, tax subsidies, financing subsidies, talent introduction subsidies, etc., and are determined according to the actual needs of enterprises and policy objectives. Fifth, providing research and development funds means that the government provides financial support for local enterprises to carry out scientific and technological innovation activities through the provision of research and development funds. R&D funds can take various forms, such as grants for scientific research projects, research grants for graduate students, special funds for technology development, etc., which help to improve the R&D level and technological innovation capabilities of enterprises.

2.2. Tax Incentive Mechanism

Through preferential tax policies, tax exemptions or tax reductions and exemptions can be given to eligible scientific and technological enterprises and transformation projects of scientific and technological achievements. This will help reduce the tax burden of enterprises and increase R&D investment and innovation benefits of enterprises. Innovation policies The preferential tax mechanism for supporting technological innovation of local enterprises usually includes the following aspects.

First of all, the government can deduct the R&D expenses actually incurred by the enterprise after calculating the enterprise income tax. This means that after calculating the taxable income, the enterprise can deduct a certain percentage of R&D expenses to reduce the tax amount of the enterprise, thereby increasing the disposable funds of the enterprise and promoting scientific and technological innovation activities. Second, the government can give a certain

percentage of tax incentives to enterprises' income from technology transfer. This means that enterprises can enjoy lower tax rates or tax-free treatment when they transfer their technological achievements to other enterprises, thus encouraging enterprises to carry out technology transfer and the promotion and application of scientific and technological achievements. In addition, the government can provide a series of tax incentives to technology-based small, medium and micro enterprises. This includes reducing and exempting corporate income tax, reducing and exempting value-added tax, and reducing and exempting urban maintenance and construction taxes to reduce the tax burden of small, medium and micro technology-based enterprises and enhance their innovation capabilities and competitiveness. Finally, the government can give tax incentives to companies that settle in technology business incubators. This includes reducing or exempting corporate income tax, reducing or exempting value-added tax, reducing or exempting land use tax, etc., to encourage enterprises to settle in the incubator and promote the incubation and transformation of scientific and technological achievements.

2.3. Intellectual Property Protection Mechanism

By improving the intellectual property protection system, encourage enterprises to strengthen technological innovation and intellectual property protection, and improve the competitiveness and innovation capabilities of enterprises. At the same time, strengthening the protection of intellectual property rights can also promote the transformation and application of technological innovation achievements. First, build and support intellectual property protection service agencies to provide professional intellectual property protection services for local enterprises. These institutions can provide support in intellectual property application, rights protection, evaluation, etc., and help enterprises protect and manage intellectual property rights. Second, set up special funds to support local enterprises in intellectual property protection. These funds can be used to subsidize intellectual property application fees, support infringement litigation costs, and promote enterprises to actively protect their own intellectual property rights. Third, improve laws and regulations on intellectual property rights and strengthen the legal protection of intellectual property rights protection. This includes revising and improving relevant laws and regulations, intensifying the crackdown on infringements, and improving the effectiveness and operability of intellectual property protection.

2.4. Talent Platform Mechanism

In terms of the cultivation of scientific and technological talents in enterprises, it is inseparable from the support of government policies and platforms for scientific and technological talents. By establishing a talent platform mechanism, the government can effectively promote the technological innovation capabilities of local enterprises, attract and train outstanding scientific and technological innovation talents, and promote the sustainable development of the local economy.

First of all, set up an innovative talent training plan and provide financial support and incentives to attract and train the scientific and technological innovation talents needed by local enterprises. This includes the establishment of scientific and technological innovation talent training programs, scholarship programs, research personnel dispatch programs, etc., to cultivate and attract high-level scientific and technological talents. Secondly, formulate talent introduction policies to provide preferential conditions for local enterprises to attract high-level scientific and technological innovation talents. This could include providing incentives such as tax breaks, housing subsidies, and children's education benefits to attract talent to join local businesses and promote technological innovation. Third, establish an innovative talent exchange platform to promote talent flow and cooperation among enterprises, universities, and research institutions. Through the establishment of cooperative research and development

projects, shared laboratories, and joint training of doctoral students, etc., the exchange and cooperation of talents will be promoted, and the synergy of scientific and technological innovation will be strengthened. In addition, establish an evaluation mechanism for scientific and technological innovation talents to ensure that the contributions of scientific and technological innovation talents are fully recognized and rewarded. By establishing an evaluation index system for scientific and technological innovation achievements, providing performance rewards and title promotion mechanisms to encourage talents to actively participate in scientific and technological innovation activities. Finally, establish an innovative talent service platform to provide local enterprises with services such as talent recruitment, talent training, and talent evaluation. Such a platform can provide functions such as talent information release, job matching, and training resource sharing, helping companies better attract and manage scientific and technological innovation talents.

