

III. PROMOTING BUSINESS AND TECHNOLOGY INCUBATION FOR IMPROVED COMPETITIVENESS OF SMALL AND MEDIUM-SIZED INDUSTRIES THROUGH APPLICATION OF MODERN AND EFFICIENT TECHNOLOGIES IN CHINA

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A. Review of the new China's development in economy and technology

1. Economic development of the new China

China founded after the World War II was a poor and backward agricultural country. From 1949 to 1977, under the system of centralized planning entirely by the Central Government, the national economy experienced a period of recovery, a period of the high tide of large-scale construction, a period of adjustment and a period of slow development in the ten years of the Great Cultural Revolution. Because of the poor foundation and the restriction of the planned economy system, China's economy was always at a state of backwardness. Especially for the influence of the Great Cultural Revolution, China's economy was at the brink of collapse.

China's pursuance of reform and opening up policy from the end of the 1970s and her gradual transition from the socialist planned economy to the socialist market economy with Chinese characteristics have put the national economy on a track of continuous rapid and healthy development. The annual average growth rate of China's GDP was 9.3 per cent, which was three times of the average growth rate of the whole world economy, two times of the average growth rate of the developing countries and four times of the developed countries in the same period. According to the report of the World Bank, China's GDP leaped to the 7th place in the world in 1997, thereby becoming an important force in the world economy. In 2001, China's GDP was up to Y 9,593.3 billion (US\$ 1,200 billion). China's economy has been greatly strengthened; the Chinese people are becoming better off; and the supply of commodities has been in abundance. In 2001, the amount of foreign investment absorbed by China was US\$ 46.8 billion, up by 14.9 per cent; the international payments were balanced; the year-end national foreign exchange reserve was US\$ 212.2 billion, up by US\$ 46.6 billion from the end of the preceding year; and the consumption level of individual residents raised by 0.7 per cent¹. China's economy has been integrated in the world economic development. China today is surprising the world with the great scale and high speed of her change and the vigour and vitality of her growth.

2. Review of New China's science and technology development

Under the planned system, S&T and industry were separated from each other, many R&D achievements were only samples, gifts, and items on display. Since the pursuance of reform and opening up to the outside world, the Government of China has resolutely insisted on the strategy of "relying on science and education to rejuvenate the nation", which has made China's science and technology enter a period of rapid development. In 1978, China held a national science conference; in 1988, Deng Xiaoping advanced the idea "science and technology are the primary productive force"; in 1985, China implemented system reform in science and technology and formulated and followed the policy that "science and technology must be relied on for economic development and science and technology must be oriented to economic development". The most essential purpose of the policy is to rapidly and extensively apply science and technology achievements to industrial production, give full play to the role of scientific and technological personnel, and greatly liberate the productive force of science and technology so as to facilitate the growth of economy and progress in society. The Government of China has unceasingly propelled R&D institutes, educational institutions and production units to cooperate to form a mechanism of synergy that integrate scientific research, design, production and service for transformation of science and technology towards direct productive force. The said policy has strengthened independent development capacity towards the economic construction, market and society of scientific research institutions, especially technological development institutions, and strengthened the linkage between technology and economy. A large group of new-type high-tech enterprises have spun off from scientific and technological institutions and become an important force and a new source of economic growth in China's development of the high-tech industry. The situation of unreasonable distribution of talents and waste of human resources has been changed to a great extent. A lot of scientific and technological personnel have left their ivory tower and begun operating enterprises through way of contracting or leasing. Participating in fierce market competition, they have become technological entrepreneurs who not only have scientific and technological knowledge but also are proficient in management.

From rice gene database, human genome programme and functional genome research in basic research to important industrial achievements with proprietary intellectual property rights (e.g., integrated computer technology,

¹ China, Government Work Report for the National People's Congress, 2002.

communication technology, network technology, microelectronics technology and cryptographic technology), many great achievements have been made in the development of science and technology. The development of science and technology has given momentum to China's economic development and become an inexhaustible driving force for the progress of the nation.

B. The launch and development of technology business incubators²

The Government of China has implemented the Torch Program and identified science and technology industrial parks (hereinafter referred to as STIPs) and technology business incubators as means to industrialize technology and to enhance the competitiveness of small and medium-sized enterprises.

1. Implementation of the Torch Program

Approved by the State Council in August 1988 and implemented by the Ministry of Science and Technology (MOST), the Torch Program is a guiding programme for the development of China's high and new technology industry. The core mission of the Torch Program is to give scope to the advantages and potentials of China's scientific and technological forces and accelerate commercialization of high and new technology achievements, industrialization of high and new technology products and internationalization of the high and new technology industry with market as the orientation. The focus of the Torch Program is to create an environment favourable for the development of high and new technology industry, which include such initiatives as formulation of related policies, laws and regulations, establishment of a suitable management and operation system for high-tech industry, exploration of new financing channels including venture capital investment mechanism, developing domestic and foreign information sources, building information networks and formulate long and mid-term development plans as well as implementation plans consistent with objective reality.

2. The launch and development of science and technology industrial parks³

In 1984, MOST, then called the State Science and Technology Commission, submitted to the State Council a report on how to respond to the challenges of the worldwide new technology revolution. This document proposed to tentatively establish STIPs in cities with appropriate conditions and requested relevant departments of the State Council to formulate preferential policies towards STIPs and business incubators. That was the first time when the concept "business incubator" was mentioned by a government department. Thereafter, MOST supported a research project to study business incubator and make relevant investigations. China's decision on system reform in science and technology was announced in March 1985. The announcement of this decision provided broad space for scientific and technological personnel to start new businesses. China's first STIP was established in Beijing in May 1988. By the end of the 1980s, the stress of STIPs began to shift to the development of high and new technology enterprises and modern industries, the absorption of foreign capital and the expansion of foreign trade and export.

STIPs have become the most vigorous source of growth in China's economic development. After more than ten years of building-up, various STIPs of China have realized continuous rapid economic growth through unceasingly improving their environments for innovation and new business creation and trying to promote the commercialization and industrialization of scientific achievements. In recent years, nearly 6,000 scientific achievements of provincial/ministerial level or above have realized industrialization in high and new technology zones. The proportion of the output value of China's high and new technology industry in the total industrial output value has increased from about 1 per cent ten years ago to more than 10 per cent at present and 50 per cent of the output value of the high and new technology industry is contributed by STIPs. By the end of 2000, the output value of products in the six technological fields of electronic information, biology, new materials, new energy, environmental protection and optical-mechanical-electrical integration accounted for 73 per cent of the

² Business incubators in China are sometimes called incubation centres, innovation centres or pioneer parks. Different designations may appear in the following chapters due to translation differences.

