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The Role of Research Institutes and Universities in Science and Technology Decision-making in China

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Since the 1980s, China's science and technology (S&T) decision-making has become increasingly scientific and democratic. One of the most significant signs is that research institutes and universities now participate in the process of S&T decision-making. Today, research institutes and universities play more and more important roles in the decision-making processes of S&T strategic planning, programs, projects, policy, and expenditures.

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THE FUNCTION OF RESEARCH INSTITUTES AND UNIVERSITIES IN CHINA

In recent years, there has been some overlap in the functions of research institutes and universities. For example, universities are increasingly focusing on S&T activities and the transformation of S&T achievements, especially in research universities. Similarly, research institutes are increasingly working on talent cultivation. However, on the whole, they still retain their original functions.

China has a complex system of research institutes comprised of three categories, which have very different functions from each other. First is the national scientific research institute, which is represented by the Chinese Academy of Sciences (CAS). CAS is the highest S&T academic institute in China, and it plays many roles. It is the comprehensive research and development center for natural science and high technology, working on the major S&T issues that connect national security and long-term development. It cultivates high-level STI talent and “career-creating” talent. It promotes transformation of S&T achievements and scale industrialization. It plays the role of the national S&T think tank, improves the international S&T competitiveness of China, and leads China’s indigenous innovation and S&T progress. In all these roles, CAS supports the scientific and harmonious development of China.

The second category is the public research institute, affording public research or services. Examples include the Chinese Academy of Geological Sciences, Chinese Academy of Meteorological Science, and the China Institute of Water Resources and Hydropower Research.

The third category is the technological development institute, developing technologies or services directed at the market. Most of these institutes have transformed into enterprises, conducting technological activities and bringing S&T achievements to the market.

Universities increasingly focus on S&T activities and transforming S&T achievements into commercialized products; however, cultivating talent remains their primary function in China. About 700 universities recruit undergraduates, creating the bedrock of knowledge innovation and talent cultivation. Chinese universities can be divided into research universities and teaching universities. According to their educational level and the strength of their government support, they can also be divided into “priority development” universities and “normal development” universities. Research universities and priority development universities place scientific research and talent cultivation almost on par with each other, while teaching universities and normal development universities place the importance of talent cultivation and teaching activities above scientific research.

China encourages universities to conduct S&T achievement transformation from a policy perspective, but in the main, technology transfer is directed toward enterprises. The educational industrialization push of the 1980s and 1990s, when China encouraged universities to start businesses, no longer exists.

China’s research institutes and universities have gathered many famous experts and scholars. Institutions such as Chinese Academy of Sciences, Chinese Academy of Social Sciences, and the Development Research Center of the State Council, among others, have become the think tanks for S&T decision-making.

THE ROLE OF INSTITUTES AND UNIVERSITIES IN S&T DECISION-MAKING

The role of research institutes and universities in S&T decision-making is facilitated by the National Leading Group of Science, Technology, and Education at the macro level. This group includes the National Development and Reform Commission, Ministry of

Education, Ministry of Science and Technology, Ministry of Agriculture, Chinese Academy of Sciences, Chinese Academy of Engineering, and the National Natural Science Foundation. The group studies and reviews national development strategies and major policies on science, technology and education, coordinates with departments inside the State Council, and connects the departments with local entities regarding major science, technology, and education issues. Input from research institutes and universities about S&T policy and major S&T projects is reported to the group for further consideration.

S&T Strategic Planning

S&T strategic planning encompasses medium- and long-term science and technology development, including medium- and long-term planning and five-year planning on S&T. The current national S&T plans are the National Medium- and Long-Term Science and Technology Development Plan (2006–2020), released in 2006, and the 12th Five-Year Plan, released in 2011.

Planning advisory committees were founded before the two plans were made. The planning advisory committee consisted of high-level experts, most of whom were from research institutes and universities. During the process of planning formulation, every step needed to be approved by experts through meetings and consultations. The planning content had to be approved by the Chinese Academy of Sciences, Chinese Academy of Engineering, and Chinese Academy of Social Sciences. The planning also introduced a technological road map, which mainly depended on the research institutes and university experts.