2.5. Industry-university-research Cooperation Mechanism

By strengthening industry-university-research cooperation, enterprises and scientific research institutions are encouraged to carry out cooperative research and jointly develop new technologies, new products and new processes. This will help transform scientific research results into innovative products and services for enterprises, and promote the application of scientific and technological innovation results. First, set up industry-university-research cooperation bases, provide venues and facilities, and promote cooperation and exchanges among enterprises, universities and scientific research institutions. The base can provide resources such as shared laboratories and R&D centers, and provide a platform for cooperation between enterprises and research institutions. Second, encourage enterprises, universities and scientific research institutions to carry out joint research and development projects to jointly solve practical and technical problems. Through resource sharing, technology exchange and experience sharing, the cooperation and innovation among the three parties of industry, university and research will be strengthened. Third, promote technology transfer and transformation between industry, university and research institutes, and help enterprises transform scientific research results into actual productivity. Promote the application and promotion of scientific and technological achievements by establishing technology transfer institutions and professional teams to provide support services such as technology evaluation and market transformation. Fourth, promote the exchange and training of talents between industry, university and research institutes, and improve the professional level and innovation ability of cooperative personnel. For example, organize enterprise employees to go to universities or scientific research institutions for exchange and study, or send experts and scholars to enterprises for technical guidance and training. Fifth, encourage intellectual property sharing and cooperation between industry, university and research institutes. By establishing a reasonable mechanism for the division and sharing of intellectual property rights, the legitimate rights and interests of all parties are protected, and the cooperation and development of technological innovation are promoted. Sixth, set up a reward mechanism to give rewards and honors to enterprises, universities and scientific research institutions that successfully implement industry-university-research cooperation projects. This can encourage all parties to actively participate in cooperation and promote the in-depth development of industry-university-research cooperation.

2.6. Financial Support Mechanism

The financial support mechanism can provide diversified financial support and risk protection, reduce the innovation risk and financing cost of enterprises, encourage local enterprises to increase investment in technological innovation, and promote economic transformation, upgrading and sustainable development. First, the government can set up an innovation and entrepreneurship fund to provide venture capital and equity investment support to local

enterprises. These funds can be used to fund research and development projects, technology transformation and marketing of start-ups, etc., to help companies overcome the initial funding difficulties. Second, cooperate with financial institutions to provide innovative loan and guarantee services for local enterprises. By setting up innovative loan products, reducing loan interest rates, and providing guarantee measures, etc., it provides financing support for enterprises and reduces innovation risks. Third, promote the establishment of a technology insurance system to provide local enterprises with insurance protection for risks in technology innovation. This includes the risk of failure of R&D projects, the risk of intellectual property infringement, etc., to reduce the economic pressure of enterprises and encourage investment in innovation. In addition, formulate tax incentive policies to provide local enterprises with tax breaks or exemptions for innovation-related expenditures. This includes preferential policies for research and development expenses, intellectual property application fees, and scientific and technological service fees to reduce the burden on enterprises and encourage innovation investment. Finally, establish a technological financial service platform to provide local enterprises with services such as financial consulting, financing connection, and risk assessment. Through the integration of financial resources and professional service agencies, it helps enterprises solve financing problems and provides comprehensive financial support.

To sum up, there are various mechanisms for innovation policy to support the technological innovation of local enterprises. These mechanisms cooperate with each other and promote each other to form a complete policy system, which can effectively promote the technological innovation and industrial upgrading of local enterprises.

3. Current Status of Scientific and Technological Innovation and Development in Wenzhou

3.1. The Current Situation of the Comprehensive Development of Wenzhou's Scientific and Technological Innovation

At present, Wenzhou's scientific and technological innovation capabilities have been continuously enhanced, with remarkable results. As a city with a strong commercial atmosphere and entrepreneurial spirit, Wenzhou has entered the top 20 in the country in the 2020 ranking of China's urban innovation competitiveness, and its ranking has improved. However, its comprehensive innovation competitiveness ranking still ranks in the second echelon, and there is still a certain gap with Hangzhou, Shenzhen, Wuhan and other cities (as shown in Table 1). Therefore, Wenzhou should also increase innovation incentives, improve regional innovation capabilities, and promote corporate competitiveness.

The China City Innovation Competitiveness Ranking is based on the three indicators of each city's patent score, R&D investment score and innovative enterprise score to measure a city's comprehensive innovation competitiveness. According to the data in 2020, we can see that, first of all, Wenzhou has a patent score of 0.1164, ranking 19th in the ranking. Although Wenzhou's patent innovation level is relatively low compared with some innovative cities such as Beijing, Shenzhen and Shanghai, Wenzhou has achieved certain results in patent innovation, which shows that Wenzhou's innovation ability is gradually improving. In addition, Wenzhou's R&D investment score is 0.0573, ranking 23rd in the ranking. Compared with some cities with more investment, such as Beijing, Shenzhen and Hangzhou, Wenzhou still lacks in R&D investment. However, this does not mean that Wenzhou has no potential for innovation, but more reflects that it needs to further increase its efforts in R&D investment. Finally, Wenzhou's innovative enterprise score is 0.0109, ranking 24th in the ranking. This shows that although Wenzhou's performance in terms of innovative enterprises is relatively lagging, this does not fully measure Wenzhou's innovation power as a business center and entrepreneurial city. Wenzhou has attracted the development of many small and medium-sized enterprises with its unique

business model and entrepreneurial environment, and the innovation capabilities of these enterprises play an important role in the overall innovation ecosystem.

