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## **Analysis on the Technology Business Incubator and Accelerator Industry in China**

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# Abstract

As an important carrier to support innovation and entrepreneurship, technology business incubators and accelerators play an important role in stimulating the vitality of national economic development. For China, a developing country, technology business incubators are still in an immature stage, and technology business accelerators are still in their infancy. As a leader in economy and innovation among developing countries, China has learned from developed countries' successful experiences, but the experiences cannot be fully applied to China. There are few existing literatures on the development of technology business incubators and accelerators in China and its regions. Based on this problem, this paper uses the PEST analysis method combined with relevant data to analyze and compare the distribution and distribution density of China's incubation industry chain, as well as the maturity of the incubation industry in China and the representative provinces and cities of various economic regions in China and its reasons. The study found that China has its own special incubation industry chain. It basically follows the chain of 'Mass maker space- incubator- accelerator'. And because accelerators in China have just started, most incubators have both incubator and accelerator services, which is why the overall number of accelerators in China is unknown. China's incubation industry has a serious regional development imbalance problem. China's technology business incubators, accelerators and maker spaces are most concentrated in the eastern region of China's economic zone, and the incubation industry in the northeast region is the slowest, and there is a gap in innovation capabilities. Finally, this paper uses SWOT analysis to analyze the cases of TEDCO, an American technology incubator, and Sinovation, a Chinese business incubator. Only by constantly absorbing successful experiences and further localizing and optimizing all aspects of the business incubator of China can we promote and develop the virtuous circle of the whole incubator ecosystem in China.

## Executive summary

### 1. Introduction

#### 1.1. Introduction and motivation

The COVID-19 pandemic has put enormous pressure on small businesses, eventually causing many bite the dust. Businesses are not only under pressure to survive, but also need to adapt to extreme environments and grow within tight timelines. This requires enterprises to acquire a lot of resources to maintain their own development. In the past,

entrepreneurs had to seek resource support from public sources until incubators appeared in the United States in the 1950s and matured in the 1990s. Whereas Technology-Based Firms (TBFs) lay the foundation for new wealth-creating industries, The race to develop appropriate policy and program mechanisms to assist in the creation and development of regions that enable new technology start-ups remains a challenge for policymakers seeking relevance in their planned interventions(Mian, 2011). It requires the rapid development of new policies that can capture commercial benefits to support. As a corollary, practitioners and policymakers are increasingly aware of the importance of incubation mechanisms that provide a competitive advantage to accelerate technology innovation and entrepreneurship(Aernoudt, 2004).As a result, the focus on TBIs has enabled them to contribute significant value to innovation and entrepreneurship. They help startups and early-stage businesses overcome initial hurdles and improve their products, while also mentoring and advising entrepreneurs over a long period of time. Incubating eggs requires the right temperature, and so do incubators. Technology business incubation and business acceleration carriers have become an important driving force for the rapid development of innovation and entrepreneurship in the world. The incubation idea joins innovation, capital, and expertise, to influence pioneering ability, and speed up the advancement of new firms, subsequently speeding up technological exploitation (Grimaldi & Grandi 2005).

The incubation model continues to evolve into a new generation of incubation models as the needs of different environments and incubation mechanisms change. A new generation of incubation models that has been introduced in Europe over the last decade is the seed accelerator program. "Accelerators are designed to accelerate the growth of entrepreneurial organizations by providing specific incubation services in order to make them successful. Mentorship is provided for a limited period with an intensive program to make it successful (Cohen & Hochberg, 2014). The world's first recognized accelerator was Y Combinator, which was founded in 2005 in Cambridge, Massachusetts, and has served as a model for many other accelerators. Even though the accelerator model includes additional services such as mentoring and network management, it also has a few distinctive characteristics that distinguish it from various incubation models (Isabelle, 2013). Technology business incubators enable companies to grow in a matter of weeks or even days. allowing businesses to complete tasks on time and with specialization for rapid growth. Companies that meet the exit assessment criteria for technology business accelerators have high revenue and profit growth rates during the accelerated period, a certain number of patent applications, and a well-established and stable management system, financing channels, social networks, and product markets. Table 1. is the distinction between the technology business incubators and accelerators.

The distinction between technology business incubators and accelerators
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	<b>Technology business incubator</b>	<b>Technology business accelerators</b>
Strategic emphasis	Business Survival	Accelerated growth
Selection process	Low competition	Fierce competition
Profitability model	Space rental, service charges	Profitable exit at the appropriate time via seed fund investment in exchange for equity
Tutor guidance	General	Intensive
Group mode	None	Yes
Duration	1-5 years	3-6 months
Display methods	Individual appointments with investors or ad hoc industry events	Roadshow days

Table 1. The distinction between technology business incubators and accelerators based on 'Domestic Incubator / Accelerator Development Report.'

## **2. Definition and Background of Chinese incubator & accelerator industry**

China's incubators started with the Torch Program, a State Council endorsed drive carried out by the Ministry of Science and Technology. Until the 1980s, a centrally planned economy dominated everything. Annual funding and annual data collection were organized according to a hierarchy, from central to local government. In 1987, China's first technology business incubator was established in Wuhan, Hubei Province. In August 2007, the Ministry of Science and Technology of China officially approved the Yong Feng Industrial Base of ZhongGuanCun Science and Technology Park as the first pilot unit in the country to build a technology enterprise accelerator.

Technological innovation has been a key strategy in the Chinese government's economic reform and development policy for the past 30 years, and incubators are expected to play an important role in that strategy (Zhang, 2017).

Since the number of domestic incubators exceeded 1,000 in 2011, the annual growth rate of incubators has soared, and the number of incubators will exceed 5,000 in 2020, and the cumulative number of graduate companies has reached 160,000.

According to the data from Torch High Technology Industry Development Center, by the end of 2020, there were 5,843 technology business incubators in China, an increase of 12.2% over 2019. Among them, 1,285 national-level companies participated in the statistics, an increase of 11.2% over the previous year. The actual number of state-level incubators in China was 1,306, an increase of 11.0% year-on-year. Fig. 1. shows the number of TBIs in China from the year 1995 to 2020.

Although incubators are booming in China today, accelerators are still a new concept in the last decade, and their business model and ecosystem are still in the process of being explored and innovated. The physical space supporting facilities, technology platform, market network, human resources, and other development environments put forward higher requirements for the development of enterprises from the seed stage, start-up stage, to the rapid growth stage, and the traditional business incubation model has been difficult to meet these requirements. According to public reports from the Chinese government, the number of accelerators in China stood at 630 at the beginning of 2018, representing a 32.3% year-on-year growth rate compared to the previous year. The Ministry of Science and Technology officially designated Zhongguancun Science Park Yong Feng Industrial Base as the first national pilot unit to construct a technology business accelerator in August 2007. The China Technology Business Accelerator is intended to help small and medium-sized enterprises that have completed incubation. Technology business accelerators in China typically have a three-to five-year acceleration cycle, compared to a three-to six-month cycle for traditional accelerators. China actively supports the 'Mass Maker Space-Technology Business Incubator-Technology Business Accelerator' technology business incubation and acceleration chain to further support the development of local industries and the real economy. There are three operating models for technology business accelerators in China, divided into government-sponsored technology business accelerators, corporate-sponsored and venture capital-sponsored technology business accelerators. In terms of data, the number of incubators transforming into accelerators is also growing.



Combination forms for 'incubation-acceleration' are classified into three types: contained combination, intermingled combination, and juxtaposed combination. On the one hand, the business incubator provides the accelerator with quality resident companies, a portion of its fixed facilities and relationship network, as well as operational and management experience. The business accelerator, on the other hand, provides an exit channel for the incubator to facilitate the incubator's healthy operation (He Kefang, 2010).

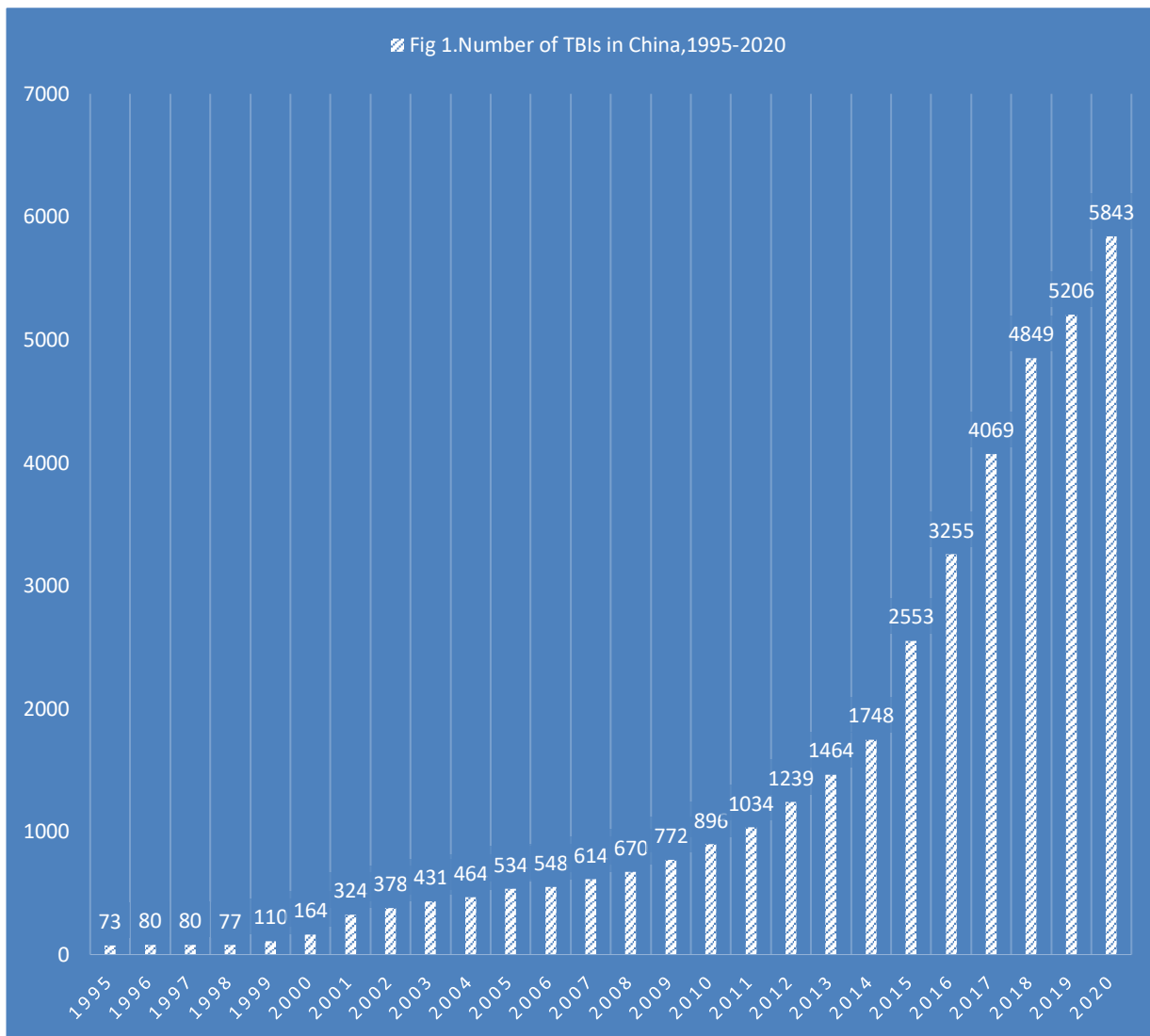


Fig 1. Data from Torch Centre, Ministry of Science and Technology, China

Through the introduction of China Farmer's Daily, Chinese incubators can be divided into state-owned background incubators and private background incubators, according to the purpose of the incubator and its control subjects. The main purpose of state-owned background incubators is to undertake the function of the state supporting scientific and technological innovation, which reflects the country's scientific and technological policy orientation, and the main control bodies are the government, state-owned enterprises, and universities. The categories it covers include National Overseas Students Pioneer Park, International Business Incubator, National

University Science and Technology Park, etc.

Private incubators are mainly controlled by individuals and investment institutions. The purpose of launching private incubators is more to serve startups or drive early-stage investment, reflecting market orientation. Private incubators can be classified into three categories: investment-driven incubators, such as innovation workshops, creative spaces, etc. Industry-driven incubators, such as Microsoft Venture Capital Accelerator; and intermediary incubators, such as Garage Cafe and Kr Space. Currently, the common direction of existing accelerators is an investment-oriented and service-oriented model. China's financial market is still developing, and the impact of government policy is unknown. Accelerators that are solely focused on investing are extremely vulnerable. Accelerators oriented toward innovation services, on the other hand, are better suited to the development of accelerators in China, and an increasing number of accelerators in China are transitioning to the role of service providers (Yan Zheng,2019). It is worth mentioning that a special conceptual product, the Mass Maker Space, was formed under the influence of the Chinese environment.

## **2.1 Definition and functions of Mass Maker Space**

The idea of Mass Maker Space originates from maker space, the world's first maker space was founded in 1981 by the Chaos Computer Club in Berlin, Germany, and over the years, the maker space model has expanded from computing to many other fields. But his role in China makes him different from the traditional sense of maker space. The term " public innovation" originated in September 2014, when Chinese Premier Li Keqiang introduced the concept of " mass entrepreneurship and innovation initiative" in China. The General Office of the State Council of China issued the "Guiding Opinions on Developing Crowd Innovation Space to Promote Mass Innovation and Entrepreneurship" in March 2015, and the "Implementation Opinions on Building the Second Batch of Demonstration Bases for Mass Entrepreneurship and Innovation" in May 2016 and June 2017, respectively, after which Mass Maker Space arose as another social term and trendy expression in the public eyes.

Mass Maker Space is a new type of technology business incubator, which is different from the traditional technology business incubators and other innovation and entrepreneurship service institutions. According to scholars An Yuhong & Lv Li, Mass Maker Space is an open and comprehensive service platform that provides low-cost, facilitated, all-factor innovation and entrepreneurship services for small and micro innovation and growth.

The functions of the Mass Maker Space are reflected in the following aspects: Firstly, the Mass Maker Space is essentially built around the initial stage of entrepreneurship and the front end of the entrepreneurial chain, together with traditional innovation and

entrepreneurship incubators, gas stations, modern parks, and private entrepreneurship bases. In addition, instead of a closed innovation environment, Mass Maker Space is more open and asset-sharing, which can provide entrepreneurs with opportunities to increase entrepreneurial information, gather network assets, and access entrepreneurial capital. Thirdly, Mass Maker Space truly meets the new requirements of social development and business and can provide a blend of networked and non-networked entrepreneurial management. Table 2. is a description of the types and operating models of existing mass maker space in China. Fig 2 is the number of Mass Maker Space between 2016 to 2020.

Types	Professional services	Training and coaching	Media extension	Investment promotion	Co-working	Integrated ecology
Operating models	Regularly organizing entrepreneurial services such as idea project release showcase, providing startups with social networks, platforms for professional technical services, industry chain resources support, etc.	Using the university's educational resources and alumni resources, the training system that combines theory with practice serves as a practical platform for university innovation and entrepreneurship.	Founded by the media for entrepreneurial enterprises, using the advantages of media publicity to provide enterprises with a combination of online and offline entrepreneurial services, including publicity, information investment and other resources	Capital as the core and link, gathering angel investors, investment institutions, relying on its platform to attract the collection of high-quality entrepreneurial projects, to provide financing services for entrepreneurial enterprises	Co-working space developed by real estate developers, attracting tenants through additional services, introduction of angel investment and certain policy benefits	Provide a comprehensive range of services including finance, training and coaching, recruitment, operation, policy application, legal counsel and even

						accommodation
Examples	Beijing Maker space, Shanghai New Workshop, Shenzhen Chaihuo Space	Tsinghua x-lab, Peking University Business Incubation Camp	CYZone, 36Kr	Garage cafe , Angel Crunch	SOHO 3Q , Ucommune	VSTARUP , TechTemple ,

Table 2. China Mass Maker Space Categories, based on (Junchao Hao & Zhangyu ,2016)

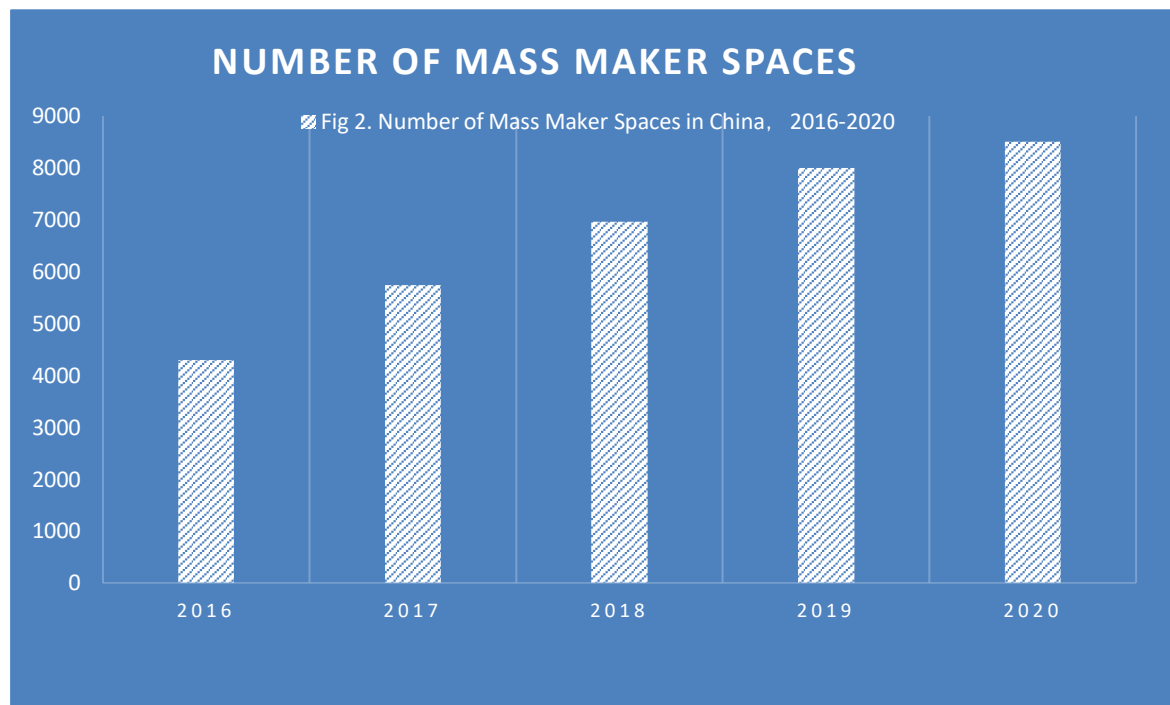


Fig 2. Data from Torch Centre, Ministry of Science and Technology, China

## 2.2 Commonalities and differences between Mass Maker Space and Chinese technology business incubators and accelerators

Functionally, the Mass Maker Space overlaps with the incubator, more precisely, it should be an extension of the incubator. According to the State Council's 'Guiding Opinions on the Development of Mass Maker Spaces to Promote Mass Innovation and Entrepreneurship', and the definition of Chinese technology business incubator and accelerator, the following key differences and commonalities are listed.

	Hardware conditions	Resource support	Service object	Service threshold	Service enterprise development stage	Commonalities
Mass Maker Space	Relatively simple, most with basic amenities.	Less support at the beginning	All innovative and entrepreneurial individuals and groups.	Quiet low, willing innovative individuals or groups can join.	Before establishment to early establishment	The service targets are all entrepreneurial teams and entrepreneurs, providing venues, social spaces, outsourcing services, and resource sharing platforms
Technology business accelerators	High quality. In addition to the office environment, there are necessary business-related equipment support.	The support of technical resources is large, and capital intervention is frequent.	After incubation and cultivation, enterprises with certain competitiveness and development foundation.	It is very high, and it needs to have a corresponding development foundation after entering the incubator for a period.	After the initial stage of establishment, it already has a certain foundation for acceleration.	
Technology business incubators	High-quality office conditions, simulating the atmosphere of a start-up company.	The introduction and support of large government enterprise resources and funds.	Newly established technology-based SMEs	Relatively high, need to conduct project review and selection.	Early establishment	

Table.3 based on Report of the Three Tanner

## 2.3 Technology Business Incubators, Accelerators and Mass Maker

### Spaces cohesive coupling mechanism

Incubation is defined by the process of gathering and integrating various incubation resources, such as technology, capital, talent, and services. There are two methods for achieving internal agglomeration. The second point is that, to compensate for its own shortcomings, the incubator can build its own resources and elements by utilizing its own resources and services. The incubator's second option is to compensate for its own shortcomings by purchasing, leasing, or collaborating with other incubators. Exogenous cohesion and endogenous cohesion are two terms used to describe these two processes. Incubation efficiency and effectiveness enhancement and integration are the foundations of coupling, which is the cooperative relationship between incubators, crowdsourcing spaces, and accelerators that aims to achieve complementary resource sharing and upstream and downstream incubation chains. Vertical coupling denotes the latter, while horizontal coupling denotes the former. (Xiao Tianye & Luo Guangning, 2016). The following diagram clarifies the coupling relationship between the Chinese main resource elements, Technology Business Incubators (TBIs), accelerators (TBAs) and Mass Maker Spaces.