³ In China, science and technology industrial parks are also called high and new technology zones, referring to a certain area designed by the government for concentration of hi-tech companies, special policies and good infrastructure are provided to the certified hi-tech companies located inside it.

total industrial output value of STIPs; the total technological, industrial and trade income of the 53 national level STIPs was up to Y 920.9 billion; their total industrial output value was Y 794.2 billion; the total amount of their profits and taxes was Y 105.7 billion; and the amount of foreign exchange they earned through exporting products was US\$ 18.58 billion.

3. The origin of China's technology business incubators

At the end of the 1980s, with the deepening of China's reforming in science and technology and economic restructuring as well as her policy of opening up to the outside world, the situation especially the transformation of scientific achievements necessitated the birth of technology business incubators. In 1987, Mr. Rustam Lalkaka, then Director, United Nations Fund for Science and Technology Development (UNFSTD) made a suggestion to the Science and Technology Minister of China at that time to set up technology business incubators in China. In the same year, funded by UNDP and the Government of China, the National Research Centre for Science and Technology for Development conducted a study on the feasibility of establishing business incubators – high and new technology incubators in China. Wuhan, Tianjin, Guangzhou, Shenzhen, Xi'an Jiaotong University and Shanghai also carried out similar studies. In June 1987, China's first business incubator – Wuhan Donghu Pioneers Centre was formally established. Since then, business incubators have sprung up in China.

Nearly 30 business incubators were successively established in China during 1989-1990. In 1991, a group of business incubators with their own floor space were successively established and put into operation in Tianjin, Chengdu and some other places. At that time, there were nearly 40 business incubators in the whole country; more than 300 start-up companies and more than 1,000 high and new technology achievements were nurtured in the business incubators; the value of the business incubators' fixed assets and funds exceeded Y 100 million; and the first group of tenant companies began graduating.

4. Periods of development of China's technology business incubators

China's high-tech business incubators have generally experienced the following two important periods of development.

(a) *The period of classic development*

This was the first period of development of business incubators. The main characteristic of this period was that the government offered special policies for supporting the establishment and development of incubators and made heavy investment in building the most basic facilities needed by the incubators. The incubators laid their stress on transforming the existing scientific achievements and nurturing the existing small enterprises, by providing physical facilities and various junior consulting. They paid more attentions to social benefits rather than direct economic benefits. Institutionally, as self-reliance organizations independently responsible for their own incomes and expenses, the incubators gradually evolve into corporate management. This period lasted for about 10 years. The most pre-eminent achievements of the incubators in this period were as follows:

(i) The transformation rate of scientific achievements into production increased from a national average level of 25 to 30 per cent to more than 70 per cent.

(ii) The survival rate of small high-tech companies was greatly increased. According to many countries' estimation, in the condition of market competition, the survival rate of start-up enterprises is generally less than 30 per cent. However, after nurturing by business incubators, the survival rate of newly-started companies is generally more than 80 per cent.

In this period, the incubators mainly adopted primary financial measures (e.g., guarantee of credit, offering loans or equity investment) to support tenant companies and used individual efforts and primary methods (e.g., information release, exhibition, etc.) to assist the tenant companies to develop markets for their products. In addition, the incubators also provided some administrative supports to tenants. The incubators laid stress on transformation and cultivation of existing scientific achievements or existing small companies. The development of incubators in this period was characterized by the high transformation rate of scientific achievements, the high survival rate of small new technology companies, the low success rate of enterprises and limited range and primary method of service for enterprises. The period of classic development was extremely important for the development of incubators and the foundation for their continuous growth.

(b) The period of diversified development

This period already started from the end of the last century and is expected to last for 20 to 30 years. In this period, the focus of incubation is laid on serving high-tech enterprises and entrepreneurs in a wider range and at a higher level, bringing out their potentials and satisfying the needs in the transformation of scientific achievements and the development of technology industrialization. The development of technology business incubators in this period mainly has the following characteristics:

(i) Gradual transition from providing the tenant companies with thorough and all-round service to directly serving the entrepreneurs. In this period, the stress in nurturing is not only a technology or a product but also a process of invention that includes certain concept or a certain idea. The activities of incubator service will cover the whole process from an idea to research, development, production, and sales and until a company become listed in the stock market (or being acquired) as well as all necessary services in the aspects of capital, administration, property, market, law, etc. In the process, a technology or idea stands more chances of being successfully nurtured and transformed into viable products. Various incubation models will appear in this period.

(ii) Development towards industry-specific incubators. The thorough and all-round service will directly leads to the appearance of successful enterprise clusters, the formation of targeted (industry-specific) incubators and STIPs, the realization of closer cooperation between incubators, tenant companies and universities or scientific research institutes and the gradual establishment of state-of-art STIPs with high technology intensity. Since 1996, Beijing has established specialized technology incubators in such fields as medicine and new materials. By now, Torch Center has identified 22 software science and technology parks have been established in China.

(iii) Venture capital investment. The shortage of venture capital was one of the main reasons for the low success rate of the tenant companies in the incubators in the classic period. Chinese business incubators have recognized this issue and some incubators already began to tackle the problem by setting up venture capital funds themselves.

(iv) Networking at regional and provincial levels. Because of the broad territory of China, the huge number of scientific research institutes and the diversified development of high-tech business incubators, networking is inevitable for incubators. Therefore, urban networks, regional networks, national networks and international networks were formed in the period of diversified development.

(v) Profit-oriented development. The profit-oriented development of incubators seemingly goes against their objective. However, the profit-oriented development here does not mean the profit-oriented business behaviour in general sense. It means that incubators make profit while properly taking their responsibility as institution for the public good for the purpose of enhancing their own strength and capability and consequently realizing further development of public good undertaking in a greater scale and at a higher level, which means to enter a “sound development cycle”.

(vi) Internationalized development. Overseas students pioneering parks, international business incubators, the overseas base of high-tech business incubators and international incubation networks are the symbols of internationalized development.

The two periods of development of high-tech business incubators are only a relative concept in terms of time on the basis of an ideal subject. In fact, because of the broad territory of China and the great differences among different regions, generally speaking, the said two periods are mutually overlapping. It means that no matter what period the principal part of China’s business incubators has reached, the incubators of the other periods will coexist at the same time.

C. The current situation and characteristics of business incubators in China

1. The present situation of business incubators in China

Since the first technology business incubator established in 1987 in China, Chinese business incubators has developed rapidly after fifteen years’ efforts. The policy environment for business incubator has been improved and more capital has been put in the establishment of business incubator; the number and scale of

incubators has been increased and service functions has been strengthened; a large quantity of technology enterprises and entrepreneurs have been brought up. According to statistics by Torch Hi-tech Industry Development Center of Ministry of Science and Technology (hereinafter referred to as Torch Center) at the end of 2001, there are 280 incubators of different kinds all over the country and 12,821 tenant enterprises. More than 3,900 enterprises have graduated from incubators. The total incubation space is 5,090,000 sq m.