To sum up, although Wenzhou still has a gap in innovation competitiveness compared with some innovative cities, as a business center and entrepreneurial city, Wenzhou has a certain performance in patent innovation, R&D investment and innovative enterprises. Demonstrate its potential and efforts in the field of innovation.

Table 1. Ranking of China's Cities' Innovation Competitiveness in 2020

ranking	City	patent score	Patent ranking	R&D investment score	R&D investment ranking	Innovative Enterprise Score	Innovative Enterprise Ranking	ranking changes (compared to 2019)
1	Beijing	0.8124	2	1	1	1	1	→
2	Shenzhen	1	1	0.5417	3	0.5736	3	→
3	Shanghai	0.5456	3	0.4702	4	0.5772	2	→
4	Guangzhou	0.5265	4	0.2106	14	0.3388	4	→
5	Suzhou	0.4399	5	0.2982	8	0.2544	5	→
6	Hangzhou	0.3038	6	0.3326	5	0.1964	6	↑
7	Xi'an	0.1515	16	0.7382	2	0.0782	14	↑
8	Nanjing	0.2768	7	0.3132	6	0.1243	9	↑
9	Tianjin	0.2439	9	0.305	7	0.1387	8	↓
10	Dongguan	0.2658	8	0.1674	15	0.1532	7	↓
11	Wuhan	0.1929	12	0.25	12	0.1191	10	↑
12	Foshan	0.2286	10	0.0968	twenty two	0.1175	11	→
13	Chengdu	0.2123	11	0.1628	16	0.0986	12	↓
14	Ningbo	0.1775	13	0.2513	11	0.0356	19	↓
15	Wuxi	0.1465	17	0.2691	9	0.0709	15	↑
16	Qingdao	0.1649	15	0.104	twenty one	0.0841	13	↑
17	Hefei	0.1184	18	0.264	10	0.0514	18	↓
18	chongqing	0.1655	14	0	25	0.0648	16	↓
19	Xiamen	0.065	twenty two	0.2324	13	0.0143	twenty two	↑
20	Wenzhou	0.1164	19	0.0573	twenty three	0.0109	twenty four	↑

3.2. Current Status of R&D Investment in Wenzhou

3.2.1. R&D Expenditures in Wenzhou

Figure 1 shows the R&D expenditure in Wenzhou during the five years from 2017 to 2022. On the whole, Wenzhou's R&D expenditure has grown rapidly in recent years. Wenzhou's expenditures have shown a straight - line upward trend, from 10.551 billion yuan in 2017 to 18.27 billion yuan in 2021, a full increase of 1.73 times. As Wenzhou attaches great importance to technological innovation of industrial enterprises, R&D expenditures are also increasing with the number of R&D projects, and R&D expenditures will maintain a state of increasing year by year in the next few years. However, compared with Hangzhou, there is still a large gap in its R&D expenditure. In 2021, Hangzhou's R&D expenditure was 3.65 times that of Wenzhou, and Wenzhou's R&D expenditure only accounted for 8.47% of the province's total expenditure, ranking fourth in the ranking of R&D expenditure among cities in the province.