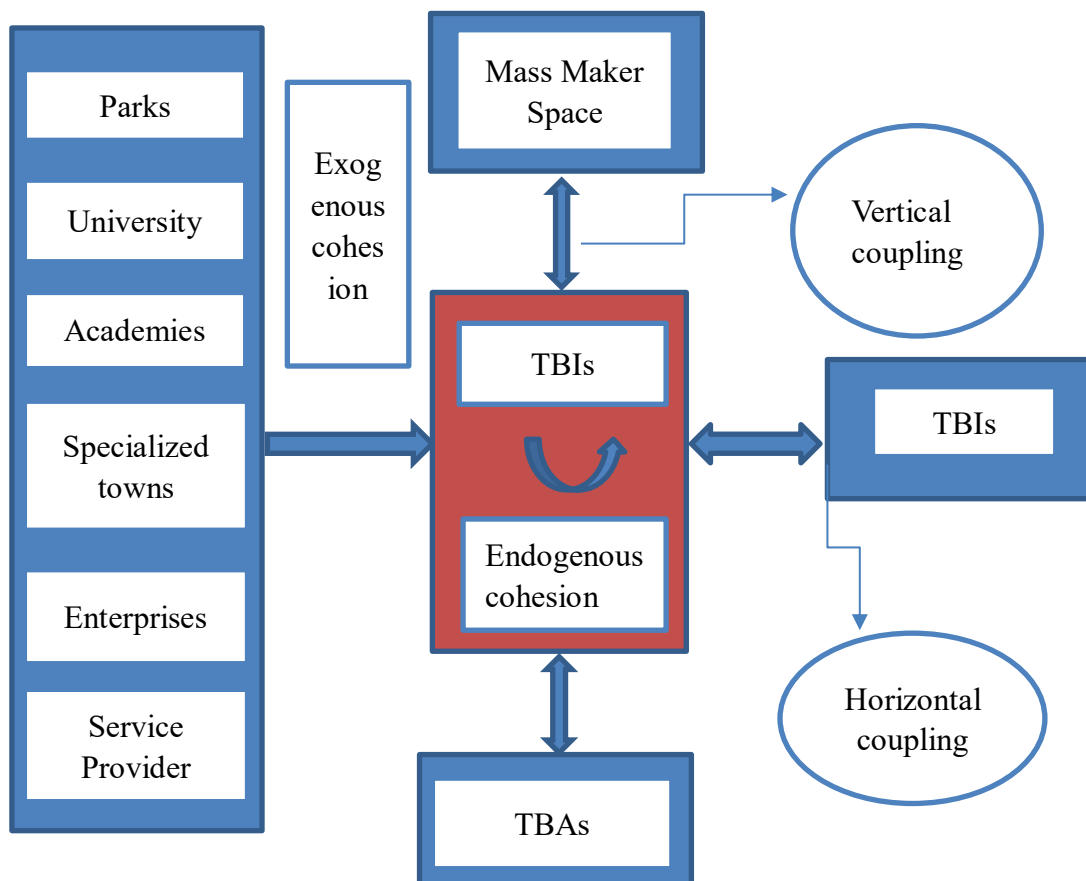


Fig.3 Coupling relationship between the Chinese main resource elements, Technology Business Incubators (TBIs), Accelerators (TBAs) and Mass Maker Spaces, based on (Xiao Tianye & Luo Guangning, 2016)

### **3. Analytical methods and thesis structure**

TBIs are also known as technology incubators, science parks (Martin, 1997), accelerator operations (Cohen, 2013), knowledge parks (Bllingtoft & Ulhi, 2005), and innovation centers (Campbell, 1989). I reviewed previous literature on the environment of Chinese incubators and accelerators, as well as some analysis of the Chinese entrepreneurial ecosystem and the impact of controlling fixed utility on TBIs performance. This literature has provided me with useful direction and insight for my research, but there is little information on incubation in Chinese provinces and cities. In addition, previous studies on the analysis of Chinese accelerators have not dealt with the clear distinction between incubators and accelerators, based on a specific Chinese background. This report will survey and analyze the technology business incubation industry in China and China's provinces and cities, as well as compare it to the United States, which pioneered the industry.

This paper will use PEST analysis to analyze the macro-environmental factors of innovation incubation and acceleration in China and its provinces and cities. This research will analyze Chinese incubators, accelerators, and their related data, combined with the impact of different policies on the incubation situation, which will be based on the political, economic, social, and technological environment of China. The impact on the incubation situation will be analyzed specifically according to different geographical and social conditions and policies.

This paper will also analyze and compare the internal and external competitive environments, strengths and weaknesses, opportunities and threats of China and the US, respectively, using the SWOT analysis method.

Data was collected from several sources. One is the 'China Torch Statistical Yearbook 2019' and the 'China Business Incubation Report 2020' provided by the Chinese Ministry of Science and Technology, which provides data on the annual sales revenue of each TBI and mass maker space, the quantity of employment, the number of graduates, incubator scale, and other data. This data is collected by the incubator management from the resident enterprises. It is then aggregated to the incubator level and reported annually to the Ministry of Science and Technology, which publishes the data. Additionally, additional information is collected from the websites of national and local business incubation associations and from individual TBI websites and brochures.

#### **Thesis structure**

This thesis starts with Chapter 1, which presents the study's motivation of Chinese incubation types and the background, definitions and the methods for analysis

incubation and acceleration in China. The Chapter 2 analyzes and shows the current situation in China from the macro environment and analyzes the impact on the incubation situation in China. Chapter 3 introduces the research methodology and the research topics of this paper, as well as the main data sources. Chapter 4 uses the PEST analysis method to analyze the overall Chinese incubation industry in recent years. Chapter 5 introduces the geographical divisions and economic zones of China with data collection. Specific provinces are also selected as regional cases for analysis based on China's economic regions. Chapter 6, Compares China's incubation industry to that of the United States, where the incubation industry is more mature, used a SWOT analysis to conduct case studies of incubator from China and the United States. The Chapter 7, which serves as the article's final chapter, described the limitations of writing the paper and conclusions about the research.

## **4. PEST Analysis of China**

The external environment has an impact on China's incubation industry. These factors act as a double-edged sword, both accelerating and stimulating the development of China's incubation industry while also impeding it. Using the PEST framework, this chapter examines the political, economic, social, and technological factors that influence the development of China's incubation industry.

### **4.1. Political Factors**

Because China is politically stable, it plays an important role in China's policy of encouraging the development, incubation, and acceleration of high-tech enterprises. Since Chinese Premier Li Keqiang proposed ' mass entrepreneurship and innovation initiative' it has become a major national development strategy. This policy is intended to assist Chinese entrepreneurs in better promoting their innovations and ideas, and the burdensome approval and establishment procedures that entrepreneurs are most concerned about will be gradually lifted through pilot free economic zones and extended to the entire country. The state council issued 'Implementation Opinions on Deepening the Reform of Innovation and Entrepreneurship Education in Higher Education Institutions,' which define the direction and content of university reform in the context of 'dual innovation.' China's incubators expanded rapidly in 2015, with over 4,000 new incubators added in just one year, equaling the total number of incubators in China over the previous 26 years. Based on the ' National Medium and Long-Term Science and Technology Development Plan' (2006-2020), the Outline of the National Innovation-Driven development strategy, and the 13th Five-Year Plan for National Science and Technology Innovation, China developed the 13th Five-Year Plan for National Science and Technology Innovation from 2016 to 2020. China's innovation and entrepreneurship has become one of the most active regions in the world since the implementation of the 13th Five-Year Plan. During the 12th Five-Year Plan (2011-2015), China's incubators shifted from providing basic services to



providing value-added services, and from focusing on technology start-up incubation to focusing on the entire chain of technological innovation and entrepreneurship. Forty-one incubators have been built with a 'Mass Maker Space-incubator-accelerator' incubation chain. The 13th Five-Year Plan, based on the achievements of the 12th Five-Year Plan, focuses on creating a sound innovation and entrepreneurship ecology, encouraging all types of market players to enter the business incubation service market, providing efficient services in a new mode, and creating more and better business incubation carriers. The 13th Five-Year Plan focuses on creating a healthy and sustainable environment for innovation and entrepreneurship, encouraging all types of market players to enter the business incubation service market, providing efficient services under new models, and developing more and better business incubation vehicles, which was reported by China National Intellectual Property Administration in 2017. According to the 13th Five-Year Plan policy, the overall effect of the implementation of tax incentives shows that in 2011, China's national university science and technology parks, science and technology business incubators and accelerators were exempted from tax by a total of RMB 197 million, with property tax and urban land use tax accounting for 75.66% of the total tax exemptions. As a result, the effective rate of tax relief for the incubator tax is The effective rate of tax relief provided by tax incentives is extremely low (Cui Jingjing& Cheng Yu, 2016) . However, these various incentives did not achieve their intended goal and instead resulted in some incubators being unable to survive on their own. According to Cui Jingjing's& Cheng Yu's research, the government should modify policy implementation criteria in order to strengthen the capacity of incubation services. Tax and other incentives have a relatively small impact on the effectiveness of incubation service improvement. The policy environment in China to support incubators and start-ups has yet to be improved, and the issue of industry, academia, and research integration has yet to be fully resolved (Ma Fengling & Chen Jie,2014).

## **4.2 Economic Factors**

China's economic growth rate has been among the highest among the world's major economies in recent years. By the end of 2021, China's GDP had increased by 8.1% over the previous year, with the economy totaling 114.4 trillion yuan, exceeding 110 trillion yuan. It is firmly in second place in the world, with an average annual exchange rate of US\$17.7 trillion, and is expected to account for more than 18% of the global economy. At the average annual exchange rate, GDP per capita exceeds RMB 80,000, or US\$12,551. China's economy expanded at a faster-than-expected 6% rate. Despite the epidemic, China added 12.69 million new urban jobs in 2021, exceeding the expected target of more than 11 million. The unemployment rate was also lower than the original target of 5.5%. According to the survey, China's average urban unemployment rate in 2021 was 5.1%. Even though China's GDP per capita has not yet reached the lower limit of high-income countries, and there is still a significant gap between China and developed countries, China remains the world's largest developing country. It provides a good environment for the development of China's

incubators and accelerators under the influence of such an economic environment, which is conducive to stimulating innovation in China's incubation industry and thus to the continued development of the economy. Fig.4 is the China GDP Growth Rate.

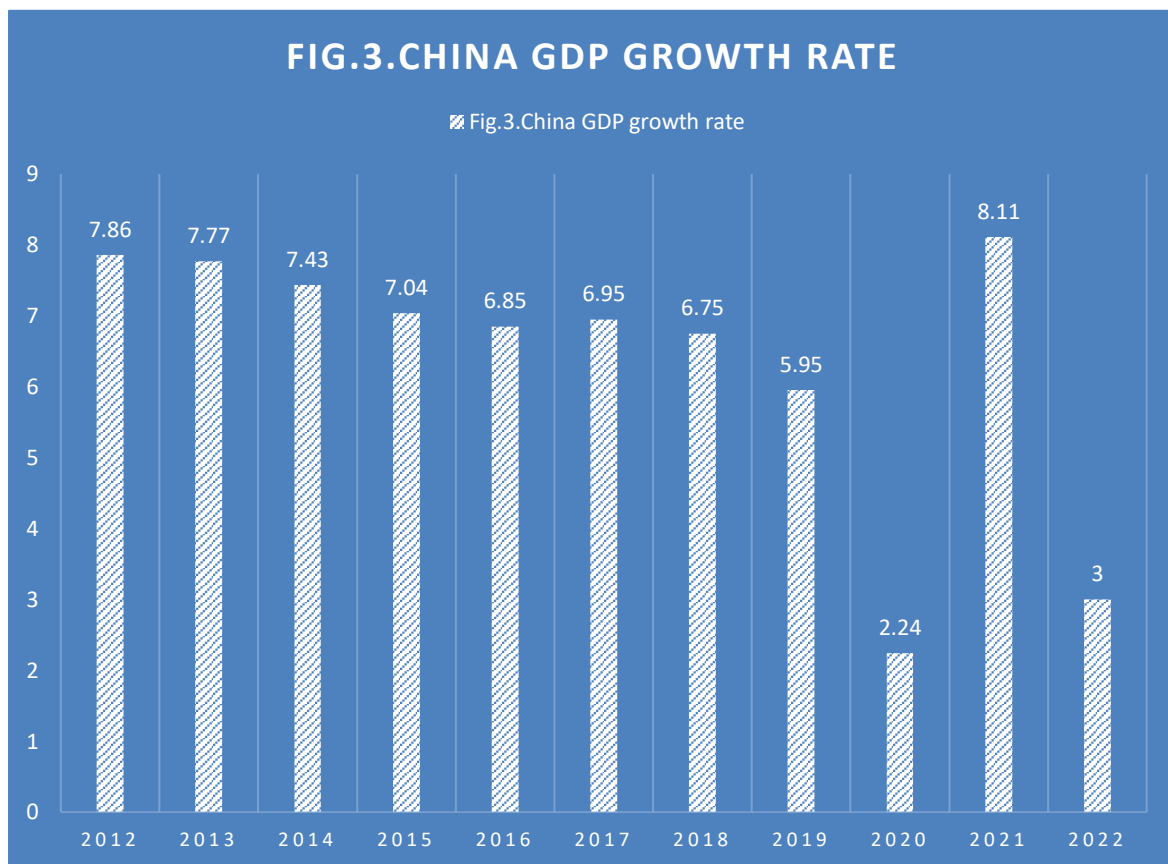


Fig.4 Data based on Trading Economics and Chinese government.

Since 2010, the level of market interest rates in China has generally trended downwards, with the pace and extent of the decline being constrained by the decline in China's savings rate and the increase in interest rate marketisation, with the level of lending rates trending downwards. Prior to 2015, China's general loan weighted average interest rate, loan base rate, and benchmark lending rate were more consistent and higher. There was a slight decline after 2015, and the level of general loan weighted interest rate fell further after the People's bank of China reformed the loan base rate formation mechanism and strengthened its pricing role in August 2019. The central bank established an RMB 200 billion science and technology innovation refinancing loan with a 1.75% interest rate in April 2022, further encouraging high-tech enterprises, small and medium enterprises, national technology innovation demonstration enterprises, manufacturing single champion enterprises, and other technology enterprises to develop their innovations.

According to Liu Xiaoyong & Du Pei (2018) research, the choice of model and internal mechanism of a technology business accelerator is directly related to the operational development and the economic and social benefits generated by the

accelerator.

In 2021, China's economy continued to recover in the face of multiple tests, including a complex and challenging international environment and the spread of global epidemics, and the equity investment market saw an increase in the number of investment cases across most sectors year-on-year. And against the backdrop of an ever-optimizing technology and innovation ecosystem, the total amount of equity investment in China exceeded \$1.4 trillion. According to Zero2IPO Research, in 2021, there were 12,327 investments in China's equity investment market, up 63.1% year-on-year, and the total investment amount reached RMB 1,422.87 billion, up 60.4% year-on-year. Looking at the various markets, the total number of investments in early-stage investment, venture capital, and private equity all increased significantly in 2021. Among them, the number of investment cases and investment amounts in the VC and PE markets reached new highs, with early-stage investment and the VC markets seeing the fastest growth. Among technology business accelerators, venture capital-sponsored accelerators identify investment opportunities and provide more than adequate funding to meet the strong capital needs of companies. The most important quantitative KPI for accelerators is the amount of investment received by accelerated startups from venture capitalists (Yan Zheng, 2019). Over the last few years, venture capital investment in China has increased rapidly. According to Wall Street Journal data, China even surpassed North America in total venture capital investment for the first time ever in 2018, with the amount of venture capital investment in China increasing significantly over the past two consecutive years and more than doubling the amount of venture capital investment in 2021 compared to 2019. In 2019 and 2020, Chinese venture capital investment totals US\$61.79 billion and US\$86.98 billion, respectively. Fig. 5 is the Value of Investment from China venture capital between July 2017 to January 2020.

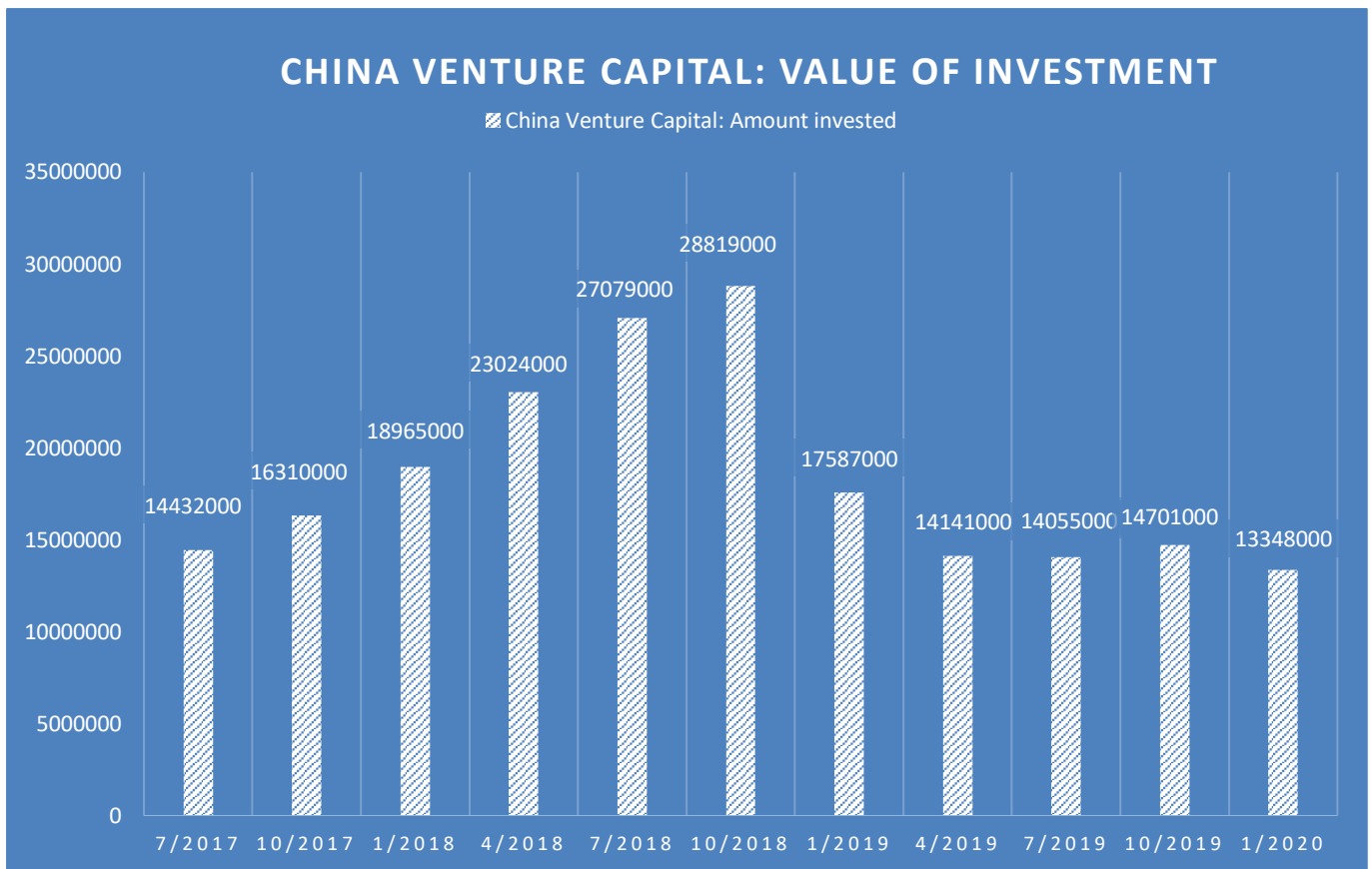


Fig 5. Data from China Economic Database

### 4.3 Sociocultural Factors

China is a historically significant country. During the Ming Dynasty (1368-1644), China accounted for roughly one-third of global GDP, and if the external environment had not changed, China would have remained unchanged. However, the Western industrial revolution occurred, and China did not continue to change and innovate. As a result, the Opium War of 1840 and the Sino-Japanese War of 1895 plunged China into history. In 2010, Kelly Services and China's leading human resources service provider, Zhi Lian Recruitment, jointly released the Kelly Services Global Employee Index Survey in China, which showed that Chinese entrepreneurial enthusiasm is the highest in the world, with 23% of Chinese respondents finding self-employment extremely attractive. This figure is much higher than the global rate (12%). Chinese employees are less confident in the competencies they need to start their own business and the main risks for Chinese employees considering self-employment. According to the 2015 Amway Global Entrepreneurship Report, China's Entrepreneurial Friendliness Index reached 73% in 2015, compared to the international average and Asian average of 50% and 63%, respectively. But then the industrial revolution took place in the West and China did not continue to change and innovate, and the result was the Opium War of 1840 and the Sino-Japanese War of 1895, which led China to the abyss of history. Kelly Services and Zhi Lian Recruitment, China's leading human

resources service provider, jointly released the Kelly Services Global Employee Index Survey in China in 2010, which revealed that Chinese entrepreneurial enthusiasm is the highest in the world, with 23% of Chinese respondents finding self-employment extremely appealing. This figure is significantly higher than the global average (12%). Chinese employees are less confident in the skills required to start their own business, and this is the main risk for Chinese employees thinking about self-employment.

According to the 'Amway Global Entrepreneurship Report' (2015), China's entrepreneurial friendliness index reached 73% in 2015, compared to 50% for the international average and 63% for the Asian average. According to the report, 91% of Chinese respondents have a favorable attitude toward entrepreneurship. Respondents from all countries surveyed internationally had significantly lower positive attitudes than Chinese respondents. Furthermore, all age groups show a high potential for entrepreneurship, with Chinese respondents aged 35 to 49 being the most optimistic. This demonstrates the importance China places on innovation, the entrepreneurial ecosystem, and the government's encouragement of people to innovate, resulting in a high level of entrepreneurship and innovation enthusiasm.

According to the 'Report on the development of Mass Innovation and entrepreneurship in China' (2020), during the 13th Five-Year Plan period, China's mass entrepreneurship and innovation will continue to develop to a greater extent, at a higher level, and to a deeper degree, promoting innovation, building development engines, creating an environment and atmosphere, and improving the institutional system. The average number of newly registered enterprises has increased from 12,000 to 22,000 per day, nearly tripling the number of enterprises, the number of science and technology-based micro - enterprises has reached 223,000, the added value of strategic emerging industries has continued to grow at a rate of more than 8%, and the development of innovation and entrepreneurship has reached a new stage. Fig .6 is the average number of new businesses per day from 2014 to 2020 in China, and the Fig.7 is the number of newly registered market entries between 2014 to 2020 in China.

