Cultivating a scientific culture for promoting self-reliance and self-improvement in science and technology

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In September 2018, I published an article titled ‘Similarities and differences between Chinese and Western scientific cultures’ in Science and Technology Daily, which is a major Chinese science and technology medium. At that time, scholarly interest in scientific culture – a highly interdisciplinary field – was just beginning to grow. By proposing the comparative study of Western and Chinese scientific cultures, I aimed to show how the latter’s richness and diversity have developed over the long term. Today, while some events have inspired new thinking about contemporary scientific culture, the ideas I introduced back in 2018 remain highly relevant.

The different features of Chinese and Western scientific cultures have been shaped by the historical contexts in which they evolved. However, our understanding of cultures is constantly deepening. This is reflected in a deeper understanding of Chinese culture and our learning of Western scientific culture with open minds, both of which have shaped contemporary Chinese scientific culture. Therefore, the features of scientific culture are a historical issue. However, only when the legacy of our forefathers is handed to the new generation of scientists can we sustain the vibrancy of the scientific ethos. The regional features of China’s contemporary scientific culture and the differences between Chinese and Western scientific cultures must both be taken into account when studying China’s scientific culture. Despite rapid advances in the scientific literacy of China’s citizens and the full-scale construction of its scientific culture, the gap with the West and the imbalances within the country are yet to be overcome.

Tackling these issues requires greater efforts to build China’s scientific culture. In April 2019, Peking University’s (PKU’s) Department of History of Science, Technology and Medicine (Institute for Scientific Culture), which was jointly established by PKU and the China Association for Science and Technology (CAST), was approved to open. In my inaugural remarks, I stated my wish to help build the country’s scientific culture and inspire others to follow. This aim had long been on my mind and was supported by the leaders of both PKU and CAST. Thus we have the successful establishment of the science, technology and medicine department. By connecting the past, present and future of science, technology and medicine, the department aims to help the current generation better understand science, society and culture. In the blink of an eye, three years have passed, and our work has made initial progress on several fronts.

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First, with the China Scientific Culture Forum, we have established a robust academic brand in the field of scientific culture. In April 2019, the first forum was held at Peking University on the theme of ‘Building scientific culture in China: New era, new thinking’. Focusing on fundamental issues such as the meaning, structure and role of scientific culture, the participants enjoyed a wide-ranging and in-depth discussion on the tasks, paths and strategies for building China’s scientific culture in the new era. The second forum was held in June 2020, focusing on ‘Battling COVID-19 and building scientific culture’. It featured a multiperspective discussion of the new trends and challenges in building scientific culture, pooling wisdom and strength for defeating the pandemic and driving the progress of science, technology and innovation. The pandemic obliged us to hold the second forum in a hybrid format (online plus offline), and we received wide public attention. More than 2 million online viewers signed up for the forum during the day, and the presentation by Professor Huai Jinpeng (now the Minister of Education) was watched simultaneously by more than 530,000 viewers on various online platforms. This indicates that the discussion on topics related to scientific culture has expanded from the academic community to society as a whole. In 2021, we planned a forum on the theme of ‘Multiple interpretations of the legacy of innovation: Carrying forward the legacy of innovation’. However, the event was postponed until 2022 due to the pandemic. Yet, as the sole provider of high-end conferences on scientific culture in China, the Scientific Culture Forum has gained considerable experience of the workflow involved in organising conferences, and I remain confident that it will continue to make a meaningful contribution to China’s scientific culture in the future.

