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**2023 Pujiang Innovation Forum Bulletin V**

**Improving the effectiveness of the national innovation governance  
system through scientific and technological evaluation**

**Editor's Note:** The Theme Forum: Innovation System and Technology Evaluation of the Pujiang Innovation Forum 2023 gives full play to the guiding role of scientific and technological evaluation, and invites experts from various fields at home and abroad to conduct in-depth discussions on the accurate evaluation of development effectiveness, the evaluation and prediction of frontier developments, and the motivation of scientific researchers. This bulletin summarizes views of guests at the theme forum "Innovation System and Technology Evaluation" for your reference.

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### **Improving the effectiveness of the national innovation governance system through scientific and technological evaluation**

With the deepening of the new round of technological revolution and industry transformation, the importance of technological governance is increasingly highlighted. As an important technological governance tool for evaluating development effectiveness, supporting future decision-making, and guiding talent development, scientific and technological evaluation is drawing increasing attention from all parties. The guests present agreed that **full play should be given to the guiding role of scientific and technological evaluation, and the accurate effectiveness judgment of current scientific and technological activities, the judgment of value decisions in cutting-edge technology fields, and the guidance of development directions for all kinds of innovation talents should be strengthened to enhance the overall effectiveness of the national innovation governance system.**

#### **I. Increasing importance of scientific and technological evaluation**

**First, countries generally attach great importance to the guiding role of scientific and technological evaluation in scientific research activities.** He Defang, Deputy Secretary-General of the Ministry of Science and Technology, pointed out that countries around the world are increasingly emphasizing innovation-driven development, and scientific and technological evaluation is receiving special attention. The Chinese government has always regarded the reform of scientific and

technological evaluation as an important part of the reform of the scientific and technological system to promote the high-quality development of the cause of science and technology. **Nie Biao, Director of the National Center for Science and Scientific and Technological Evaluation**, Ministry of Science and Technology, mentioned that scientific and technological evaluation is a policy tool highly valued by major innovation-oriented countries. At the beginning of this year, the U.S. Department of Energy evaluated Fermilab and proposed to replace the laboratory operation team based on the evaluation results.

**Second, scientific and technological evaluation has become an important tool for predicting and evaluating cutting-edge technologies.** **Zhang Xu, President of Chinese Academy of Science and Technology for Development (CASTED)**, pointed out that the starting point of scientific and technological evaluation is to guide research institutions to serve the state's missions and strategies. Technology prediction and evaluation is another important direction of this guiding role, and the past technology prediction and evaluation activities have provided strong support for the formulation of China's scientific and technological development plans, and the identification of key technologies. **Fu Xiaolan, Academician of the British Academy of Social Sciences, and Director of the Technology and Management Center for Development (TMCD), University of Oxford**, said that recognizing the economic value of technology is crucial for high-quality development. Not only universities and startups need scientific and technological evaluation, but also investors need to evaluate technologies accurately.

**Third, scientific and technological evaluation provides accurate guidance for development directions of talents.** Pan Jiaofeng, President of the Institutes of Science and Development, Chinese Academy of Sciences, suggested that scientific and technological evaluation will eventually act on people. How to evaluate research levels of scientific and technological talents, and their contributions to scientific and technological progress not only concerns the rational allocation of limited scientific and technological resources, but also has an important impact on the education, training and career development of scientific and technological talents. **Pei Duanqing, Chair Professor and Assistant to the President of Westlake University,** introduced that Westlake University is exploring the formulation of a standard for innovation-oriented scientific and technological evaluation to guide talents to further value the indispensability of their outcomes.

## **II. Problems and challenges in current scientific and technological evaluation**

**First, evaluation should be more systematic.** He Defang said that scientific and technological evaluation should be strengthened in the following areas: **(1) Insufficient coordination and synergies:** Scientific and technological evaluation in various sectors is inaccurately positioned and not complementary enough, integration and coordination with funding, personnel, remuneration, etc. should be further strengthened, and connection with the application of evaluation results is not smooth enough; **(2) The task of eliminating the old and bringing in the new has not been fully implemented,** and scientific and technological evaluation is in a transitional stage of "breaking old standards and

formulating new ones", and is affected by conventional thinking and social rankings; **(3) The evaluation result transmission mechanism of "evaluation of organizations by the government and talents by organizations" is not sound enough**, and the evaluation system for research institutions oriented to mission performance, and that for scientific research talents oriented to competence and contribution have not been fully established.

