



A Study on Promoting the Integration of Science and Technology and Economy by University Entrepreneurship Incubation in Guangdong Province

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Abstract. This study focuses on the key role of entrepreneurship incubation in universities in Guangdong Province in promoting the integration of science and technology with the economy. Uses official data to present the current situation, reveals problems and proposes targeted optimization strategies, aiming to enhance the efficiency of entrepreneurship incubation in universities in Guangdong Province, promote the transformation of scientific and technological achievements into real productive forces, and achieve the deep integration of science and technology with the economy. Provide theoretical support and practical guidance for related work.

Keywords: Colleges and universities in Guangdong Province; Entrepreneurship incubation; The integration of technology and economy; Mechanism; Path

1 Introduction

Against the backdrop of the in-depth advancement of the innovation-driven development strategy, the deep integration of science and technology with the economy has become the core engine for high-quality regional development. As the source of knowledge innovation and the main battlefield for talent cultivation, the entrepreneurship incubation system constructed by universities plays an irreplaceable pivotal role in promoting the transformation of scientific and technological achievements and fostering innovative market entities. As a vanguard of China's economic development and a frontier of scientific and technological innovation, Guangdong Province's university entrepreneurship incubation work is confronted with unique opportunities such as the superimposition of policy dividends and a solid industrial foundation in the process of promoting the integration of science and technology with the economy. However, it also urgently needs to address practical challenges in aspects such as the efficiency of technology transfer and the mechanism of university-enterprise collaboration. ^[1]

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2 The Current Situation of Entrepreneurship Incubation in Colleges and Universities in Guangdong Province

2.1 The Number and Scale of Entrepreneurship Incubation Carriers in Universities

According to statistics from the Department of Education of Guangdong Province, by the end of 2024, there were over 300 various types of university entrepreneurship incubation carriers in Guangdong Province, covering forms such as university science and technology parks, maker Spaces, and entrepreneurship bases. These carriers provide support such as venues, equipment and funds for college teachers and students to start businesses. For instance, the Sanchuangying Mass Innovation Space of Guangzhou University (a national-level mass innovation space) has a construction area of 1,000 square meters and can provide 100 job positions. It focuses on college students' entrepreneurship, adding 20 to 30 new entrepreneurial teams every year. It has cultivated over 200 high-quality entrepreneurial teams and registered 142 enterprises in total. Introduce venture capital funds, carry out professional and market-oriented investment operations, and provide investment and financing services for entrepreneurial teams. The entrepreneurial team has cumulatively received 100 million yuan in social investment and financing, with a market value exceeding 1 billion yuan, and has created 2,000 jobs. ^[2]

2.2 Achievements of Entrepreneurship Incubation

Under the guidance of the innovation-driven development strategy, the entrepreneurship incubation work in colleges and universities in Guangdong Province has achieved fruitful results and presented numerous highlights. Take Guangzhou University Town as an example. By 2024, it has incubated and cultivated over 1,200 enterprises, much like a vibrant "cradle of innovation". It provides comprehensive support from the emergence of ideas to the implementation of enterprises for teams and individuals with dreams of innovation and entrepreneurship, helping countless innovative concepts thrive into market entities. In the field of technology transfer, regular colleges and universities in Guangdong Province demonstrated strong capabilities in 2024. A total of 2,022 technology transfer contracts were signed throughout the year, with a contract amount as high as 757.258 million yuan. The actual income for the year also reached 252.453 million yuan (Figure 1, Data source: Department of Education of Guangdong Province). Among them, Sun Yat-sen University has stood out particularly. The amount of technology transfer contracts is approximately 200 million yuan, and it has signed 332 technology transfer contracts (Table 1, Data source: Department of Education of Guangdong Province). It has taken the lead in the technology transfer race among universities in Guangdong Province, demonstrating the leading role of top universities in promoting the integration of scientific and technological innovation and economic development with its strong research capabilities and efficient ability to transform research results. Its comprehensive strength ranks among the top of universities in the province.