Second, taking the history of science and technology as the disciplinary foundation, we have focused our academic research on building China’s scientific culture. To achieve this, a number of key research projects have been planned around the central task of constructing a cultural environment that will nurture the development of science and technology. Commissioned by the Chinese Academy of Sciences, one such project was a comparative study of the scientific cultures of particular countries. We analysed the elements of scientific culture that supported innovative activities of basic science and proposed ways of optimising the cultural environment to encourage innovation. We also undertook a CAST research project on the historical experience and patterns of the innovative development of science and technology associations. Taking a macro-historical and global perspective, we considered notable cases of Chinese and foreign science and technology associations. We reviewed the historical reforms made by these associations to adapt to their changing social environments, aiming to identify the current constraints on the innovative development of associations and ways of overcoming them. In addition, funded by PKU alumni Li Ge and Zhao Ning, we began a new project titled ‘Science disciplines of Peking University and the development of modern and contemporary science and technology in China’. This puts research on PKU’s science disciplines into the context of modern Chinese history to explore historical patterns and evolutionary trends in scientific development. Supported by CAST, we have also studied a number of other subjects, such as the culture and ecology of innovation towards 2035, the ethical principles of science and technology in China, and academic democracy. Such studies have laid the theoretical foundations on which scientific spirit and culture may flourish in the present-day context.

Third, we have established a competent teaching and research workforce and a complete teaching and training system. In order to emulate the quality of the science history departments of leading European and American universities, PKU has reinforced its teaching and research system by recruiting outstanding young faculty and researchers from home and abroad. It has enrolled 14 PhD and master’s students in two years and offered 12 specialized graduate courses in the 2021–2022 academic year, five of which are English courses delivered using globally validated approaches to teaching. In addition, we successfully held the first National Forum on Contemporary Science, Technology and Society for doctoral students and rewarded outstanding contributions, which we will continue to do in the future. Our undergraduate course on the history of contemporary science and technology encourages students to explore the sociocultural impact of
contemporary science and technology from a historical and cultural perspective, inspiring them to delve into subjects such as the scientific spirit and the intrinsic value of science, as well as its benefits to humanity. We have received encouraging feedback over the two academic years, as evidenced by exponential growth in student numbers. This shows that undergraduates are highly motivated by the opportunity to study the history of science and technology. Our efforts to eliminate disciplinary barriers and promote the integration of literature and science are beginning to bear fruit.

Fourth, we have worked with partners from home and abroad to build a network of exchange and cooperation in the science history community. Shortly after its establishment, the PKU Department of History of Science, Technology and Medicine rallied 28 university departments running science and technology history programmes across the country and organized the inaugural meeting of the National Alliance of University Departments of Science and Technology History. In August 2020 and July 2021, the second and third alliance meetings were held at Inner Mongolia Normal University and Guangxi Minzu University, respectively. The alliance has helped overcome various problems in the teaching, collaboration and disciplinary construction of science and technology history across China and promoted its further development. In the past three years, we have cooperated with six foreign universities, including the University of Manchester in the UK, and seven institutions, including the Max Planck Institute for the History of Science in Germany. We have also applied successfully for EU research projects and signed an intention to cooperate with Huntington Library in the US. We have invited several world-renowned historians of science and technology from the UK, the US and Germany to give lectures. Finally, we were appointed by the Historical Commission on Science, Technology and Diplomacy of the Division of History of Science and Technology to organize an international symposium on the ‘History of science diplomacy in twentieth century China’, which was held in a hybrid format at Peking University on 19–20 March 2022.

Overall, there is a need for scientific culture in Chinese society, and our efforts to build scientific culture over the past three years have produced visible results. However, the efforts of all are required to ensure that the field continues to prosper: experts, scholars and members of the public should all play their part. This special column on scientific culture aims to encourage the convergence of diverse ideas and attract the involvement of all in building a scientific culture – a topic that touches multiple levels, dimensions and points of discussion. One such point is the type of innovation ecosystem that will best foster self-reliance and self-improvement in science and technology. Others include how to integrate ethical concepts into the bloodline of scientific advances, how to make scientific culture a defining feature of social culture, how to define ancient Chinese scientific culture and what kind of innovation culture will best serve society in the future. It is hoped that this special column can present a vivid picture of scientific culture in all its dimensions. I am confident that the perspectives shared by scholars with different backgrounds, research interests and academic views will enable the public to better understand scientific culture and cultivate fertile grounds for promoting self-reliance and self-improvement in science and technology.

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