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Experiences and Reference Solutions to Development Zones in China

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Abstract. This paper introduces the Silicon Valley of the United States, Singapore's Science Park, Taiwan's Hsinchu Science Park and Suzhou Industrial Park, and analyses successful experiences of these development zones in development and construction, then some common characteristics of these parks are summarized. By learning from successful experiences of development zones domestic and abroad, this paper puts forward some inspirations for the construction of China's development zones.

Keywords. Development Zone; Experience; Reference Solution

I. Introduction

The concept of "Development Zone" in China is closely related to concepts such as "Special Economic Zones" in Western academia (Wang 2022). Among them, the export processing zones and science parks, as well as the Enterprise Zone and Urban Development Corporation in the UK, have the deepest impact on China's development zones (Zhao and Wang 2021).

The development zones have played a huge role in attracting foreign investment, promoting local economic development, cultivating talents, and developing high-tech industries. In recent years, China's development zones have experienced rapid development in both quantity and scale. As of November 2022, China has established a development zone system consisting 675 national level development zones and 2107 provincial level development zones.

This article will analyze the successful practices of famous development zones domestic and abroad, summarize the successful experiences, and provide useful insights for the construction of other development zones in China.

II. Development experience of domestic and international development zones

1. Silicon Valley, USA

Silicon Valley has become a world-renowned high-tech park due to the development of computers and semiconductors, with Stanford University located at its center. It is not only the cradle of modern high-tech industry in the United States, but also the pioneer of world science and industrial parks (Zhong 2001).

(1) The tradition of close ties with universities

Silicon Valley attaches great importance to the coordinated development of regional economy and research institutions such as universities. It is closely connected with a large number of high-level universities and research institutions centered around Stanford University. Silicon Valley and Stanford University are not only geographically adjacent, but also have very close business connections. Most of the topics in the school come from development zones, and many university faculty members also serve as consultants for enterprises, even investing directly to establish companies in Silicon Valley.

(2) Complete hardware and software supporting facilities

Silicon Valley not only has complete hardware facilities such as roads, communication, and urban construction, but also has complete software facilities such as talent, information networks, technical support, and venture capital, providing a good production environment and external support for the development of enterprises in the area and the establishment of new enterprises. Especially the mature venture capital market has played an irreplaceable role in the transformation of American technological achievements, the realization of technological innovation, and the cultivation of new economic growth points. It has also provided technical and financial support for the failure to start a new business.

(3) The role of the government is indispensable

The success of Silicon Valley largely benefits from a market-oriented business model, but the role of the government cannot be underestimated. The government promotes the technological development of Silicon Valley through research and development investment and related policies. The government provides direct funding and various investments in basic research and development that is in line with national scientific development. It also invests in research and development for small and medium-sized enterprises, and encourages them to conduct project research and development through tax policies and other incentives. In addition, the government has played an important role in improving the transportation situation in Silicon Valley (Zou 2008).

2 Kent Hill Science and Industry Park in Singapore

In 1980, in order to promote scientific research and development in Singapore, the Singapore Science Park was established by the Singapore government at Kent Hill near the National University of Singapore. After decades of development, the Singapore Science Park has become one of the most influential science parks in Asia.

(1) Support from universities and research institutions

The Kent Hill Science Park is located in the heart of the Singapore Technology Corridor, adjacent to important research institutions such as the Kent Hill Digital Laboratory, Advanced Computing Research Institute, Microelectronics Research Institute, Wireless Communication Center, Biotechnology Center, National Computer Commission, Singapore Science Center, etc. The strong knowledge production capacity provides important knowledge foundation and technical support for the development of Singapore's science park (Li 2008).

(2) Powerful government intervention

Singapore's science parks are driven by the government from creation to development, while private sector participation is largely limited. The government plays an important role in the establishment, site selection, and operation of science parks, as well as in attracting multinational corporations from overseas to conduct research and experimental development activities, promoting cooperation between surrounding universities and research institutions with the industry, and providing policy support for incorporating science park projects into national technology plans^[5].