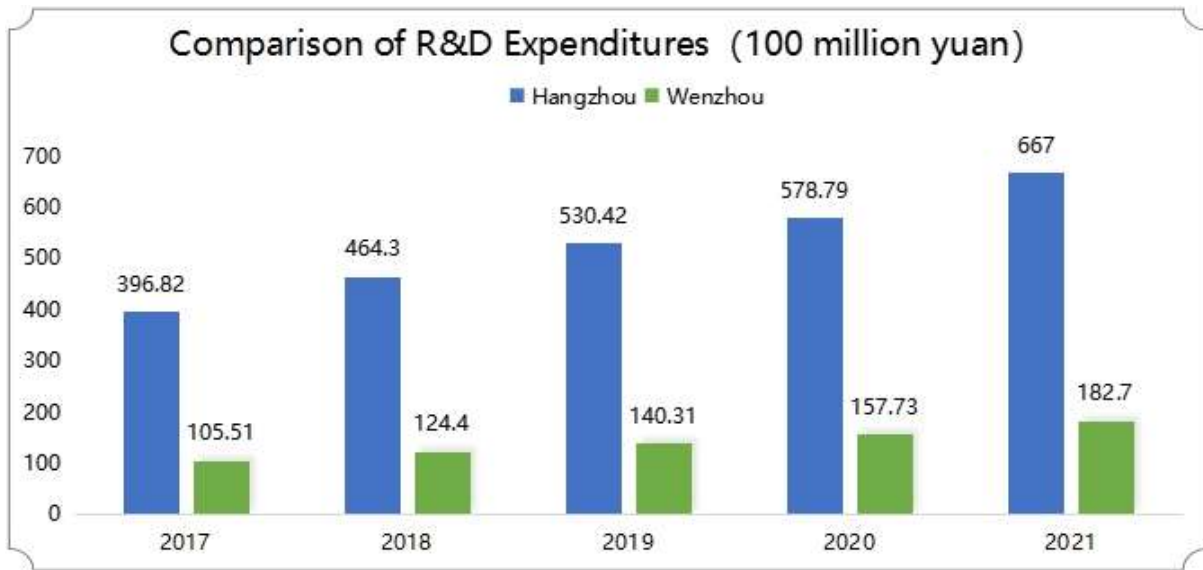


Figure 1. Comparison of R&D expenditures between Wenzhou and Hangzhou in 2017-2021

What needs to be noticed is that the ratio of Wenzhou's R&D expenditure to the regional GDP is lower than the average level of the province, which is not commensurate with Wenzhou's economic development level. Table 2 reflects the changes in the proportion of R&D expenditures in Wenzhou and the whole province in GDP from 2017 to 2021. It can be seen from the table that in 2017 Wenzhou 's R & D expenditure accounted for 1.95% of the city 's GDP, which was far lower than the provincial average of 2.45 %. In 2021, the proportion of Wenzhou's R&D expenditures in the region's GDP has increased, accounting for 2.41 %, but it is still lower than the average level of 2.94% in the whole province, ranking only sixth in the province. This shows that although Wenzhou's R&D investment funds show a steady growth trend in terms of overall value, there is still a clear gap with the top few developed cities in the province, and the R&D investment intensity is insufficient and the motivation is not enough, which is lower than the province's tie level.

Table 2. The ratio of R&D expenditure to GDP in various cities in Zhejiang Province

	2017	2018	2019	2020	2021
Total in Zhejiang Province	2.45%	2.57%	2.68%	2.88%	2.94 %
Hangzhou	3.15%	3.44%	3.45%	3.59%	3.68 %
Ningbo	2.46%	2.57%	2.70%	2.86%	2.76 %
Wenzhou	1.95%	2.07%	2.12%	2.30%	2.41 %
Jiaxing	2.80%	2.91%	3.07%	3.31%	3.30 %
Huzhou	2.65%	2.80%	2.79%	3.09%	3.12 %
Shaoxing	2.40%	2.41%	2.65%	2.80%	2.87 %
Jinhua	1.69%	1.73%	1.85%	2.01%	2.26 %
Quzhou	1.40%	1.46%	1.61%	1.79%	2.00 %
Zhoushan	1.16%	0.84%	1.06%	1.74%	2.00 %
Taizhou	1.89%	1.82%	1.99%	2.26%	2.41 %
Lishui	1.30%	1.44%	1.66%	1.83%	2.00 %

3.2.2. Investment of R&D Personnel in Wenzhou

Table 3 shows the input of R&D personnel in various cities in Zhejiang Province from 2017 to 2021. According to the statistical data, we can see that the R&D team in Wenzhou is constantly

growing. Especially during the four years from 2017 to 2020, Wenzhou's research and development personnel have developed rapidly. In 2020, the equivalent full-time equivalent of R&D personnel in Wenzhou was 63,700 person-years, which was 1.41 times that of 2017 (45,100 person-years), indicating that R&D personnel grew rapidly.

It is worth mentioning that although the number of R&D personnel in Wenzhou continues to grow, the number of R&D personnel will shrink for the first time in 2021. The equivalent full-time equivalent of R&D personnel in Wenzhou has shrunk from 63,700 person-years in 2020 to 58,800 person-years in 2021, indicating that Wenzhou's investment in R&D personnel has weakened, and new innovation policies are needed to attract innovative R&D personnel.

Compared with other cities in Zhejiang Province, Wenzhou's R&D personnel investment has remained stable in recent years, ranking third in the province. According to the full-time equivalent equivalent of R&D personnel in each city in the province, the top three cities are Hangzhou, Ningbo, and Wenzhou. Although Wenzhou ranks third in terms of R&D personnel investment in the province, it is far behind the top two. In 2021, the equivalent full-time equivalent of R&D personnel in Hangzhou is 138,100 person-years, 113,900 person-years in Ningbo, but only 58,800 person-years in Wenzhou, only half of Hangzhou and Ningbo. This shows that although there is still a big gap between Wenzhou and the top two cities in terms of investment in R&D personnel, it is necessary to further increase the investment in R&D personnel.