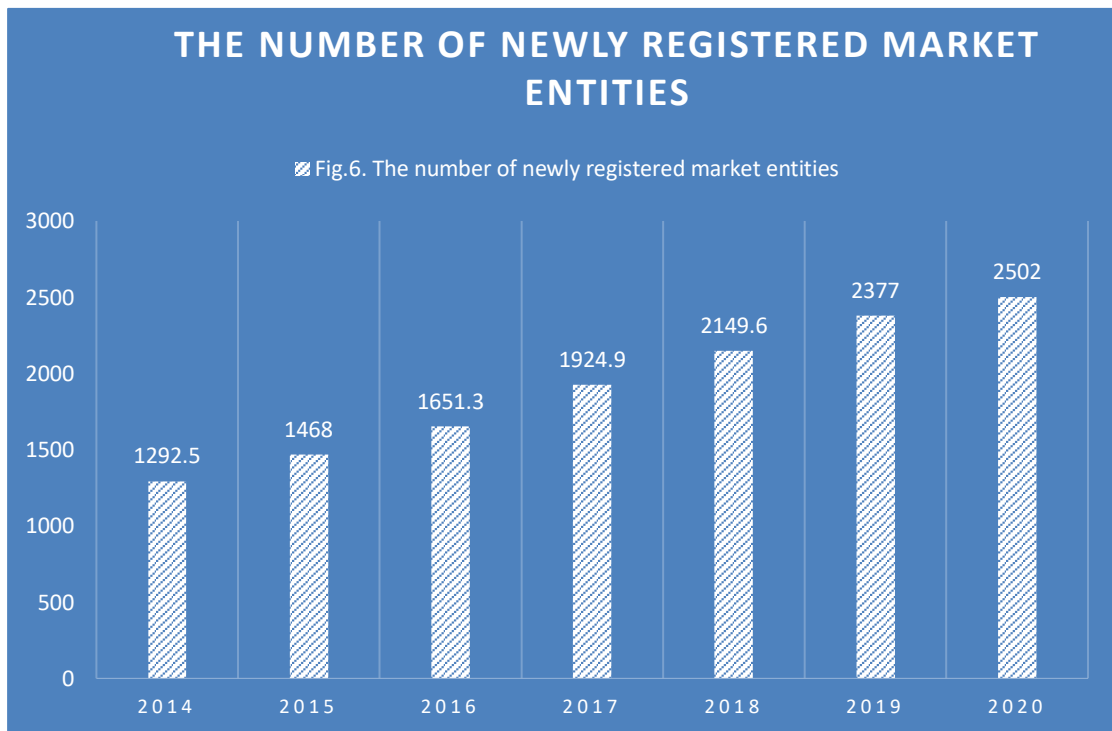
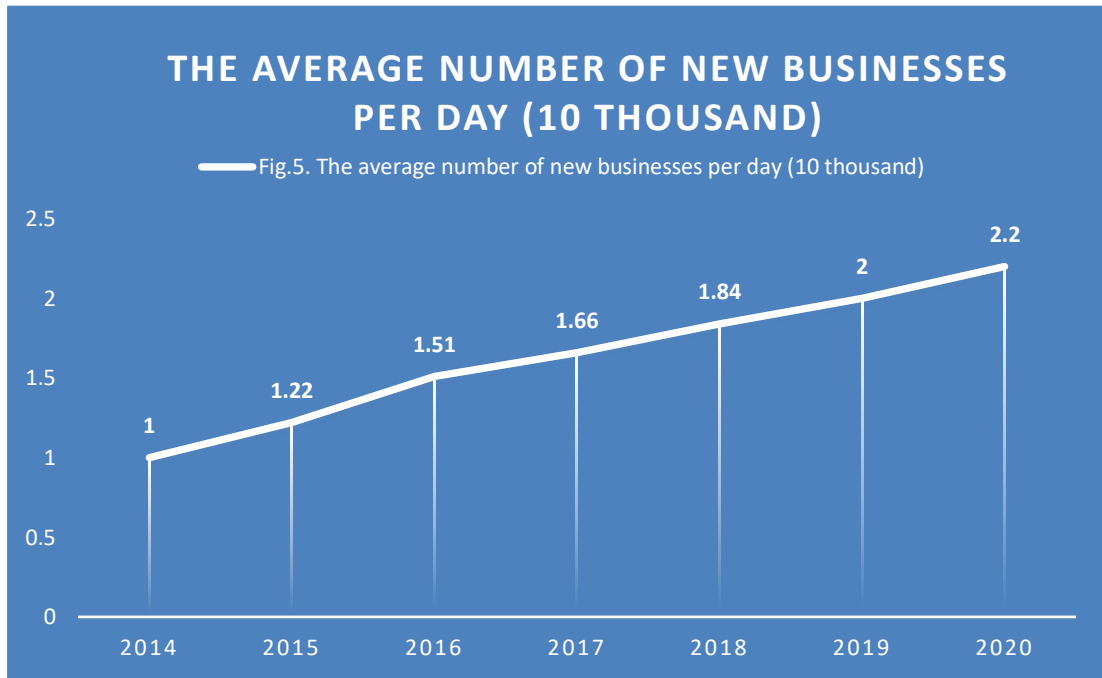


Fig.6,7 Data from report on the development of mass innovation and entrepreneurship in China (2020)

## 4.4 Technological Factors

Since technology is central to promoting economic growth and new firm creation is the necessary mechanism for transferring high-tech knowledge to markets, then technology incubators and accelerators have the biggest potential to contribute to economic growth. Therefore, the research about specific technological levels in certain regions plays a significant role in studying the behavior of Chinese incubators and accelerators (Tiago Ratinho, Rainer Harms & Aard Groen, 2010). According to the 'World Intellectual Property Report' (2019), the United States, Japan, and Germany were at the epicenter of global knowledge innovation activity from 1970 to 2000, accounting for more than two-thirds of all patents worldwide. Following the year 2000, the output of innovative knowledge, such as patented technologies, became more widely dispersed globally, with the number of nodes in global innovation networks, as well as the number and density of network connections, increasing (Wang Jiayi & Yang Qiaochu, 2022). China has emerged as a key player in global innovation activities, representing emerging countries.

The ability of firms to innovate is a key indicator of whether a country is a technological powerhouse. Chinese enterprises have significantly improved their innovation capabilities over the last 40 years, propelling China to become the world's second largest economy. Overall, however, the goal of relying on innovation, particularly high-end technological innovation, to drive enterprise development has yet to be realized (Li Y & Wei Z L, 2019). The number of Chinese patent applications filed at the USPTO in 2013 was 8,083, but by 2020 it is expected to be 24,759, a 200% increase over 2013. From 2000 to 2020, 40,891 Chinese companies filed patent applications, primarily in the computer, communications, and other electronic equipment manufacturing, medical information transmission, computer services, and software industries. According to Wang Jiayi & Yang Qiaochu (2022) statistical study of Chinese patents, Chinese high-tech enterprises have a strong capacity for independent research and development activities, and international patent applications rely more on independent research and innovation than on cross-border (regional) cooperation.

According to the National Bureau of Statistics of China, China's innovation index reached 242.6 in 2020, an increase of 6.4% compared to the previous year. By region, China's innovation environment index is 266.3, up 6.3% from the previous year, the innovation input index is 209.7, up 5.4% from the previous year; and the innovation output index is 319.8, up 8.5% from the previous year.

From the growth in the China innovation index and the number of Chinese patent applications shows the power of Chinese innovation that China is gradually demonstrating to the world. More and more countries are recognizing China's technological innovation. The entrepreneurial ecosystem is conducive to helping

China's technology business accelerators and incubators grow. Fig.8 shows China's innovation and the index by region.

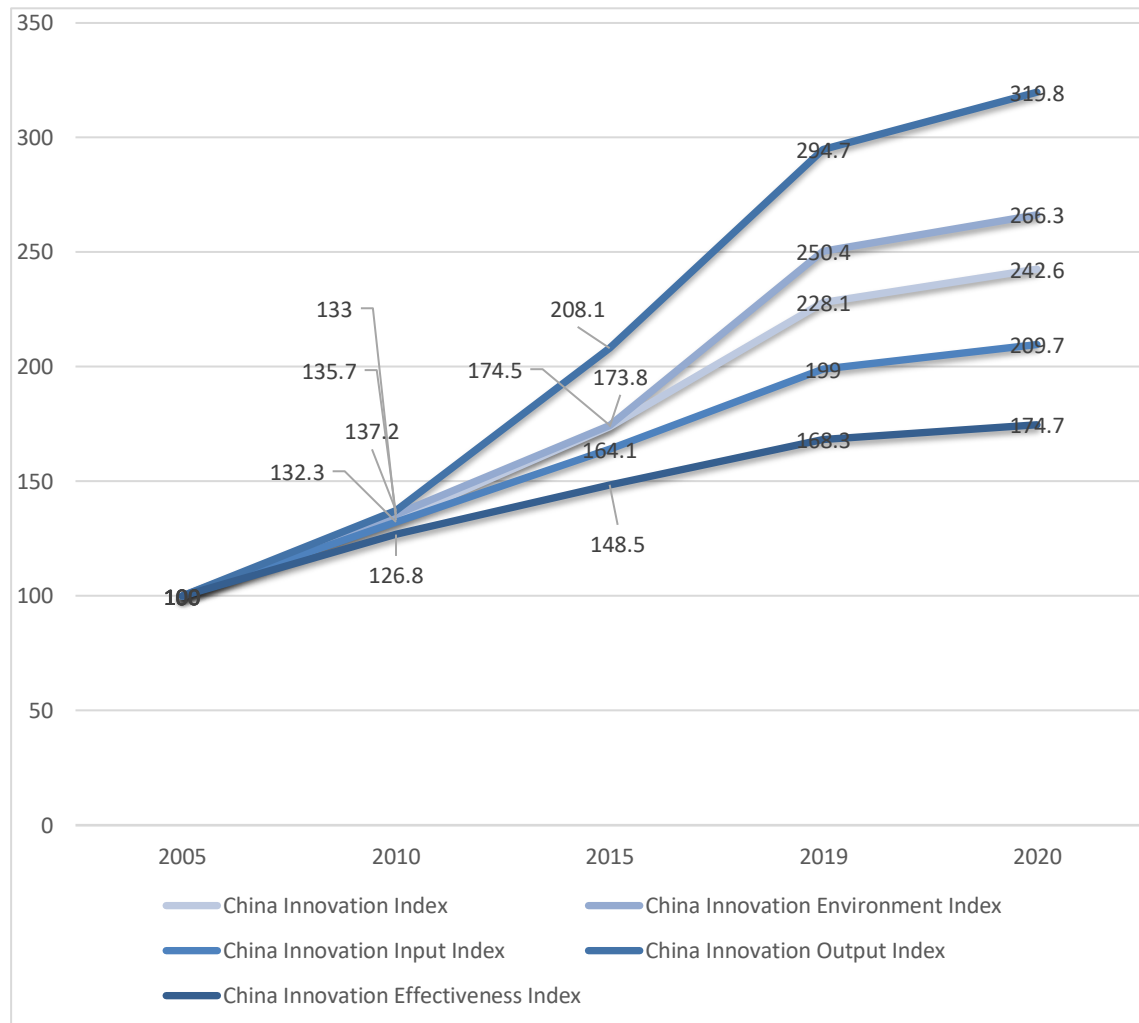


Fig.8 Data from the China Innovation Index study

## 5. China's Regional Analysis

China is geographically divided into seven regions, namely East China, North China, Central China, South China, Southwest China, Northwest China, and Northeast China. However, because of the obvious regional division of economic development, China's economic regions are divided into four major regions: East, Central, West, and Northeast. The central region includes Shanxi, Anhui, Jiangxi, Henan, Hubei and Hunan. The eastern region includes Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, and Hainan. Western region includes Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia and Xinjiang Northeast China includes Liaoning, Jilin and Heilongjiang. Fig. 9 is China's economic regions, the green region is China Western region, red part is China's Eastern region, yellow part is China's central region, blue part is China's Northeastern, and the purple part is China's Hong Kong and Macau Special Administrative Region. The Fig. 10 is China's geographically regions. The



region located at the top of the map is the Inner Mongolia Autonomous Region, the central part which belongs to northern China, the east belongs to the north-east and the west belongs to the north-west.



Fig.9 China's economic regions

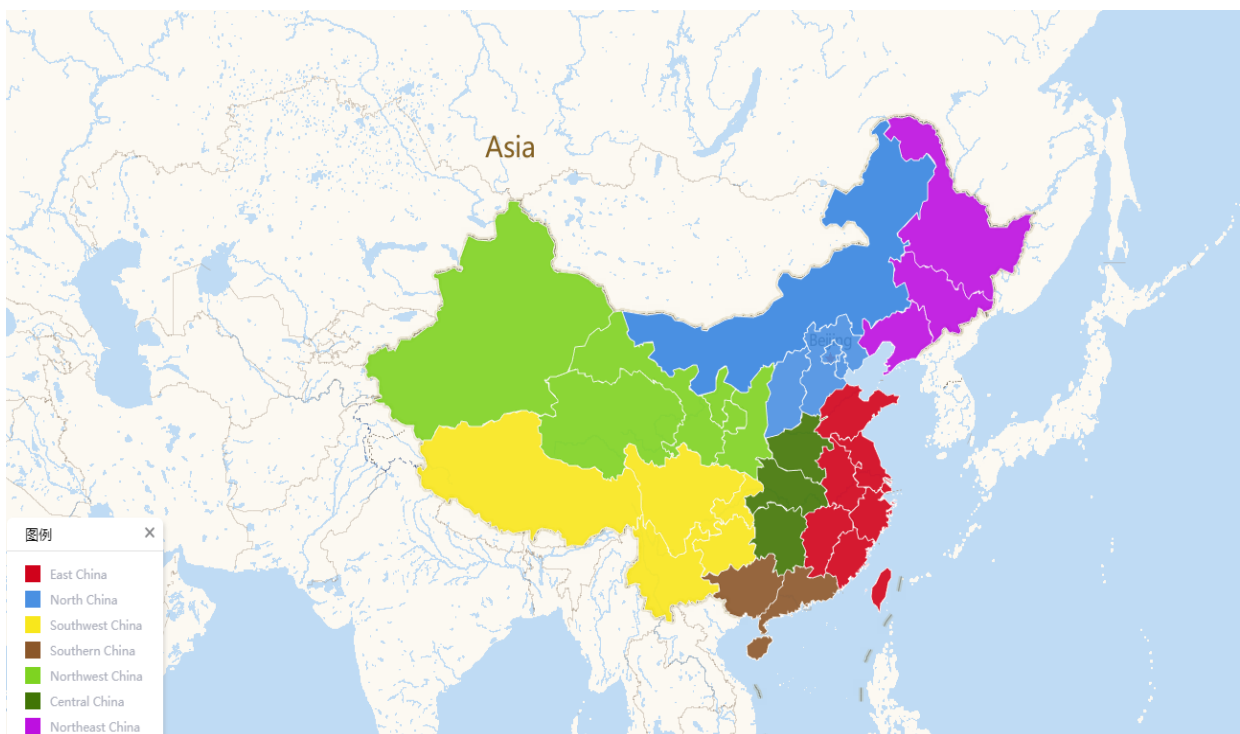


Fig. 10 China's geographically regions

## **5.1 Incubators by province and city in China**

### **5.1.1 In terms of quantity**

According to data from China's 'Business Incubation Development Report' (2020), the top five provinces and cities with the most incubators in China in 2019 were Guangdong, Jiangsu, Zhejiang, Shandong, and Hebei. The share of incubators in these five provinces and cities in China is 54.2%. The number of incubators in Jiangsu has increased significantly compared to the previous year, with a growth rate of 19.7%. Fig. 11 shows the number of incubators in the years 2018 and 2019 by province and city in China. These five provinces and cities all belong to the eastern part of China's economic region. In terms of the share of business incubators in each region, as of 2019, 64.3% of incubators are in the eastern region of China, an increase of 6.6% year-on-year. The number of incubators in the Central region was 766, accounting for 14.7% of the total, an increase of 7.1% year-on-year. There were 752 incubators in the Western region, accounting for 14.4% of the total, an increase of 17.9% year-on-year. In the Northeast region, there were 342 incubators, accounting for 6.6% of the total, a year-on-year decrease of 4.5%. The Western region saw an increase of 114 incubators, up 1.2% year-on-year, while there were 342 incubators in the Northeast region, accounting for 6.6% of the total, down 4.5% year-on-year. Fig. 12 shows the number of incubators in China's economic regions.

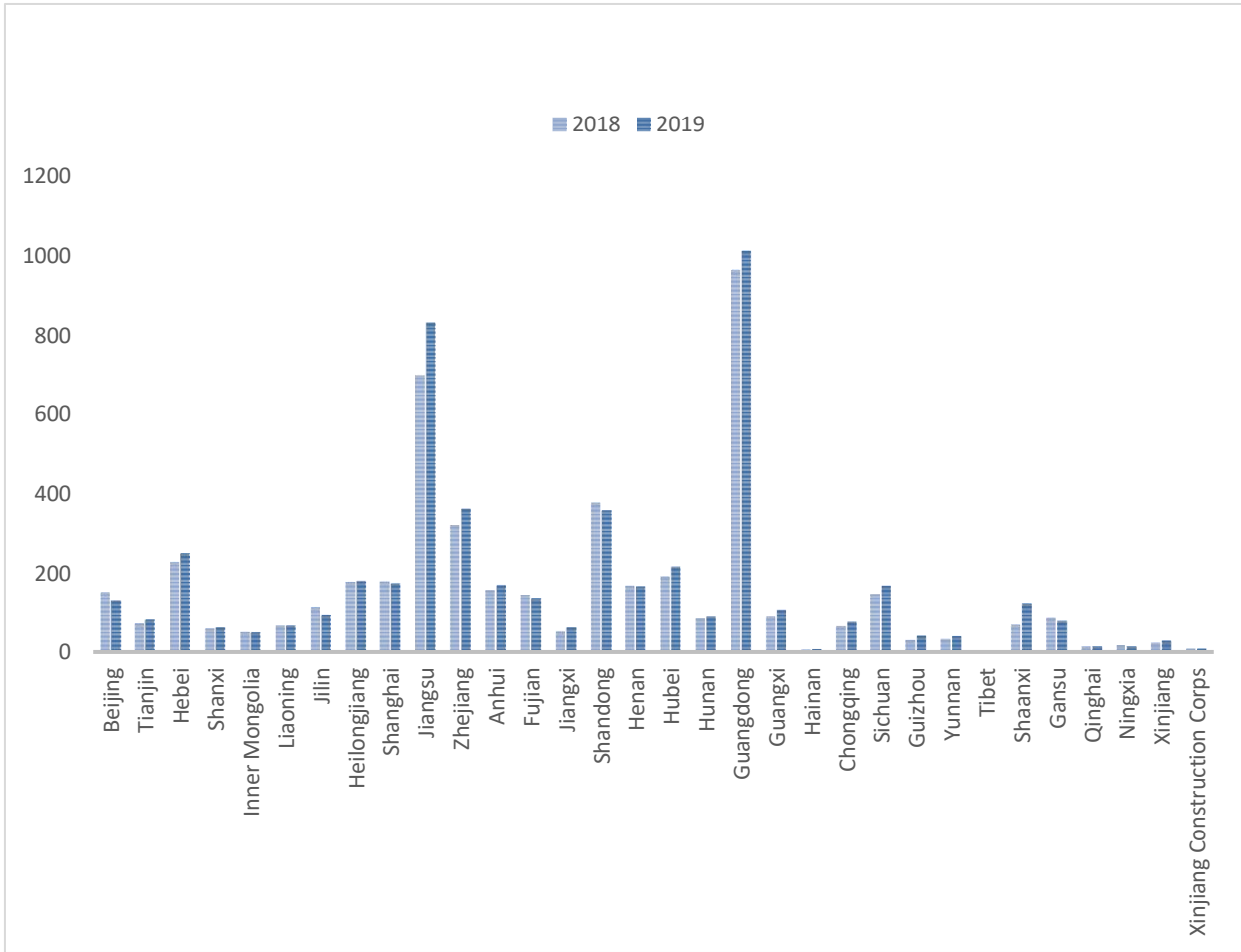


Fig. 11 Data based on China's Business Incubation Development Report (2020)

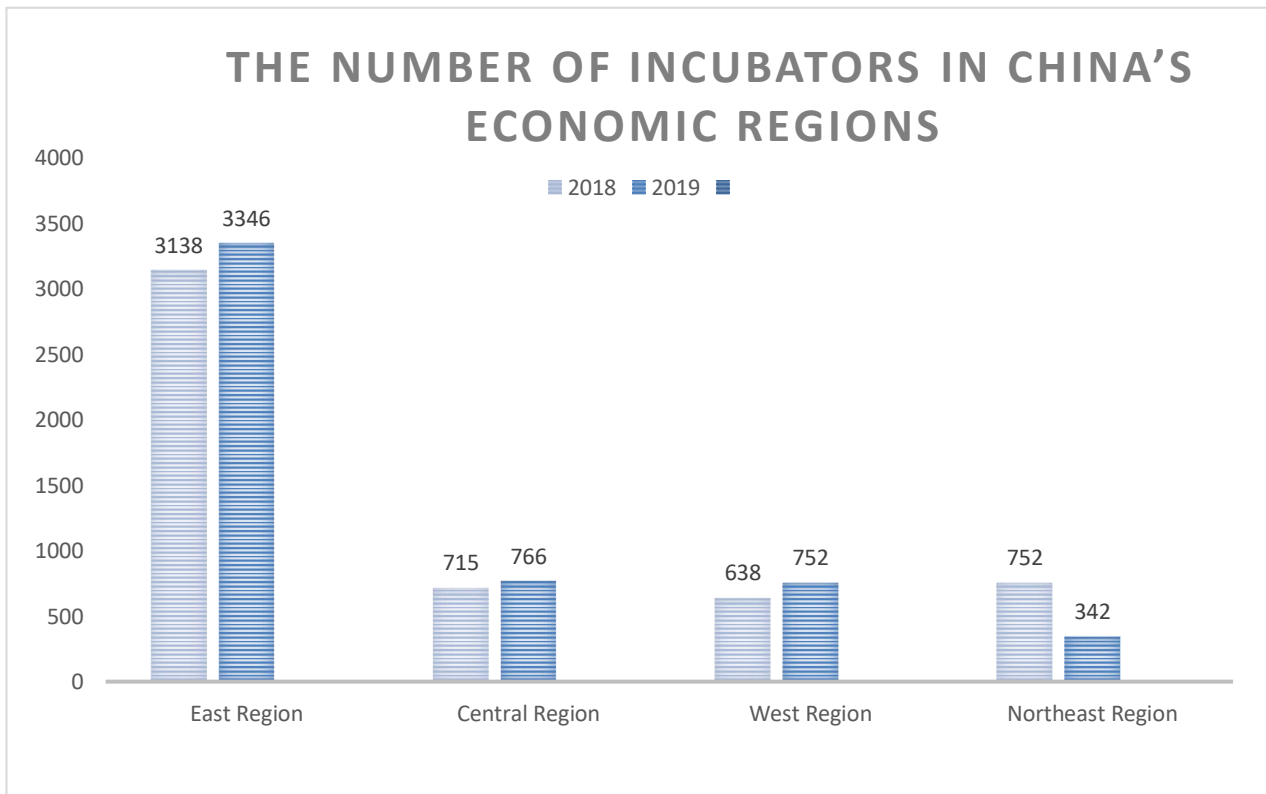


Fig.12 Data based on Torch Centre, Ministry of Science and Technology, China

### 5.1.2 In terms of incubation area and incubatees

According to the 'China's business incubation development report' (2020), as of 2019, the total area used by incubators in China was 129,279,000 square meters, of which 68.6% was used by incubatees, a slight downward trend of 2.65 million square meters less than in 2018. The regions with larger incubation areas also belong to the eastern region with a high number of incubators, with the top five provinces and cities occupying 55.1% of the total area used by incubators in China.