(3) Comprehensive service facilities

The Singapore Science Park Management Authority has built a comprehensive social service infrastructure to attract investment in the technology industry, such as libraries, telecommunications and postal departments, residential areas, schools, hospitals, and entertainment facilities, providing various conditions and logistical support for investors' scientific research and leisure activities. The National Science and Technology Commission of Singapore has established venture capital investment companies, entrepreneurship centers, and consulting institutions in the park to provide venture capital and consulting services to high-tech companies within the park.

3 Hsinchu Science and Industry Park in Taiwan

Since its establishment in 1980, Hsinchu Science and Industry Park has developed into one of the world's famous high-tech parks. There are now six high-tech fields with broad prospects, including electronic computers and peripheral equipment, precision instruments and machinery, biotechnology, integrated circuits, communication, and optoelectronics, which have become important components of Taiwan's economy.

(1) The construction policy of "high-tech, college oriented, community oriented, and internationalized"

"High technology" refers to the selection and scientific allocation of high-tech industries, which is the central task in building science parks. "Academization" refers to utilizing the strong technological and intellectual advantages of science parks to develop high-level education, cultivate scientific and technological talents, and form a cycle of combining teaching, research, and production. In order to solve the industrial technology problems of enterprises in the park, the park fully utilizes universities and abundant intellectual resources, establishes an industrial research institute, gathers a large number of scientific and technological personnel, and relies on the research strength of universities to directly serve enterprises in a market-oriented operation mode (Xia 2008). "Community oriented" means that the construction of scientific parks should be convenient for work and life, making work and life in the park comfortable and convenient. "Internationalization" means that the planning and construction of science parks should fully absorb the advantages of science parks in the United States and Europe, always follow international standards and practices, and pay attention to international cooperation.

(2) The construction of a technology city that integrates technology, housing, social education, and entertainment, including the "Historical Monument City" and "University City"

The Hsinchu Science and Industry Park is composed of several major areas, including industrial zone, educational research zone, commercial zone, residential zone, and garden zone. In 1986, the Science City was established centered around the Hsinchu Science and Industry Park. This science city is built using the latest urban planning concepts to create a high-level science city with the best living space and quality of life, and a high-tech industrial development environment. The development plan of Hsinchu Science City, combined with the existing resources in the Hsinchu area, aims to develop it into a regional science and technology city that integrates four major functions: technology, housing, social education, and entertainment.

(3) Supporting construction and services

In terms of supporting facilities, the park focuses on the construction of community supporting facilities. There are residential areas and recreational areas within the park, as well as relatively complete community supporting facilities such as leisure vacation, medical and health care, and education for employees' children, providing a good living space for the park and nearby residents. In terms of service guarantee, the park fully establishes service guarantee

institutions in accordance with the principle of "manufacturer service, completed within the district" (Yang etc. 2018).

(4) The combination of government role and market role

The Hsinchu Science Park emphasizes the combination of government and market roles, such as direct government involvement in the planning and construction of the Hsinchu Science Park; The government formulates a series of rules and regulations to carry out scientific, efficient, and standardized management of the Hsinchu Science and Industry Park. Through such government participation and management, the entrepreneurial and management costs of enterprises in Hsinchu Science Park have been reduced, and the park's layout in transportation, factories, facilities, and other aspects has been more reasonable, making its development forward-looking and long-term, and also building a good platform for regional innovation systems.

4 Suzhou Industrial Park

Suzhou Industrial Park is an important cooperation project between the governments of China and Singapore. It was officially launched in May 1994 and is located on the east bank of Jinji Lake in Suzhou City. The administrative area is 278 square kilometers (including 80 square kilometers of the China Singapore Cooperation Zone). The construction goal is to turn Suzhou Industrial Park into a high-tech industrial park with international competitiveness and a modern, landscaped, and internationalized new urban area. It is known as an important window for China's reform and opening up, and a successful example of international cooperation.