Table 3. Full-time equivalent equivalent of R&D personnel in cities of Zhejiang Province (10,000 person-years)

	2017	2018	2019	2020	2021
Hangzhou	10.32	10.95	12.63	14.94	13.81
Ningbo	8.32	9.47	10.49	10.74	11.39
Wenzhou	4.51	5.58	6.61	6.37	5.88
Jiaxing	3.44	4.3	4.69	5.3	5.42
Huzhou	1.88	2.35	2.71	3.18	3.13
Shaoxing	3.77	4.31	4.99	5.39	5.02
Jinhua	2.5	3.1	4.03	4.54	4.74
Quzhou	0.57	0.57	0.79	0.93	1.1
Zhoushan	0.39	0.38	0.53	0.56	0.42
Taizhou	2.97	3.37	4.33	4.7	5.08
Lishui	0.54	0.69	1.03	1.11	1.07

Note : R&D personnel are counted according to " full-time equivalent (10,000 people- years)" , that is , the full-time R&D personnel among the R&D personnel are calculated as one equivalent; the remaining half-time and part-time R&D personnel are calculated according to their actual R&D activities. The working time ratio is used to calculate the equivalent, and the sum of the two is the total number of "full-time equivalent" R&D personnel of the unit.

3.3. Current Status of R&D Output in Wenzhou

Figure 2 shows the patent authorization situation in Wenzhou in the past five years. Compared with Hangzhou, although the number of patent authorizations in Wenzhou is increasing year by year, the growth rate is slow. In terms of vertical comparison, the number of patent applications granted in Wenzhou in 2017 was 29,511, and it reached 61,313 in 2021, which is 2.08 times that of 2017; in contrast, the number of patent applications granted in Hangzhou in 2021 is 143,912, an increase of 2.90 times compared with 2017. In terms of horizontal comparison, the number of patent applications granted in Wenzhou in 2021 is only half of that in Hangzhou. Although the number of patents granted in Wenzhou is not growing fast, there are relatively many high-quality innovations represented by inventions, and their growth rate is

fast. From 2017 to 2020, the number of invention patent authorizations in Wenzhou has increased year by year, and the growth rate is getting faster and faster. In 2017, the number of invention patents granted in Wenzhou was 2,758, and in 2020 it will reach 7,189, which is 2.61 times that of 2016. Relatively speaking, there were 9,872 invention patents in Hangzhou in 2017, and 17,327 in 2020, a growth rate of only 1.76 times. This shows that in the four years from 2017 to 2020, compared with Hangzhou, although the number of invention patents granted in Wenzhou is small, its growth rate is much higher than that of Hangzhou, which shows that Wenzhou has a relative advantage in high-quality innovation represented by invention.

However, the number of discoveries in Wenzhou and Hangzhou in 2021 will show a reverse growth trend. In 2021, Hangzhou's invention patents continued to grow, reaching 22,948, an increase of 32.4% compared to the previous year; while in 2021, Wenzhou's invention patents fell for the first time in recent years, with only 5,218, compared with the previous year. A one-year decline of 27.4%. This shows that if Wenzhou wants to further maintain the upward trend, it needs more innovation policies to attract innovative talents and support technological innovation of enterprises.

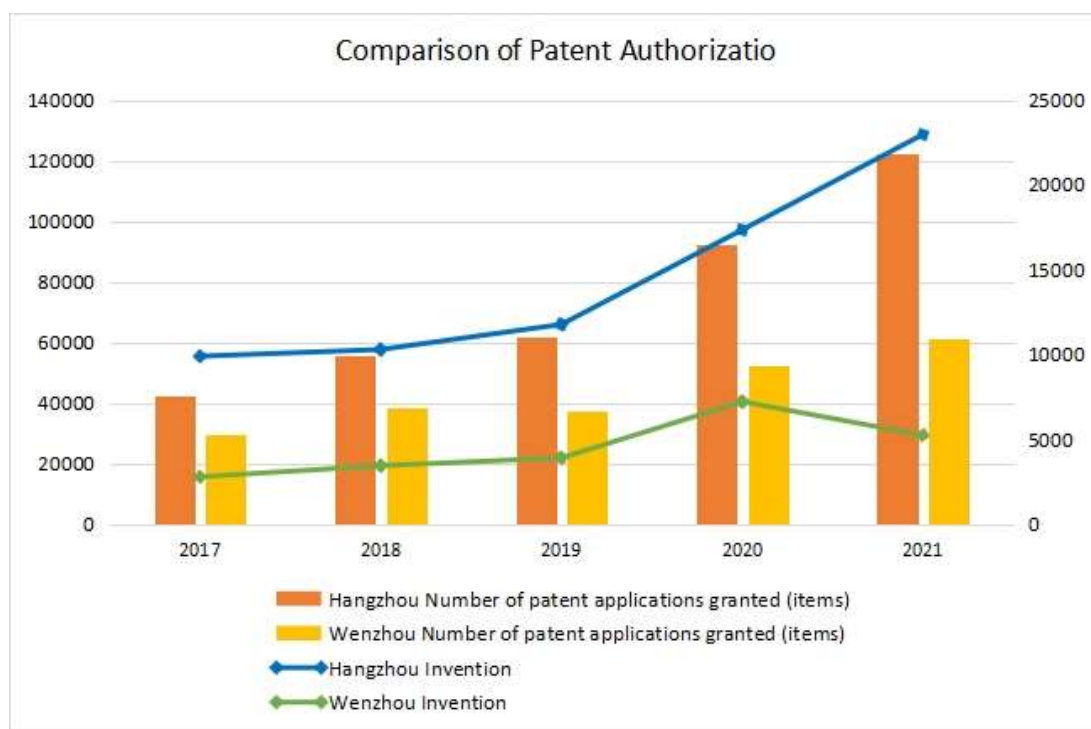


Figure 2. Comparison of patent authorization between Wenzhou and Hangzhou from 2017 to 2021