Table 2-III-1. Main economic performances of business incubators in China
(million of Y)

Index	Year 2000	Year 2001
Number of incubators	131	280
Floor space (sq m)	2 721 000	5 090 000
Tenants	7 693	12 821
Tenant sales	17 880	40 540
Cumulative number of graduates	2 770	3 994
Graduates' sales	35 690	30 880
Total amount of seed capital	740	1 090
Tenants' employees	128 776	263 596
This year's new tenants	2 389	5 048

Source: Statistics of Chinese Torch Program in 2001, Torch Program, High Technology Industry Development Center, Ministry of Science and Technology.

Note: * US\$ 1 = approximately Y 8.3.

The successful operation of business incubators accelerates the transformation of scientific achievements, creates a good environment, develops the entrepreneurial spirits of “tolerating failure, encouraging venture and advocating innovation”, attracts a group of overseas personnel of high quality to start business in China and promotes international cooperation. The central and local government gives great support to incubators and the whole society pays much attention to them. Business incubators explore a new way to speed up the transformation of scientific achievements in market economy, which contributes a lot to technological innovation and sustainable development.

2. Characteristics of business incubators in China

Chinese business incubation programme has drawn on many foreign experiences especially best practices of the United States since its beginning of establishment. As the same period during the 15 years from 1987 to 2002, China was experiencing a rapid development in both economy and society. Combined with these factors and Chinese cultural traditions, the Chinese incubation programme has formed so-called characteristics as follows:

(a) *Strong support from government*

The Chinese business incubation programme is under the guidance and coordination of a special institution – Torch Program Office of MOST, which is unique in the world. To promote and standardize the development of incubators, the Torch Program office enacted *The Principled Comments on Technology Business Incubators* in November 1994, describing the nature, mission and establishing criteria of Chinese incubators, making preferential policies for incubators, and suggesting management in detail as well. Similar to the management of STIPs, the Torch Program office identified a group of incubators as national ones, which set an example for others. The guidance and coordination of the Torch Program office is vital in every stage of incubator development.

Most of the Chinese business incubators were established by technology administrations or STIPs. The programme is incorporated into the Torch Program and local high-tech industry development programmes. The initial fund mainly came from government. All the incubators got total or partial financial support from governments at provincial and city levels and STIPs in their early stage.

(b) *Nurturing technology enterprises as main objective*

As one important mechanism in implementation of the Torch Program, business incubators in China are playing an important role in transforming scientific results to real productive force. The main objective is to nurture technology enterprises and technology entrepreneurs by providing efficient services. Incubators accelerate commercialization and industrialization of scientific achievements by supporting SMEs.

TBIs in China generally stipulate clear criteria and qualification of technology enterprises to be admitted. The common principle is: the tenant must be technology-based; the legal representative must be a technological personnel with good education and quality, and understands the policies well, be honest, and well disciplined. In addition, he must have demonstrated potential business management ability.

(c) *Close linkage between incubators and STIPs*

(i) Many incubators are set up by STIPs. Now there are 53 national STIPs all over the country and a large number of STIPs at provincial levels. The STIPs set up incubators to satisfy the demand of scientific achievement transformation.

(ii) The STIPs give great support to incubators. Many STIPs have well-built infrastructure, therefore, incubators can get access to the infrastructure easily in its initial period. Some STIPs even don't expect incubators to be economically independent; instead, they expect incubators to provide them high-tech enterprises of good performance.

(d) *Paying much attention to value-added service*

Incubators in China pay much attention to provide all kinds of value-added services for tenant companies, including:

(i) Funding sources and financial consulting. Funding is always a key problem when establishing an enterprise especially for small high-tech ones. Incubators assist entrepreneurs in financing by making use of its linkage with government, banks and other related institutions. At the same time, those incubators that have enough capital would like to help entrepreneurs to overcome financial difficulties by their own funds. Incubators also provide assistance in the tenants' daily financial management in terms of accounting, consulting, acting as financial representative for newly built enterprises. And the tenants' financial development was well reviewed by studying their financial reports.

(ii) Training. The present training approach is mainly to organize various training courses, with study tours at home and abroad as supplement. The training programme covers policies and laws, business management, marketing, international trade, finance and tax, audit and insurance. The overall objectives are to improve the entrepreneurs' management skills, and help to transfer them from technology personnel to technology entrepreneurs.

(iii) Developing international cooperation. Generally speaking, in the initial period, entrepreneurs are aware of the importance of international cooperation but have difficulties in finding international cooperation channels. Incubators assist enterprises in overseas study tours, negotiation, and training, recommending international cooperation projects and finding export channels for products and assisting in related procedures.

(iv) Preferential policies. The government provides many preferential policies to certified high-tech enterprises to implement Torch Program. Local governments have adopted corresponding preferential policies. Incubators have a full understanding of these policies by long-term management experience. In this way, incubators can help enterprises to make use of these policies or assist in policy consulting.

(e) *Investment and financing service of incubators*

As a special service organization, business incubator introduces venture capital into enterprise start-up process as the most important supporting means. From establishment to maturity, an enterprise undergoes start-up, growing and expanding stages. And the venture capital comes in the form of seed capital, initiation capital, venture capital and development capital, which covers and supports the entire venture process for technopreneurs. Incubators provide its tenants with various kinds of investment and financing options. The

primary methods are as follows: invest in the start-up companies by incubators' own-seed capital, invest jointly through cooperation of incubators and venture capital companies, facilitate cooperation between venture capital companies, banks and tenant companies, and seek all kinds of government funds to subsidize the tenants.

(f) *Diversified types*

(i) General technology business incubators

General technology business incubators are the mainstay of incubators in China. It absorbs transferable technology achievements and promising small technology enterprises and provides them with necessary services, such as floor space and facilities, financing, marketing development, development consulting, business management training, financial management, laws and policies, and financial support. All these create a favourable environment for the transformation of scientific achievements and the nurturing of technology enterprises. Generally speaking, the average term of incubation is 3-5 years, and the survival rate is over 85 per cent. Incubators are non-profit institutions. With the support of preferential policies and funding provided by government, incubators produce high-tech enterprises that are competitive and with great growth potential to STIPs. In this way, incubators need government support to have floor space and seed capital fund needed in their initial period to evolve into financially independent institutions.

(ii) Specialized technology business incubators

Based on the experiences in developing general-purpose technology business incubators, specialized technology business incubators target at transformation of scientific achievements and cultivation of SMEs of a special technology field with the support of universities or R&D institutes. They pay more attention to design and use of the incubation space and services with expertise orientation, and are more industry-specific than general TBIs in terms of technology field, marketing, information and training. So they have greater ability, better services to help tenants to grow. Specialized technology business incubators are in a vigorous period of growth in China today, and shows one of the development trends of Chinese business incubator. They usually focus on software, new material, bio-medical, cmos (complementary metal oxide semiconductor) chips, energy-saving and environmental protection and telecommunications, etc.