**Second, higher requirements are imposed on evaluation capacity.** Zhang Xu pointed out: **(1) The task of exploring maiden fields is increasingly severe.** With the rapid change of technologies and industries, we should aim at trends of global technological change, judge trends properly, and make iteration and adjustment timely. **(2) The complicated international competition landscape aggravates uncertainties.** We should judge the technological competitiveness and strength of all fields accurately and objectively, conduct a thorough evaluation, and identify weaknesses and breakthrough points accurately. **(3) Changes in actual social demand bring more challenges**, and all aspects should be better coordinated to find out future needs of economic and social development, and identify common key technologies.

**Third, basic evaluation systems should be improved.** Pan Jiaofeng pointed out that **on the one hand, the orientation of quantitative evaluation is deviating from the essence of scientific value.** The quantitative evaluation system tends to be limited to indicator calculation, and under the orientation of quantitative evaluation, a large number of papers are just a supplement to the existing knowledge system, and there is a lack of truly pioneering and original achievements. **On the**

**other hand, the classified and graded evaluation system for scientific and technological talents has not been established yet.** The evaluation of technological talents emphasizes the universality of standards, while lacks the precise classification of different types of technological talents, a talent identification system based on their growth pattern and individualized considerations. **In addition, utilitarianism has eroded the scientist spirit.** Expert evaluation and peer review are likely to give rise to issues such as "circle culture" and "mogul culture", while quantitative evaluation methodology is not scientific and diverse, so there are still practical difficulties in their integration.

### **III. All-round exploration of effective paths for improving scientific and technological evaluation**

**First, integrate scientific and technological evaluation with scientific and technological activities closely.** He Defang proposed to embed scientific and technological evaluation into the entire chain of scientific and technological activities and management, highlight the full process evaluation of scientific research activities, and develop more scientific evaluation tools; define key directions of evaluation reform, promote the direct linkup between national level evaluation, and the undertaking of major national scientific and technological tasks, establish an evaluation transmission chain of "evaluation of organizations by the government, teams by organizations and talents by teams", and adhere to the basic evaluation principles of "evaluation of whatever is positioned by the mission", "evaluation of talents by whoever using them" and "evaluation of whatever is agreed on"; accelerate the exploration and practice of "new standard formulation", standardize microscopic

operations, develop scientific and technological evaluation tools around major strategic planning policies, and establish a negative list of scientific and technological evaluation.

**Second, integrate technology prediction into scientific and technological evaluation to create a full closed loop.** Zhang Xu proposed to always base planning on technology prediction and evaluation, and transform consensus generated into planning tasks, and major scientific and technological projects; establish a stable and continuous technology prediction and evaluation mechanism, improve technological comparability on the timeline, and establish relevant standards and specifications; integrate technology prediction with evaluation deeply, realize the closed-loop management of prediction, planning, project implementation, budgeting, performance and evaluation, and strengthen the application of technology prediction and evaluation results to the performance evaluation of research institutions. **Fu Xiaolan** pointed out that AI can be used to explore solutions to bottleneck problems in technology valuation, establish a large specific database for each industry through the theory of technology value utility, and customize AI algorithms.

**Third, establish a technology talent evaluation system that returns to the origin of scientific value.** **Pan Jiaofeng** pointed out: **(1) Establish a classified evaluation system.** Conduct classified evaluation based on scientific, technological, economic, social and cultural values. **(2) Improve refined evaluation indicators.** Adhere to the practice and contribution orientation, and enhance the pertinence and accuracy of indicators by combining functions of different innovation entities to

establish an objective and equitable system of classified talent evaluation standards. **(3) Improve talent evaluation methods.** Pay attention to the application of the latest achievements in the fields of sociology, psychology and management, and make comprehensive use of technical means such as scenario simulation and data mining. **(4) Defining the division of labor between the government and market in evaluation.** Promote the decentralization of talent evaluation autonomy reasonably based on value orientations of different types of technological talents.

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