4. Overview of Wenzhou Science and Technology Innovation Policies

Wenzhou has been promoting innovative development. In recent years, with the goal of high-quality development, Wenzhou has promulgated a series of innovative policies in terms of scientific and technological innovation leadership, intellectual property protection, preferential tax policies, construction of science and technology parks, and introduction of innovative and entrepreneurial talents around the strategic planning of scientific and technological development. support.

4.1. Leading by Scientific and Technological Innovation.

Wenzhou is committed to creating an urban development model led by technological innovation and promoting the transformation and upgrading of traditional industries. In 2023,

the Wenzhou municipal government launched "Several Policies on Promoting High-quality Economic Development" (referred to as the "8+4" policy system), proposing to fully integrate the four elements of finance, natural resources, energy, and talents into for the 8 major policy areas including scientific and technological innovation, further refine the policy system and promote Wenzhou's scientific and technological innovation leadership.

4.2. Construction of Science and Technology Parks.

Wenzhou has built several science and technology parks, including Ouhai Science and Technology City, Lucheng Science and Technology City and Longwan Science and Technology City, providing high-quality scientific research and office space to help enterprises gather and innovate. The "Wenzhou Science and Technology Small and Micro Enterprise Innovation Park Construction Implementation Plan" and "Wenzhou City's Ten Policies for Promoting the Innovation and Development of the Software and Information Service Industry" successively proposed to create an innovation cluster park, clearly promoting the gathering of innovation elements to enterprises, and stimulating the innovation vitality of enterprises.

4.3. Supporting Innovation in Colleges and Universities.

Wenzhou City supports the cooperation between universities and enterprises to jointly promote the transformation of scientific and technological achievements. In 2020, Wenzhou City promulgated the "Wenzhou Vocational Education School-Enterprise Cooperation Promotion Measures" (referred to as "Measures"). The policy will promote the establishment of an industry-education integration alliance, promote the organic integration of the education chain, talent chain, industry chain, and innovation chain, and enhance the ability of vocational education to serve economic and social development. In addition, the implementation of the "Implementation Plan for Promoting the Integrated Development of Vocational Education and the Private Economy to Boost the Construction of a "Vigorous Wentai" (2021-2023)" will fully mobilize the enthusiasm of both schools and enterprises, which will help optimize the integration of production and education, and deepen the school-enterprise One. In addition, Wenzhou City also encourages colleges and universities to build science and technology parks to attract more innovative enterprises to settle in.

4.4. Strengthen the Introduction of Innovative And Entrepreneurial Talents.

The key to scientific and technological innovation lies in talents, and the introduction of high-level talents is the prerequisite for the optimal allocation of human resources. To this end, the Wenzhou Municipal Government has promulgated a series of talent policies to encourage innovative and entrepreneurial talents to develop in Wenzhou, and provide them with corresponding talent policies and supporting services. With the "Wenzhou City Leading Innovation and Entrepreneurship Talent Award Funding Implementation Measures (Trial)", "Wenzhou City Leading Innovation and Entrepreneurship Team Introduction and Cultivation Implementation Measures" and "On Vigorously Implementing the Ouyue Talent Plan to Build a High-level Important Talent Center in Southern Zhejiang and The launch of a series of measures such as the 40 Opinions of Innovation Heights (referred to as "40 New Deals for Wenzhou Talents") has brought a certain driving effect to the introduction of high-level talents in Wenzhou.

4.5. Promote the Protection of Intellectual Property Rights.

Wenzhou strengthens the protection of intellectual property rights, improves the management and service system of intellectual property rights, and improves the innovation ability and competitiveness of enterprises.

5. Comparison of Science and Technology Innovation Policies in Typical Cities

According to the reality of urban science and technology innovation development and the principle of comparability, the science and technology innovation policies of Hangzhou, Shenzhen and Wuhan are selected for classification research and analysis, in order to provide reference for Wenzhou's science and technology innovation policies.

5.1. Overview of Science and Technology Innovation Policies in Hangzhou

As a national science and technology innovation center city, Hangzhou has always attached great importance to technological innovation and has rich innovation support policies. In recent years, Hangzhou's science and technology innovation policy has been continuously strengthened, and the policy covers "Hangzhou City Artificial Intelligence Industry Three-Year Action Plan (2018-2020)", "'Double Innovation' Talent Policy", "Hangzhou Science and Technology Small and Medium-sized Enterprises Promotion Quality and Efficiency Improvement Action Plan" and the establishment of a 5 billion yuan Hangzhou Science and Technology Innovation Investment Guidance Fund, etc.

