

## 146. Dual Identifications of Science Centre: **Research and Practice in China**

*Ou Yage*

China Science and Technology Museum  
No.5 Beichen East Road, Chaoyang District, Beijing 100012, P. R. China  
ouyage@sina.com

**Abstract.** Science centres in China nowadays are generally facing great pressure in sustainable development. Most reasons of this dilemma are the differences between the special dual identifications of the science centre: the role of the public welfare purposes in the science centre identified by the government, the need of the market player role identified by the science centre itself. The possible solution is to give the science centre a normal identification, the marketing player identification generally owned by the international science centres.

**Keywords:** Science centre, Identification, China

In China, a government-led catch-up modernization country, the cause of science centre starts from zero and grows rapidly to be a vigorously new member in the international community of science centres in 22 years<sup>1</sup>. Its development experience is worthy studying by other countries, especially by the developing countries.

Since its establishment in 1988, the cause of the science centre in China has made remarkable development. All kinds of science centres reach 200 and attract 40 million visitors each year, making a great contribution to the dissemination and popularization of science and technology. However, most science centres in China nowadays are facing great pressure in sustainable development and survival. Most reasons of this dilemma are the differences between the special dual identifications of science centre: the role of the public welfare purposes in the science centre identified by the government, the need of a market player role identified by the science centre itself.

### The Identification of the Government on Science Centres

The identification of Chinese government on science centres is closely connected with its understanding in the importance of science and technology, the dissemination and popularization of science, and most of all the role of science centre.

The future of science and technology is determined by the value endowed by the society<sup>2</sup>. In the past half century, Chinese government more and more realized the important role of science and technology. In 1950s, Mao Zedong thought the more the people, the stronger the force, which emphasized the importance of man rather than the power of science and technology. This point lasted more than double decades. By 1978 the Reform and Opening began and the spring for science came in China. On September 5th, 1988 Deng Xiaoping clearly pointed out that science and technology are the primary productive force. At the beginning of the 21 century, Hu Jintao further advanced the strategy theory of building an innovation-oriented country, putting the innovation of science and technology as a national fundamental strategy, greatly improving the capacity of innovation in science and technology and then forming the national competitive advantage. The implement of this strategy calls for increasing the level of research and development in science and technology all over the country and improving the level of scientific literacy for all Chinese citizens.

At the same time, the government in China more and more realizes the importance of the dissemination and popularization for science and technology. In August 1950 Chinese Association for Science and Technology Popularization, the predecessor of Chinese Association for Science and Technology (CAST), was found and precluded the great cause of dissemination and popularization for science and technology in new China. However, a situation that stresses scientific research and looks down on its popularization lasted decades. In addition, scientific workers were unwilling to do this job either. Gladly, this situation greatly changed in recent years. In June 2004 Hu Jintao declared that the innovation of science & technology and its dissemination and popularization are the double aspects of scientific cause. For the first time, the innovation of science and its popularization are stressed equally at national level.

<sup>1</sup>Cheng Donghong: Opening Speech for Chinese and Foreign Science and Technology Museums Forum, 2009.

<sup>2</sup> Christopher Bryant and Michael Gore, the Development of the Public Communication of Science Center: Study on the Australian Public University. Science centers for this century, Sainte-Foy, Quebec : Éditions MultiMondes, 2000.

As Chinese government more and more realizing the significance of science and technology, it began to concern and support science centres which is considered as an important channel for scientific dissemination and popularization. In 1958 Chinese government had intended to build the Central Science and Technology Museum, the predecessor of China Science and Technology Museum (CSTM), which stopped eventually for the shortage of capital and materials. Obviously science centre was not a necessary but dispensable infrastructure for scientific communication at that time. After the Reform and Opening, everything changed. In the National Science Congress in 1978, which marked the beginning

of scientific spring in China, many famous scientists such as Mao Yisheng and Qian Xueshen suggested once again to build CSTM and started the long march of its construction. By September 22, 1988, CSTM was founded and opened to society, beginning the cause of science centres in China either. At the same month, Deng Xiaoping advanced the famous point that science and technology are the primary productive power, which is not just a coincidence by chance. As the history went into 21 century, science centres are booming in China. In 2008, Chinese government declared in the Science Facilities Development Planning (2008-2010-2015) that it will optimize the layout of national science centres with at least one science centre in large and medium-sized cities. According to the requirements of “Scientific Outlook on Development”, the central government and provincial governments are committed to the development of the science centre which is concerned playing an indispensable role in spiritual civilization construction and economic and social progress. Science centres nowadays become an important civilization symbol for a city. Up to now there are more than 200 science museums in China, including 30 science centres of modern characteristic, though most of them are called science and technology museums. Each year more than 40 million visitors go into the science and technology museums or the science centres. (Refer Table 1)