As of the data available for search, there were a total of 206,828 incubated enterprises in China's incubators in 2019, of which 58,830 were newly incubated, accounting for 27.1% of the total. Of these, 56.8% of incubators had 10–50 incubatees within them and 26.9% had 50–100 incubatees within them. The percentage of incubators with fewer than 10 incubatees was 11%. Only 5.3% of incubators had more than 100 incubatees. The five provinces and cities with the highest number of incubatees were Jiangsu, Guangdong, Zhejiang, Shandong, and Hubei. Among them, the number of incubatees in Guangdong was 34,800 and in Guangdong was 32,918. Fig. 13 shows the incubation space by province and city in China for the year 2018-2019. Fig. 14 shows the number of incubatees in incubators by province and city in China.

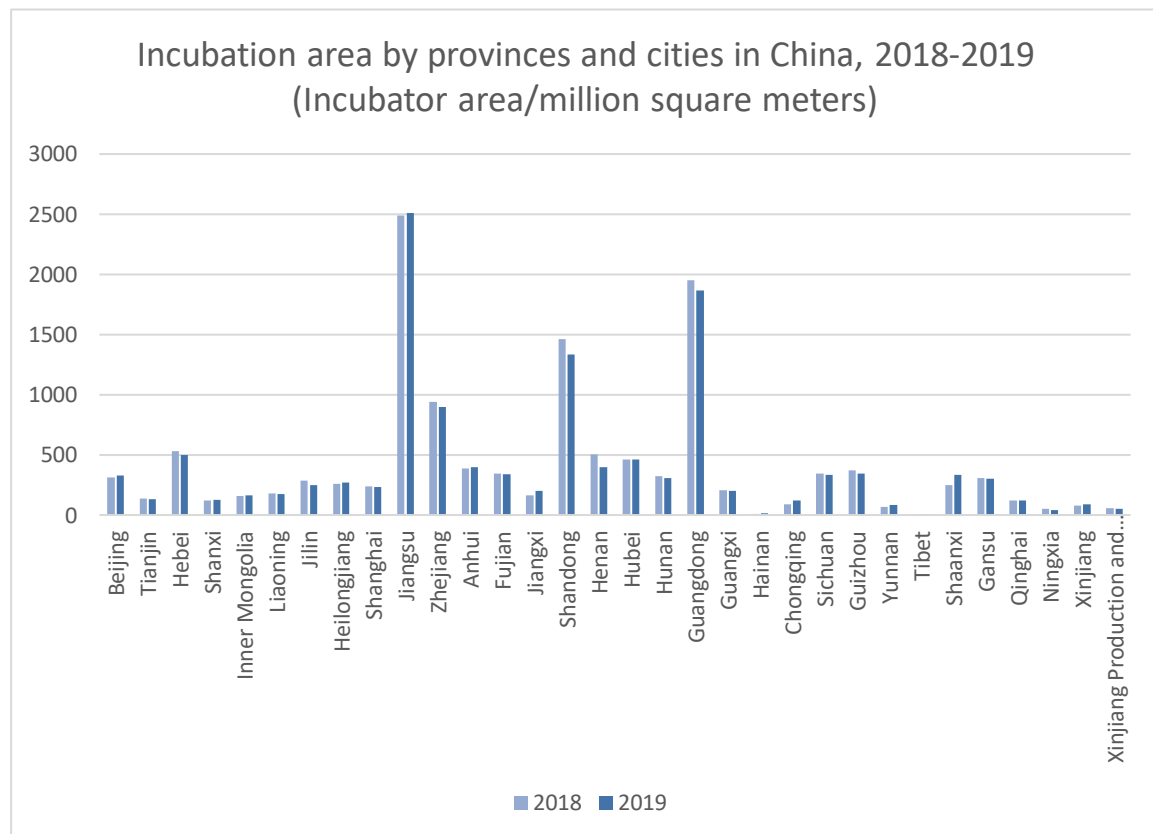


Fig. 13 Data based on China's business incubation development report (2020)

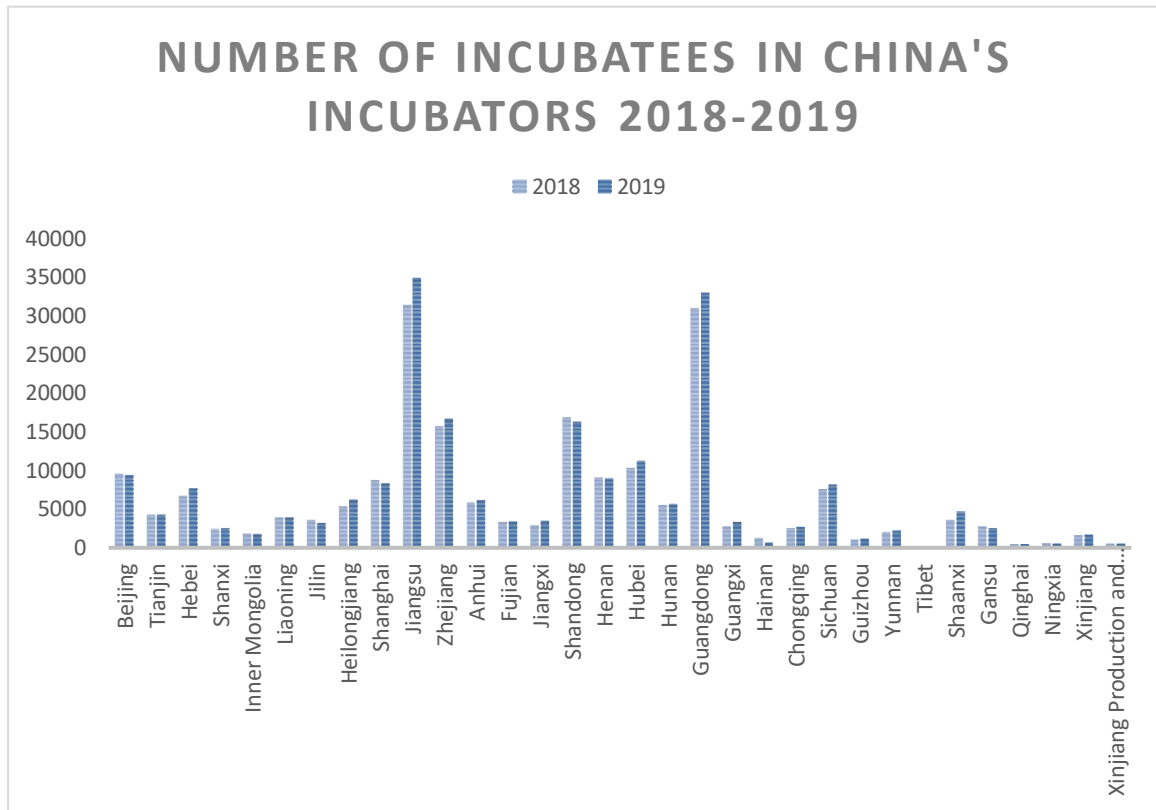


Fig. 14 Data based on China's business incubation development report (2020)

### 5.1.3 Corporate graduation status

From China's business incubation development report (2020), a cumulative total of 160,850 companies graduated from incubators in China with valid data, with 26,152 companies graduating in year 2019, 2,718 more than the previous year and an increase of 15.4% year-on-year. The top five provinces and cities in terms of the cumulative number of graduates are Jiangsu, Guangdong, Beijing, Zhejiang, and Shandong. These five provinces and cities accounted for 53.8% of the cumulative number of graduated enterprises nationwide. Table.4 is graduation status of companies from TBIs by province and city in year 2019.

Province and city	2019					
	Cumulative Graduated Enterprises	Of which the number of listed companies	Graduating companies of the year	Number of companies listed in the year	Companies merged and acquired during the year	Enterprises with turnover of over RMB 50 million in the current

						year
Beijing	15091	412	1321	109	56	122
Tianjin	2479	80	328	15	14	65
Hebei	4401	88	942	7	26	75
Shanxi	2025	58	410	20	31	26
Inner Mongolia	1890	18	264	3	1	11
Liaoning	4114	59	412	21	8	37
Jilin	2114	12	371	1	5	40
Heilongjiang	3345	56	482	4	5	11
Shanghai	3837	218	462	20	24	144
Jiangsu	26197	592	4524	110	122	894
Zhejiang	13893	272	2416	61	53	251
Anhui	3720	145	544	79	16	90
Fujian	3772	111	606	14	30	123
Jiangxi	2647	41	592	6	25	90
Shandong	12529	382	2152	45	50	261
Henan	6698	354	1005	107	38	207
Hubei	8409	405	1214	76	35	111
Hunan	4189	130	690	9	18	189
Guangdong	18858	668	3766	126	101	579
Guangxi	1952	52	435	10	28	43
Hainan	171	0	66	0	0	0
Chongqing	2756	45	498	13	2	21
Sichuan	5464	276	883	77	33	152
Guizhou	789	15	150	0	4	17
Yunnan	1416	14	169	0	1	11
Tibet	60	2	0	0	0	4
Shaanxi	4728	132	766	24	8	110
Gansu	1358	21	299	0	7	10
Qinghai	502	3	65	0	0	2
Ningxia	387	3	57	10	0	3
Xinjiang	811	11	162	4	2	24
Xinjiang Production and Construction Corps	248	0	101	0	0	6

Table 4. Data based on China's business incubation development report (2020)

## 5.2 Accelerators and Mass Maker Space by province and city in

### China

#### 5.2.1 Technology business accelerator

In terms of the geographical distribution of technology business accelerators, they are found in the south-eastern, central, and north-western regions of China. Overall, there is a high concentration in the southeast and a sparse concentration in the central and western regions. Although there is no specific data on the number of technology business accelerators in China's provinces and cities, the graphs in the 2017 China 'Accelerator blue book' show that the provinces and cities with the highest density of business accelerators in China are Beijing, Tianjin, Guangdong, Shandong, and Zhejiang. This basically matches the regional pattern of the better development of Chinese business accelerators, concentrated in the geographical southeast of China. The reasons for this are that the southeast of China is relatively rich and dense in business resources, with a relatively high number of business incubators and companies graduating from them, and a greater demand for technology business accelerators. Southeastern China has a faster growing economy, relatively strong local government capacity, and a higher level of investment in accelerators. Fig 15 is the the distribution of technology business accelerators among Chinese provinces and cities. Where the blue bubbles represent the density of technology business accelerators among companies.



Fig. 15 based on China business accelerator blue book (2017)

## 5.2.2 Mass maker space

The number of Mass maker space in China has been increasing since 2016, and by Torch Centre counted, by the end of 2019, there were 8,000 Mass maker space in China, an increase of 86.1% compared to 2016. In terms of China's provincial and municipal regions, Guangdong province ranks first, with the top five in order: Guangdong, Jiangsu, Zhejiang, Shandong, and Hebei. In terms of economic regional distribution, the number of Mass Maker Space in all regions of China grew by varying degrees in 2019, with the eastern region increasing the most, by 745, and the central region growing the fastest, by 21.1% over the previous year. With the service environment of Mass maker space getting better and better, more and more companies are being born in the Mass maker space of China. As of 2019, a total of 91,000 newly registered enterprises have been established in China under the incubation of Mass maker space. The cumulative average amount of investment and financing that Mass maker spaces in various regions helped start-up teams to obtain was RMB 2.94 billion. Among them, Beijing topped China in helping startup teams and companies obtain a cumulative total of RMB 44.67 billion in investment and financing. Fig. 16 is the number of Mass maker spaces in China by province and city.

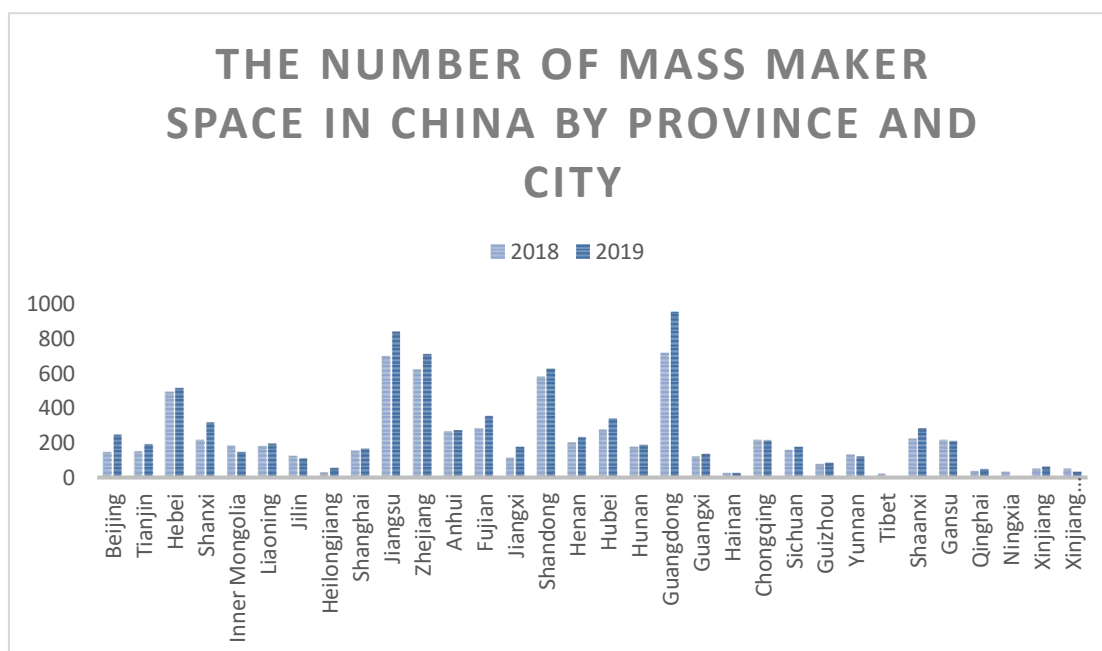


Fig 16 data from China's business incubation development report (2020)

In general, based on the above data analysis it can be found that incubators, accelerators, or Mass maker space in China are most concentrated in the eastern part of China's economic zone, followed by the central and western regions, with the incubation industry developing more slowly in the northeast.



## **5.3 Analysis of eastern region**

Using the data in 5.1, I have selected one municipality and one province in the eastern region of China for the special case analysis, which are Shanghai and Guangdong Province respectively.

### **5.3.1 Analysis of Shanghai**

#### **5.3.1.1 Technology Business Incubation Developments**

From 'China's business incubation development report' (2020), as of 2019, there are a total of 354 business incubators and accelerators in Shanghai, including 175 incubators, 164 Mass maker spaces, and 13 accelerators spread across 16 districts. There are 55 national-level incubators, accounting for 31.4% of the total number of incubators. The number of valid pieces of intellectual property owned by incubatees in Shanghai's business incubation institutions reached 40,083 by the end of 2019. A total of 134,313 people were employed by the incubated enterprises, of whom 10,483 were freshly graduated students.

#### **5.3.1.2 Political Factors**

The main guideline issued by the shanghai government in 2016 is named "Measures for the Administration of Science and Technology Business Incubators in Shanghai", which aims to enhance an environment that encourages technological incubators and promotes the construction of Shanghai's technological innovation and entrepreneurship service system. There are five chapters in the guideline, which specify the policy on recognizing technology business incubators. The required financial scale and the minimum area of the incubators are also defined. In chapters 4 and 5, the rules about how the related official department supervises the behavior of technological incubators' entrepreneurship classify the performance.

The central policy related to Makerspace is "Guiding Opinions on the Development of Makerspace in the City to Promote Makerspace Entrepreneurship, " issued by the General Office of Shanghai Municipal People's Government in 2015. The regulation proposes the necessary policies from six aspects to improve the industry classification rules of enterprises and the management methods of business scope, based on the characteristics of emerging industries.

The above-all regulations have something in common.

Initially, they all specify the solution to accelerate the development of the industrial estate. Through revitalizing the stock resources to establish various forms of maker space and incubators, it makes a good contribution to encouraging all districts, counties, industrial parks, and major enterprises to use existing commercial buildings,

industrial plants, warehouses, and other stock properties to convert them into incubators and other maker spaces without changing the building structure or affecting building safety.

Secondly, for providing convenient service, measures such as specific window services, online declaration, and integration of three certificates into one are adopted to facilitate the industrial and commercial registration of entrepreneurial enterprises.

In addition, they also indicate how to inspire mass innovation and entrepreneurship, establish innovative service institutions, promote the development of angel investment, and strengthen fiscal and taxation support.

### 5.3.1.3 Economic Factors

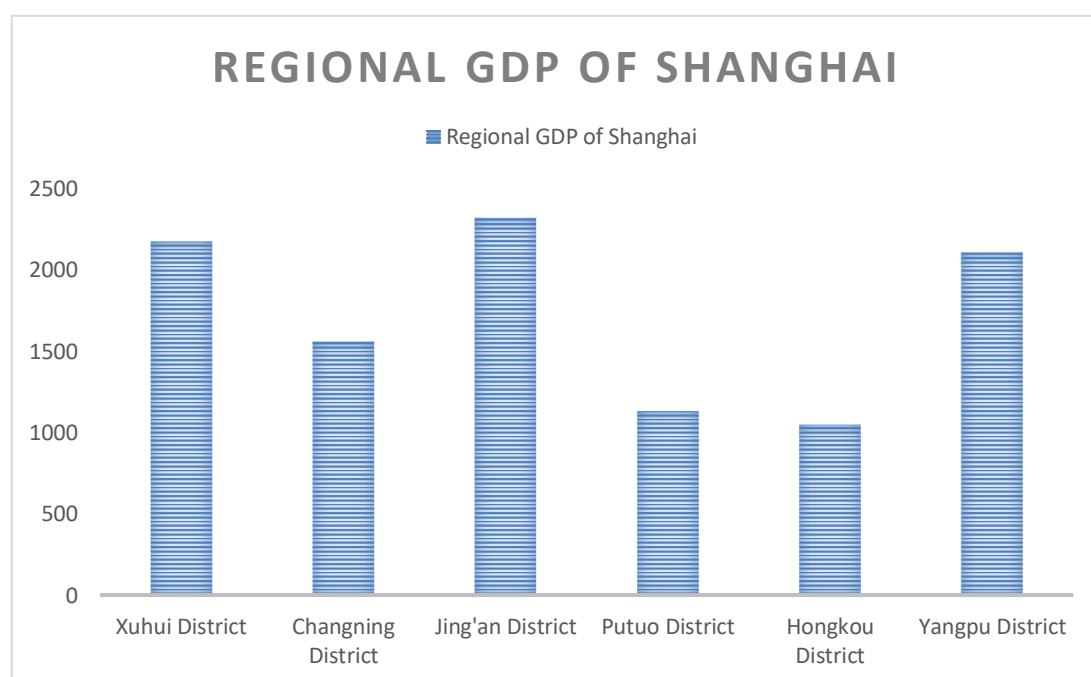


Fig 17 Data from Bureau of Statistics, Shanghai

Shanghai, as an international financial center, prior to the first three quarters of 2020, Shanghai's GDP was RMB 2,730,199 million, with the economy recovering slightly slower than in other Chinese cities due to the greater impact of the epidemic in Shanghai, with all three quarters showing negative growth. However, the economic pressure on Shanghai was gradually relieved in 2021. Shanghai has a higher year-on-year financial sector growth rate in 2021 than other Chinese provinces and cities. Shanghai's GDP surpassed RMB 4 trillion in 2021, reaching RMB 4.32 trillion, an 8.1% increase year on year. Last year, Shanghai advanced the implementation of "Article 30 of Finance," introducing and implementing supportive policies such as the construction of a global asset management center, an international green financial hub, and an international reinsurance center, promoting the implementation of several financial industry liberalization projects such as the first wholly foreign-funded brokerage firm, and launching financial innovation products and businesses such as

crude oil. The total value of financial market transactions surpassed RMB 25 trillion, representing a 10.4% increase. Shanghai has been a source of economic development for China. Shanghai's economy is centered on modern services, capital markets, real estate markets, high-tech industries, and manufacturing. The Shanghai economy is focused on the modern service industry, capital markets, real estate markets, high-tech industries, and the online new economy, as well as the core elements that drive high-quality economic development, which are innovative technology and capital. The overall indicators of Shanghai's science and technology financial performance fluctuated considerably, rising from 2003 to 2009, reaching a peak in 2009 and then showing a linear decline. This may be related to the current domestic economic downturn and the complex international financial environment. With a peak in 2009 and a new ten-year low in 2016, market technology finance is influenced by macroeconomic and financial markets. In addition, it can be seen that in 2008, due to the financial crisis, Shanghai's science and technology innovation output, science and technology financial performance, as well as public science and technology financial performance, all declined to varying degrees, with market science and technology financial performance indicators declining the most, followed by science and technology financial performance, science and technology innovation output, and public science and technology financial performance declining the least (YANG Shangguang, & YE Xiaotong, 2022). In 2019, incubatees in Shanghai spent RMB 4.55 billion on R&D, a decrease of 8.0% percentage points from 2018. The total revenue of incubation institutions, on the other hand, increased by 5.5% to RMB 2.89 billion, indicating that Shanghai's incubation industry is steadily growing as the city's economic influence grows. Fig 15 is the Shanghai GDP by Region. Table 5 is yearly finance Performance composite indicator of Shanghai.