The promulgation of these policies marks that Hangzhou has increased its investment in technological innovation and financial strength, and implemented a more active and promising industrial policy. By formulating development plans to determine the direction, increasing talent and financial support, promoting the optimization and upgrading of the industrial structure, and helping the growth of small and medium-sized enterprises, the rapid development of Hangzhou's technological innovation is imperative. This will surely inject strong impetus into the development of Hangzhou's technological innovation, and promote the continuous acceleration of Hangzhou's process of building a national independent innovation demonstration zone and a technological innovation center city. This also reflects the grand blueprint of the Hangzhou Municipal Government to promote a strong city through science and technology and implement an innovation-driven development strategy.

In addition, Hangzhou proposed to implement the "Hangzhou Science and Technology Innovation 2025 Action Plan". This is a programmatic document for the development of science and technology innovation in Hangzhou. It includes 47 specific actions in 8 categories, including strengthening original innovation, expanding high-tech enterprises, accelerating the cultivation of emerging industries, promoting the deep integration of industry, education and research, strengthening intellectual property protection, and improving technology finance. Support and optimize the talent policy environment and increase social participation in science and technology, etc. The release of this document points out the direction for Hangzhou's industrial transformation and upgrading.

5.2. Overview of Science and Technology Innovation Policies in Shenzhen

Shenzhen is the forefront of China's technological innovation, and frequently introduces technological innovation policies. In recent years, Shenzhen has continued to promulgate various policies to support technological innovation, including the implementation of the "Shenzhen 'Double Innovation' Talent Work Plan (2018-2022)", "Shenzhen Three-Year Action Plan for Accelerating the Construction of a National Independent Innovation Demonstration Zone (2018-2020)", etc.

The focus of Shenzhen's scientific and technological innovation work is to accelerate the construction of a national independent innovation demonstration zone, promote the high-quality development of scientific and technological innovation, and lead industrial transformation and upgrading with innovation. At the same time, Shenzhen implements the "Shenzhen High-Level Science and Technology Innovation Center Construction Action Plan

(2018-2022)", selects a group of high-level scientific research institutes and enterprises, and builds them into "Shenzhen Science and Technology Innovation Center" to accelerate technology-driven industrial upgrading pace of. In terms of talents, Shenzhen has implemented talent plans such as "Shenzhen Elites" and "Industrial Engineers", improved the talent evaluation system, and increased the introduction and training of high-level talents and policy support. This helps gather more high-end scientific and technological innovation talents. In addition, Shenzhen City encourages the establishment of the Shenzhen Science and Technology Finance Development Fund, guided by government investment, gathering social capital to promote the development of technology and finance formats, focusing on supporting technology-based start-ups, small and micro enterprises, etc., solving their financing problems, and boosting the industry of scientific and technological achievements change. It is particularly worth mentioning that the "Shenzhen Science and Technology Innovation 2025 Plan" is the top-level plan for Shenzhen's technological innovation, which points out the direction for industrial development. The plan proposes a development framework centering on "one district, one triangle, one belt and one center", to accelerate the construction of a world science and technology innovation center, and to form a science and technology innovation highland with global influence.

To sum up, Shenzhen has accelerated the reform of science and technology finance, improved policies for small and medium-sized enterprises and talents, and optimized the intellectual property environment, etc., reflecting Shenzhen's forward-looking and openness in the design of science and technology innovation policies. This will further stimulate the vitality of science and technology enterprises, encourage original innovation, and provide policy impetus for Shenzhen to build a science and technology innovation center.

5.3. Overview of Science and Technology Innovation Policies in Wuhan

In recent years, Wuhan has continuously pioneered and innovated in the design of science and technology innovation policies, and has made great progress. First of all, Wuhan formulated a development plan for technological innovation and determined the development blueprint for building a national independent innovation demonstration zone and a high-tech industrial base. This is the top-level design of technological innovation and points out the direction for industrial development. Secondly, Wuhan set up a 10 billion yuan scientific and technological innovation guidance fund to support high-tech research and development, transformation of achievements and development of emerging industries, which greatly expanded the financial strength of technological innovation. Thirdly, Wuhan implements a talent-first development strategy, intensifies the introduction of high-level talents, and implements the "Hundred Scholars Entering Han Plan" and the "Thousand Postdoctoral Scientific Research Workstation Project", which will help Wuhan gather more high-end scientific and technological talents. In addition, Wuhan has increased support for technology-based small and medium-sized enterprises and provided various subsidy support, which has created a good environment for the development of technology-based small and medium-sized enterprises. Finally, Wuhan has built an industry-university-research collaborative innovation platform, supported cooperation between universities, scientific research institutions and enterprises, and implemented industrial technology research institute construction projects, which promoted the industrial application of scientific and technological achievements.