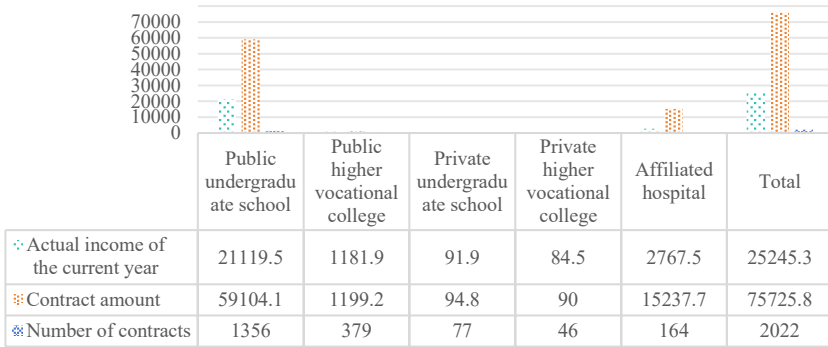


Fig. 1. Technology Transfer Amount of Guangdong Universities in 2024 (in ten thousand yuan)

Table 1. Top Five Statistics of Technology Transfer Contract Amounts in Guangdong Universities in 2024 (in ten thousand yuan)

Ranking	School name	Number of contracts	Contract amount	Actual income
1	Sun Yat-sen University	332	19234.7	2502.8
2	South China University of Technology	286	13883.4	9757.6
3	South China Agricultural University	83	1181.2	2022.1
4	Southern Medical University	16	1481.5	1481.5
5	Shenzhen University	27	4503	901.4

2.3 Policy Support System

Guangdong strictly implements the national tax and fee preferential policies for college graduates and other young people's entrepreneurship, and has formed a support system covering the entire entrepreneurship cycle. In the field of self-employment, college graduates who engage in individual business operations within the graduation year can have their value-added tax, urban maintenance and construction tax and other taxes and fees successively deducted up to a maximum of 14,400 yuan per household per year (the national benchmark is 12,000 yuan, and Guangdong implements a maximum increase of 20%). The implementation period is until December 31, 2025. Value-added tax (VAT) small-scale taxpayers with monthly sales of less than 100,000 yuan (or quarterly sales of less than 300,000 yuan) are exempt from VAT, and taxable income subject to a 3% levy rate is levied at a reduced rate of 1%. For small and low-profit enterprises, the portion of the annual taxable income not exceeding 1 million yuan shall be included in the taxable income at a reduced rate of 25% and subject to enterprise income tax at a rate of 20%. At the level of social support, enterprises that hire key groups such as college graduates who have been registered as unemployed for more than half a year will have their relevant taxes and fees reduced by a fixed amount of up

to 7,800 yuan per person per year (the national benchmark is 6,000 yuan, and Guangdong will increase it by up to 30%).

3 Structural Contradictions Existing in the Promotion of the Integration of Science and Technology with the economy by University entrepreneurship Incubation

3.1 There is a Disconnection Between the Efficiency of Scientific and Technological Achievement Transformation and Market Demand

There is still significant room for improvement in the efficiency of scientific and technological achievement transformation in universities in Guangdong Province. Some scientific research achievements have a transformation gap from "laboratory to market". According to the "White Paper on the Transformation of Scientific and Technological Achievements in Colleges and Universities of Guangdong Province in 2024" released by the Department of Science and Technology of Guangdong Province, the idle rate of scientific and technological achievements in colleges and universities across the province has reached 29.6%, among which 37.2% of the idle achievements are difficult to be industrialized due to the lack of a pilot-scale maturation process.

3.2 There are Structural Gaps in the Entrepreneurship Incubation Fund System

At present, the problem that entrepreneurship incubation funds rely on the single channel of government finance is prominent. According to a sample survey conducted by the Department of Education of Guangdong Province in 2024 on 86 universities across the province, the average funding gap rate of public university entrepreneurship incubation bases reached 18.9%, while that of private universities was even higher, at 28.7%. The person in charge of a university entrepreneurship park in the Pearl River Delta disclosed that due to a shortage of funds, the research and development of three artificial intelligence projects in its incubation projects was interrupted.