Software parks are larger than common incubators and resemble the quality of a science park with small and medium-sized software technology enterprises as tenants. Approved by MOST, 19 software parks have been founded in STIPs in China.

(iii) University-related S&T parks

University-related S&T parks are generally set up by universities to take advantage of technology resources in universities. The mission is to transfer scientific achievements of universities and foster SMEs built by universities or technology enterprises that have cooperation relationships with universities. Technology personnel can make full use of technology research facilities and combine teaching with research in universities. University-related S&T parks create better development environment for enterprises. University-related S&T parks are incubators in essence, transferring new scientific achievements, nurturing technology companies and pushing forward the development of local high-tech industries. Nowadays, 22 university-related S&T parks at national level have been set up in China.

(iv) Incubators for returned overseas scholars (IROS)

IROS is a special kind of incubator open to more than 300,000 Chinese students studying abroad and overseas Chinese scholars. Generally set up in medium and big cities that have large number of Chinese studying abroad and intensive technology resources, it provides better infrastructure and policy according to the characteristics and demands of overseas scholars. The overseas scholars are familiar with cutting-edge technology, knowing the norms of conducting foreign market and modern business management well, and have a strong desire to return and start up venture at home. Although the majority of the 25 incubators for returned overseas scholars have a history of only 1-2 years, they show a flourishing trend. IROS is also practical and preferable approach for incubators to have international operation.

(v) *International business incubators (IBI)*

In 1996, with the help of experts from the United Nations, MOST selected eight better performed incubators from Beijing, Xi'an, Suzhou, Shanghai, Wuhan, Tianjin, Chengdu and Chongqing as pilot IBIs. IBIs are designed to assist both international and Chinese start-up firms enter the Chinese and international markets respectively, and to promote cooperation between the two. While the traditional incubator serves only national ventures, the IBI is intended to facilitate small companies with significant technical products but with limited resources to enter a complex market such as China. The international operation of Chinese business incubators is a responsive measure to enterprises wishing to develop international operation. IBIs have set good examples and are accelerating the cooperation between business incubation in China and internationally.

(vi) *Incubators set up by state-owned enterprises (SOE incubators)*

Setting up incubators within SOE is an important practice in reconstructing traditional industries by utilizing high technology, and this infuses new vigour into China's incubation programme. Relying on the existing resources of SOEs, incubators can promote the transfer of technology achievements, speed up the reconstruction of traditional industries by utilizing high technology, nurture the new technology and new products, cultivate new sources of economic growth so as to reconstruct and upgrade the business operation of the SOEs.

Beijing Gas Engine Manufacturing, new and high-tech incubator, is the first incubator set up by SOEs in China. The Gas Engine Group is the largest manufacturer of combustion engines in China. In recent years, the products were over produced and outdated, efficiency was low and demand was falling. Other problems include low efficiency of management, staff redundancy and lacking of capital. With supports from Torch Program and Beijing Municipal Government, Beijing Gas Engine Group, Beijing Polytechnic University and Beijing Hi-tech Business Incubator jointly established the said Incubator in August 1999. Taking the TBI model and selecting the promising manufacturing high-tech projects and enterprises as tenants, the incubator provides the services needed for transformation of scientific achievements and technology start-ups and financing, training and marketing services as well. Over two years of practice, the incubator has got very good performance with 20 enterprises nurtured, tenant sales over Y 50,000,000, more than 400 jobs created. One business among the 20 was even created by nine workers who resigned from Beijing Gas Engine Group. The Incubator has shown a bright future.

Until now, more than ten SOE incubators have come into being, concentrated mostly in Beijing.

(vii) *General purpose business incubators*

While the above incubators are predominantly for commercializing innovations, the incubator to address other social and economic issues has also been explored. Now, an incubator in Tianjin focusing on enterprise creation by laid-off female factory workers, and sponsored by UNDP, Australian Agency for International Development (AusAID) and the Tianjin Women's Federation, is presently in the implementation stages and has been operating well since its official stating in October 2000. The All-China Women's Federation (ACWF) is expecting to promote the model in the whole country.

D. Models and trend for China's business incubation programme

1. Two institutional models

From the end of 1970's to the present, China has been undergoing profound social changes from the planned-economy system to a socialist market-economy system, and a series of new type social organizations continue to arise. Whether viewed from the standpoint of their form or functionality, the former planned-economy system did not have these kinds of new organizations, and as such there is no way to use the planned-economy system's means of classification to distinguish and address these new organizations. While the new market system is in the process of development, two institutional models have been chosen for China's business incubators. One model is a non-profit model, which is for public good, and the other is the commercial for-profit business model. Of these two models, the non-profit currently is in the predominant position.

(a) *The non-profit model*

China's business incubators adopted the non-profit organizational model when the pioneer TBIs set-up, and most of the followed as well. But because China did not yet have this kind of non-profit organizational description at that time, they enlisted the formerly used autonomous institutions in which the organization would be responsible for its own profits and losses. Generally in China, government departments set up business incubators, they provide initial funds and appoint the incubator's management team. Thereafter, the government hands the responsibility over to this management team, no longer bears the responsibility for the financial operation. Then the government takes on the role of providing services to the organization in order to reach public goals. Like most of the incubation programmes around the world, China's business incubators are mainly promoted by the government. The main reason why the Government of China has become the biggest investor in business incubation is because of the great changes have been taken place in the functions of the Government of China since the Reform, that means the government would no longer like to plan and control all the economic matters in detail, but taking the utilities of more and more social agencies.

(b) *The commercial model (for-profit)*

In recent years, people have discovered that business incubators are also of a great deal of commercial value and have the possibility to be used as profitable business enterprises. As such, in recent years there have been many attempts to begin profitable business incubators. When taken the commercial model, the business incubator's value is relied on its ability to foster the growth of its tenants, and discovering the latent potential of the enterprises' entrepreneurs, and the enterprises' market value fostered would increase the incubator's value. Especially while in the process of new economic fast development in China, the continual emergence of new sources of growth becomes the seeds to be incubated, and through which incubator develops into a "business that produces businesses".

Under the commercial model, the business incubator is seeking to make progress together with its incubated enterprises, and wishing the success of which could be reflected in economic benefits to both parties ultimately. This allows business incubator to be designed to a special type of for-profit corporation. And the relationship between incubator and its tenants is not only the traditional give-and-take services, but also have the give-and-take investment relationship. The investment can be both actual capital input and services investment, with each service provided being counted as a kind of investment. Then, as the enterprise develops, it begins to repay the business incubator. Moreover, the model is to be designed as incubator services plus venture capital plus strong consulting services.