(1) Adhere to planning first and invest in infrastructure moderately ahead of schedule

The park adopts a "planning first, construction later" model. At the beginning of the park's development, China and Singapore exchanged experts to draw on the experience of Singapore and international advanced urban planning and construction, jointly formulated a forward-looking and scientific overall plan for the park's development, formulated and implemented more than 300 professional plans, and coordinated the layout of various urban functions such as industry, transportation, commerce, housing, and landscape. The park has invested billions of yuan in infrastructure construction funds, advanced the construction of high-level infrastructure, and effectively ensured the continuous entry of projects and the production and living needs of personnel.

(2) Improve urban functions and create a good living environment

The park abandons the single mode of industrial development and focuses on the positioning of "industry city integration, people-oriented". From the beginning, it focuses on "industry city integration" and proactively coordinates the development of the park and urban construction. The park has increased efforts to cultivate and develop exhibition economy, building economy, traffic economy, and urban leisure economy, and has successively built over 1 million square meters of production and living service facilities. With Jinji Lake as the core, the central business district is laid out around Jinji Lake, forming the urban center of the park; Surrounding an 80 square kilometer "China Singapore Cooperation Zone". There are four functional areas: business, science and education innovation, tourism and vacation, high-end manufacturing and international trade, forming an urban development framework of "industry city integration and regional integration". It makes the surrounding Jinji Lake area gradually become a new financial, commercial, modern leisure, and commercial cultural center in Suzhou city. Suzhou Industrial Park draws inspiration from Singapore's experience and builds residential areas around the "neighborhood center". This layout integrates commerce, culture,

and community services, providing comprehensive, all-round, and multifunctional services for community residents.

(3) Emphasize the development of education and cultural undertakings

In line with economic and social development, the park adheres to the strategy of revitalizing the district through science and education, and attaches great importance to educational work. As of February 2024, there are over 21300 in-service teachers and nearly 265000 full-time students in the entire region, forming a relatively complete modern education system consisting of preschool education to higher education. In order to meet the demand for high-end and applied talents in the rapid development of the park's economy, the Suzhou Dushu Lake Science and Education Innovation Zone began construction in 2002. As a multi-disciplinary, high-level, and innovative graduate education base that adapts to Suzhou's cross century development, the park promoted the process of settling in of famous Chinese and foreign schools. At present, 33 well-known domestic and foreign universities have been established and approved as the first "internationalization demonstration zone for higher education" in China. In order to change the concept that industrial parks are cultural deserts, the park is committed to the establishment of cultural facilities and the development of cultural activities. It has restored the construction of Chongyuan Temple and built Suzhou Science and Technology Cultural and Art Center.

(4) Establishing ecological parks by utilizing natural resources

The park is rich in natural resources, with a total of 238 rivers and a total length of about 430 kilometers within its jurisdiction. The river water area is about 16 square kilometers, and a total of 6 lakes are listed in the Jiangsu Province Lake Protection List, with a lake water area of about 55.7 square kilometers. According to the construction standards of "low-carbon, intelligent, ecological, and humanistic", the park is making every effort to create a green ecological demonstration zone, and the urban form of landscaping, ecology, and human culture has been formed.

The park has been successively approved as one of the first-class ecological industry demonstration parks in China, one of the first-class ecological civilization construction pilot parks in China, one of the first-class national low-carbon industrial parks in China, one of the first-class national green demonstration parks in China, and one of the first-class national level carbon peak pilot parks in China.

III. Experience reference and inspiration

Development zones are an effective way to promote regional development. Looking at the development history of domestic and foreign development zones, it is not difficult to find that successful development zones have some common characteristics, which has good reference significance for guiding the construction of development zones in various regions.

Drawing on the successful experiences of domestic and foreign development zones, we can gain some beneficial insights.