The introduction of the above-mentioned technological innovation policy measures reflects the forward-looking and openness of Wuhan in the design of technological innovation policies, and has made great efforts in leading development, gathering resources, and promoting integration. Through the formulation of long-term plans and increased investment in various fields, Wuhan will definitely accelerate the construction of a national independent innovation demonstration zone and a high-tech industrial base, and then develop into a technological innovation center

city with global influence. At the same time, this also shows that Wuhan's science and technology innovation policy not only focuses on long-term positioning, but also closely follows the actual demands, and achieves a balance between guidance and stimulation.

6. Optimizing Path of Wenzhou's Innovation Policy

On the basis of an in-depth analysis of Wenzhou's innovation policies, and by interpreting and studying the actions of Shenzhen, Hangzhou, and Wuhan in terms of science and technology innovation policies, it can be seen that Wenzhou is increasingly clear about the strategic significance of science and technology innovation, but in terms of policy concepts and design Methods and other aspects still need to be improved. To this end, this paper gives the following innovation policy optimization path.

6.1. Establish Multiple Financing Channels to Support the Development of Science and Technology

First, expand sources of innovation funding. Encourage venture capital institutions, insurance funds, government investment funds and other capital to set up innovation funds, raise funds through multiple channels to invest in high-tech industries, and improve the marketization level of funds. In particular, Wenzhou has a lot of private capital and overseas Chinese capital, and the government can issue relevant preferential policies to guide these capitals to invest in innovative projects.

Second, expand direct financing channels. Improve the ability of the capital market to serve the real economy, increase support and financial incentives for high-tech companies to go public, and guide qualified companies to go public in domestic and foreign capital markets; support mergers and acquisitions in innovative industries, and promote industrial integration and optimization of innovative projects Layout; Encourage qualified high-tech enterprises to raise funds by issuing medium- and long-term bonds, short-term financing bonds, and medium-term notes to invest in enterprise innovation projects.

Third, broaden the indirect financing channels of enterprises. Encourage local governments to establish loan risk compensation mechanisms or financing guarantee institutions to support high-tech enterprises in obtaining commercial loans, and encourage high-tech enterprises to obtain financing through intellectual property pledges, equity pledges, etc.; establish a government innovation industry fund to support important high-tech projects Medium and long-term loan support, and increase support for high-tech enterprises with loan discounts.

6.2. Develop Key Industries and Regions to Generate Radiation and Driving Effects

Develop key industries, select representative, demonstrative, and oriented high-tech enterprises and major innovation projects, and carry out precise policy guidance, dynamic management, and tracking services. In recent years, Wenzhou is speeding up the construction of a technological and economic innovation development zone, which can support the development of a number of key industries and key enterprises, and give play to the radiation effect of these industries and enterprises, drive the construction and development of upstream and downstream related enterprises, and create a Wenzhou A unique science and technology innovation center. Wenzhou should release more preferential policies to attract outstanding talents to return to Wenzhou for local development, and drive the development of new formats, new enterprises, and new projects.

Develop key areas, coordinate and optimize the regional innovation layout, and create a regional innovation center with characteristics and advantages. Support the construction of high-tech industrial clusters, support the characteristic and high-end development of high-tech parks, guide the agglomeration and flow of innovation elements, promote the rational division

of labor in industries, promote the overall improvement of regional innovation capabilities and competitiveness, and encourage enterprises to use international innovation resources to enhance industrial development. , driven by market applications, to promote the continuous upgrading of technology and industry.

6.3. Optimizing Talent Policies

Talent is the core force of innovation. In terms of personnel training, increase investment in higher education in Wenzhou, encourage school-enterprise cooperation, cultivate compound and practical innovative talents, establish a high-tech talent training base, and regularly organize various talent training and advanced studies to keep pace with the times Advance and continuously improve the quality of talents. In terms of talent attraction, the government should strengthen talent policies, introduce competitive talent preferential policies, introduce top experts, talents and teams, and attract outstanding college students to settle in Wenzhou, especially Wenzhou college students studying outside the province or Wenzhou high-level talents return to Wenzhou for development, retain Wenzhou local talents, attract talents from outside the province, and help the development of Wenzhou's technological innovation.

6.4. Strengthen the Protection of Intellectual Property Rights

Strengthen the protection of intellectual property rights and reduce the risk of enterprise innovation. On the one hand, improve the relevant laws and regulations on intellectual property protection; on the other hand, strengthen the law enforcement of intellectual property protection, improve the linkage mechanism between administrative law enforcement and criminal justice, accelerate the construction of intellectual property rights protection center, and increase the punishment for intellectual property infringement. To effectively curb infringement by increasing the opportunity cost of violations.

The optimization of innovation policies needs to start from multiple levels, continuously improve and perfect through a series of paths, and establish a policy evaluation mechanism to achieve dynamic optimization and adjustment, and provide institutional guarantees for the construction of an innovative economic system in the region. This requires the government and the industry to attach great importance to and cooperate with each other to promote it together.

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