3.3 There is a Dual Quality Gap in the Supply of Innovative and Entrepreneurial Talents

There is a significant mismatch between the cultivation of talents in colleges and universities and the demands of industries. A 2023 survey by the Guangdong Provincial Institute of Education shows that although 89% of colleges and universities in the province offer innovation and entrepreneurship courses, only 34.6% have set up real business simulation sections. The shortage of versatile talents is particularly prominent - less than 18% of them possess capabilities in technology research and development, market operation and management, leading to a widespread "market blind spot for technology founders" in technology startups. Empirical research further reveals that the imbalance in the team's ability structure has led to a failure rate of 39.2% for incubation

projects in Guangdong universities, highlighting the urgency of optimizing the talent ability matrix. [3]

3.4 The Collaborative Mechanism Among Industry, Academia and Research Institutions Has Not Yet Formed a Closed-Loop Ecosystem

The depth of collaboration among universities, enterprises and research institutions is insufficient, and the stability of cooperation faces multiple challenges. In Guangdong Province, 32% of the industry-university-research projects remain at the level of short-term technical services, while only 11.5% have established a long-term joint research and development mechanism. The unsmooth benefit distribution mechanism has become the main obstacle. A new energy technology project jointly carried out by a certain university and an enterprise was terminated due to a dispute over patent revenue distribution, resulting in a loss of over 20 million yuan.

4 Optimize the Paths for Promoting the Integration of Science and Technology with the Economy Through Entrepreneurship Incubation in Colleges and Universities

The entrepreneurship incubation in colleges and universities in Guangdong Province needs to be further optimized in many aspects in promoting the integration of science and technology with the economy (Figure 2).

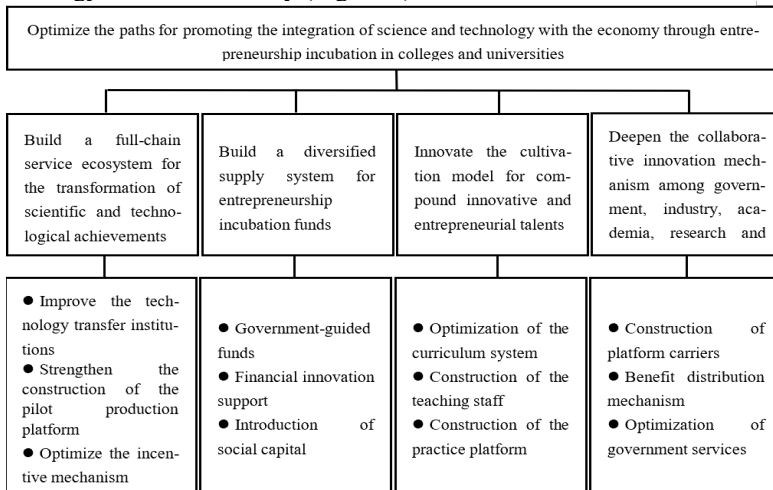


Fig. 2. Optimize the paths for promoting the integration of science and technology with the economy through entrepreneurship incubation in colleges and universities

4.1 Build a Full-Chain Service Ecosystem for the Transformation of Scientific and Technological Achievements

Guided by market demand, all colleges and universities in the province should focus on improving the service system for the transformation of scientific and technological achievements and build a full-chain closed loop from "evaluation - pilot production - industrialization". At present, the Department of Science and Technology of Guangdong Province has recognized 32 university technology transfer centers, and the amount of technology transfer contracts facilitated in 2024 is as high as 4.72 billion yuan. In terms of the construction of pilot-scale platforms, Guangdong Medical University plans to invest 50 million yuan to build a biomedicine pilot-scale base, while South China University of Technology has already completed a new materials pilot-scale platform covering an area of 12,000 square meters. In 2023, this platform will incubate 9 projects, with a total output value of 1.18 billion yuan. In terms of incentive mechanisms, in accordance with the "Regulations of Guangdong Province on Promoting the Transformation of Scientific and Technological Achievements", universities generally increase the proportion of income from the transformation of scientific researchers' achievements to over 70%. For instance, in 2024, the patent conversion revenue of Shenzhen University's micro-nano Optoelectronics team reached 12.4 million yuan, accounting for 76% of the total contract value.^[4]

