Building the cultural infrastructure of science requires unconventional approaches

Xiang Li
National Academy of Innovation Strategy, China

Xin Qi
China Science and Technology Museum, China

The 5th Plenary Session of the 19th CPC Central Committee fully recognized the country’s achievements in promoting the integrated development of urban and rural public cultural services since the 18th CPC National Congress. The National Action Plan for Scientific Literacy (2021–2035) specifically states that, by 2035, ‘the soft power of scientific culture will be significantly enhanced, and the all-round development of people and the progress of social civility will reach new heights’. This shows that we need to constantly build infrastructure able to keep up with the growing demand for scientific culture, which is an essential part of public cultural services and an important dimension of the scientific literacy of citizens.

Public cultural service infrastructure, represented by science centres, science museums and libraries, serves both as a window for presenting science to the public and as a vehicle for carrying scientific culture. Therefore, to meet the increasingly diverse and multi-tiered scientific cultural needs of the people, the cultural infrastructure of science should not only contain content with distinctive features and values and disseminate information based on local conditions, but also explore new pathways such as digitized and region-specific models of development to preserve the vitality of cultural vehicles. Although, in recent years, China has seen a significant increase in the number of facilities such as science centres, and the number of visitors has continued to grow, there are still some problems in the development of infrastructure.

Institutionally, existing policies are fragmented, and effective interconnection between science and cultural venues is lacking. Behind the isolated development of various types of infrastructure is a lack of integrated and comprehensive planning due to the division of responsibilities among different administrative departments. For example, the National Action Plan for Scientific Literacy (2021–2035) and the newly revised Law of the People’s Republic of China on the Progress of Science and Technology have both stressed the importance of science popularization infrastructure, and the 14th Five-Year Plan for Culture and Tourism Development has raised clear requirements for the construction and development of public cultural facilities. Although, in its content, each of these documents has its own focus and seems to cover a wide scope, there still needs to be a more holistic and comprehensive approach that considers the

Corresponding author:
Xiang Li, National Academy of Innovation Strategy, 3 Yuyuantan South Road, Haidian District, Beijing 100038, China.
Email: talentbel@126.com

Creative Commons Non Commercial CC BY-NC. This article is distributed under the terms of the Creative Commons Attribution-NonCommercial 4.0 License (https://creativecommons.org/licenses/by-nc/4.0/) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the SAGE and Open Access page (https://us.sagepub.com/en-us/nam/open-access-at-sage).
multiple functions, multiple layers and diverse features of science and cultural venues.

Historically, science centres in China originated from the ‘science center’ model in North America and have made rapid advances only in the past two decades. Therefore, as in North America, these facilities all look similar, if not entirely the same. Science centres focus more on the interactive features of exhibits rather than the collection and presentation of physical objects, and the exhibits are created from scratch through meticulous design and research. Due to research difficulties and technical complexity, exhibits in science centres tend to have limited variety, quantity and scale, leading to a strong similarity of exhibits among some science centres. This is very different from science museums, which differ from each other based on their distinctive collections. The similarity of exhibits in science centres has limited the richness and diversity of the content of scientific culture for dissemination.

Theoretically, while the building of cultural infrastructure of science is progressing by leaps and bounds, the foundation of theoretical research is still rather weak. Although research on science centres and scientific culture has taken shape in China, there is not much medium-level research between macroscopic theories and practical experience. For example, the exploration of local histories of science and technology, the development of original exhibits and activities, and research on frontier theories of museology are still inadequate. Therefore, there is an urgent need to strengthen China’s theoretical research on scientific culture to catch up with the advance of international theories and make it proceed in tandem with the construction of physical infrastructure.

To address the above-mentioned problems, further efforts are needed in the following areas.

First, promote cross-sector integration between science centres, science museums and libraries. At the end of 2021, the Alliance of Chinese Science and Cultural Venues was jointly launched by 16 institutions, including the China Science and Technology Museum, the Palace Museum and the Chinese Physical Society. The establishment of this national alliance is inspired by the global experience of mutual learning and bridge-building between scientific and cultural facilities. It also points to the future development of various types of Chinese venues and institutions at all levels. Following this concept of cross-sector, integrated development, science popularization infrastructure and cultural infrastructure both need to abandon the traditional approach that draws a clear line between science and culture. They need to enhance awareness of self-organization and replace the low requirement for professionalism with higher requirements for communicating scientific culture and promoting the spirit of science.

Second, increase the diversity of scientific cultural content. Domestically, science venues should explore the local history of science and technology and summarize the changes brought by the development of science and technology to people’s lives in order to ensure that the content of communication is rooted in everyday life and easily empathized with and accepted by the public. It is important to replace the unitary goal of knowledge popularization with the concept of communication of scientific culture. This can be achieved by starting with the identification of scientific elements in local histories to trace the roots of scientific culture, and then moving on to science stories with local characteristics to boost people’s cultural confidence, thus increasing the diversity of scientific cultural content. Internationally, we need to actively carry out exchanges and cooperation in various forms and at various levels, embrace the latest concepts, such as eco-museums and NFT (non-fungible token) museums, with an open attitude, and integrate innovative forms and ideas of exhibition and education in foreign countries with distinctively local elements to enrich scientific cultural content to the best extent possible.

Finally, strengthen the capacity of infrastructure by promoting academic research and development of original exhibits. At the theoretical level, we need to expand the academic research function of scientific cultural institutions, keep up with the latest achievements in various fields, such as museology, pedagogy, science communication, the history of science and technology and art design, and improve our understanding of public cultural service infrastructure. On this basis, we will be able to strengthen academic research at the medium level with reference to China’s unique experience.
and accumulate research outcomes that are up to international standards and have Chinese characteristics. This will be China’s contribution to global efforts towards the construction and development of the cultural infrastructure of science. At the practical level, we need to conduct original research and development in various areas, such as exhibit development, exhibition design and event organization. Thus, we can ensure that content development grows in tandem with an increase in the number of facilities, and that various venues can truly perform their functions as scientific cultural infrastructure and find their rightful place among various public cultural service facilities.

In the past couple of decades, China has made remarkable progress in building cultural infrastructure of science. China’s goal of self-reliance and self-improvement in science and technology and the increasingly diverse scientific cultural needs of the people all require us to free our thinking and build scientific cultural infrastructure that is truly unconventional with an open mind and rigorous attitude.

**Declaration of conflicting interests**

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

**Funding**

The authors received no financial support for the research, authorship and/or publication of this article.

**Author biographies**

Xiang Li is an associate researcher of the National Academy of Innovation Strategy, CAST. His research interests concern science museums, science culture and art and science.

Xin Qi is a researcher of the China Science and Technology Museum. Her research focuses on science communication, science popularization and science museums.