Year	Technology Finance Performance Composite Indicator	Public Technology Finance Performance Composite Indicator	Market Technology Finance Performance Composite Indicator
2003	2458	1931	1535
2004	2426	1607	1981
2005	3421	1713	3456
2006	3115	1928	3203
2007	3611	2351	3826
2008	2977	2350	3047
2009	3823	2911	4157
2010	3166	3625	3318
2011	2804	3611	2870
2012	2744	3802	2783
2013	2769	3650	2828
2014	3059	3747	3188

2015	2931	4291	3060
2016	2696	4485	2748

Table. 5 is based on YANG Shangguang & YE Xiaotong (2022)

### 5.3.1.4 Sociocultural Factors

As early as the Republic of China, Shanghai had already become the largest city in the Far East, far surpassing Tokyo, and Hong Kong in economic terms. Shanghai's unique geographical position in China, at the mouth of the Yangtze River (China's largest river) and at the midpoint of China's north-south coastline, laid the foundation for Shanghai to become the economic center of China in the age of the maritime economy. Thanks to strong financial resources, a large population and a stable source of income, Shanghai is financially self-sufficient and has the highest balance rate in China. The fact that Shanghai's innovation and entrepreneurship was not as developed as Beijing, Shenzhen and Hangzhou in previous years is due to the way Shanghai's government is managed and the city's culture. For starters, Shanghai's government is committed to meticulous business management, and the city's land area is comparatively small in China. Additionally, rents in Shanghai are expensive and not conducive to the development of small businesses. Second, while Shanghai is one of China's most open and tolerant cities, it was previously unaware of how beneficial the media could be in promoting start-ups.

In recent years, the Shanghai government has developed the industry of innovation and entrepreneurship in Shanghai by changing its philosophy, increasing the importance given to startups, increasing startup-friendly policies, lowering taxes and bringing in more technology-based talents, and encouraging the growth of technology business incubators, accelerators, and Mass maker spaces in Shanghai.

### 5.3.1.5 Technological Factors

With the rising cost of various factors in China and changes in the international development environment, the previous model that mainly relied on labor, land, currency, and other factors to promote economic growth is no longer sustainable. Nowadays, innovation is the primary driving force for development and strategic support for building a modern economic system. Science and technology are the primary productive forces, and finance is the blood of the modern economy. How to combine technological finance with technological innovation will become one of the long-term focus issues of the theoretical and practical circles in China.

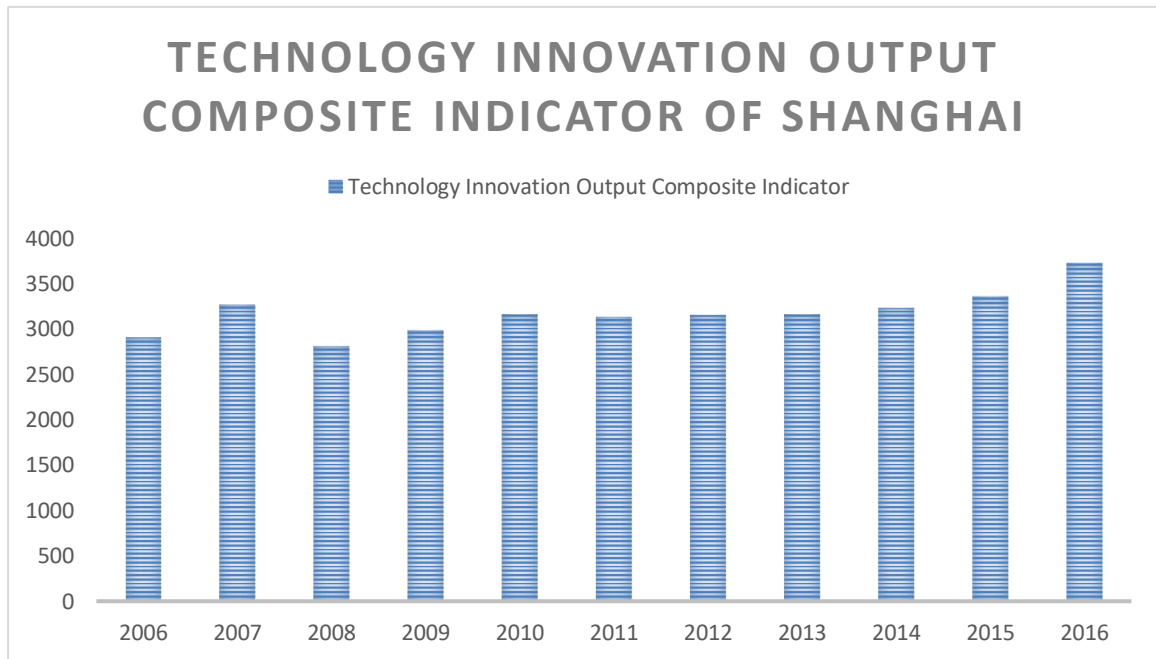


Fig. 18 Data based on Shanghai Innovation Yearbook

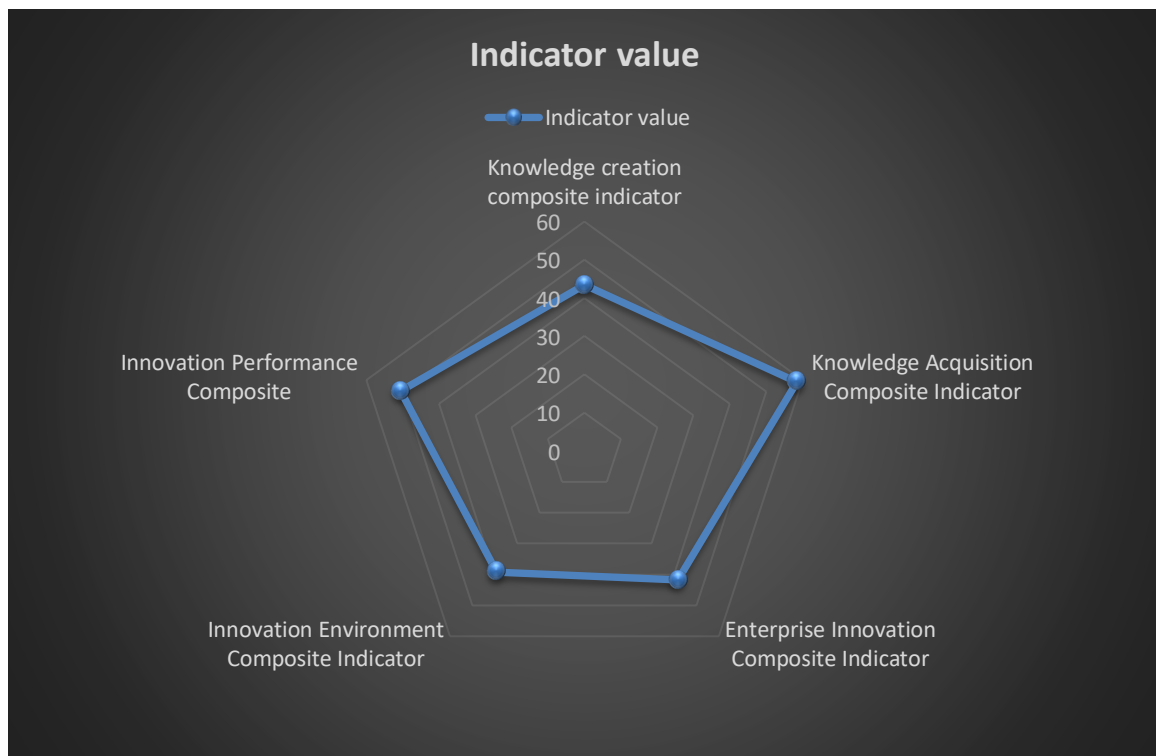


Fig. 19 Data from China Innovation and Entrepreneurship Management Research Centre (2019)

It can be seen from the table and the figure that the overall index of Shanghai's scientific and technological innovation output shows an upward trend year by year, indicating that Shanghai's scientific and technological innovation capability is constantly improving. Shanghai ranked fourth in China in terms of overall innovation

capacity for the 11th consecutive year in 2019, with a strong ability to acquire knowledge and a more balanced development of overall innovation capacity.

In Shanghai, the government has established one High-tech Industrialization Zone called Zhangjiang Hi-Tech Park consisting of 6 zones. It is operated by Zhangjiang Hi-Tech Park Development Co., Ltd. The park specializes in research in life sciences, software, semiconductors, and information technology. As of 2009, there were 110 research and development institutions, 3,600 companies, and 100,000 workers located in the technology park. In some circles, the park is also known as China's Silicon Valley. Each zone has an incubator, and small and medium-sized technology enterprises will stay in the zone to develop after growing up and graduating through cultivation. For example, the incubator in the Caohejing High-Tech Park has an incubation area of 22,000 square meters, and 100 companies are incubating. In 2003, the total income from technology, industry, and trade reached 630 million yuan, 56 companies have graduated, and the survival rate of enterprise cultivation is over 90%, relying on the good industrial development environment of the high-tech zone.

At present, in the construction of the technology business incubator, Shanghai has transferred it from the high-tech zone to the location of scientific and technological resources and the traditional industry-intensive area. For example, Shanghai has established a combination in the Huangpu District Science and Technology Capital. A professional incubator for IC design has been found, resulting in an agglomeration effect. According to the development trend of the environmental protection industry, combined with the original advantages of Yangpu District, they are creating an environmental protection professional incubator. They also combined the construction of the modern agricultural industrial park in the Fengxian District to create a modern agricultural professional incubator. What will be achieved is the combination between Nanhui Modern Equipment Industrial Park and the construction of modern equipment professional incubator. Another example is that with the development of the nano industrialization base in Xuhui District, relying on the district government, Shanghai Institute of Materials, and East China University of Science and Technology to jointly create the Shanghai Nanotechnology Incubator.

### **5.3.1.6 The Technology Business Incubators and Accelerators in**

#### **Shanghai**

Because various incubators may have various focus areas or industries that they support, the industry distribution of business incubators in Shanghai may vary. However, the following industries are frequently targeted by business incubators in Shanghai:

Technology and innovation: Supporting startups in these sectors, which include fields

like software development, biotechnology, and advanced manufacturing, is a major focus of many business incubators in Shanghai. Like the Shanghai Science and Technology Innovation Center, Shanghai Zhangjiang Hi-Tech Park, Shanghai Jiaotong University Xuhui Innovation Hub, Shanghai Pudong New Area Science and Technology Innovation Center, Z-Park, and Shanghai International Science and Technology Entrepreneurship Center. These are a few examples of the incubators and accelerators in Shanghai that focus on supporting startups in the field of technology and innovation.

E-commerce and online retail: As e-commerce in China has expanded quickly, Shanghai has seen the emergence of several business incubators that support startups in this sector. Some of the bests are Alibaba Group, Shanghai International Commerce Center (ICC), Shanghai Pudong New Area Science and Technology Innovation Center, Shanghai Zhangjiang Hi-Tech Park and Shanghai International Science and Technology Entrepreneurship Center.

Creative industries: Shanghai is home to a thriving creative scene, and the city is home to a few business incubators that support startups in industries like media, advertising, and design. Like Shanghai Creative Industry Park, Shanghai Zhangjiang Hi-Tech Park, Shanghai Jiaotong University Xuhui Innovation Hub and Shanghai Pudong New Area Science and Technology Innovation Center.

Food and beverage: The food and beverage industry are an important part of Shanghai's economy, and the city has several business incubators that support startups in this industry. The Shanghai Food and Beverage Industry Innovation Park, Shanghai Zhangjiang Hi-Tech Park, Shanghai Pudong New Area Science and Technology Innovation Center and Shanghai International Science and Technology Entrepreneurship Center all focused on supporting startups in the food and beverage industry.

Healthcare: Shanghai is home to many leading healthcare organizations, as well as several business incubators focused on supporting healthcare startups. The Shanghai Biomedical Innovation Center and Shanghai International Science and Technology Entrepreneurship Center also offers a range of services including workspace, mentorship, and access to financing.

## **5.3.2 Analysis of Province Guangdong**

### **5.3.2.1 Technology Business Incubation Developments**

As of 2019, there were 1,965 business incubatees in Guangdong Province, an increase of 17.1% compared to 2018. Among them, there were 1,013 incubators and 952 Mass Maker Spaces. Among them, 150 are national-level incubators, accounting for 14.8%

of the total. according to the data from China's business incubation development report (2020). By the end of 2019, the number of incubated enterprises in Guangdong Province was 76,279, and the number of Mass Maker Space in incubated enterprises for the year was 43,361. There is no definitive number of business accelerators, and the landscape of business accelerators and incubators in Guangdong and throughout China is evolving. New programs are frequently launched, and existing programs may close or shift their focus. As a result, it is not able to provide the number of business accelerators operating in the province.

On August 26, Guangzhou hosted a theme summit on the high-quality development of technology business incubators. The "Report on the Development of Science and Technology Incubation and System Construction in Guangdong Province (2022)" was officially released at the meeting. According to the report, Guangdong Province currently has 1,111 incubators and 1,076 Mass Maker Spaces, ranking first in China on an overall scale for six consecutive years. However, for the purposes of data comparison, the Chinese national data published in 2019 will be used.

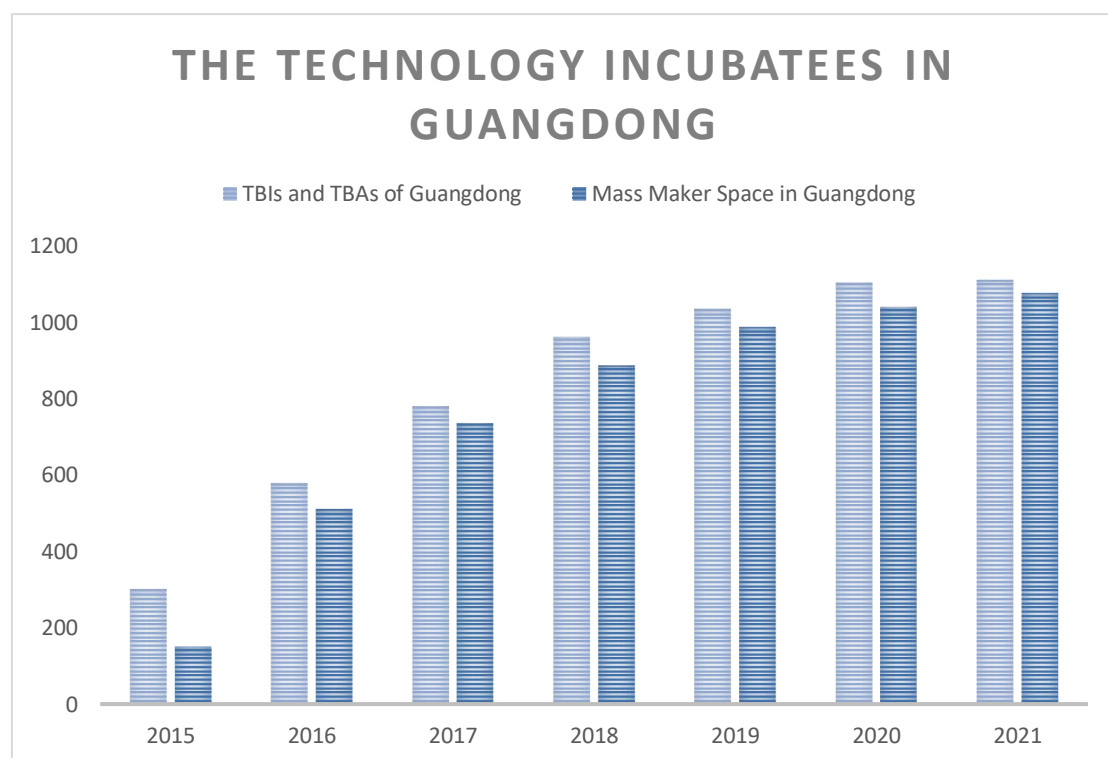


Fig.20 Data based on report on the development of science and technology incubation and system construction in Guangdong province (2022)

### 5.3.2.2 Political Factors

According to a cadre of policies released by China, Guangdong province has formulated the 'Measures for the management of technology business incubation



carriers in Guangdong province' in order to strengthen the standardized management of technology business incubators, accelerate the quality and efficiency of the technology incubation and breeding system, build an excellent technology entrepreneurial ecology, promote mass entrepreneurship and innovation to a new level, and support the construction of an international technology innovation center in the Greater Bay Area of Guangdong, Hong Kong, and Macau. The management policy has introduced the concept of 'technology business incubation carrier' for the first time, guiding the construction of an integrated chain of 'Mass Maker Space-technology business incubator-technology business accelerator' for technology business incubation. For the first time, an accelerator is included in the management approach, with an emphasis on the docking mechanism between the accelerator and the incubator, requiring the accelerator to have a fast track from the incubator to the accelerator. For the first time, internationalized, Guangdong, Hong Kong, and Macao technology business incubation carriers are included in the management approach, and the recognition of internationalized, Guangdong, Hong Kong, and Macao technology business incubation carriers is incorporated into the policy, focusing on internationalized, Hong Kong, and Macao innovation and entrepreneurship elements in professional incubation services, resource matching, innovation and entrepreneurship activities, talent measures, etc. to guide the province to accelerate the gathering of international innovation and entrepreneurship elements and accelerate the promotion of Guangdong, Hong Kong, and Macao . We focus on guiding incubation carriers to improve their incubation services, raise the quality development requirements in terms of density of incubated enterprises, technological content, investment and financing, business mentorship, and the conditions of graduated enterprises, and scientifically guide the development of technology business incubation carriers in the direction of high quality through a combination of 'absolute number + proportion.'

The Guangdong provincial department of finance has issued a trial regulation on post-subsidy for technology business incubators, which states that science and technology business incubators and accelerators are entitled to subsidies for new incubation areas, rewards for excellent operational performance and other related subsidies. The fourth article in the second section proposes that for incubators that have received subsidies for additional incubation space from municipalities above the prefecture level (including Shunde district) in the previous year, the provincial government will provide a follow-up grant of not more than 50% of the amount of the municipal (including Shunde district) subsidy, up to a maximum of RMB 2 million per incubator. This provision of financial support has significantly alleviated the stagnation of high-tech business development after the epidemic and the slow incubation process of business incubators due to insufficient funding.

### **5.3.2.3 Economic factors**

Guangdong province is known for its strong economic growth and development, it is one of the wealthiest provinces in China. Outpacing many other regions in China and

around the world, Guangdong has continued to experience strong economic growth. As of 2021, the GDP of Guangdong was approximately RMB 12,436.967 billion, an increase of 8.0% over the previous year and a two-year average growth rate of 5.1%. The following graph shows the GDP of the 21 cities in the province of Guangdong in the year 2021. It can be seen from the figure that Guangdong province still has a lot of room for improvement in the economic development of county units.

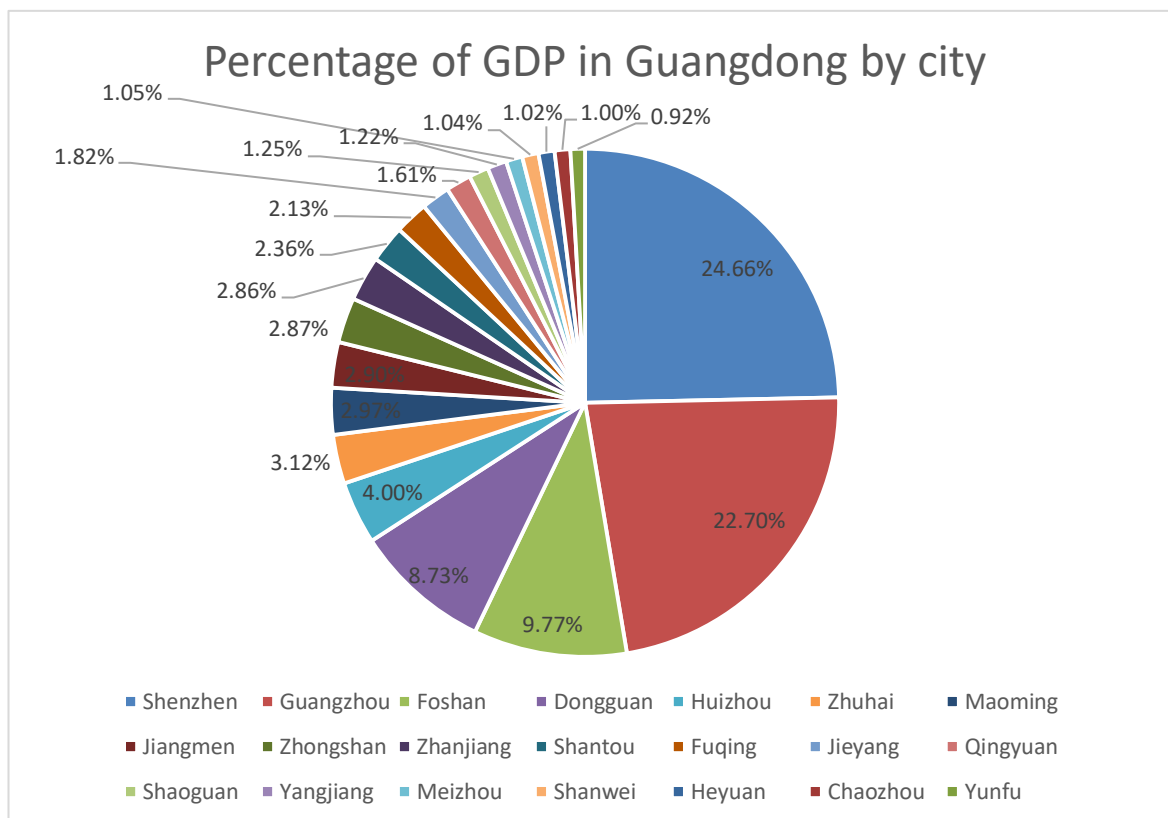


Fig.21 Data from People's Government of Guangdong Province

City	GDP 2021 (Hundred Million)	GDP 2020 (Hundred Million)	Increment (Hundred Million)	Rate of growth (%)
Shenzhen	30664.85	27670.24	2994.61	10.82
Guangzhou	28231.97	25019.11	3212.86	12.84
Foshan	12156.54	10816.47	1340.07	12.39
Dongguan	10855.35	9650.19	1205.16	12.49
Huizhou	4977.36	4221.79	755.57	17.90
Zhuhai	3882	3481.94	400.06	11.49
Maoming	3698.1	3279.31	418.79	12.77
Jiangmen	3601.28	3200.95	400.33	12.51
Zhongshan	3566.17	3151.59	414.58	13.15
Zhanjiang	3559.93	3100.22	459.71	14.83
Shantou	2929.87	2730.58	199.29	7.30

Fuqing	2649.99	2311.65	338.34	14.64
Jieyang	2265.43	2102.14	163.29	7.77
Qingyuan	2007.45	1777.15	230.30	12.96
Shaoguan	1553.93	1353.49	200.44	14.81
Yangjiang	1515.86	1360.44	155.42	11.42
Meizhou	1308.01	1207.98	100.03	8.28
Shanwei	1288.04	1123.81	164.23	14.61
Heyuan	1273.99	1102.74	171.25	15.53
Chaozhou	1244.85	1096.98	147.87	13.48
Yunfu	1138.97	1002.18	136.79	13.65

Table.6 GDP and rate growth in Guangdong by city, data from Guangdong Statistics Bureau

According to the above chart, the main contributors to the GDP of Guangdong province are Shenzhen and Guangzhou, accounting for 24.66% and 22.7% respectively. They are the key centers of trade, investment, and economic activity in Guangdong. Shenzhen is famous of its high-tech industries and fast-growing economy. In recent years, Shenzhen has become a hub for technology companies, startups, and innovation, and is often referred to as ‘China's Silicon Valley.’ This has driven significant economic growth in the city and helped to make it one of the wealthiest and most economically dynamic cities in China. Guangzhou is an important hub for trade, investment, and economic activity in the region. The city is known for its thriving services sector, which includes finance, real estate, and other business services, and has a well-developed manufacturing sector as well. Guangzhou and Shenzhen both have strong market demand for a variety of goods and services. From the website of Guangdong government, end of 2021, Guangdong's total retail sales of consumer goods will be RMB 4.42 trillion, up 9.9% year-on-year, with a two-year average growth rate of 1.4%. By type of consumption, food and beverage sales grew by 15.4% year-on-year, while retail sales of goods grew by 9.3%. According to the Guangdong provincial science and technology department's 2021 annual performance ‘Special funds for science and technology innovation strategy’ project, the annual budget for the project was RMB 980.8648 million and the implementation amount was RMB 980.8648 million, achieving 100% of the budget. The province's 14 national high-tech zones achieved a gross domestic product of RMB 2.16 trillion and industrial added value of RMB 1.35 trillion, accounting for 17.4% and 36% of the province respectively, the province's 40 high-tech zones have become increasingly evident in supporting economic development and leading the way in science and technology, cultivating a stock of 14,899 high-tech enterprises, accounting for 24.7% of the province. In 2021, the province will invest a total of RMB 400.218 billion in research and Development (R&D), an increase of RMB 52.230 billion or 15.01% over the previous year, with a growth rate of 2.71 percentage points higher than the previous year. The intensity of investment in R&D (as a ratio to the province's regional GDP) was 3.22%, 0.09 percentage points higher than the previous year. This creates a favorable environment for incubators and accelerators, which benefit from

the growing demand for technology-related products and services.