4.2 Build a Diversified Supply System for Entrepreneurship Incubation Funds

To break the predicament of relying solely on finance for funds, it is necessary to establish a fund network of "government guidance - financial support - social participation". The Guangdong Provincial finance allocates 500 million yuan of special funds for entrepreneurship incubation every year. Shenzhen has established a 1 billion yuan angel investment guidance fund, successfully leveraging 5.37 billion yuan of social capital to invest in college entrepreneurship projects, forming a leverage effect of 1:5.37. In terms of financial innovation, according to the data from the Guangdong Science and Technology Finance Promotion Association, in 2024, banking institutions provided intellectual property pledge services to enterprises incubated by universities. The loan amount in the first quarter alone reached 10.35 billion yuan, and it is expected that the annual growth rate will exceed 25% to 30%. In addition, entrepreneurship competitions such as the "Mass Innovation Cup" have cumulatively attracted 8 billion yuan of social investment. Among the projects that won in 2024, 61% received subsequent financing, with an average financing amount of 11.8 million yuan.

4.3 Innovate the Cultivation Model for Compound Innovative and Entrepreneurial Talents

Constructing a three-in-one training system of "curriculum - practice - incubation" can effectively enhance the compatibility between talents and industries. At present, the coverage rate of innovation and entrepreneurship courses in colleges and universities across the province has reached 92%, among which 41% of the courses are embedded

in real projects of enterprises. For instance, the "Entrepreneurship Practical Workshop" of Guangdong University of Technology connects with over 100 enterprises every year, and 32 projects completed by students have been successfully industrialized. In terms of faculty development, universities across the province have hired 12,000 enterprise mentors. Shantou University and The Chinese University of Hong Kong have jointly launched a "Dual Degree Program in Entrepreneurship and Innovation". The entrepreneurship rate of graduates has reached 23% (including individual business operations), which is 11 percentage points higher than the provincial average. Among them, 62% of enterprises have survived for more than three years. In terms of practical platforms, there are 89 provincial-level demonstration bases for college students' entrepreneurship incubation. In 2023, a total of 13,000 enterprises were incubated, creating 125,000 jobs.

4.4 Deepen the Collaborative Innovation Mechanism Among Government, Industry, Academia, Research and Application

Building a long-term cooperation model with shared benefits as the core is the key to breaking through the bottleneck of insufficient depth of collaboration. Guangdong Province has established 152 provincial-level collaborative innovation centers, generating direct economic benefits of 26.8 billion yuan in 2024. Among them, Foshan New Energy Industry Technology Research Institute, in collaboration with enterprises, has overcome the technology of hydrogen fuel cell catalysts, driving the industrial chain's output value to exceed 5 billion yuan. In terms of the benefit distribution mechanism, Foshan City offers a maximum reward of 5 million yuan for industry-university-research cooperation projects and implements a model of "co-ownership of intellectual property rights + proportional sharing of profits". For instance, in a cooperation project between a certain university and Midea Group, the patent licensing revenue was distributed between the two sides in a 4:6 ratio, totaling 80 million yuan. In terms of government services, the provincial Department of Science and Technology has established a "one-stop" service platform for industry-university-research cooperation. In 2024, it facilitated 1,743 cooperation projects, a year-on-year increase of 37%, with 68% of the projects serving universities and enterprises.^[5]

To sum up, the entrepreneurship incubation in colleges and universities in Guangdong Province has formed a multi-dimensional optimization path in promoting the integration of science and technology with the economy. By building a full-chain service ecosystem for the transformation of scientific and technological achievements, creating a diversified supply system for entrepreneurship incubation funds, innovating the cultivation model for compound innovative and entrepreneurial talents, and deepening the collaborative innovation mechanism among government, industry, academia, research and application, the development of entrepreneurship incubation in universities will be further promoted, injecting strong impetus into the scientific and technological innovation and economic development of Guangdong Province.

5 Conclusion

Entrepreneurship incubation in colleges and universities in Guangdong Province plays a significant role in promoting the integration of science and technology with the economy, but it also faces many challenges. In response to the existing problems, adopting optimization paths such as strengthening the construction of the service system for the transformation of scientific and technological achievements, broadening the channels of funds, improving the talent cultivation system, and deepening the cooperation mechanism among industry, academia and research can effectively enhance the efficiency of entrepreneurship incubation in universities, promote the deep integration of science and technology with the economy, and drive the high-quality development of the economy in Guangdong Province. In the future, with the improvement and implementation of policies, the entrepreneurship incubation of colleges and universities in Guangdong Province will play a greater role in the integration of science and technology with the economy, providing strong support for building an innovative province.

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