{No.13 Vol. 148}

Shanghai Center for Pujiang Innovation Forum June.16 2021

2021 Pujiang Innovation Forum Bulletin XIII

Technology Independence, Institutional Breakthrough

Editor's Note: In 2021 Pujiang Innovation Forum—National Universities Forum on Innovation in Science Research and Technology Transfer, with the theme of "Technology Independence, Institutional Breakthrough", well-known experts and scholars from home and abroad had in-depth discussions on the reform of the scientific research systems and mechanisms in universities, transfer and commercialization of technological achievements, talent training and other topics. This bulletin is a summary based on the reports from the participating guests[1], and is intended for reference.

[1] Participating guests include LU Min, Deputy Direcrtor-General of Science and Technology Commission of Shanghai Municipality; YANG Zhenbin, Party Secretary of Shanghai Jiao Tong University; CHEN Jie, President of Tongji University and Academician of Chinese Academy of Engineering; LEI Chaozi, Director-General, Department of Science, Technology and Informatization, Ministry of Education; XING Huaibin, Deputy Director General, Department of Strategy and Planning, MOST; GAO Ruiping, Deputy Director, National Natural Science Foundation of China and Academician of Chinese Academy of Sciences; DING Xiaodong, President, University of Shanghai for Science and Technology; LI Zhimin, Former Director, Science and Technology Development Center, Ministry of Education; Ming Ju, Vice President, Chongqing University; LUO Xisheng, Vice President, University of Science and Technology of China; WU Dan, Vice President, Shanghai Jiao Tong University; TONG Xiaohua, Vice President, Tongji University; ZHANG Weidong, Vice President, University of Science and Technology Beijing; SHI Hongbin, Executive Deputy Dean, The SCI-TEC Academy of Zhejiang University; FU Qiang, Executive Deputy Dean, Institute of Science and Industrial Technology,, Harbin Institute of Technology; ZHOU Yu, Deputy Dean, Chinese Institution of Engineering Development Strategies, Tsinghua University.

2021 Pujiang Innovation Forum Bulletin XIII

Technology Independence, Institutional Breakthrough

The essence of today's competition is the competition in talents and education. A country's higher education system requires the strong support of first-class universities, as the level and quality of first-class universities is a decisive factor of that of the higher education system. Top research universities shall undertake the mission of realizing high-level technology independence, and make strategic contributions to establishing the new development pattern and developing China into a sci-tech power. **The participating experts agreed unanimously that as an essential part of national strategic power in science and technology, universities shall develop science and technology as the first productive force, cultivate first-class talents as the first resource and promote innovation as the first motive force, so as to make irreplaceable contributions to national prosperity, national rejuvenation and people's well-being.**

I. Universities Take Proactive Actions for Institutional Breakthrough and Take the Initiative to Undertake the Mission of Realizing Technology Independence

Firstly, we shall stick to the problem-oriented strategy and refine scientific problems from practical problems to remove the "bottlenecks" in key and core technologies. As pointed out by YANG

Zhenbin, Party Secretary of Shanghai Jiao Tong University, we shall stick to the problem-oriented strategy, encouraging researchers not only to be brave explorers and focus on the originality, but also to refine scientific problems from practical problems including socioeconomic development and safeguarding national security. In the opinion of **CHEN Jie, President of Tongji University and Academician of Chinese Academy of Engineering**, as an essential part of national strategic power in science and technology, top research universities shall target at the frontiers of future S&T and industrial development, develop key and core technologies in important areas, and speed up the transformation of scientific and technological achievements from samples to products and finally to merchandise. According to **LEI Chaozi, Director-General, Department of Science, Technology and Informatization, Ministry of Education**, we shall research into real problems and truly research into problems. We shall dedicate ourselves to solving practical problems and remove the "bottlenecks" in the key and core technologies to provide strong support for China's high-level independence.

Secondly, we shall improve the system for the commercialization of scientific and technological achievements in universities and create a high-quality commercialization environment. As pointed out by **CHEN Jie, President of Tongji University and Academician of Chinese Academy of Engineering**, we shall speed up the construction of an innovation union which is led by leading enterprises and supported by universities, and in which innovation subjects cooperate with each other,

so as to deepen the integration of science and technology with socioeconomic development, break the path from strong science and technology to the powerful industry, economy and country, and realize high-level technology independence.

According to **Ming Ju, Vice President, Chongqing University**, Chongqing University will establish two systems with top-down design, one for administration and coordination, and the other for social and market services. Besides, it will take three actions, including optimizing the systems and policies, building service capability, and strengthening the connection with the market and society, to establish a comprehensive management system for administration and coordination and a three-level social service system. According to **WU Dan, Vice President, Shanghai Jiao Tong University**, Shanghai Jiao Tong University has formulated and issued *Implementation Suggestions on Promoting the Commercialization of Scientific and Technological Achievements in New Era*, which covers organization, management, motivation, service and guarantee, to establish and improve the "1+5+20" institutional system for achievement commercialization, orderly promote compliance correction and rectification, achieve a breakthrough in equivalent preferential tax measures for proprietary technologies, and pilot the formation of a well-established, replicable and promotable path and pattern for the commercialization of scientific and technological achievements. According to **FU Qiang, Executive Deputy Dean, Institute of Science and Industrial Technology, Harbin Institute of Technology**, Harbin

Institute of Technology adopts an innovative pattern for technology transfer, namely “Local Comprehensive Research Institutes + Non-local Professional Research Institutes + Technology Transfer Centers of Schools”, to establish technology transfer institutions across the country in the form of research institutes. Harbin Institute of Technology focuses on the major part rather than minor part of achievement commercialization (constructing research institutes for major projects while conducting achievement empowerment for minor projects), strengthens the construction of technology transfer system, gathers all kinds of innovation resources and regards the construction of local comprehensive research institute as a key project.