#### **5.3.2.4 Sociocultural Factors**

There are many rivers in Guangdong province, and the coastal areas of the province have experienced remarkable economic and social development since the reform and opening. Guangdong has a strong entrepreneurial culture, which is conducive to the development of new technology start-ups and businesses. This culture is reflected in the number of entrepreneurs and innovators who are willing to take risks and pursue new ideas. This benefits incubators and accelerators that help nurture and support new ventures. Guangdong has a large pool of talented individuals, including engineers, designers, and business professionals, which helps support the growth of technology startups and businesses. Incubators and accelerators in Guangdong can benefit from this talent pool by attracting and retaining highly skilled professionals to support their startups and businesses. In addition, Guangdong is home to several world-class universities and research institutions that provide a pipeline of talent for incubators and accelerators.

#### **5.3.2.5 Technological Factors**

Guangdong is a hub for technology development and innovation, driven by its strong manufacturing sector, growing high-tech industries, and thriving start-up ecosystem. As of 2019, the number of incubators in Guangdong's business incubation institutions has 138,861 effective intellectual property rights, an increase of 33.6% compared to 2018, and the number of effective invention patents is 24,215. By 2022, Guangdong's comprehensive regional innovation capacity will rank first in China for six consecutive years, the 'Shenzhen-Hong Kong-Guangzhou Science and Technology Cluster' will rank second in the world for three consecutive years; the province's R&D expenditure will be about RMB 420 billion, accounting for about 3.26% of the regional GDP, and the province's R&D investment, R&D personnel, number of high-tech enterprises and number of PCT international patent applications will all rank first in China. The following chart shows the main science and technology output indicators for Guangdong Province from 2009-2019 (Fig.22). Guangdong province's innovation capacity remained in first place in China in 2019, in line with previous years. It has strong performance in corporate innovation, innovation environment and innovation performance, and is slightly behind Shanghai, which is also in the eastern economic region, in terms of knowledge acquisition.

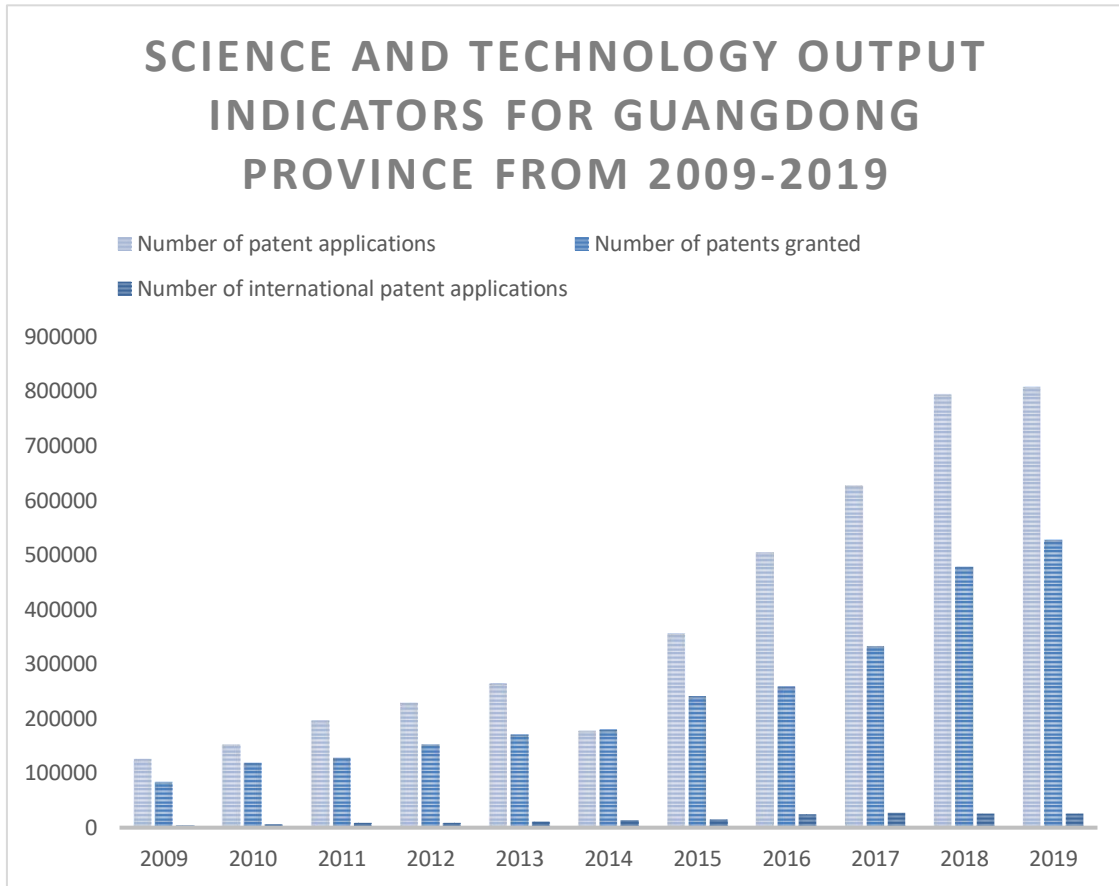


Fig.22 Data based on Guangdong Science and Technology Innovation Dynamic Data (2020)

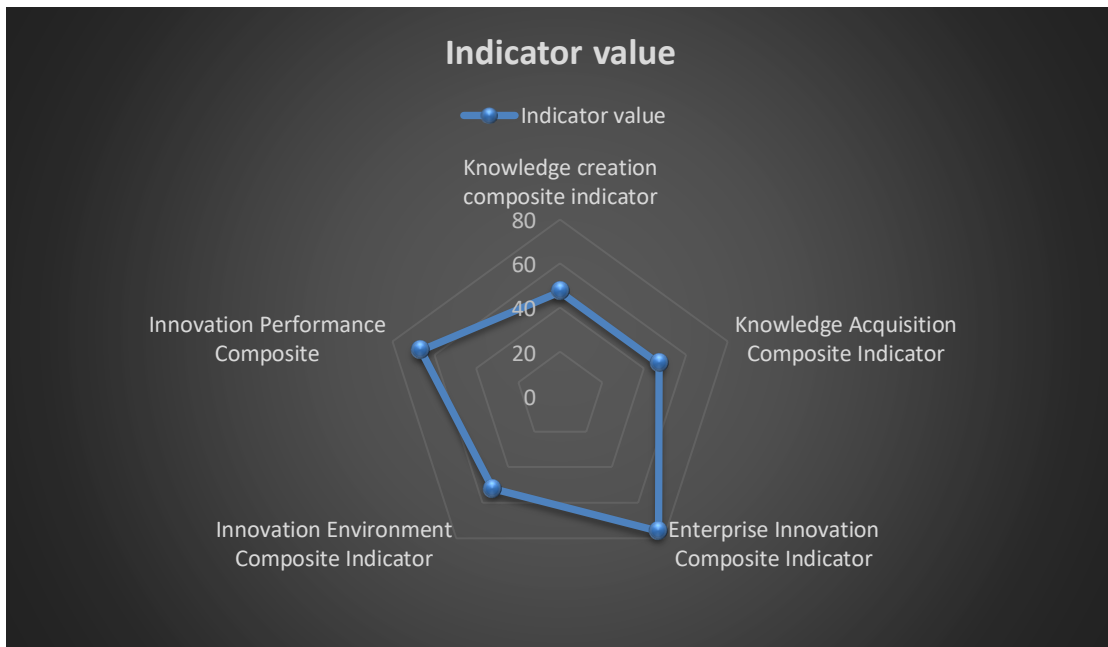


Fig.23 Data from China Innovation and Entrepreneurship Management Research Centre (2019)

Incubators and accelerators in Guangdong benefit from access to a well-developed

technological infrastructure, including high-speed internet, advanced telecommunications systems, and access to cutting-edge technology. From ‘notice of the Guangdong provincial department of science and technology on the publication of 2020 Guangdong provincial key laboratory assessment and evaluation results’ as of 2020, a total of 471 key laboratories have been established in Guangdong province, 6.2% increase over 2019, including 276 in Guangzhou, 72 in Shenzhen, and 123 in other cities in Guangdong. These laboratories have provided support for Guangdong's scientific and technological development, can be crucial in helping business incubators and accelerators to succeed. And the scientific and technological development of Guangdong province basically relies on city Shenzhen and Guangzhou.

### **5.3.2.6 The Technology Business Incubators and Accelerators in**

#### **Guangdong**

Some of the industries that are typically supported by technology business incubators and accelerators in Guangdong are as follows:

1. Information and communication technologies (ICT): The start-ups in this area could be companies specializing in the development of mobile applications, cloud computing services or network security solutions.
2. Internet of Things (IoT): This includes companies focused on developing technologies related to the Internet of Things, such as wearable devices, smart home systems and industrial automation solutions.
3. Artificial Intelligence (AI): Includes companies focused on developing artificial intelligence technologies, such as machine learning algorithms, natural language processing systems and computer vision solutions.
4. Biotechnology: These firms include those that specialize in developing biotechnology-related technologies such as medical devices, diagnostic tools, and gene editing technologies.
5. Clean Energy: This includes companies focused on developing clean energy technologies such as solar panels, wind turbines, and energy storage systems.

Here are the examples of Technology Business Incubators and Accelerators in Guangdong:

1. Shenzhen Oasis: Shenzhen Oasis is a Shenzhen-based technology business incubator and accelerator. It offers startups assistance and resources in areas such as the Internet of Things (IoT), big data, and artificial intelligence.
2. Guangdong Hi-Tech Incubation Center: The Guangdong Hi-Tech Incubation Center is a high-tech incubator and accelerator that helps startups and early-stage

companies. It provides office space, funding, and other resources to assist startups in getting started.

3. TUS-STAR Incubation Center: TUS-STAR Incubation Center is a Guangzhou-based technology business incubator and accelerator. It helps startups in fields such as artificial intelligence, robotics, and biotechnology.
4. Chaihuo Maker Space: Chaihuo Maker Space is a Shenzhen-based technology business accelerator. It helps hardware startups by providing access to prototyping equipment and resources, as well as mentorship from experienced entrepreneurs and business leaders.
5. Hax Accelerator: Hax Accelerator is a Shenzhen-based global technology accelerator. It offers hardware startups assistance and resources such as funding, mentorship, and office space.

## **5.4 Analysis of western region**

According to the data comparison in 5.1, Shaanxi Province is the most developed in China's western economic zone. Here make an analysis of the Technology Business incubator and accelerator's industry in Shaanxi province.

### **5.4.1 Analysis of province Shaanxi**

#### **5.4.1.1 Technology business incubation developments**

According to China's business incubation development report (2020), as of 2019, Shaanxi had 406 entrepreneurial incubation institutions, up 38.6% from 2018. Among them, there are 122 technology business incubators, 53 more than in 2018, and 284 Mass Maker Spaces. There are no specific statistics for Technology Business Accelerators. There are 33 national-level incubators, accounting for 27% of them. As of 2019, the number of incubating enterprises in Shaanxi Province's business incubation institutions has reached 19,590, an increase of 23.8% over 2018. The number of effective intellectual property rights held by these incubation companies has increased by 99.7% since 2018, reached 32495 pieces. As of this year, the hatched companies employed 146,353 people, a 23.8% increase over 2018.

#### **5.4.1.2 Political Factors**

To standardize the management of science and technology business incubation

carriers, optimize the ecological environment for innovation and entrepreneurship, and improve the service capabilities of carrier incubation, Shaanxi province formulated the 'Shaanxi provincial Science and Technology Enterprise Incubation Carrier Management Measures' in 2021. Article 7 of Chapter 1 points out that the technology business incubation chain is centered on the incubator and extends to the front and back ends of the incubator. Targeted professional incubation services, and gradually realize from team incubation to enterprise incubation to industrial incubation, forming an integrated technological enterprise incubation chain of 'Mass innovation space-incubator-accelerator-industrial park'. The industrial parks with the characteristics of Shaanxi are the driving force and the accelerator for the high-quality development of the regional economy. This technology business incubation chain has accelerated the improvement of industrial supporting facilities.

The "Management measures for the incubation carriers of science and technology enterprises in Shaanxi province" was issued for the support of incubation and acceleration industries. According to the management measures, Provincial Department of Science and Technology will give RMB 200,000 to 500,000 of post-subsidy support to newly recognized provincial-level technology business incubators, and no more than RMB 300,000 to newly recognized provincial-level maker spaces. Subsidy support of RMB 500,000 to 1 million will be given to the newly identified demonstration Mass Maker Space; a construction and operation subsidy of no more than RMB 300,000 will be given to the professional Mass Maker Space of provincial enterprises, which is suitable for mature conditions and complete functions. Those with distinctive features and industry influence will be given RMB 500,000 to RMB 1,000,000 in support for entrepreneurial research and development projects.

### **5.4.1.3 Economic factors**

In 2021, the total GDP of Shaanxi Province was RMB 2980.098 billion, ranking 14th in the country, and the ranking remains unchanged from last year. Ranked in the middle of the 31 provinces in China in terms of size. (Shaanxi Provincial Bureau of Statistics)

Although Shaanxi is better than other provinces and cities in the western part of China's economic zone in terms of technological innovation incubation industry chain, its GDP is lower than that of Sichuan province. Shaanxi's unbalanced and insufficient economic development limits the province's high-quality economic and social development and affects the further development of scientific and technological innovation in Shaanxi. The tertiary industry has been the main driver of Shaanxi's economic growth in recent years, but in terms of total value, the total value added of Shaanxi's tertiary industry ranked 17th in the country in 2018. In terms of growth rate, the value-added growth rate of Shaanxi's tertiary industry ranked 10th in the country in 2018, with relatively slow development. Although Shaanxi's economic structure



has been continuously optimized in recent years, there has been no fundamental change in the structure dominated by resource-advantaged and traditional industries. In 2018, the R&D investment intensity of Shaanxi was 2.18%, lower than the average level of Chinese provinces and cities for two consecutive years. Among them, the R&D investment intensity of industrial enterprises in Shaanxi Province is only 0.87%. The R&D investment of enterprises, which can truly reflect the region's independent innovation capability, is out of proportion to the investment intensity. The motivation to support and lead Shaanxi's economic development is obviously insufficient, resulting in low R&D investment intensity. This is the result of insufficient R&D activities by enterprises and unbalanced and insufficient development of innovation themes. The cities of Xi'an and Yulin are the largest contributors to GDP in Shaanxi Province and are also home to most of Shaanxi's Technology Business Incubators and Accelerators. Table 7. is the GDP of each of the cities in Shaanxi in the year 2021 and the related situations.

City	GDP 2021 (Hundred Million)	GDP 2020 (Hundred Million)	Increment (Hundred Million)	Rate of growth (%)
Xi'an	10688.28	10020.39	667.89	4.1
Yulin	5435.18	4089.66	1345.52	7.9
Xianyang	2581.32	2204.81	376.51	8.5
Baoji	2548.71	2276.95	271.76	6
Weinan	2087.21	1866.27	220.94	8.2
Yan 'an	2004.58	1601.48	403.1	8.1
Hanzhong	1768.72	1593.4	175.32	8.2
Ankang	1209.49	1088.78	120.71	7.5
Shangluo	852.29	739.46	112.83	9.5
Tongchuan	439.41	381.75	57.66	7.5
Yangling	157.78	151.71	6.07	2.2

Table 7. GDP and rate growth in Shaanxi by city, data from Shaanxi provincial Bureau of Statistics

#### 5.4.1.4 Sociocultural Factors

Shaanxi is a special province in China, the rich historical heritage and profound cultural heritage are the most distinctive features of this land. Due to the geographical influence and economic backwardness of the industrial era, the gap with the coastal cities is gradually widening. This is the main reason why the economy of Shaanxi is lagging that of the economic regions in the east of China. Shaanxi has many universities and research institutes that produce a steady stream of excellent scientists, engineers, and entrepreneurs, but there is still room to improve the quality and relevance of education to meet market demand. A culture that values risk-taking and entrepreneurship can provide a supportive environment for innovation. However, in

some areas of Shaanxi, traditional cultural attitudes discourage some entrepreneurship and risk-taking, which limits the development of Shaanxi's entrepreneurial and innovation ecosystem.

#### **5.4.1.5 Technological Factors**

On the technical side, in 2019, Shaanxi Province ranked 12th nationally in innovation capacity, up one position from the previous year. While Shaanxi has an ecosystem of research institutions, universities and enterprises, there may be challenges in ensuring that all stakeholders have access to the technologies and resources needed to drive innovation. The pace of technological change is rapid, which may limit their ability to take advantage of new technologies and innovations and cause their competitiveness to lag. According to 'China Regional Innovation Capability Evaluation Report' (2019), knowledge creation ranked 6th in China, up 2 places. Knowledge acquisition ranked 18th in China, down 2 places. Overall Enterprise Innovation Index Ranking 20th in China, down 2 places. 12th in the country for innovation environment, up 2 places. Ranked 9th nationally for innovation performance, up 2 places. In 2018, Shaanxi will further promote the implementation of the "Nine Shaanxi Measures", increase the income ratio of owners of scientific and technological achievements, strengthen industry-university-research cooperation to promote the transformation of scientific and technological achievements, and establish a "talent pool" and "patent pool" to promote the transformation of scientific and technological achievements in Shaanxi, the ability to create knowledge is stronger and the ability to acquire knowledge is poorer. In 2018, the Shaanxi-Hong Kong Science and technology innovation development cooperation forum was held, and eight Shaanxi-Hong Kong partner laboratories and two Shaanxi-Hong Kong international joint research centers were jointly established with Hong Kong, the Shaanxi "Belt and Road" science and technology Innovation and entrepreneurship and key laboratory innovation cooperation forum was held, and the Shaanxi key laboratory innovation alliance was formed, also 16 new provincial key laboratories were built, they providing strength for the development of subsequent science and technology business incubators and accelerators.

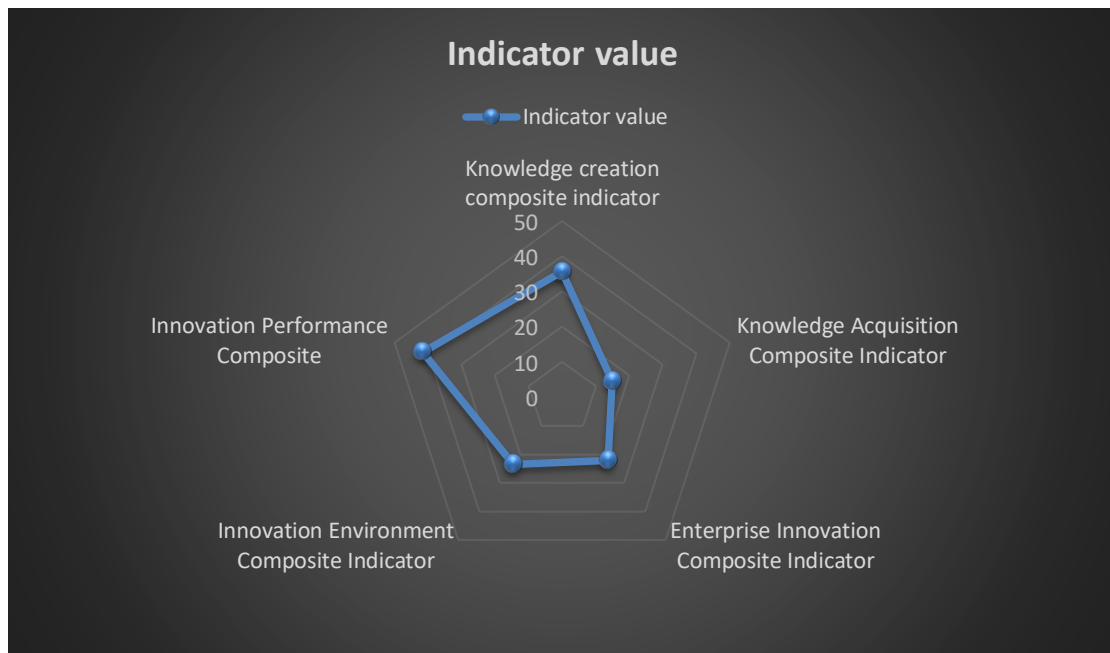


Fig.24 Data from China Innovation and Entrepreneurship Management Research Centre (2019)

### 5.4.1.6 The technology business incubators and accelerators in

#### Shaanxi

Shaanxi's technology business incubators and accelerators typically focus on a range of high growth sectors and industries, including information technology, biotechnology, new materials, and advanced manufacturing. Here are some examples of Shaanxi's incubating industry.