**Table 1. Views and affairs on science & technology in different decades in China**

Decades	Views on Science	Science Center Affairs	Science Communication
1950s	The more the people, the stronger the power.	In 1950 Chinese Association for Science & Technology Popularization was found.	In 1958 the construction of Central Science & Technology Museum stopped.
1980s	Science & technology are the primary productive power	In 1978 many famous scientists suggested once again to build CSTM in the National Science Congress which started the spring of science in China.	In 1988 CSTM was found and the cause of science centre in China started.
2000s	Implement Scientific Outlook on Development and build an innovation country.	In 2004 Hu Jintao declared that the innovation of science & technology and its dissemination and popularization are the double aspects of scientific cause.	In 2008 the Science Facilities Development Planning (2008-2010-2015) declared to build at least one science center in large and medium-sized cities all over China; SSTM, GSC and the New Museum of CSTM are found and list in the top 10 science centres in the world for their sizes and scopes.

In the new century Shanghai Science and Technology Museum (SSTM), Guangdong Science Centre (GSC) and the New Museum of CSTM are founded one after another, everyone of which has been invested about 300 million \$ and lists on the top of 10 science centres in the world for its size and scope. SSTM and the New Museum of CSTM both attract 3 million visitors a year. Today science centres in China are playing a significant role in the dissemination and popularization of science and the improving the level of scientific literacy for all Chinese citizens.

However one fact must be pointed out that as to the remarkable development of science centres in China in the past two decades, one reason was that Chinese government and society more and more realize the significant role of science centres in the dissemination and popularization of science and technology, another important reason cannot be ignored was the booming economy in China at the same time.

Reviewing the long march that science centres in China has gone in the past two decades, there are at least two characteristics which are obviously different from other countries.

First, Science centres in China play a significant role in the dissemination and popularization of science and improving the level of scientific literacy for all Chinese citizens.

Second, the science centre is the public welfare. As to the identification of the science centre, Chinese government defines it with the characteristic of public welfare purpose, a public infrastructure for scientific popularization and an important platform to service the public for science communication.

Third, the government is vital in the construction and development of science centre. The government leads and cooperates with the science & technology circles and the whole society, forming a development path with Chinese characteristics of government-led, point to area, echelon development and then comprehensively promotion. The government concentrates its effort to build a few science centres such as CSTM and then, with this model, puts it forward to the provinces, cities and counties all over China.

The identification and construction model with Chinese characteristic are valuable which was proved by the remarkable development of Chinese science centres in the past two decades. However, this identification and model also demonstrate the shortages which follow up:

Firstly, science centres generally lack vigour and lose the ability of sustainable development. As the public agencies, science centres deeply bureaucrat and play poorly in the market, facing great pressure of development and even survival.

Secondly, there is no mechanism for companies endowing science centre. Without the powerful support of companies and communities, the government lonely sustains science centres, many of them become the heavy financial burden of all level governments.

Thirdly, the geographical layout of science centres in China is unreasonable. Most of them are clustering in the eastern coast areas and large cities, few of them in the middle and western areas and little cities.

Finally, science centres all over China are generally built from a few models and are highly similar to each other. Most of them are copied in some way from several science centres such as CSTM. If one had visited CSTM, he needn't visit other science centres any more. These standardized science centres lack their own characteristic and are short of attraction to visitors.

## The Identification of the Science Centre on Itself

As to the development of the science centre, the first and most important key is a precise identification about itself: Who am I? What do I want to do? What can I do? How can I do it? Since its establishment in China, science centre circles spare no efforts to explore the identification on itself: What is the ideal science centre? How to construct it? How to develop it? Gladly, many conclusions have reached in some areas:

Exhibition is the foundation of science centre and education is its soul. Exhibitions in the gallery should be organized by story-line or subject like a poem. Unfortunately, there is no education but exhibitions in some science centre for the chaotic arrangement of exhibitions.

