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Review of the Work in 2014: Science and Technology System Reform and Policy

In 2014, General Secretary Xi Jinping, Premier Li Keqiang and other senior leaders made important instructions and raised clear requirements on the work of science and technology (S&T), which showed great emphasis given by the CPC Central Committee and the State Council on deepening S&T system reform and implementing the innovation-driven development strategy. Retrospectively, several important reform items have been approved by the CPC Central Committee, and several reform measures have been deployed and issued by the State Council.

On March 12, the State Council issued documents on the reform of fund management for S&T Programs;

On June 5, the Standing Committee of the Political Bureau of the CPC Central Committee approved the proposal of improving management for academician systems;

On August 18, the Central Leading Group for Financial and Economic Affairs listened to the report on implementation of the innovation-driven development strategy;

On September 29, the Central Leading Group for Comprehensively Deepening Reforms deliberated on the

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proposal of reforming management of S&T programs (projects and funds) funded by central government budget, and on October 16, the Standing Committee of the Political Bureau of the CPC Central Committee approved it.

On October 27, the Central Leading Group for Comprehensively Deepening Reforms deliberated on the opinion of opening national major research facilities and large-scientific equipment to the public;

On October 28, the State Council promulgated the opinion on accelerating the development of S&T service industry;

On November 19, the State Council approved the revised draft of the *Law of Promoting the Formation of Research Achievements*, and decided to submit it to the NPC Standing Committee.

On December 3, the State Council decided at one of its executive meetings that the policy measures for innovation, which have been carried in the Zhongguancun area of Beijing, would be introduced to larger scope of the pilot areas nationwide. pilot policy on a larger scale.

From December 9 to 11, the Central Economic Work Conference highlighted again the innovation-driven development strategy.

Among the above-mentioned reform items, great efforts have been made in reforming the management system of S&T programs funded by central budget, building up a national S&T Reporting System, and reforming the management system of scientific research achievements.

1. Reform on management system of S&T programs (projects and funds) under central funding

This reform is aiming to restructure the existing S&T program system at national level and transform the government role in the management of S&T programs. It was estimated that there were about more than 40 government departments being in charge of over 100 S&T programs and special projects before the reform started. Therefore, some problems, like dispersed use of government funding and lack of coordinations within the government bodies, happened and blocked research and innovation. In implementing the innovation-driven development strategy, what comes first is to readjust the management system of national S&T programs.

Several things have to be done well are as follows. Firstly, improving coordination. The government will establish new management mechanism and platforms, discuss major issues by convening cross-ministerial meetings. And meanwhile, a committee of strategic consultation and comprehensive evaluation will be set up to provide policy coordination for the cross-ministerial meetings. Secondly, optimizing and integrating research and innovation programs. The previous S&T programs and projects will be optimized and integrated to be 5 categories of programs, namely National Natural Science Foundation of China, National Major S&T Project, National Major R&D Program, Special Project (a Guiding Fund) for Technological Innovation, and Special Project for R&D Bases and Personnel. Thirdly, delegating power and improving administration. The government department will not directly get involve in the management of S&T projects, but focus on strategic planning, major task selection, environment building as well as evaluation, monitoring and services.

In 2017, the new S&T program management system will be thoroughly put in place, while the first three years starting from now is the transition period. At present, MOST is working with relevant ministries to take actions for a faster implementation of this reform.

2. Build National S&T Reporting System

In early September 2014, the State Council General Office forwarded MOST's *Opinion on Accelerating the Building of National S&T Report System* (hereinafter referred to as the Opinion), which will help realize storage, accumulation, sharing and application of S&T reports.

In line with the overall requirements of building the report system, the Opinion deals with major missions, management, collection and environment building. According to the Opinion, by 2020 a unified national system of report submission, collection, management and sharing will be established, thus forming a scientific, standardized and efficient management model and operation mechanism. This means that we will build upon our efforts at departmental and local level to speed up the nationwide prevalence of such a system.

