

Experience and Enlightenment

Cambridge Science Park—A Model of University Science Park

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Abstract: Cambridge Science Park is one of the most successful Science Parks in the world. Its successful development experience has important referential value to current science and technology innovation. This article mainly discusses about the business model and facing problems of Cambridge Science Park and studies about its future prospects for development under the context of world economic integration.

Keywords: Cambridge Science Park; Development course; Success experience; Prospects for development

1. Development Course of Cambridge Science Park

Cambridge Science Park is located in Cambridge County, Southeast England. It was founded in 1970 under Cambridge University's initiative. Today it has been the most successful science park in Europe. It is dedicated to transfer science and technology research achievements to market place, and has developed into a European high-tech industry center. Full of vitality and vigor, Cambridge Science Park has formed an innovation-oriented economic form in which Cambridge University, emerging new companies and large-scale multinational corporations closely cooperate in different industrial networks. Accordingly investments from the world are attracted to Cambridge Science Park. The economic development in Cambridge Science Park has created "the Cambridge Phenomenon". During the past 30 years, the Science Park has been increasing by 5,000 employ-

ment opportunities per annum. The average yearly GNP has reached 6.3%, much higher the average of 3.4% in UK. It has created £55b tax revenue for UK and £28b export value. Such a high-tech park with increasing economic efficiency and technical advancement has become the development center of the entire Eastern England, and it has become an important engine that promotes the development of electronic information industry in UK and the European Union.

2. Success Experience of Cambridge Science Park — "New Economy Knot"

"Cambridge Phenomenon" is not a short historical process. Such an economic growth model oriented by high-tech innovation maintained long-term development in Cambridge area, made it famous as "Silicon Fen", and developed it into not only the vital constituent of UK's new economy pivot but also the "New Economy Knot" in the world. The emergence

of Cambridge Science Park was not incidental. It is the inevitable result by combined effects of historical, technical, commercial, substantial and governmental factors, etc. The Cambridge University has been playing an essential role in the establishment and development of Cambridge Science Park toward success.

It is the super-strong scientific research power of Cambridge University that has facilitated the emergence of "Cambridge Phenomenon" and the foundation of Cambridge Science Park. Cambridge University keeps widespread contact continuously with the real world. The University's research and development is the key for enterprise innovation and development. Many small-size high-tech companies developed from Cambridge University's various departments and colleges, for example: Laser Scan Co., WestCommon Data Co., Optical Micro System Co., Cambridge Function System Co., are spin-offs from Trinity College; Computer Lab, Cavendish Lab of the Physics Departments, Computer Auxiliary Design Center separately. In addition, 1/3 of the firms in Cambridge are high-tech companies, 70% of the employees are from Cambridge University, more than half of the high-tech companies have close cooperation with Cambridge University, among which 90% have direct relation with Cambridge University's departments and colleges.

Cambridge University's remarkable success in high-tech industry mainly lies in good conditions for high-tech development and the promotion by the Science Park. According to the investigation made by Cambridge University Business Research Center, the factors influencing on the development of Cambridge Science Park are as follows in terms of their importance:

1) Extremely attractive local environment. The Science Park has convenient transportation, advanced telecommunication network, and sufficient electric power facilities. The entire park is beautiful and clean, with convenient living conditions as well as culture, education, and entertainment facilities. Be-

sides good production and housing conditions, flexible renting contract, spacious parking lot, abundant opportunities to communicate and network with other enterprises, good image and mutual trust, consulting service, public facility sharing and close relation with Cambridge University, so on and so forth, all promote the development of the enterprises in the Science Park and attract excellent staff and management personnel.

2) Complete market economy system. The Science Park has provided the enterprises with perfect service such as venture capital, intermediate agency, logistics supply etc. The Park Administration has established perfect venture capital system, which provides venture investment, venture insurance, risk guarantee etc. Through business development of traditional financial agencies, financial innovation and complete high-efficiency security market, such a system also provides capital in line with the development of high-tech. Consequently a complete economy market system is formed by the portfolio of traditional financial agencies, venture capital market and security market.