Exhibition should be secured, manageable, scientific-interesting and innovative. The security vetoes other

aspects. No security, no exhibition.

The key to the education of science centre is to experience the science & technology and inspire the innovation.

It is less important to disseminate some particular scientific knowledge.

As to books, magazines, newspapers, televisions broadcasts, internets and other media, the advantage of the

science centre in science communication is to experience the scientific scene.

Child gallery is the most attractive part in the science centre. For example, the Science Paradise for children in

CSTM attracts about forty percent visitors with less than one fifth exhibition areas of the whole museum.

Preschool children (hoped a bright future by their parents), primary and middle school students (unifiedly organized by schools) and the retired elders (organized free activities) are the three majority visiting people<sup>3</sup>, whose number is about 40 percent, 40 percent and 10 percent respectively. The numbers are slightly different in different science centres.

Temporary exhibition, which needs little money and can easily arrange, is vital to attract visitors and enlarge the influence of science centres.

It is significant to learn from international experiences. The newly built SSTM, GSC and the New Museum

<sup>3</sup>Zhang Chengguang, Probe the New Way of the development for Chinese Science and Technology Museum Industry, 2009.



of CSTM all founded its international experts committee and absorbed international experiences worldwide, which have grown beautiful flowers. It is no difficulty to find that the understanding and experiences on the identification of science centre in China

are alike those acquired for many years in international science centre circles and there isn't some innovations any more. Furthermore, these experiences concentrate in the construction rather than the management of science centres. It shows that China has accumulated rich knowledge in the constructions of building and content in science centres and is capable to build international level ones. There is an interesting example. In the course of building some super science centre in China, the child science park had once contracted award to a famous international company. However, the foreign partner withdrew for some reasons and Chinese had to build it alone by studying home and abroad experiences. Nowadays there are more than one million children and parents in one year visiting this science paradise with just 3,800 square meters and the summit of visiting number a day is more than 10,000. All of these not only prove the former point that child gallery is the most attractive part in science centre, but also prove that it is more easily to absorb construction knowledge than to assimilate management experiences abroad.

As to management aspects of science centres between China and other countries, one can also easily find that there is an obvious, even fundamental, difference. Today China is capable to build an international level science centre but cannot find a good way to make it operate smoothly. It is a common situation in China that it is easy to build but difficult to cultivate a science centre. Most of science centres repeat a vicious circle that it is hot one year, cold three years and silent ten years. Audience numbers standstill and even reduce by years. Survival and development generally become onerous problem to them.

There are only two science centres outside this way: CSTM and SSTM. CSTM is located in Beijing, the capital of China. Since its opening in September 1988, it has served more than 20 million visitors at all. The audience number each year achieves 3 million nowadays from 100,000 in its beginning. On October 3, 2010 there are unprecedented 38,000 people visiting it. However, as to the reason of all achievements, a key factor was the seemingly inexhaustible and increasing subsidization from the government in the past decades, which enabled CSTM to greatly enlarge its building and exhibitions every few years and made it abandon all exhibitions to build a whole new museum in a new place in September 2009. It is rare to see such enormous investment from the government in the 200 years' development history of the global science & technology museums or science centres. SSTM is opened to the public in December 2001 and covers the Yangzi River delta which is the richest area in China. With the powerful finance from Shanghai municipal government, SSTM is the national tourist spot of AAAAA standard important science education and leisure travelling base. Up to now, it has attracted more than 18 million visitors by greatly promoting its science education and science travelling functions and widely winning social confirmation and compliments. Its audience number also increases yearly and reaches to more than 3 million a year. Obviously it has gone into a track of healthy development. As to sizes and scopes, Guangdong Science Centre is the largest science centre in China as well as in the world. However, there are just 800,000 people visiting its huge galleries each year. It is still uncertain whether GSC has explored out its sustainable development way.

Unfortunately, the remaining science centres in China are less vigorous and perform poorly in the market few of them have a bright way ahead.