Accelerating the establishment of a unified reporting system is an important component of deepening S&T system reform. S&T reports will be assessed as results of scientific research projects and accumulated and managed as national basic resources. Meanwhile, S&T reports will become available to the public.

MOST started from 2013 to initiate the pilot work in S&T programs like the 973 Program, 863 Program, S&T Enabling Program and S&T Major Projects. On March 1 2014, MOST formally opened the system. Tangible progress has been made in submission, management and sharing services of S&T reports. Over 30,000 S&T reports have been submitted in each pilot projects.

3. Reform on the management system of research achievements

In mid-October 2014, approved by the State Council, the Ministry of Finance, MOST and SIPO (the State Intellectual Property Office) issued the Notice on pilot reform of utilization, disposal and profit management of research achievements for the central public research institutions (hereinafter referred to as the Notice). The Notice marked the initiation of the pilot reform in central public research institutions.

The pilot reform aims to eliminate the institutional barriers impeding transformation of research achievements, promote the achievement of scientific research to be translated into productivity, and make colleges and research institutes better capable of starting business and innovation.

According to the Notice, pilot universities and research institutes will enforce two new measures. First, responsible government bodies and financial departments will no longer deal with approving and recording of research findings' use and disposal, while pilot institutions will conduct translation of their research results by means of transfer, admission and shareholding. Second, the revenue arising from research achievements will totally stay in its original institution. Moreover, the Notice said that the price of research results can be confirmed through agreement, entering of technology markets and auctioning. Meanwhile, the name and initial price will be transparent to the public.

To encourage scientists and engineers to participate in the transfer and translation of research achievements, the Notice made relevant regulations in income distribution, stock ownership incentive, rewarding for those who accomplished research results and those who made outstanding contributions.

(Source: Science & Technology Daily, January 8, 2015;
Science & Technology Daily, September 12, 2014;
Science & Technology Daily, October 17, 2014)

Review of the Work in 2014: Ten Science and Technology Tasks

On January 1, 2015, the Science & Technology Daily issued a special report to introduce the progress of ten science and technology (S&T) tasks in 2014.

Task No.1: To enhance the top-level design of innovation-driven development strategy

The innovation-driven development strategy was implemented in an orderly manner after completing the "Outline of National Medium- and Long-term Program for Science and Technology Development" and conducting mid-term evaluation and technological prediction. Relevant departments have studied the key programs and projects that are due to be completed before 2030 and started to draft the thirteenth five-year plan for science, technology and innovation.

Task No.2: To promote substantive breakthroughs made in key reforms

The reform of central government spending on science and technology, a main task of S&T system reform, was comprehensively launched. In the future, the government bodies will not manage specific projects and the national S&T programs will be integrated into five major categories. At present, the specific measures and detailed rules are being studied and key pilot projects have been launched.

The *Law on Promoting Transformation of Research Achievements* (Revised Draft) has been approved by the State Council. The government has established a mechanism for opening and sharing scientific resources and approximately 40,000 S&T reports have been released publicly. By deepening the reform on government administration, a great number of the matters requiring government review and approval have been canceled or delegated to lower-level governments, such kind of matters have been reduced by 35% of the total in previous year.

Task No.3: To promote the implementation of National S&T Major Project

By promoting the implementation of National S&T Major Project, high-end integrated circuit equipment were produced on a large scale; the sales and application of numerical control machine products added a value of 17 billion yuan; the CAP1400 pressurized water reactor demonstration project with independent IPR passed experimental validation; the complete set of large fracturing equipment for shale gas development which was designed by Chinese professionals independently was applied; China's Tianhe-2 has remained the world's fastest supercomputer for the fourth year; the deep-water ROV with 4500 meter depth capability made a successful attempt. In medical field, Japanese Encephalitis Attenuated Live Vaccine was on the UN Agency's procurement list and supplied to other countries. The new medicine Chidamide, treatment of relapsed or refractory peripheral T-cell lymphoma (PTCL), is going to appear on the market. It is the first original chemical drug developed by China independently.