The business incubator's management company (taking the authorization to run other people's incubator) is also taken as a kind of profitable company model as well.

2. Financing model

Since 1987, as China's incubation programme has grown and developed, incubator sponsorship forms have also continuously developed. The sponsorship forms have experienced two stages namely single sponsorship and diversified model.

(a) *Single sponsorship*

If differentiated from the perspective of the business incubators' main sponsorship, the first ten years of development (1987 to 1997) comprised the initial stage, since at that time the S&T administrative, namely the Ministry of Science and Technology, local science and technology committee and the STIPs, sponsored most of the business incubators in China. In the initial of this stage of development, provincial or city level science committees sponsored the majority of business incubators, and later, most business incubators were sponsored by the STIPs. According to the Ministry of Science and Technology 1998 statistics, of the then 77 business incubators in China, there were 24 incubators sponsored by provincial or city science committees, comprising 31.2 per cent of the total. These incubators were mainly established between 1988 and 1994. Forty-seven were sponsored by STIPs, comprising 61 per cent of the total. One incubator was co-sponsored a provincial S&T committee and STIP, two were sponsored by state-owned enterprises; another two by universities, and one by an economic technology development zone.

During this period, the government has been China's business incubators' main investor. A government sector usually invests directly on an incubator, plus loans from banks in the name of the government or business incubator. These funds are used for building the incubator's premises, facilities, purchasing equipment, training staff, etc. (see tables 2-III-2 and 2-III-3).

Table 2-III-2. Investment funds ratio of China's business incubators by 1994

Investors	Ratio (percentage)
National or local government allocated funds	42.2
Bank credit loan	39.3
Other (including reinvested funds)	15.3
Total	100.0

Source: High Technology Industry Development Centre, Ministry of Science and Technology and China's High-Tech Industries Development Zone Association, *Scientific and Technological Incubators* (China's Business Incubator, March 1995).

Table 2-III-3. Sponsors of China's business incubators, through 1998

Type of Sponsor	Number of Centres
Provincial or city level science committee	24
STIP	47
Science committee and STIP cooperation	1
State-owned enterprise	2
University	2
Economic technology development zone	1
Total	77

Source: Ma Feng-Ling. *Chinese Business Incubators Development Evaluation Report* (February 2000).

(b) Diversified financing model in economic transformation period

In recent years, the financing model for China's business incubation is diversifying. From the original foundation of solely government sponsorship model, there has now evolved enterprise-sponsored and multiple-investors-sponsored incubators, such as those funded by SOEs, privately owned enterprises, international organizations and other types of sponsors. Nowadays, the Chinese business incubators' investments mainly come from the following sources:

- Government/quasi-government sectors. The government's S&T administrations are currently the primary investors, including all levels of S&T Committee, all levels of STIPs, and all levels of economic technology development zones. The personnel department, the education department, the social security and labour department and other related departments are also gradually involved;
- Universities, R&D institutes;
- Various types of enterprises, including state-owned enterprises, privately owned enterprises, foreign enterprises, investment companies and listed companies;
- Non-governmental organizations;
- International organization.

3. Organization models and leadership styles

(a) Organization models

The organizations for China's business incubators are divided into two types: public institutions and corporate enterprise organizations. Specific models are as follows:

- Government-sponsored public institutions in which the funding comes solely from government appropriated funds

- Government-sponsored autonomous-management public institutions (self-reliance ones)
- Government-lead, mixed-investment corporate enterprises
- Government-background SOEs sponsored corporate enterprises
- Non-government-background SOEs sponsored corporate enterprises
- Privately-owned enterprise business incubator
- Non-governmental-background mixed-economic-form business incubator
- University or R&D institute sponsored public institution business incubator
- University or institute sponsored corporate enterprise business incubator
- NGO sponsored public institution business incubator

(b) Leadership Style

Because of the different sponsors, the business incubators' organization models and leadership styles vary. Generally, a director or a manager will be appointed to take the primary responsibility for the incubator's leadership. Another difference is whether the incubator has a board of directors.

When the investor is a government agency, the incubator is usually set up according to the public institution model, and in most cases the director-led leadership style is used, and usually without a board of directors. Enterprise sponsored incubators would like to have a board of directors and appoint a manager.

Incubators set up through the cooperation of government and enterprises are also usually set up in the corporate style, as are those incubators set up by universities, institutes, intermediary companies, or private investors. Corporate-style incubators mainly use the general-manager-led or board-of-directors-led leadership styles. NGO sponsored business incubators use the governing-board-led style of leadership.

Compared to the government sponsored business incubator, more private enterprise business incubators adopt a modern corporate system, with the prominent characteristics being that there is a standard, formal board of directors which decides upon the incubator's important matters and a general manager who is appointed by and is responsible to the board of directors. The general manager assumes responsibility for the incubator's specific daily management.

The multi-investor cooperation model refers to those business incubators that are founded by two or more investors and run according to a determined cooperation contract. In order to be carried out as close to the market economy standards as possible, some newly established multi-investor cooperation incubators have adopted a joint stock company model, and therefore established a board of directors to be responsible for the incubator's major decisions and appointed a general manager to run daily affairs.

Along with the development of a market economy, some newly established government-sponsored business incubators also follow the corporate style, creating a board of directors and implementing the general-manager-led style of leadership.

Table 2-III-4. Analysis of three types of business incubators

Category	Government Sponsored Model	Private Enterprise Model	Multi-Investor Cooperation Model
Investor	Government	Private	Multiple investors
Main purpose	Service oriented	Profit oriented	Diverse interests
Nature	Public institution	Corporate enterprise	Diversified
Characteristics	Policy tool	Flexible	Shared model
Issues	Relationship between the government and the incubator, and funding issues	Potential conflict between the incubator's function and profit goals	Diversified goals contradiction, management confusion

Source: Zhang Jingan, China's Science and Technology Business Incubator, *Case Analysis and Development Countermeasures* (Science and Technology Document Publishing House, May 2001), p. 243.