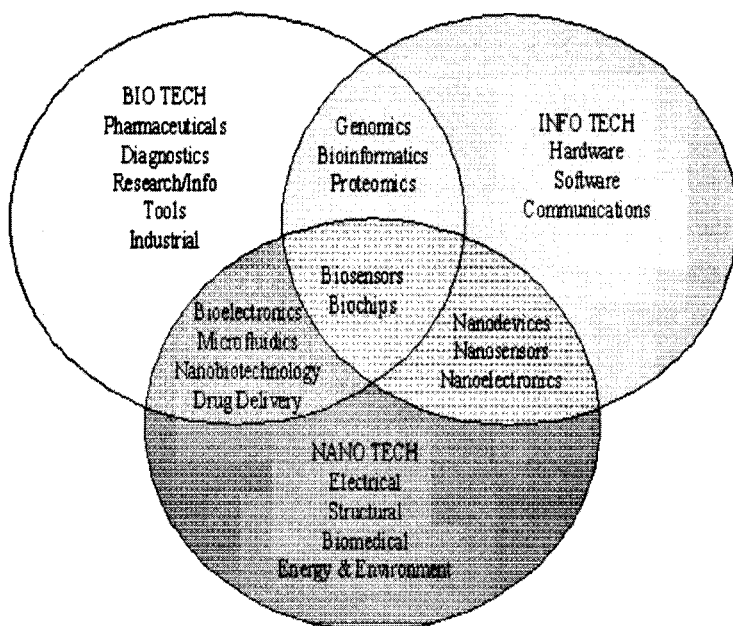
3) Stable supply of high-quality talents. Cambridge is a prestigious area, the basis of international enterprises' R&D, as well as the park of science& technology consulting and professional technical service. The Park attracted a number of European first-class talents by reliable prospects, attractive challenges and high salaries. Employees in the Park seldom change their jobs. The cohesive enterprise culture gives the staff strong psychological contract. Stable and sufficient talents enable local companies to retain a strong knowledgeable team and to benefit from its continuity.

4) Governmental preferential policy. The Science Park stipulated favorable policies for small and medium-size enterprises to incubate inside the Park. The Government and the Science Park Administration all provide such preferential policies for capital, tax, and law etc. In UK, foreign capital companies enjoy the same investment preferences as British

companies. In other words, foreign companies could basically enjoy national treatment in UK, and could obtain the same project fund aid. Moreover, UK's company tax rate is the lowest in Europe, which strengthens local companies' competitiveness. UK has no special law to guide or limit foreign investment, foreign merchants or foreign capital holding companies enjoy the same treatment as British companies, and they could be engaged in many types of economic activities in UK.

5) Cambridge Spirit. As a successful cluster area of high-tech enterprises, the advantages of Cambridge lie in that it has the environmental conditions to transform entrepreneurship into technical innovation. Capital is doubtlessly important to develop high technology, but more important would be to fully exert the creativity and transform it into enterprise and technology innovation, initiate special entrepreneurship and unique humanitarian atmosphere, so as to continuously develop the Science Park. And this is the manifestation of Cambridge Spirit.

3. Classification of Industries and Study of Cases about Cambridge Science Park



Source: Alan Barrel's report on the "Seminar about Cambridge Phenomenon in Xiamen University, 2005

The industries in Cambridge Science Park are mainly concentrated in IT, biochemistry, instrument, and law etc. Most of them are subsidiaries of multinational companies. Cambridge has great advantages in science and technology. It has produced 81 Nobel Prize winners. Cambridge Science Park has taken the principle of keeping the balance between Real Estate, Venture Capital and Seed Projects. The following chart indicates the overlapping situation of the main discipline research about industries.

Obviously, in Cambridge Science Park, industry category covers not only advanced information technology and biological technology but also electromagnetics etc. Further more, there is an extensive overlapping and cooperation between various disciplines. Some overlapping research and bordering research have become the mainstream of industrialization. At the same time, the leading position of Cambridge University in technical engineering field has also achieved fundamental advantages for the enterprises in the Science Park.

ARM is the largest provider for digital product and technology in the world. Its application field covers: wireless, network, consumption entertainment, phantom, automobile electronics, safety application and memory units. ARM provides a wide range of products, including: 16/32 digit RISC microprocessor, data engine, 3-dimension graphic processor, digital unit base, embedded memory units, peripheral parts, software, development kits, simulate and high-speed connection products. ARM has been providing speedy and stable systematic solution package for users in collaboration with many technology partners. ARM has established R&D center in Cambridge Science Park in order to keep technology leadership.

TTP Group is another high-tech company in Cambridge Science Park. It has following subsidiaries: The Technol-

ogy Partnership, TTP Venture Managers Ltd., TTP COM, TTP Labtech, White Carbon etc. It is a comprehensive group company specializing in technology innovation and service that has great influences not only inside Cambridge Science Park but also across UK.