Thirdly, we shall strengthen the construction of basic disciplines and intensify multidisciplinary and integrative innovation to provide high-quality science and technology supply. Basic research shall not only focus on problems in frontier disciplines but shall also promote the studies on basic problems. As pointed out by **GAO Ruiping, Deputy Director, National Natural Science Foundation of China and Academician of Chinese Academy of Sciences**, the developing direction of basic research policies in developed countries is to pay attention to the integration with the industry, supporting effective portfolios which pay more attention to support national strategies and improve funding tools to encourage interdisciplinarity and breakthroughs in originality. In the opinion of **DING Xiaodong, President, University of Shanghai for Science and Technology**, universities shall proactively integrate the

strengths of different disciplines to meet the industrial demands regarding integrated circuits, biological medicine, artificial intelligence, etc., establish multidisciplinary innovation centers and develop key and core technologies in an organized fashion. As the depth and breadth of medical and scientific researches continue to expand, multidisciplinary construction becomes more and more common, new means of prevention begin to spring up, and medicine is developing towards a new direction driven by novel technologies. According to **LUO Xisheng, Vice President, University of Science and Technology of China**, faced with the problems of independent innovation in China, especially the weakness in original innovation capability, we shall intensify the support in basic research through long-term investment, and deepen the supply-side reform and evaluation system reform to promote achievement commercialization.

II. Improve the Higher Education System and Cultivate First-class Innovative Talents

Firstly, developed countries, where the competition among national basic research talents is fierce, pay great attention to higher education. As pointed out by **GAO Ruiping, Deputy Director, National Natural Science Foundation of China and Academician of Chinese Academy of Sciences**, internationally, the competition among basic research talents has been increasingly heated up. Developed countries pay lots of attention to the continuous support for basic research talents and

the decentralized allocation of resources. In the opinion of **ZHOU Yu, Deputy Dean, Chinese Institution of Engineering Development Strategies, Tsinghua University**, in America, the commercialization of technological achievements is an extension of science and technology innovation. From 1787 to 1986, America had been insisted on the strategy of "Transferring everything whenever possible", during which the education system provided powerful support for science and technology innovation. America pays far more attention to education than any other country.

Secondly, higher education shall penetrate the whole chain of science and technology innovation, and science and technology shall be people-oriented. As pointed out by **LI Zhimin, Former Director, Science and Technology Development Center, Ministry of Education**, universities shall regard serving the national strategy as the major goal. The higher education shall play a leading and prospective role in accordance with national talent strategy, especially in the terms of talent preparation, and pay great attention to the integration of information technology with education and teaching to cultivate information quality of talents. According to **DING Xiaodong, President, University of Shanghai for Science and Technology**, universities shall cultivate excellent engineering talents with international horizons, patriotism, scientific mindsets, engineering capability, innovative spirits and good physical and mental health. The novel education evaluation institution will ensure more focused services for industries and regions. In the

opinion of **LUO Xisheng, Vice President, University of Science and Technology of China**, achievement commercialization shall focus on the transfer of all factors. In terms of universities' achievement commercialization, the direct pattern is to provide high-quality technology supply, the indirect pattern is to provide innovative tools and methods, and the best pattern is to provide talents for innovation and entrepreneurship. Universities shall focus on the major missions and tasks, promote independent cultivation of talents, pay attention to basic research, develop key and core technologies and strive to become the national strategic power in science and technology.

Thirdly, we shall improve the evaluation system for talents and speed up the construction of the talent teams for the commercialization of scientific and technological achievements. As pointed out by **WU Dan, Vice President, Shanghai Jiao Tong University**, Shanghai Jiao Tong University has established a corresponding evaluation system for talents, set senior professional positions for two series: commercialization and promotion of scientific and technological achievements and management services for intellectual property and technology transfer. Starting from the selection of 12 technology transfer specialists, the university will gradually build a high-level and professional team for the commercialization of scientific and technological achievements to provide standardized services covering the whole process. According to **TONG Xiaohua, Vice President, Tongji University**, the creation, protection, management and application

of intellectual property shall be integrated into talent cultivation, scientific research, social services and international exchanges. We shall establish a multidimensional evaluation system for scientific and technological achievements for comprehensive evaluation. In the opinion of **ZHANG Weidong, Vice President, University of Science and Technology Beijing**, we shall establish a category-based evaluation system; optimize the title (position) evaluation and employment mechanism; standardize the evaluation of talents; reverse the tendency to utilitarianism; and scientifically set the quality standards for the academic degrees.

Summarized by XUE Ya and LUO Xianfeng