S&T Programs

S&T programs are one of the main means to fulfill S&T strategic planning. Currently, China has formulated a system of national S&T projects. This system consists of major S&T

projects, key technology support programs, high-tech R&D projects, basic research projects, basic conditions for S&T projects, and international technology cooperation projects. The establishment of an S&T program is typically through expert consultation. Some plans, such as the high-tech R&D projects, were first proposed by experts in research institutes and universities. Most of the S&T programs are organized and implemented by the central government or local governments, but the high-tech R&D project and the basic research project are dependent on the expert mechanism.

S&T Projects

At present, almost all S&T project decision-making requires peer review or expert consultation. Although recent years have seen more emphasis on the participation of enterprises in the review process, experts are still mainly from research institutes and the universities. Expert opinion is the main basis of S&T decision-making. If governmental decisions clash with experts' advice, the government needs to explain its reasons. High-tech R&D project and basic research project decision-making relies even more heavily on experts. Experts are considered to have more of a right to speak, because they better understand basic research and research in cutting-edge technologies.

S&T Policy

Compared with the areas already discussed, the role of research institutes and universities is relatively smaller in S&T policy decision-making. Current S&T policies are focused on enterprise innovation, such as R&D expenditure deduction policies, government procurement policies, and high-tech enterprise tax preferential policies. As a result, advice from enterprises or related management departments is more likely to be considered. However, policies that are closely re-

lated to the concerns of research institutes and universities, such as the "four skills" policy and university science park policy, are likely to benefit from experts' opinions. An example of the role of research institutes can be seen in the recent emergence of several R&D institutes in Jiangsu and Guangdong provinces. These institutes do not benefit from existing policies for research institutes or enterprises, and consequently, they are appealing for new specialized policies to support them.

S&T Expenditures

In China, approval of S&T projects and decisions on expenditures are typically separated, because S&T expenditures only can be decided after the project has been approved. The two kinds of decisions are under the charge of different sectors of S&T administrative departments, with the Ministry of Finance making the final decision on S&T expenditures. This decision largely relies on project budget assessment. Most of the budget assessment experts come from research institutes and universities.

DIFFICULTIES ENCOUNTERED IN S&T DECISION-MAKING AND SOME SUGGESTIONS

There are several challenges to be overcome in the Chinese S&T decision-making process. First, the power of research institutes and universities is being weakened. New policies have overemphasized enterprises as the drivers of innovation, thus policymakers put most S&T resources toward supporting enterprises. Even in some cooperative arrangements among enterprises, universities, and research institutes, S&T expenditure still mainly flows to the enterprise. Accordingly, enthusiasm of research institutes and universities for these types of arrangements has waned because despite being the prime suppliers of knowledge and technology,

budget allocations relegate them to a lower status than enterprises.

To remedy this, S&T decision-makers should absorb suggestions from research institutes and universities along with enterprises—all of them being drivers of innovation. Research institutes and universities are more authoritative on basic research and cutting-edge technology research. More S&T expenditure should flow to research institutes and universities, but the research results should be freely provided to enterprises.

Second, experts' opinions are used inappropriately by decision-makers. Some decision-makers rely wholly on expert opinion, while others reject expert opinion wholesale. S&T decision-makers should weigh experts' opinions objectively.

Third, there is too much government interference in the process. Since expert consultation is organized by the government, officials sometimes put pressure on experts to conform to the officials' opinions on a particular issue or project. The government should create a fair environment for expert consultation and standardize assessment rules and practice.

Finally, some research institutes and universities do not provide objective advice. Some have tried to influence other experts in the consultation process. In other cases, undisclosed relationships have provided incentives to unfairly favor one project or direction over others. This type of conduct is detrimental to S&T decision-making and resource allocation. Experts should absolutely follow the assessment rules and maintain their personal credibility. Experts with low credibility should be removed from the process.

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