4. Service models

During its 15 years of development, China's business incubator has formed some certain service models. In terms of structure, functionality and other aspects, the business incubators has gone through continuous development, all the while maintaining a common model among all incubators and yet allowing each incubator to develop their own distinct characteristics. In summary, the incubation service models can be described as the following three:

(a) *Service model 1: Shared space + shared facilities + shared service*

This is the business incubator's basic service model, which is used to reduce the start-ups costs. This model includes the following services:

(i) *Physical Infrastructure:*

- *Floor space:* enterprises are provided with flexible, rental space in which all basic requirements can be met (water, heating, electricity)
- *Office services:* mainly includes typing, copying, printing, reception, conference rooms, recording equipment, reference materials, transportation, security, etc.
- *Communication:* mainly includes telephone, fax, post office box, etc.
- *Financial channels:* mainly includes banks, guarantor companies, investment companies, etc. Can also invite one or more banks to open branch offices either in or nearby the business incubator
- *Information services:* high-speed Internet access, construction of LAN, electronic press releases, foreign periodicals, etc.
- *Production development:* common-use computer facilities, electrical laboratory, machining equipment and other common-use facilities
- *Representative services:* mainly includes business license registration, tax registration, opening bank accounts, personnel file management, professional title evaluation, collection of utility, sanitation and environment beautification services fees, fire protection inspections, hosting of various activities and events, etc.
- *Basic services:* restaurants, sanitation services, shower facilities, shopping facilities, health and fitness facilities and cultural and entertainment facilities

(ii) *Software Environment:*

- Create an entrepreneurial culture and atmosphere;
- Provide management guidance: Inform enterprises of national and locally determined ordinances, statutes, and other relevant policies in a timely manner and provide necessary training and consultation services. Enable enterprises to follow the proper development path in a rapid manner;
- Help enterprises create development plans, marketing strategies, etc.
- Provide financial channels and financial consulting;
- Human resources training;
- Project finding services;
- Project application services;
- Implement preferential policies;
- International cooperation partners;
- Trademark recognition. The business incubator has a well-known reputation, so tenants associated with the incubator can receive benefits from being associated with the incubator and its trademark.

Under this model, the business incubator pays great attention to the construction of optimized local environments in which to foster new enterprises. An environment in which enterprises feel more comfortable,

and from which interference of all kinds is excluded is very important for the development of a new enterprise. At the same time the business incubator regards some procedures in the founding of new enterprises as their core works, and also emphasize the creation and execution of preferential policies.

(b) *Service model 2: Shared space + shared facilities + shared service + professional consulting*

Based on reducing the start-ups costs, this model begins to deepening the incubator's service functions and move towards the phase that the incubators to increase the enterprises in value. One concrete way of increasing the value is to offer specialized consulting services, or the said business development service (BDS).

Management obstacles are the most prominent difficulties incurred while enterprises developing. So the character of this period requires deep research into numerous issues of the start-ups, including enterprise team building, technological development, market development, production, financing, rules of enterprise development, and the tests and trials experienced in founding successful enterprises.

Professional consulting services include:

- Consulting with regard to business planning, market development planning, human resources development planning, financial planning, product development planning, and production planning;
- Consulting in finance and law and other professional services;
- Providing practical training courses to enterprises;
- Assisting in market development for enterprises;
- Assisting enterprises in connecting with all walks of life.

Under this model, the business incubator pays special attention to the building of key abilities so as to enable enterprises to not just survive, but to have fast and healthy development. The incubators truly become a learning tool for future entrepreneurs. This is accomplished by providing business development services and creating conditions to train, support and develop successful small enterprises, encourage active practice and the fostering of entrepreneurial and creative spirits.

(c) *Service model 3: Shared space + shared facilities + shared service + professional consulting + venture capital investment*

In terms of problems incurred during the enterprise growth, lack of capital is another most difficult problem to solve as it seriously restricts the enterprises' healthy development. Because of the special character of China's transition economy, banks nowadays are not willing to provide loans to SMEs who do not have a mortgage or other guarantees, SMEs usually cannot get financial support from the bank, thus making the funding problem very prominent. When taken as a societal problem, it is now being gradually recognized, and the national government is already formulating and will continue to formulate a series of measures to address this problem. Additionally, solving this problem for new ventures has always been a main responsibility of the business incubator. The main means by which to solve this problem includes using the incubators' own commercial credit standing and related channels in order to provide the enterprise with a loan guarantee, a short-term cash-flow loan and start-up capital investment (seed capital).

Furthermore, the model incubator plus venture capital is also a well approach for business incubators to get enough fund as growing with the promising incubatees.

5. Trends of China's business incubator

Chinese business incubators have already entered the stage of rapid development. The characteristics of this stage are:

(a) *Rapid increase in number across the nation*

By year 2005, it is expected that China may have as many as 1,000 to 1,500 business incubators. The underlying reasons for this rapid increase are: (a) a large number of entrepreneurs are now starting businesses, the incubators are fulfilling this urgent market demand; (b) now after fifteen years of practice, the society have

come to recognize that business incubators produce an obvious social impact; (c) the industries and investing institutions are now very willing to invest in this area.

(b) *Diversified financing*

All levels of government, all kinds of development zones, SOEs and privately-owned enterprises (among them many are listed companies), foreign capital, women's organizations, organizations for assisting the empowerment, charity institutions, private individuals and many others will become sponsors in business incubators.

(c) *A variety of business incubator operational models*

In terms of organizational models, the business incubators would include both non-profit institutions and for-profit institutions. There will also be various types of commercial models. Some models may be based on physical space requirements while others have no physical space requirements and thus fall into the category of "virtual" incubators. The business may also be varies depending on their different business scopes which may be, for example, consulting services, training services, intermediary financial services, investment services, etc.

(d) *More and more specialized technology business incubators*

Numerous specialized technology business incubators will appear in the near future. The reason behind this rapid development is that entrepreneurs are eagerly in need of a technological innovation platform with profession technological services.

(e) *Competition intensifies*

Competition among incubators in different major cities, in different districts within the same city, and in areas with abundance of knowledge and capital resources will be inevitable. The competition is not only limited to organizations within China, but overseas investors will come on the stage and make the competition more and more intense.

E. Role of the Government of China in the development of business incubation programme

1. Strong administration

Up to now, the Torch High-tech Industry Development Center of MOST is the specific administrative organization overseeing the work for China's STIPs and TBI programme at the national level. The local science and technology committees and STIPs are in charge of the management of their own regional incubation programme.

2. Macrodirection and policy guidance

(a) *Identify the social status of incubators*

The national and local governments formulated a series of laws and regulations to confirm the social function of business incubator, including China SMEs accelerating law, decision about strengthening technical innovation; developing high technology and realizing industrialization; rules on accelerating transfer of Research Results, Principle Comments on China's Hi-tech Incubator, Relevant Comments on Implementing central government decision of strengthening technical innovation; developing high technology and realizing industrialization by Ministry of Education, etc. The local government stipulated relevant policies. The said laws and regulations have supported the development of business incubation in China.

(b) *Formulate standards of technology business incubators*

MOST formulated Assessment Criteria and Methods of National Technology Incubator to define the nature of incubator, its mission and commencement requirements. It also formulated Comments on Accelerating

Incubator Development in the Tenth Five-Year and Development Outline for China's Business Incubation in the Tenth Five-Year.