**Xi'an Torch High-tech Industry Development Zone:** This is one of China's national-level high-tech zones, dedicated to fostering the growth of high-tech industries such as information technology, biotechnology, and new materials.

**Xi'an International Entrepreneurship Center:** This is a government-backed accelerator that provides a range of services and resources to support the growth of start-ups and entrepreneurs, including mentoring, training, and funding.

**Xi'an Software Park:** This technology park offers a comprehensive range of services for software companies. These include office space, funding, and networking opportunities.

**Xi'an Hi-tech Industries Development Zone:** This is another national-level high-tech zone that fosters the growth of high-tech industries such as information technology, biotechnology, and new materials.

## **5.5 Analysis of central region**

Based on the combined consideration of the incubation of the six provinces in the Chinese economy central region in 5.1 and their GDP, I have chosen Hubei province as the central region to study.

### **5.5.1 Analysis of province Hubei**

#### **5.5.1.1 Technology business incubation developments**

According to China's business incubation development report (2020), as of 2019, there were 553 technology business incubators in Hubei, an increase of 18.4% from 2018, including 216 technology business incubators, an increase of 12.5% from 2018. Of these, 53 were national-level incubators, accounting for 24.5%. The number of technology business accelerators specifically focused on technology businesses is not available. The number of Mass Maker Spaces was 337, an increase of 62 from 2018. The number of incubatees in incubators reached 33,005 in 2019, a decrease of 0.7% from 2018, and absorbed a total of 217,840 people into employment, an increase of 8.5%.

#### **5.5.1.2 Political factors**

To enhance the capacity of professional incubation services and actively build incubation institutions supported by scientific and technological resources and led by high-end talents, Hubei Province issued the "Measures for the management of technology business incubators in Hubei province" in 2022. This accreditation procedure has five chapters and is basically based on the Ministry of Science and Technology's Measures for the administration of technology business incubators. Chapter 2 has strict selection criteria for science and technology business incubators in Hubei province, including detailed descriptions of a total of nine articles on the eligibility of legal entities to apply, operating hours, location and area, seed capital and incubation funds, and service teams. This has had a positive impact on technology incubators in Hubei province and on improving the quality of the incubated industry. Article 19 of Chapter 4 encourages incubators to "participate deeply and invest heavily" in entrepreneurial projects, advocates the establishment of an incubation community with entrepreneurial enterprises, strengthens the symbiotic capacity of incubation and entrepreneurship, integrates the needs of fragmented entrepreneurial enterprises with professional services, and links resources such as talent, capital, technology, and markets. It has promoted the application of new technologies, the development of new products and new markets by start-ups, and the development of the incubation industry in Hubei province.

### 5.5.1.3 Economic Factors

Hubei province has strong economic strength, the economic aggregate ranks seventh in the country, and the economic growth rate is relatively fast. The financial strength is at the middle level in the country, and the general budget revenue ranks tenth in the country. From Hubei provincial Bureau of Statistics, in 2021, Hubei province have a GDP of RMB 5001.294 billion, an increase of 12.9%. Among the Table 7. find that the economic development of Hubei province is uneven, and the economy is mainly concentrated in Wuhan city, Xiangyang city and Yichang city. Among them, Wuhan city "dominates" with an economic scale of more than RMB 1.7 trillion, accounting for 35.40% of the province's total. Hubei's government debt is high, ranking 11th in China. Benefiting from its good economic and financial strength, the Hubei provincial government has a low debt ratio and debt service ratio, with low debt and repayment pressure.

City	GDP 2021 (Hundred Million)	GDP 2020 (Hundred Million)	Increment (Hundred Million)	Rate of growth (%)
Wuhan	17716.8	15616.1	2100.7	12.2
Xiangyang	5309.4	4602.0	704.4	14.7
Yichang	5022.7	4261.4	761.3	16.8
Jingzhou	2715.5	2369.0	346.5	12
Xiaogan	2562.0	2193.6	368.4	13.4
Huanggang	2541.3	2169.6	371.7	13.8
- Provincial districts	2536.7	2240.7	296.0	-
Shiyan	2164.0	1915.1	248.9	11.5
Jingmen	2120.9	1906.4	214.5	10.8
Huangshi	1865.7	1641.3	224.4	13
Xianning	1751.8	1524.7	227.1	12.8
Enshi	1302.4	1117.7	184.7	11.7
Suizhou	1241.5	1096.7	144.8	12.0
Yuezhou	1162.3	1005.2	157.1	12.9
Provincial districts include Tianmen, Xiantao, Qianjiang, Shennongjia				

Table 8. GDP and rate growth in Hubei by city, data from Hubei provincial Bureau of Statistics

In 2021, the added value of Hubei Province's over-designated high-tech industries will be RMB 1,019.65 billion, surpassing RMB 1 trillion for the first time, an increase of 16.9% over the previous year. The added value of high-tech manufacturing industry increased by 30.2%, 12.0% faster than the national rate, and accounted for 10.9% of the added value of over-designated size industries, an increase of 0.7 percentage points over the previous year. These data show that there has been significant growth

in the value-added of high-tech industries in Hubei province. The fact that the added value of high-tech industries has exceeded RMB one trillion for the first time suggests that these industries are becoming increasingly important to Hubei's economy. It is also evidence that the technology business incubation industry is well on track under the influence of Hubei's economy.

#### **5.5.1.4 Sociocultural factors**

China's first technology business incubator was born in Wuhan, Hubei province. In the history of China's technology business incubator development, Wuhan East Lake New Technology Venture Center is not only the earliest incubator, but also one of the most innovative. There is a strong entrepreneurial culture here, and young people are enthusiastic about entrepreneurship. This entrepreneurial culture provides a supportive environment for the development of new technologies and businesses. The Hubei provincial government supports technology business incubation through various programs and initiatives and provides substantial funding to encourage young entrepreneurs to realize their ideas.

#### **5.5.1.5 Technological factors**

In the 2021 global innovation index released by the World Intellectual Property Organization, Wuhan ranks 25th in the world's urban clusters and 6th in Chinese cities. Hubei's technological innovation capabilities have been significantly enhanced. From 2018 to 2021, Wuhan's global innovation index ranks from 43rd to 25th, with a strong upward momentum. Investment in science and technology continues to grow, and the proportion of social research and development (R&D) expenditures in GDP raised from 3.02% in 2015 to 3.51% in 2020. These data are an indication that Hubei, and particularly Wuhan, is making significant progress in terms of technological innovation. By the end of 2019, the number of valid intellectual property rights owned by enterprises incubated in business incubators in Hubei reached 34,601, an increase of 5,495 or 18.9% compared to 2018. Although the new technology achievements promote the economic development of Hubei province, the patent technology achievements invented in Hubei province in recent years are gathered in the research and development of new processes and new products, the independent innovation patent technology is single, and other high-tech content of the patent invention technology is lacking. This has resulted in a single innovation output, which limits the economic development of the region. Due to the weak transformation rate of innovative technological inventions and insufficient investment in science and technology, it still affects the development of emerging science and technology in Hubei province (Ruan Jingxing, 2018).

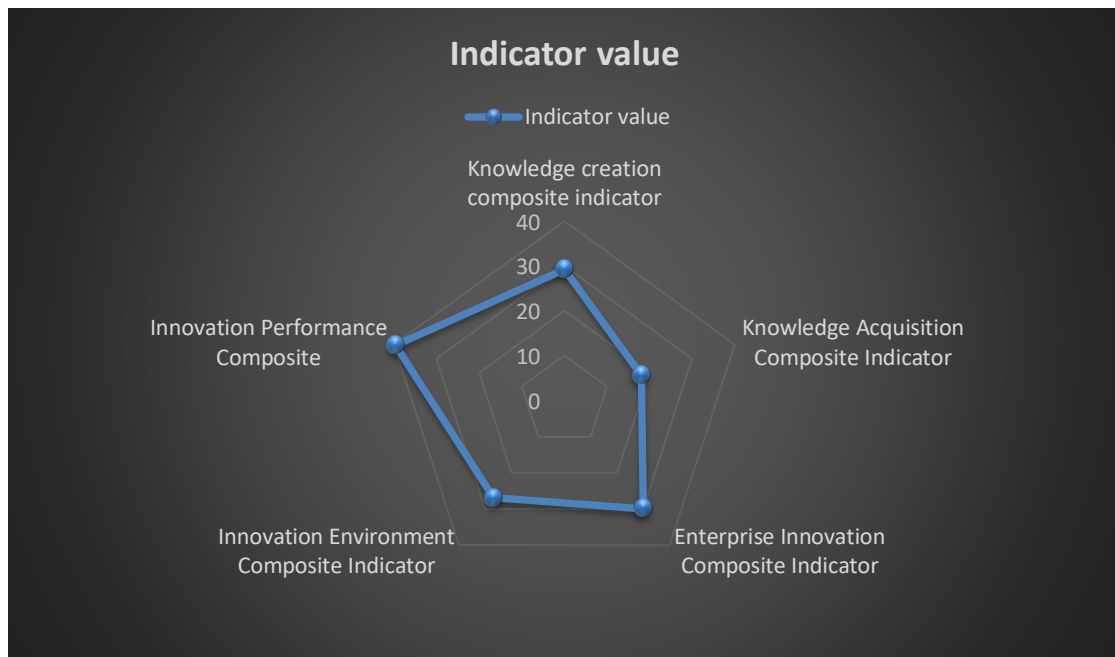


Fig.25 Data from China Innovation and Entrepreneurship Management Research Centre (2019)

### 5.5.1.6 The technology business incubators and accelerators in Hubei

Hubei's technology business incubators and accelerators tend to focus on a variety of industries, including technology, biotechnology, advanced manufacturing, and clean energy. Here are some examples of incubators and accelerators in Hubei:

1. Wuhan National Incubator for Small and Medium-sized Enterprises (Wuhan WISE): Wuhan WISE is a national-level small and medium-sized enterprise incubator. It offers start-ups and entrepreneurs a variety of support services, including workspace, mentorship and training, and access to funding and investment opportunities.
2. Wuhan Torch High-tech Industry Development Center: The Wuhan Torch High-tech Industry Development Center is a high-tech industrial park that offers assistance and resources to innovative businesses in a variety of fields, including biotechnology, advanced manufacturing, and clean energy.
3. Wuhan East Lake High-tech Development Zone: The Wuhan East Lake High-tech Development Zone is a high-tech industrial park that offers assistance and resources to innovative businesses in a variety of industries such as biotechnology, advanced manufacturing, and clean energy.
4. Wuhan Institute of Technology Venture Capital and Incubation Center: This center assists technology start-ups and entrepreneurs by providing access to funding and investment opportunities, mentorship and training, and workspace.

## **5.6 Analysis of northeast region**

### **5.6.1 Analysis of province Liaoning**

Through the data in 5.1, it can be found that the development of the northeastern part of China's economic region is relatively backward compared with other economic regions in China. According to the comparison of the three provinces in northeastern China, I chose Liaoning province as the research object.

#### **5.6.1.1 Technology business incubation developments**

According to China's business incubation development report (2020), as of 2019, there were 261 business incubators in Liaoning province, an increase of 13 from 2018. Among them, there were 67 incubators, a decrease of 1 from 2018. There were 30 incubators at the national level, accounting for 44.8% of the total. There were 194 Mass Maker Spaces, an increase of 14 from 2018. There is no detailed data on the number of specific technology business accelerators. The number of incubated enterprises in business incubation institutions in Liaoning province reached 23,023, an increase of 12.2% over 2018. A total of 153,786 people were employed, an increase of 49.1% over 2018.

#### **5.6.1.2 Political factors**

In November 2015, the general office of Liaoning Provincial Government issued the 'Implementation plan for the division of tasks to implement several opinions of the state council on accelerating the development of the science and technology service industry', which clarified the key tasks for the development of the science and technology service industry in Liaoning province and formulated specific policy measures and division of tasks in seven aspects, including market mechanism, financial and tax support, and talent training. The plan proposes to build an entrepreneurial incubation ecosystem with a focus on professional incubators and innovative incubators, supported by comprehensive incubators. Guide enterprises and social capital to participate in the investment and construction of incubators, promote the close integration of angel investment and business incubation, promote incubation models such as "incubation + venture capital", actively explore new incubation methods based on the Internet, and improve the professional service capabilities of incubators. It shows that the Liaoning government is exploring new internet-based incubation methods and working to improve the professional service capabilities of incubators.

The Liaoning provincial government issued the "Management measures for technology business incubators in the culture and technology park of Liaoning



university" in November 2022. There are five chapters in this management method, which regulate the conditions that the incubated enterprises should have, the evaluation methods of the incubated enterprises, and the policies that the incubated enterprises enjoy. The Liaoning government is not strict with the conditions for incubated enterprises, and in the fifth chapter it gives policies that are very conducive to the development of start-ups, such as "the incubated enterprises are exempted from house rent in the first year, and only collection and payment fees". This greatly solves the problem of insufficient funds and no place for start-ups in the early stages.

### 5.6.1.3 Economic factors

Liaoning is a province with a relatively stable economy. In recent decades, the economic growth of Liaoning Province has never experienced explosive growth and has always maintained a slow and stable growth pattern. From Liaoning provincial Bureau of Statistics, in 2021, the GDP of Liaoning province was RMB 2,758.41 billion, an increase of 5.8% over the previous year. Of this, the added value of the primary industry was 246.18 billion yuan, the added value of the secondary industry will be 1,087.52 billion yuan, and the added value of the tertiary industry will be 1,424.71 billion yuan. Table 9. Shows the GDP of each city in Liaoning. As can be seen, Dalian and Shenyang are major contributors to Liaoning province's GDP, which is why Liaoning province's technology business incubators and accelerators are concentrated in these two cities.

City	GDP 2021 (Hundred Million)	GDP 2020 (Hundred Million)	Increment (Hundred Million)	Rate of growth (%)
Dalian	7825.9	7000.4	825.50	11.79
Shenyang	7249.7	6571.6	678.10	10.32
Anshan	1888.1	1738.78	149.32	8.59
Yingkou	1403.2	1325.5	77.70	5.86
Panjin	1383.2	1303.6	79.60	6.11
Jinzhou	1148.3	1072.2	76.10	7.10
Chaoyang	944.8	875.6	69.2	7.90
Benxi	894.2	810.4	83.80	10.34
Fushun	870.1	827.8	42.30	5.11
Liaoyang	857.9	837.7	20.20	2.41
Dandong	854.4	779.4	75.00	9.62
Huludao	841.7	770.4	71.30	9.25
Tieling	716	663.1	52.90	7.98
Fuxin	544.7	504.6	40.10	7.95

Table 9. GDP and rate growth in Liaoning by city, data from Liaoning provincial Bureau of Statistics

After the new crown epidemic, Liaoning has gradually returned to normalcy, as evidenced by the rapid recovery of the third industries and the accelerated growth of emerging industries. However, when compared to the rest of the country, Liaoning's economic recovery is slower and to a lesser extent. Aside from the epidemic's impact, Liaoning's economic development is "climbing through hurdles," and the downward pressure on the economy is relatively high. New industries, formats, models, and other new driving forces are weak; economic recovery and development continue to rely primarily on traditional industries; demand-side consumption and export demand are weak; private investment willingness and ability are waning, and economic growth lacks momentum to accelerate. This is not conducive to the incubation and growth of Liaoning province's technological innovation enterprises.

#### **5.6.1.4 Sociocultural factors**

Geographically, Liaoning is a northern coastal province. Unlike the coastal provinces and cities in eastern China, Liaoning province is the most developed province in northeastern China, China's largest military industry province, and China's only advanced equipment manufacturing province. Compared with other provinces and cities in China, its development has been relatively slow in recent years, and people's thinking is relatively closed, without too much awareness of innovation. This explains why Liaoning has fewer technology business incubators and accelerators than the economic eastern and central regions of China.

#### **5.6.1.5 Technological factors**

From China Regional Innovation Capability Evaluation Report (2019), Liaoning Province's innovation capability ranked 19th in the country in 2019, down two places from 2018. The ability of enterprise innovation was ranked 16th in the country, the same as the previous year. The innovation environment is ranked 29th in the country, a ten-place drop from the previous year. Its performance in innovation ranks 29th in China, up two places from 2018. From these data, could be seen that while the ability of enterprise innovation in Liaoning Province has remained stable, the overall innovation capability and innovation environment have declined compared to other regions in China. According to the "Report on technology innovation and development of Chinese cities", in 2020, the rankings of Liaoning's cities in the science and technology innovation and development index are as follows Dalian, Shenyang, Anshan, Jinzhou, Panjin, Yingkou, Dandong, Fuxin, Fushun, Tieling, Liaoyang, Benxi, Huludao, Chaoyang. Among them, the technological innovation and development indexes of Dalian and Shenyang are higher than the national average, while the technological innovation and development indexes of other cities are lower than the national average. As a sub-provincial city, Dalian leads the province's technological innovation development index, ranking first in the province and 32nd in the country, but there is still a large gap with other cities in China that have developed

well in terms of technological innovation. By the end of 2019, the number of valid intellectual property rights owned by incubated enterprises at business incubation institutions in Liaoning reached 11,524, an increase of 81.1% over 2018. The number of effective intellectual property rights of incubators in Liaoning has increased significantly, and incubators have successfully promoted the development of new enterprises. However, based on the relatively small number of intellectual property rights owned by incubating enterprises in Liaoning province, it does not prove that Liaoning has a high degree of perfection in the innovation incubation industry chain and a well-established professional operation team.

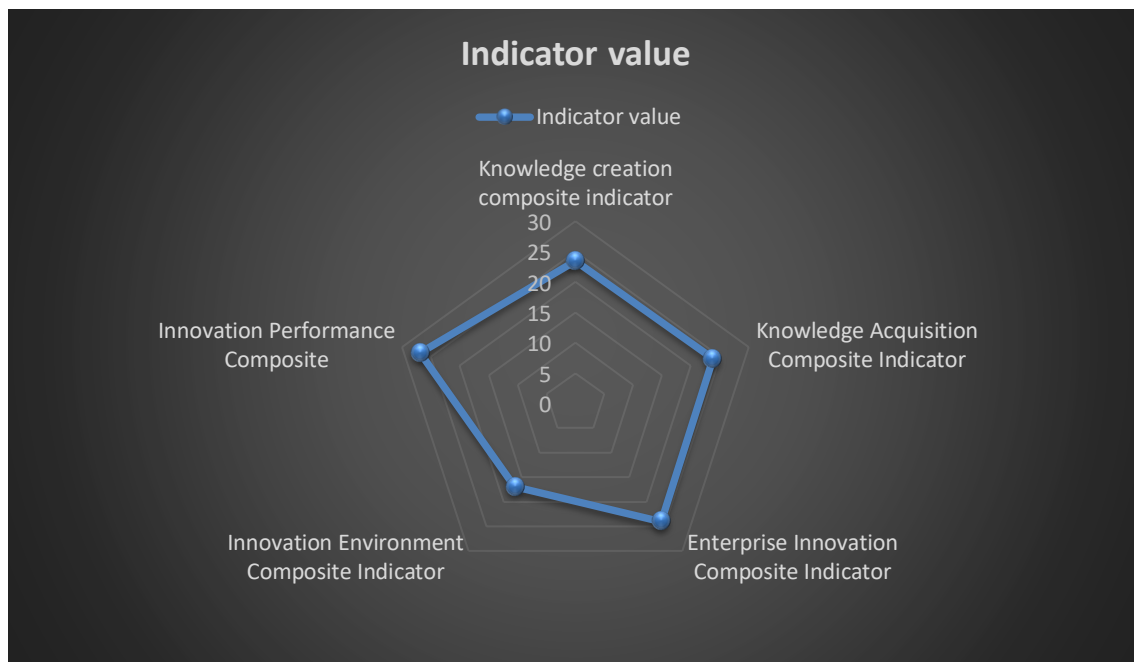


Fig. 26 data from China Innovation and Entrepreneurship Management Research Centre (2019)

### 5.6.1.6 The technology business incubators and accelerators in

#### Liaoning

Liaoning has technology business incubators and accelerators distributed across a variety of industries, including information technology, biotechnology, and clean energy. Here are some examples of Liaoning's TBI and TBA.

**Dalian Software Park:** This IT Park offers software development and services for companies. It also provides incubation and acceleration services for start-ups.

**Dalian Hi-Tech Zone:** This zone is devoted to high-tech industries and aids startups in fields such as information technology, biotechnology, and clean energy.

**Shenyang National Independent Innovation Demonstration Zone:** This zone is

dedicated to fostering independent innovation in a variety of industries, including information technology, advanced manufacturing, and biomedicine.

Liaoning Biomedical Industry Accelerator: This accelerator is focused on promoting the development of the bio-medicine industry in Liaoning and provides support for startups in this field.

## **6. Case studies of technology business incubators in China and the United States**

### **6.1 Methodology**

SWOT stands for strengths, weaknesses, opportunities, and threats, being a strategic planning tool have the capacity for evaluating the internal and external factors that can affect an organization, and project.