First, the poor finance from the government. For instance, a city science centre in a middle province of China receives only 50,000 \$ from the government. It is less to the county science centre that it is 9,000 \$ a year<sup>4</sup>. These capitals are obviously far from enough for an energetic science centre that wants to speak loudly in the society. Tianjin Science & Technology Museum is located in Tianjin, one of the four municipalities directly under the central government, and once the largest one in China in mid-1990s with about 400,000 visitors a year. It also faces the financial dilemma nowadays which the lowest fee is 1.6 million \$ a year to operate it. However, the local government can just satisfy 40% of its need each year. Furthermore, the tendency free to adolescent in museums more outstands the shortage of capital in the science centre<sup>5</sup>.

Second, the science centre performs poorly in the market. The ticket fee is the main source of income for most science centres. However, as to the shortage of capital, the exhibitions are obsolete and slow to replace; the facilities are old and security risks increase. Therefore, it is unable to undertake major activities and then greatly influences the exertion of its function<sup>6</sup>. As a result, the visitor reduces. So does the ticket fee and income. No wonder, the management comes into a vicious circle in many science centres all over China.

In one word, today the shortage of capital becomes the No. 1 problem for science centres in China. Even

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<sup>4</sup> Jin Kejun, the Major Problems and Corresponding Solutions for Mid and Little Science Museums Nowadays, 2009.

<sup>5</sup> LSM, A Few Thoughts on the Sustainable Development of Science and Technology Museums, <http://www.donglikewei.com/news.asp?newsid=1917>.

<sup>6</sup> Ipid.

though many of them make double efforts to explore solutions such as launching science travel, arranging temporary exhibitions and learning from entertainment industry, etc. On the whole there has still not discovered the fitful new ways of development for Chinese science centres at this stage<sup>7</sup>.

### **Dilemma and Solutions**

In view of the whole 200 years' development history and management status of the global science centre, it is not hard to find that science centres in China are facing a structural and institutional dilemma toady, which deeply root in the great differences between the special dual identifications of science centre: the role of the public welfare purposes identified by the government, the need of a market player role identified by the science centre itself.

On one side, the government identifies the science centre as the public welfare agency and gives it financial support. However, except a few museums, all level governments are unable to provide enough financial subsidization. Moreover, the government classifies the science centre as museum then manages and subsidizes it like a museum. However, as everyone knows that the expenditure of science centres is greatly higher than that of museums.

On the other side, as the constitutional design of the public welfare agency, the science centre is deeply dyed with the colour of bureaucracy. With indefinite right and responsibility and without an inspiring mechanism, science centres have limited management capability like most public agencies.

In addition, there is short of the corresponding mechanism for enterprises to donate science centres. For example, the enterprise that endow science centre can reduce or avoid its tax. As a result the science centre almost receives no donation from enterprises and communities, which aggravates the management difficulty of science centres.

It is known to all that the expenditure of science centre in one year is one tenth of its construction fee for its expensive spending on operating and repairing exhibitions. As to the international successful science centres such as Ontario Science Centre and Los Angeles Exploratorium, their expenditure sources generally come from the financial subsidization of government, the income of science centre itself and the donation from enterprises and communities, which are about one third respectively. However, the hard situation of expenditure sources for most science centres in China is that the limited financial subsidization of government, the poor income of science centre itself plus the scarcely donation from enterprises and society. It is no wonder that they generally confront with tremendous pressure of development and even survival.

Therefore, in order to resolve the structural and institutional dilemma twisting science centres in China at this stage, it should ponder and take actions from the structural and institutional perspective rather to adopt some tiny and trivial remedy arrangements. The following maybe some possible resolutions:

All level governments should persist with the public welfare identification for science centres, applying the management system that is different from normal museums and increasing the financial subsidization for science centres.

Give a normal identification to science centres which generally owned by the international science centres: possessing the management subject, with a clear definition of rights and responsibilities, reducing the colour of bureaucracy, bearing the internal and external motivate mechanism, and then fundamentally improving the capacity of management in the market areas because one cannot expect a government officer to be successful in the market. He must become a business person at first.

Build wide channels for enterprises and communities to donate the science centre and expand the sources of income.

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<sup>7</sup> Zhang Chengguang, Probe the New Way of the development for Chinese Science and Technology Museum Industry, 2009.