(c) National conferences and training workshops

To further develop the business incubators, MOST organizes working conferences at regular and irregular intervals. In 2000, in cooperation with Ministry of Foreign Trade and Economic Cooperation, Ministry of Education, Chinese Academy of Science, Chinese Academy of Engineering, Shanghai Municipality and UNDP, MOST succeeded in hosting the International Conference on Business Incubation and Technology Innovation, which attracted more than 100 overseas high-ranking government officials, business leaders, scholars and experts and incubator managers as well, more than 200 domestic participants presented their views and exchanged opinions on issues concerning business incubation. This conference has drawn extensive acclaim and greatly boosted profile of Chinese business incubators in the world. The local governments often hold similar meetings.

Besides national conferences, the Government of China actively sponsors training workshops and seminars on business incubation as well. From 1988, MOST has organized 15 workshops attended by over 300 managers from international business incubators. World-known experts were invited to give keynotes on their experiences in developing incubators. Chinese scholars and experts also expatiated on their practical experiences in the workshops. MOST organizes seminars during Beijing Hi-Tech International Week and Shenzhen Hi-Tech Week, both of which are held every year. To draw experiences from abroad, Chinese incubator managers were sent to attend training workshops in other countries, too. There have been a total of 64 incubator managers and staff who attended training courses in the United Kingdom or Finland. All of these played an active role in developing the incubation programme.

3. Preferential policies

The policies cover encouragement to both incubator itself and its tenants, such policies as tax exemption or reduction to tenant companies, tax exemption and reduction for income generated from incubator services, policy to attract talented personnel to incubator management, encouraging policy for all walks of life to set up incubators, low rentals for start-up companies, provision of value-added services etc. Meanwhile, government also provides various supports in the incubators' business services, consulting, human resources training, international exchange and cooperation, financing, and personnel transfer, etc.

4. Financial support

Financial support is one of the most important means that government adopts to help incubators. Funds are made accessible to incubator infrastructure building as well as earmarked spending. By the end of year 2001, the Torch Program Fund, administered by MOST, directly invested in business incubators with a total of over Y 70 million. This has a very good model effect. Local governments across the country invested Y 1 billion in the development of business incubators.

MOST set up Innovation Fund for Hi-Tech SMEs, which provides US\$ 25 million annually in the forms of grants or loan interest subsidies to support SMEs in their technological innovation. The local governments also set up matching funds for Innovation Fund, which added up to Y 1.19 billion (about US\$ 143 million).

5. Support and facilitate the development of Associations

The government pays attention to support the development of non-governmental organizations for incubation. It greatly advanced the non-governmental activities such as the establishment of China Science Park Association Business Incubation Sub-Committee, and initiation of China Technology Business Incubation Association. The non-governmental organizations of business incubators create a strong cooperative atmosphere in training, experience exchange, consulting and international cooperation between the incubators national wide, and help to bring about a sound development for business incubation.

6. International exchanges

The government actively organizes incubators managers to participate in international exchange activities, such as attending annual international conferences held by the International Association of Science Parks (IASP), Asia Science Parks Association, the National Business Incubation Association (NBIA), organizing delegation of science parks, business incubators and SMEs to visit abroad to exchange experiences in technology and relevant policies, inviting world-known experts and specialists to give lectures in China, holding international workshops to introduce Chinese incubator management experiences to participants from developing countries, and sending experts to countries like Pakistan, Viet Nam and Egypt to do technical consulting in incubation development.

7. Importance attached by top leaders of the state and local governments

The leaders from central and local governments pay great attentions to the development of incubation programme. There was quite a lot of news coverage about the leaders' inspecting incubators in the media. Up till now, most of China's top leaders have inspected incubators, which is considered a big drive for development of incubation programme.

F. Conclusions and suggestions

1. Social and economic value

(a) Social benefits

(i) Create businesses

SMEs play a key role in innovation from the viewpoint of developing high technology and realizing industrialization. Chinese business incubators are well aware of the fact, and contribute a lot to nurture a good many technology-based SMEs and become a real cradle for hi-tech start-up companies.

(ii) Create jobs

Unemployment has always been existing in Chinese cities and countryside. However, 15 years ago when business incubators were just founded, they were not expected to create job opportunities. Over the past 15 years, business incubators achieved startling success in the creation of job opportunities, which contribute much to social and economic development in China. According to the statistics in 2001, the 280 business incubators across the nation had a total of 12,583 tenants employing 263,596 people, and 3,994 graduate companies employing 195,502 people. In another word, the incubators directly created 459,097 job opportunities. If we double the number of indirect job opportunities generated by a direct job, by inference, the indirect job opportunities generated by incubators amounts to 918,194. Added up, the total job opportunities have been 1,377,291.

(iii) Improve the success rate of scientific results transfer and accelerate industrialization of high technology

As an important mechanism to commercialize high technology, the business incubators provide a favourable environment for technical innovation and related commercialization. It provides the entrepreneurs with prerequisite for commercialization of their scientific results. The transfer success rate of scientific results surpasses 80 per cent, of which 30 per cent are achieved through technical transfer and cooperation, 70 per cent through self-investment. Making the transfer of scientific results from lab to market possible, incubators play an active role in transferring technology to productive force, which constitutes the most important part of China Torch Program.

(iv) *Foster and highlight culture of innovation and entrepreneurship*

In the years when China practiced planned economy, the setting up of enterprises as well as the products and services were all considered and decided by government, leaving no place for private businesses, let alone personal innovation, entrepreneurial spirit or culture of innovation. China's reform policy made the birth of business incubators possible. By providing facilities and services for business creation, TBIs encourage scientists and researchers to establish technology companies in an effort to support the development of high technology. The knowledge-based businessmen appeared, simultaneously motivated a group of young intellectuals to found their own businesses. Nowadays, some university graduates start their businesses in incubator directly after their graduation from schools, some even run a business while studying in the university. The university students have become a new source of venture creation and innovation. Now, entrepreneurship has already formed within and outside incubators in China, which is unwilling to be left behind, in pursuit of excellence and new technology, daring to innovate, ready to cooperate, tolerant of failure and encourage adventure.

(v) *Attract overseas Chinese scholars to start business in China*

According to statistics of the 44 incubators for returned overseas scholars, by the end of the year 2001, the total floor space was 1,257,000 sq m, which have 1,449 tenant companies founded by returned overseas students. Nearly 3,000 returned overseas Chinese students are working in these incubators. Over 90 per cent of them have doctorate or master degrees.

(vi) *Promote international cooperations*

The development of China's business incubation programme has already drawn attention internationally. The incubators keep close contacts with counterparts in the world, and have built cooperative partnership with science parks and relevant incubators in human resources exchange and training with the United States, the United Kingdom, Italy, Canada, Finland and Australia. Internationally well-known incubation experts expressed their surprise over the fast development and high quality of China's incubators in spite of the shortage of market resources and inadequate investment by government. The Government of China even had sponsored various international business incubation workshops open to developing countries. Shanghai has successfully hosted four sessions and trained 79 managers of incubators from 26 developing countries, which won China a good reputation worldwide.