Since SWOT analysis contributes to help identify areas where an organization or individual can build on their strengths, minimize weaknesses, take advantage of opportunities, and mitigate potential threats, this methodology is adopted in studying the comparison in terms of Chinese incubators and American incubators.

### **6.2 Case study of Maryland Technology Development Corporation**

#### **(TEDCO) (USA)**

TEDCO, Maryland's economic empowerment organization, was established in 1998 to foster the growth of the state's technology-based economy by creating jobs, developing new products and services, and generating economic opportunities. TEDCO achieves its mission primarily through its technology advancement, entrepreneurial support, and investment programs. Over the past 23 years, TEDCO has been a driving force for innovation in Maryland. In November 2021, an independent study conducted by the Jacob France Institute at the University of Baltimore found that TEDCO has produced substantial economic and fiscal benefits for the state.

In Maryland, innovation will continue to thrive in traditional fields such as cybersecurity, robotics, and life sciences, while also expanding into emerging sectors like clean/blue technology, agriculture, unmanned aerial vehicles/systems (UAV/UAS), and quantum technology. With the right strategies for growth, Maryland has the potential to build an innovation ecosystem that will be recognized globally for its social impact and innovative solutions. By providing support in key areas and backing from TEDCO, Maryland can continue to grow and become even stronger.

TEDCO has a team of experienced professionals who are knowledgeable about all aspects of the entrepreneurial ecosystem, such as product development, marketing, fundraising, and business strategy. According to its website, TEDCO has provided funding to over 500 businesses and assisted in the creation of over 7,500 jobs in Maryland. Below I will list the benefits of TEDCO.

### **6.2.1 Strength**

Firstly, TEDCO has a strong attraction for start-ups and the community. TEDCO is a direct participant in the implementation of the Maryland Small Business Credit Initiative (SSBCI), it offers financial assistance and professional services, which provides loans to underserved entrepreneurs and communities.

Secondly, TEDCO has a high social impact. TEDCO also focuses on programs that benefit society, such as the Rural Business Innovation Initiative (RBII) and the Maryland Stem Cell Research Fund, which provide technical and business assistance to rural areas and social medicine. This has helped to increase his influence and raise his profile in the community.

Thirdly, TEDCO has a full range of incubating facilities to meet all the needs of start-up companies. TEDCO shared resources and connections to other startup communities, as well as a supportive environment in which to develop their ideas and turn them into successful businesses. Here are some examples: The Maryland Innovation Center, Betamore, [bwtech@UMBC](mailto:bwtech@UMBC).

Fourthly, TEDCO can provide an intelligent IP platform. In terms of ecosystem empowerment, TEDCO provides entrepreneurs with one year of free access to the IPGen IP management platform, which uses artificial intelligence to streamline and automate the patent process, guiding and assisting startups through the patent process. Helping entrepreneurs to save time.

Fifthly, TEDCO has the experience to help entrepreneurs avoid risk. The start-up entrepreneurs can use TEDCO's powerful database for free. There are also regular expert mentoring sessions, roundtables, and other events where companies can get proven advice and learn from each other's experiences in similar businesses.

Sixth, TEDCO has aided and contributed to the local economy. Maryland, one of the most densely populated states in the United States, is home to several federal laboratories, and TEDCO has been working with the federal laboratories to support technology transfer and to make their technology, data, and facilities available to entrepreneurs to help them become more competitive in the marketplace. TEDCO is also committed to collaborating with universities to provide students with opportunities to invest in and advance their careers, thereby retaining talent for Maryland and federal laboratories.

Seventh, TESCO provides a sense of belonging for special groups. It helps to address systemic barriers that have historically excluded certain groups, such as women and people of color, from participating fully in the tech and startup industries. For example, provides targeted Funding programs for women and minority-owned businesses, as well as programs that provide mentorship, training, and other resources to assist underrepresented founders in achieving success.

Eighth, TEDCO has a comprehensive, transparent management system that provides accurate historical information to stakeholders. This reduces the risk of fraud, waste, or other mismanagement, ensures that resources are used as efficiently as possible, and fosters trust and confidence among stakeholders.

### **6.2.2 Weakness**

Although no specific weaknesses were identified in the incubation program, the program director noted three main areas of potential concern. The first pertains to the lack of support for hiring a qualified incubator manager, the second relates to the absence of in-house consultancy or resources, and the third concerns the inadequacy of qualified feasibility studies for companies to be included in the incubator. TEDCO may engage a Network Advisor on a contractual basis to provide paid advisory services to companies that have received, or are expected to receive, investment from TEDCO, in order to help them achieve specific milestones and improve their competitiveness for future funding and growth opportunities. In FY2021, TEDCO provided funding to 7 loaned executives and 8 companies, all of which were introduced to TEDCO programs such as RBII, Builder Fund, and Federal Programs.

### **6.2.3 Opportunity**

Chapter 450 of 2012 brought about the establishment of the Maryland Innovation Initiative (MII), a unique public-private partnership that aims to accelerate the commercialization of technologies with significant market potential from Maryland's partnering universities, namely Johns Hopkins, Morgan State, University of Maryland College Park Campus, University of Maryland-Baltimore Campus, and University of Maryland-Baltimore County. MII achieves its objectives through the provision of grants, investments, and support for startup creation, thus de-risking these technologies. MII is governed by statute and an independent board of directors. The program's approach has driven job creation, attracted follow-on investments, and spurred venture creation. Since its inception, MII has created 105 companies, attracted over \$585 million in investment to Maryland, and generated high-tech jobs with an average salary of \$100,000. MII has reviewed 609 grant and 142 investment applications to date, with a funding rate of 45% and 58% of applicants, respectively.

In FY21, MII reviewed 44 grant and 11 investment applications and awarded funding to 55% and 82% of applicants, respectively. Although MII funding demand remains high, the funding success rate reflects the increasing maturity of the ecosystem as program applicants become more adept at technology commercialization. Without the support provided by MII, these pioneering innovations may not remain in Maryland. The Fiscal Year 2003 Allowance funds MII at \$5.3 million, consistent with FY2022 funding, which was increased due to the program's high demand. The FY23 Allowance funds MII at a similar level, while also providing \$500,000 to support an MII pilot program with Bowie State University and Frostburg University as required by legislation passed during the 2022 Session. TEDCO is working closely with these institutions to develop pilots. (M.T.D.C budget report 2023)

Another opportunity TEDCO owns is the Builder Fund program, which is designed to support startup companies in Maryland that are operated, and majority owned by entrepreneurs who demonstrate a socially or economically disadvantaged background that limits their access to traditional forms of capital and executive networks. These companies receive direct investment from TEDCO and agree to receive executive management assistance to achieve specific milestones that make them more attractive for follow-on investment. By identifying exceptional investment opportunities statewide and working collaboratively with these companies to advance their development, the Builder Fund program aims to help these companies secure the next stage of investment. This program aligns with TEDCO's overall mission of investing in and helping to build great Maryland-based companies that can grow and last. In addition, TEDCO provides companies with information about other State programs for minority and women-owned businesses and makes referrals to the Maryland Small Business Development Financing Authority for those companies that express an interest in additional resources.

What also has a remarkable influence on the entrepreneur is the Gap Investment Fund program. The Gap Investment Fund aims to provide financial support to early-stage technology-based startups in Maryland that require capital to scale their operations. These disbursements are matched by investments from other sources, and the primary objective of the fund is to help companies overcome the funding gap that exists between initial investment and institutional venture capital. By doing so, the fund seeks to prevent companies from seeking funding opportunities outside of the state, thereby retaining promising startups in Maryland. To be eligible for funding, companies are required to use the Gap Investment Funds to create new job opportunities and establish a stronger presence in Maryland.

#### **6.2.4 Threats**

Coping with COVID-19 is a top concern for entrepreneurs around the world. In Maryland, innovation will be the driving force as the state emerges from the pandemic. Thanks to strategic investments in innovation, Maryland is well-positioned to take a

leadership role in this area. Maintaining the status quo is not a sustainable strategy for growth, and just as Maryland emerged from the tragedy of 9/11 with innovative solutions in the facility and travel security, the state must now seize the opportunity to create new entrepreneurial ventures in response to the challenges posed by COVID-19. These new ventures will not only ensure safety but also enable more efficient and effective global teamwork and facilitate more valuable e-commerce transactions.

Apart from other challenges, TEDCO is also facing a threat related to funding. While TEDCO's funding is considered a general fund grant of the State, it is not subject to annual adjustments for inflation, cost of living adjustments, or other annual increases like other State agencies, leading to a diminished purchasing power of TEDCO's budget over time. TEDCO's administration and operating budget have been particularly impacted by this. Since 2011, the budget provided by the State to cover TEDCO's general and operations budget has remained stagnant, while expenses have increased by 19 percent. These expenses are driven not only by normal inflationary pressures but also by increases in operational responsibilities, as TEDCO's programming improves and expands, resulting in increased administrative needs. Additionally, TEDCO currently has a limited budget allocated for marketing and communications efforts, which poses a challenge in making its funds known to the broader community. As TEDCO expands its programs and services into underserved markets in Maryland, scaling up marketing and communications support will be necessary for effective outreach.

### **6.3 Case study of Sinovation Ventures (China)**

The entrepreneurial services offered by Sinovation Ventures are roughly divided into three levels: The initial one focuses on helping entrepreneurship and solving the basic problems in the start-up period of the enterprise, such as company registration, office space, preferential policy docking, etc.; The second one of entrepreneurial services provides a full range of value services around the operation of start-ups, including manpower, financial and tax consulting, Legal, marketing, public relations, and other professional services; The last level of entrepreneurial services aims to use the entrepreneurial service platform as a Center, relying on the advantages of core resources, expand a diversified service system, and build a self-circulating innovation that contributes sustainable value business ecosystem. Sinovation Ventures has entrepreneurial spaces located in Zhongguancun, Beijing, and Yangpu, Shanghai. Since it has been established for more than six years, Sinovation Ventures has provided a full range of entrepreneurial services for more than 200 start-up companies.

On the platform of Sinovation Ventures, more than half of the start-ups have obtained one round of financing or are being acquired, and more than 20 companies of startups are currently valued at more than 100 million dollars, and these 20 start-up companies have attracted nearly 5 billion in venture capital investments.



The Sinovation Venture team is a group of industry elites, including professionals in the investment field, entrepreneurs with innovative spirit and industry experience, including senior professionals from Silicon Valley, and industry experts from large domestic and foreign enterprises. This is an important factor for Innovation Works to attract many entrepreneurial teams to settle in. In addition to the entities listed in this article, the Innovation Works platform also includes an angel fund managed by Kai-Fu Lee, so the entire Innovation Works is a mixture of angel investment and an incubator. The two functions operate separately, but they influence and support each other. As an all-around entrepreneurial platform, Sinovation Ventures is considered a representative of angel investment and large-scale industrialization.

### **6.3.1 Strength**

The first advantage is in terms of service, Sinovation Ventures is committed to building a three-dimensional entrepreneurial service platform for outstanding entrepreneurs and providing a large scale of entrepreneurial services. The business model of Innovation Works is embodied in the construction of an entrepreneurial service ecosystem that continues to contribute value. In detail, the bottom layer of the workshop ecology is a shared common space for entrepreneurship with workshop characteristics, where entrepreneurs settle down and enjoy the comprehensive, open, and friendly office space and hardware provided by the workshop platform Supporting facilities.

The second one is related to the business development team, which can be recognized as the middle layer of the workshop ecology. Many senior people with rich experience in professional fields have a significant influence on helping entrepreneurs resolve some essential problems, such as company organizational structure, product technology, business model, fiscal and taxation management, legal framework construction, market strategy, public relations maintenance, etc. The full range of valuable experience the team owns including strategic guidance, entrepreneurship courses, and "one-on-one" training for mentors contribute to outstanding achievement.

The third one is an online platform. As the top layer of the workshop ecology, the online platform is centered on the Sinovation Venture. Combining a wide range of external users makes building a "boundaryless" entrepreneurial resource network for entrepreneurs a necessary step of long-term development, which realizes the optimal docking of capital and entrepreneurial projects.

The fourth is the focus on resources. One of the specific advantages of Sinovation Venture is the capability of dealing with differentiated resources. The self-iteration and extension development of the entrepreneurial ecosystem is the core chain they focus on. And the external service owned by Sinovation Venture is mainly concentrated in the fields of Internet companies, digital entertainment, community

tools, 020, and smart hardware. They have the characteristics of a certain degree of industry concentration and precision, which is conducive to achieving the highest utilization of resources and the use of various costs.

The fifth is the abundant incubation experience in coping with specific problems of enterprises.

Meitu, with a current market capitalization of RMB 38 billion, is in the incubation stage. Sinovation Ventures has used its advantages in services and resources to solve design and OEM production problems for Meitu mobile phones, helping the Meitu team to find talents related to smart hardware.

Zhihu is currently valued at more than \$1 billion. During the incubation stage, Zhihu relied on the brand Sinovation Works to help the Zhihu team recruit on campus and quickly form a team in a short period of time. In addition to providing basic services, the Zhihu team also received guidance from the Sinovation Ventures resource team for its development, helping the Zhihu team determine the direction of product development.

Xiaoyuzaijia is currently valued at over US\$100 million. During the incubation stage, Innovation Works successfully connected the world-class manufacturers for Xiaoyu's home team and solved the problems of hardware design and production. Among the third-tier service features of Innovation Works, Heroes Club is one of the two service models for Innovation Works to build an entrepreneurial value-sharing platform. Heroes Club is co-organized by Sinovation Ventures and industry funds to provide closed entrepreneurial counseling training for 40 outstanding entrepreneurs. Half of the invited coaching guests are from venture capital institutions and half are from well-known corporate executives. After the coaching training, about 68% of the entrepreneurs got a new job.

Sinovation Ventures utilizes its own service model and resource advantages, as well as the accumulation of incubation experience over the past few years. The success rate of incubation has been continuously improved. Entrepreneurs have successfully obtained subsequent rounds of financing, and the market value has continued to grow, attracting more and more entrepreneurs and angel investors. Excellent entrepreneurial services, top mentor resources, and access to high-quality financing are the main values brought by the new factory to innovation and entrepreneurship.

### **6.3.2 Weakness**

The fund management business of Sinovation Venture relies too much on related transactions, which means it provides fund management outsourcing services for funds controlled by Kai-Fu Lee and charges management fees. Although the fund and the Innovation Works incubator are two independent entities, the fund controlled by

Kai-Fu Lee is also one of the reasons why many start-ups choose to settle in the Sinovation Venture. The much closer relationship between these two sectors will result in unfair price issues. From the perspective of investors, as the scale of the fund expands in the future, affiliated transactions will be too dependent on affiliated transactions, which will encounter many problems. In addition, part of the profit was due to performance brought about by related party transactions.

What's more, it can be found that the cash flow problem is a common problem in the incubator industry, even Sinovation Venture obtaining stable incubation service income also have the same problem. Incubators not only need to maintain profitability but should have excellent cash flow acquisition capabilities in order to achieve sustainable development as well. The current model of Sinovation Venture determines that its main cash flow comes from entrepreneurship service income and fund management outsourcing income, while the income from entrepreneurship services comes from the station fee and entrepreneurship service fee paid by the incubated enterprises. In addition to limited access to cash, the increase in accounts receivable is also a factor in cash flow problems.

The accounts receivable of Innovation Works mainly come from the fund management outsourcing fees and entrepreneurial service fees that should be collected in the previous quarter, and the related fees collected on a quarterly basis make the income recognition mode consistent, so in fact the composition of accounts receivable is in line with the business operation characteristics of this industry. Therefore, the focus of improving cash flow is to expand the source of service income. In addition, compared with investment-type incubators and real estate-type incubators, Sinovation Venture does not need to bear the risks brought about by venture capital and does not have the risks brought about by heavy assets. The overall risk is smaller than the risks brought about by the other two incubator models.

### **6.3.3 Opportunity**

The biggest opportunity is the compatibility between the long-term strategy of innovation Venture and the economic and technological environment of China's current goal. Since the Chinese government offers a series of diverse policies and support for innovation and entrepreneurship, many start-ups showing up in these emerging fields such as artificial intelligence, big data, and virtual reality, which developing rapidly. Sinovation Venture mainly focuses on the capital market and actively invests in new fields to further promote the development of innovative enterprises. In terms of business strategy, the company continued to focus on the development strategy of "deep incubation + regional incubation + business school", highlighting the core business, and building an incubation platform. Enhancing brand influence and realizing diversified integration of business models are first priorities. In 2017, the company focused on building the Artificial Intelligence Engineering Institute (referred to as "AI Engineering Institute"), whose attitude is to accelerate the

introduction of talents in the Engineering area, determine the vision and goals of the Academy of Engineering and refine the business model, and improve the core team in subdivided business fields.

### **6.3.4 Threat**

Service-oriented incubators such as Sinovation Venture are prone to homogeneous competition, especially when more and more incubators have emerged in recent years. If the service model of Sinovation Venture cannot maintain innovation and adapt to development, it may lose its competitive advantage.

The other threat is how to deal with the loss of the core management team and mentor resources. Under the leadership of Dr. Li Kaifu, Sinovation Works has gathered a group of mentor resources and management teams with leading advantages and rich experience in their respective professional fields to help entrepreneurs avoid entrepreneurial traps, recognize business models, grasp the market trend, entrepreneurial consulting, and professional services. The core element of the company is the element of human capital. Its core management team and mentor resources have rich management experience in professional fields, international vision, and forward-looking industry insights. The stability of the core management team and the expansion of mentor resources are essential for the company to maintain its core competitiveness in the industry is of great significance. Based on the significant influence of Dr. Lee Kai-fu and other core management teams, it may affect the expansion of mentor resources or bring certain adverse effects on the company's future development when losing the core team, from a point of view which is mainly manifested in the creation and branding of Sinovation Venture.

Overall, China's incubators have reached a level comparable to that of the United States in terms of service and have also established links between certain university research institutions and start-ups and incubators, but there is still room for improvement. On the other hand, China's humanistic care is relatively weak and needs to be strengthened in terms of providing services for disadvantaged entrepreneurs. When it comes to funding and policy support, China has focused on providing strong policy endorsement and funding programs for start-ups in recent years, but it is not comprehensive compared to the United States.

## **7. Limitations and Conclusion**

### **7.1 Limitations**

Due to limited access to available data, the author can only analyze and study some of the known data published by Chinese provincial and municipal government platforms, information in published books and brochures, and the conclusions drawn may not

show the full picture of Chinese provinces and municipalities. Because of the large number of provinces and cities in China, the author has only conducted a special analysis of a few representative provinces and cities from each economic region in China, which can only summarize most of the current situation in each economic region in China and does not fully reflect the advantages and limitations of each province and city.

## **7.2 Conclusion**

Business incubators typically offer a range of tangible and intangible services to support startups in their early stages of growth and development, with the aim of fostering local economic development. By providing a haven for young firms, incubators contribute to the economy and actively promote economic development at the local, regional, and national levels. As they adapt to changing economic conditions, incubators help support diverse economies, facilitate the commercialization of new technologies, create jobs, and build wealth.

As a relatively new tertiary industry in China, technology business incubators and accelerators still have significant market potential, due in part to an excellent policy environment and market demand. Drawing lessons from mature cases in developed countries, it can be drawn that experience, resources and capital are fundamental to a successful incubator. On the one hand, an excellent incubator understands the laws of incubating enterprises and understands the growth needs of each stage of the enterprise. On the other hand, through the extensive resources accumulated over the years, it promotes the precise connection between enterprises and resources, reduces transaction costs, and wins valuable development opportunities. In the incubation process of technology enterprises, the trial-and-error process of enterprises is reduced, and the development of enterprises is accelerated, thereby greatly improving the probability of entrepreneurial success. Financing has always been another difficult issue for entrepreneurs. Incubators should have investment and financing capabilities, as well as certain financial strength and broad financing channels. As a result, on the one hand, a small amount of capital can be invested at the start of the enterprise to meet immediate needs, while on the other hand, it can rely on strong resource integration capabilities to connect a large amount of capital for the enterprise's rapid expansion.

Based on an examination of China's economic regions, it is concluded that there are three reasons for the unbalanced regional development of China's incubation industry: Firstly, there is an imbalance in resources due to natural geographical factors. Although the central and western regions are vast, their total area accounts for over 60% of China as a whole. Due to environmental, communication and transportation constraints, the western part of China is lagging. Secondly, since the reform and opening, the people of eastern China have become more ideological than the rest of China, the people are generally better educated, more willing to cooperate

economically with the international community and more innovative. Thirdly, China has implemented an eastern strategy of unbalanced regional economic development, which has not only promoted the development of the eastern region, but also increased the innovation consciousness of the people in eastern China. The economic benefits of innovation have further widened the gap between the economic development of eastern China and other regions and has led to a cluster development pattern in China's incubation industry. Because of China's uneven development, we concentrate our analysis on the country's eastern region, where the economy is more developed. Based on various regional studies, it is found that the incubation industry in China basically follows the "mass maker space - technology business incubator - technology business accelerator" chain, and most incubators in China serve as both incubators and accelerators, which is why the number of specific technology business accelerators in most Chinese provinces is unknown. Also find that the innovation capacity of each economic region in China has different characteristics than before, with Guangdong's innovation capacity continuing to expand and Shanghai following closely behind. The gap between China's geographical east and west is narrowing, while the gap between the north and south is still widening, and China has largely formed several innovation agglomerations. The China's economy eastern part is still the leading region in terms of innovation capacity, the central regional part of the economy is catching up fast and the pace of innovation is accelerating in China's economy western part and the north-eastern part of the economy are relatively lagging. Overall, the gap in innovation capacity between regions is still wide, and coordinated regional development needs to be improved.

In China's incubation industry, technology business accelerators are still in their infancy. There are most mass maker spaces and incubators in the early stages of incubation, and there are also many parks in the back end of industrialization, which play a key role in the development process. The number of accelerators is relatively small. Even in most provinces and cities in China, technology business accelerators have not been clearly separated from technology business incubators, did not producing very clear effects. The government-sponsored technology business accelerator has the most public interest, the most funding and tax breaks, but it is also subject to the most government intervention and thus less motivated to innovate. Both corporate-sponsored and venture capital-sponsored technology business accelerators operate through market-based allocation of resources and are profit-oriented in a highly competitive market, with more corporate sponsorship. Due to their professionalism, they are able to provide high quality, all-round development goals and supporting services to the resident companies.

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