4. Bottlenecks that Hinder the Development of Cambridge Science Park

Knowledge Industrialization and Knowledge Dissemination

Massive high-tech R&D has been focused in Cambridge University. Although Cambridge has some leadership in knowledge industrialization, there is still a large quantity of science & technology achievements that only show up in academic periodicals. Market operation of knowledge innovation not only requires perseverant experiments but also keen insights. IP protection, cooperation models between enterprises and the University still need breakthrough and reform in system. These are the core essential factors for Cambridge Science Park to keep long-term competitive advantages.

Lack of Large-scale Local Profitable Enterprises

There are many small enterprises in Cambridge Science Park with innovation spirit, flexible operation models, and speedy knowledge renewal. But these small enterprises appear to be very weak before market competitions. Some companies wither away because of too small scale. Many companies inside the Science Park face the bottlenecks for expansion to large-scale enterprises. The difficulties to keep long-term market leadership not only pose great challenges to the enterprises but also lead to a dilemma that Cambridge Science Park has to solve.

Inefficiency and Insufficiency in Early -Stage Fund-raising

Due to the characteristics of high-tech enterprises, venture capital is required to enter during their early stages so as to provide them moment for take-off. Although Cambridge Science Park attracts large amount of global venture investment every

year, capital operation is normally very inefficient during the fund-raising process, especially the start-up process of early stage, Such an inefficiency not only restricts the development of enterprises but also wastes enormous capital.

Shortage of Infrastructure Facilities

Firstly, traffic congestion is increasing day by day. With remarkable increase of population density, crowded transportation and frequent traffic jam have affected the efficiency of the Science Park. Especially with the tourism development in the Park, every summer a large number of tourists flocks into the Science Park. At peak time, tourist number could be nearly the same as that of workers, which drastically deteriorates the traffic situation.

Secondly, transportation connection between the Park and other areas is insufficient. The link between the Airport with international destinations is quite limited. Although Cambridge Science Park has some global radiation power, there is big lag not only in the link between the Park and adjacent villages but also in the link between the Park and international destinations. This has greatly limited Cambridge Science Park's communication with outside and its global expansion.

Thirdly, there is inadequate supply of housing in quantity and quality. With the development of Cambridge Science Park, the demand for housing is sharply increasing in quantity and types. Obviously, such situation is not anticipated at the beginning of Park construction. The inadequate supply of housing in the Park area has caused great inconvenience, which indirectly restricts the development of Cambridge Science Park.

Finally, the land supply is insufficient. With the reducing of land supply day by day, the Science Park could not meet the needs of spin-outs from the high-tech enterprises and new comers from outside. The land inside the Science Park has become more and more expensive. Accordingly the Science Park has to be more careful in choosing projects. Wellcome Trust has taken big efforts in applying for land

in order to establish a high-tech biological company. Finally the Park has to give up this company as the environmental protection test shows that such a project might not fully meet up with environmental standards.

5. Development Prospect of Cambridge Science Park

Satellite City Plan

In response to current problems, Cambridge Science Park has been adjusting its development strategies. One strategy is to establish "Satellite City" high-tech center around Cambridge University in order to alleviate the serious land shortage which increases day by day. The plan is to link the Park area with surrounding towns and villages so as to expand the influences of the Science Park. The new Cambridge Science Park would be a prospective high-tech incubation area. Its central region and periphery villages will form an Innovation Cluster with extensive expanding space.

Global Operation – China-UK Cambridge Science Park

Cambridge Science Park has been carrying out international cooperation and exchanging since its establishment. With the acceleration of world economic integration, Cambridge Science Park has been playing a more important role in the international cooperation for technology innovation.

On May 31, 2005, 6 companies from Guangzhou founded the China-UK Cambridge Science Park and put up the formal Plate in Cambridge University St. John's Innovation Center. China-UK Cambridge Science Park is the joint-venture of the Chinese and British government. Its principles are

"Based in Cambridge, Entering into UK, Facing Europe, Serving the World". Its target is to help more Chinese medium and small-size high-tech companies to develop their business in UK and Europe, to promote their R&D capabilities and management level, to increase their competitiveness, to enlarge their global market share, as well as to introduce advanced technology and management from overseas.

The establishment of China-UK Cambridge Science Park by the 6 Chinese enterprises will have significant, positive, and deep influences. It will not only strengthen the science and technology exchange and cooperation between Cambridge and Guangzhou, UK and China, but also will expand the cooperation to more extensive areas such as airports, seaports and service etc. An optimized combination and disposition will promote the economic development for both Cambridge and Guangzhou.

By strengthening the cooperation with China, which is called the "Main Engine" of global economic growth, UK will obtain new momentum for its economic development. By joining hands with Guangzhou, which is located in global manufacturing center, Cambridge Science Park will definitely open broader prospects for development.

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