Looking into the future: Aspects of evolving scientific culture that require attention

Fujun Ren
National Academy of Innovation Strategy, China

This special column on scientific culture offers many insightful ideas and gives us a glimpse into the thriving scientific culture in China. We can see that, while China’s hard power in science and technology continues to increase, the government and society are paying increasing attention to the soft power of culture that underpins the development of science, technology and innovation, thus leading to a strengthened social atmosphere for scientific culture. This is encouraging to all people studying scientific culture. With the combined impact of government advocacy, policy incentives, academic interest, media attention and public participation, the building of China’s scientific culture has taken root at all levels of the national innovation ecosystem, providing institutional safeguards for the cultural foundation supporting self-reliance and self-improvement in science and technology. The building of scientific culture is a long-term task and a systematic project. It requires the joint effort and collaboration of various stakeholders so that the system for scientific culture is not only energized with innovative content but is also constantly enriched and improved in communication platforms.

The spirit of scientists, as a legacy of scientific traditions, is the source of a prosperous scientific culture. Promoting the spirit of scientists is not for show, but to carry forward the core values of patriotism, innovation, pragmatism, dedication, collaboration and talent cultivation across the scientific community. Scientific researchers interpret scientists’ spirit through their actions in an effort to pass on the traditional values and practices of the scientific community and promote the development of scientists’ spirit by generating new content and intellectual advances. Because of the intergenerational transmission and practice of science and technology workers, the spirit of Chinese scientists is not a slogan but a core value of the scientific culture system.

The science and technology institutions and mechanisms, which provide the policy tools at the institutional level, shape the character of scientific culture by constraining the conduct of scientific research. Since the birth of modern science, a relatively well-developed set of institutions has been formed. The publication and authorship of papers, the ownership of priority in scientific discoveries, the rules on the division of work in research teams and the general forms of scientific communication are all regulated by corresponding norms. There are also unwritten rules that function as implicit institutions, such as the moral values of goodness, the ethical principles of responsibility and the tenets of honesty in scientific research. They all produce behavioural constraints and, therefore, demonstrate the moral values pursued in scientific undertakings. Those behavioural constraints, relating to various dimensions and aspects, have captured the essence of the institutional culture of science.

The instruments, equipment and other tools used in scientific activities, which are defined as...
 artefactual objects, serve as unique cultural symbols. Contemporary and future material basics, such as experimental equipment and scientific devices in use, present a figurative image of science to society. By contrast, examples of historic scientific tools, as well as the letters and manuscripts of past scientists, provide important value in recording and presenting scientific history. In this sense, whether it is the physical spaces where scientific activities are carried out, such as laboratories, or the public spaces where artefacts of scientific history are preserved and displayed, such as museums, they are all important parts of the representation of scientific culture, and the occupation of those spaces has cultural implications.

The values and practices of science, which are a form of communication, exist widely in various communication channels. No matter whether it is seen as an artefactual, institutional or spiritual culture, science needs to be disseminated for the public to understand it and participate in the construction of the culture. Therefore, the presentation of science as a type of information during the communication process is a universal form of existence for science. The communication of science is a process in which scientific knowledge and values are diffused to the external community after they have been generated. It is also a process in which the scientific culture is constructed with the joint participation of stakeholders beyond the scientific community. Such a vital process needs to take place in a specific arena, such as the media. It needs to be advanced via an effective channel.

Broad-based public recognition and acceptance, as an indication of the public’s perception and awareness, shows the impact of the construction of scientific culture on society. The outcomes of scientific culture generated within the scientific community are communicated through the transfer of knowledge, the dissemination of research results, the export of institutions and the transmission of values, yet they can become a social culture only after they are recognized and accepted by society. The public’s recognition of science often manifests itself in all aspects of human life, thus shaping social culture. It provides both the cultural foundation of respect, support and trust for science and scientific research activities and the social bedrock for building an innovative country and a world leader in science and technology.

The theoretical and empirical outcomes of multidisciplinary integration, which is a major field of academic research, provide an important pivot for understanding the scientific culture. With rapid advances in science and technology, the scientific process has become a subject of academic interest. Scientific culture, which used to be spontaneously formed values and behaviours in the scientific community, has now become a social atmosphere consciously shaped by the public. As a result, scientific culture is no longer viewed just as a spontaneous combination of explicit elements such as artefacts, institutions and concepts, but is dissected and analysed as a systematic research subject. Unlike other research, research on scientific culture is not directly involved in the construction of such a culture, but the results produced by the research are a major contributing factor to that construction.

All the points elaborated above might not cover the whole picture of the system for constructing the scientific culture. Yet, they indicate that our future effort in this endeavour should not only focus on improved systems in cultural production and information dissemination but also consider who can carry that culture forward. As scientific culture shifts from a process of rapid advance to a trickle-down into the national culture, the communication of culture is bound to move from a dynamic to a relatively stable state. In this state, the spirit of scientists, the material foundation laid down by scientific research and the history of science and technology, the basic institutional culture that underpins the functioning of the scientific community, and the rational way of social production and social life are all elements that sustain the scientific culture and keep the culture prosperous and vibrant.

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Author biography

Fujun Ren is a professor of the National Academy of Innovation Strategy, CAST, and an adjunct professor of the University of Science and Technology Beijing. He is the former chief editor of *Cultures of Science* and *Studies on Science Popularization*. His areas of expertise include science popularization, innovative culture, scientific culture and scientific policy.