(1) Government guidance and strengthened planning

Although different development zones have their own development models, the government has played an irreplaceable role in their development process. Firstly, it is reflected in reasonable institutional arrangements and support from preferential policies. Secondly, it is necessary to strengthen planning and provide solid support for the success of the development zones. The construction and development of development zones are closely related to urban economic, social, and spatial development. It is necessary to plan the construction of development zones from the perspective of the overall city, and incorporate various types of

development zones into the overall framework of urban spatial development. Therefore, the spatial planning of development zones should not only meet the specific functional requirements of the park itself, but also follow the general laws of urban spatial development. Planning should be forward-looking and have the initiative to adjust planning and control strategies in a timely manner, in order to ensure high performance in spatial resource allocation^[2]. In addition, management personnel at all levels should establish a sense of responsibility, strengthen review efforts during the project approval process, and ensure that the construction of the development zone meets the planning requirements.

(2) Introducing research institutes and increasing technological support

At present, large-scale development zones generally integrate scientific research and manufacturing, with high requirements for the intensity of intellectual resources. This is firstly because high-tech industries are technology and intelligence intensive industries, and without a certain degree of intelligence intensity, it is difficult to form high-tech industry clusters. Due to the interactive effect between research institutions such as universities and research institutes and industrial clusters, successful development zones both domestically and internationally attach great importance to the close connection between development zones and universities and research institutions. Universities and research institutions can provide technical design, guidance, and consulting for enterprise development, as well as a large amount of talent resources for enterprise development.

(3) Increase investment in the tertiary industry and promote coordinated development of the primary, secondary, and tertiary industries

High tech industries cannot develop in isolation. They not only rely on intelligence for development, but also need to be interconnected with upstream industries and service sectors that supply the equipment and materials needed for high-tech industries. High tech parks need to have supporting service systems in areas such as financial services, venture capital, legal services, technical consulting, commercial trade, and information services. At the same time, leisure and entertainment service facilities and systems also need to be developed accordingly. The development zone should shift from focusing on the secondary industry to coordinating the development of the primary, secondary, and tertiary industries, especially vigorously developing the tertiary industry with modern service industries as the main focus.

(4) Creating a good living environment and devoting to green and low carbon development

Successful development zones have good production and working environments. On the one hand, the development of high-tech products has relatively high requirements for the natural and acquired environment; On the other hand, a quiet and beautiful environment is conducive to scientific research and development, and excellent quality of life is also an important factor in attracting technology talents to live and work in peace. Strengthening the construction of ecology and living environment has attracted high attention from domestic and foreign development zones.

Development zones are important carriers of regional industrial agglomeration and platforms for regional economic development, and are the main battlefield for promoting green and low-carbon transformation and development. We need to improve the system and policy system for green and low-carbon development, establish and improve green access and incentive mechanisms for industries in development zones, and lead the comprehensive green transformation of development zones through innovation in the green and low-carbon development system and mechanism (Wang etc. 2022).

(5) Improving supporting facilities and building a modern new urban area

Besides having a good infrastructure, large development zones attach great importance to the construction of supporting facilities in their development process, striving to build them into a new urban area that integrates work, scientific research, learning, living, and entertainment. On the basis of clarifying the division of functions between large-scale development zones and cities, major infrastructure such as transportation and communication in cities will be extended to large-scale development zones, strengthening the connection between development zones and cities, and timely guiding the transfer of urban population and industries to development zones. Promoting the development zone to shift from a single production function zone to a modern new urban area with multiple functions such as entertainment, culture, leisure, tourism, commerce, and residence, which is suitable for work and living.

IV. Conclusion

To sum up, this paper analyzes the successful experiences and practices of several famous development zones in their construction and development. Some useful insights are drawn for the construction of other development zones, including government guidance and strengthening of planning; introducing research institutes and increasing technological support; increasing investment in the tertiary industry and promoting coordinated development of the primary, secondary, and tertiary industries; creating a good living environment and devoting to green and low-carbon development; improving the construction of supporting facilities in the development zones, etc.

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