(vii) *Develop venture capital operations in China*

While applying for governmental support and bank loan, incubators set up seed capital fund, credit guarantee fund and shareholding mechanism to improve the financial situation, which actually mitigate the financial difficulties of start-ups during the commercialization of high technology.

(b) *Economic development tool*

According to statistics collected by Torch Center in the year 2001, 280 incubators had an average floor space of 18,179 sq m, 46 tenants and 21 employees for each tenant. Each had an average of 14 graduate companies. The average tenant sales accounted to equivalent of about US\$ 382,000, with profits of about US\$ 21,500.

Statistics shows that by the end of 2001, the governments at all levels had invested more than Y 1 billion or US\$ 121 million in 280 incubators. It is expected that all the investment will be returned by the amount of taxes charged from the tenants within three years after 2001, let alone social benefits generated directly or indirectly by incubator, such as job opportunities, increased payable tax by supplier and customer, innovative culture, technology products and service value, etc.

Table 2-III-5. Performances of Torch Program incubators, 2001

Gross floor space	5 089 716 sq m	
Tenants	12 821	
Tenant employees	263 595	
Tenant sales	Y 40 540 000 000	US\$ 4 900 000 000
Tenant profits	Y 2 300 000 000	US\$ 275 100 000
Tenant taxes	Y 1 580 000 000	US\$ 190 200 000
Cumulative number of graduates	3 994	
Graduates' employees	195 502	
Total seed capital funds	Y 1 100 000 000	US\$ 130 200 000

Source: Torch High-tech Industry Development Center, Ministry of Science and Technology. *The Statistics of Chinese Torch Program in 2001.*

2. Advantages and constraints

Government initiatives are crucial in development of business incubators especially at the initial stage. But government support alone is not enough. Development of incubators is also affected by the social conditions and economic strength of the nation.

(a) Advantages

(i) Strong governmental backup

The remarkable growth of Chinese business incubation programme is mainly attributed to governmental advocacy by stipulating favourable policies and provision of funds. Governmental policies not only provide incubators and entrepreneurs with financial incentives in terms of tax reduction and exemption but also demonstrate positive attitude of government towards companies set up by individuals. This was particularly important during China's transition from planned economy to market economy and greatly liberated people's traditional mindset. Financial support from government to incubators also assumes great significance. Up to now, government at all levels has invested more than Y 1.7 billion or about US\$ 205 million to incubators to improve their infrastructure and quality of services rendered.

(ii) Extensive networking among incubators in China and active exchanges between domestic incubators with foreign counterparts

With Torch Center as the nodal point, business incubators in China can benchmark their performance and learn from each other through meetings, identification of national incubators and various activities. The government also promotes international exchanges by organizing delegations of incubator managers to go abroad to study and exchange view and ideas with foreign counterparts, sponsoring training workshops on business incubation open to international participants and hosting international conferences. Non-governmental organizations like Incubator Associations at national and local levels also promote interactions among incubators.

(iii) Full potentials and capacity for sustainable growth

As a later comer, Chinese incubation programme can draw lessons and experiences from other countries and achieve sustainable development.

(b) Constraints

(i) Unbalanced development

Due to difference in sponsorship, basic conditions, governance and operation mechanisms and available facilities, incubators vary greatly in scope and quality of services.

(ii) *Limited funding channels*

Start-up companies inside incubators always encounter shortage of fund due to market failure. In addition, capital market in China is yet to be further perfected to encourage development of venture capital and other investment activities, as well as the incubators.

(iii) *Overemphasis on the hardware facilities undermines provision of value-added services*

At the start, government gave excessive attention to develop physical facilities of incubators, which led to negligence of offering quality value-added services.

(iv) *Managers of incubators are insufficient in business managing experiences*

This limits the services that the incubator can provide to the incubatees.

(v) *The social environment is expected to be improved*

China is experiencing the transition from planned economy to market economy. The social mechanism cannot fully support or encourage the development of SMEs yet. Neither can the service system meet the needs of the innovation activities. The innovation service organizations are still waiting for support from all walks of life.

However, there is a common understanding that with the development of the incubation programme in China, these problems are being or will be solved. The incubation planners as well as the managers are well aware of these facts.

3. Experiences and lessons to be learned

(a) *Government support is indispensable*

Incubators as cradle for creation of start-ups and job opportunities and training school for entrepreneurs deserve support from government. Experiences indicate that government backup assumes tremendous significance for development of incubators.

(b) *Right choice of the location*

The right choice of the location of an incubator will speed up its further progress and create enough income. Generally speaking, the incubators should be located in the STIPs, close to knowledge-intensive area surrounded by universities and research institutes, so that incubators can enjoy resources of technologies and knowledge workers as well as share R&D facilities of these institutes.

(c) *With market orientation*

For-profit or non-profit, an incubator must adopt market-oriented governance mechanism in its operation. Though government support in financing and administration is necessary in the start-up period of incubators, the ultimate purpose of incubators is to be self-sustaining and economically independent.

(d) *Integration with venture investment*

Experience at home and abroad shows that both venture capital and incubator are effective tools to promote development of hi-tech companies and high-tech industries. By providing much needed capital as well as financial advices, venture investment can tremendously enhance the success rate of business incubation and accelerate the growth of tenant companies. On the other hand, incubators offer facilities and services to start-up companies to lower the risk of commercial failures, and improve chances of success for venture investment. They are complementary and mutually beneficial.

(e) Offering comprehensive and high quality services

Quality of services is the core value of an incubator and to a large degree determines the success rate of its tenant companies.

(f) Synergy with R&D institutions, universities and other companies should be stressed

Incubator serves as a platform for convergence of resources between R&D institutions, universities and other companies.

(g) Selection of promising tenants

Incubators should be very careful in choosing tenants, such aspects as market potential, management team and business plan should be emphasized.

(h) Extensive networking

The incubators should set up such non-governmental organizations as association, chamber of commerce and club, which connects the incubator with the all walks of life. Those organizations offer opportunities to incubator in training, exchanging experience and other cooperation.

(i) Support from the United Nations

All the visits, information dissemination, investigation and conference from the United Nations play an active and important role in the incubation development.

4. Conclusion

The first phase of Chinese transition from the planning economy to market economy is accomplished successfully. The incubation programme has served as a means of facilitating this. It will show a growing and energetic trend in every respect in the following decade, like China itself. On the basis of the current development situation, as an efficient way, the incubation programme will further promote technical innovation and economic growth in China.