Task No.4: To strengthen basic research and the layout of strategic technology

Chinese scientists have achieved many results. For example, they transformed new iron-based superconducting materials at 40K by using hydrothermal method. They built a non-human primate model, which lays a foundation for curing human disease through gene therapy. The research by Chinese researchers on the origin of birds has attracted global attention. The world's deepest underground laboratory with the least cosmic ray for the research of dark matter would be built up by the Chinese Academy of Sciences (CAS).

Task No.5: To accelerate the development of modern agriculture

Chinese scientists cultivated super-hybrid rice that yields 1026kg/mu (15.3 ton/hectare), hitting a new

record high. Thanks to the implementation of National Grain Bumper Science and Technology Project, 43.02 million tons of grain were added during the twelfth five-year plan period, bringing a benefit of 100.2 billion yuan. Thanks to the implementation of Bohai Granary Technology Demonstration Projects, more than 5 million mu of wasteland was upgraded and 350 million kg grain was added. Thanks to the implementation of key special seed technology projects, 535 new crop varieties were cultivated and improved varieties were used in 350 million mu of land, covering almost all major crops.

Task No.6: To promote science and technology projects for public wellbeing

Greater efforts have been made by government to implement the action plan for preventing and controlling air pollution. The ultra-low emissions technology has been applied in coal-burning power plants with production capacity of million kilowatts. 89 technologies for preventing and controlling air pollution have been promoted and applied across the country, especially in Beijing, Tianjin and Hebei Province. Thanks to the implementation of innovative medical equipment projects, a batch of products and equipment including 1.5 T magnetic resonance imaging system can be produced in China.

Task No.7: To enhance regional innovation

It has approved that several national innovation demonstration zones would be built in Shenzhen city, South Jiangsu province, Binhai New Area in Tianjin and Changsha-Zhuzhou-Xiangtan district in Hunan province. There are altogether 115 national high-tech zones, realizing a revenue of 23 trillion yuan, or an increase of 15 percent over the previous year.

The government has made great efforts in promoting the building of Beijing-Tianjin-Hebei collaborative innovation community, initiating new Silk Road brand, launching comprehensive innovation reform pilots and building pilot innovative province and city.

Task No.8: To improve talent development mechanism

The government has implemented the major talent development plan such as Innovation Talents Promotion Plan. Hundreds of overseas experts have been employed to participate in the national science and technology projects and become leaders in their research fields. The Ministry of Human Resources and Social Security have funded 564 returned overseas students to start their own businesses in China.

Task No.9: To improve STI policy

In the beginning of December 2014, the State Council decided to implement Zhongguancun Pilot Innovation Policy across the country, including the reform of fund management of research programs and equity-based incentives. At the same time, 4 new trial policy measures were implemented in Zhongguancun.

Two guiding documents ---- Accelerating Finance Service System through Science and Technology and The Promotion Plan for the Implementation of the National Intellectual Property Strategy (2014-2020) were issued in 2014.

Task No.10: To expand international S&T cooperation

As international communication and exchanges expand, China has launched S&T cooperation with more and more countries. In recent years, innovation has become an important theme for China to conduct S&T exchanges and cooperation with US, Britain, France and EU. And meanwhile, the Chinese government have extended the scope of S&T aid to developing countries and continued to optimize it. China's new cooperation models like Science and Technology Partnership have been embraced in the world. China has actively joined international big science projects like ITEA and SKA, and continued to play a leading role in Group on Earth Observations (GEO).

(Source: Science & Technology Daily, January 10, 2015)

Wan Gang Talks about Main Tasks of S&T Development in 2015

On January 10, 2015, the National S&T Work Conference was held in Beijing. The theme of the Conference dealt with deepening S&T system reform and implementing the innovation-driven development strategy in line with the guidelines of meetings of CPC Central Committee. At the Conference, what has been done in 2014 was reported and ideas for the work in 2015 were put forward. In addition, it also laid out policies and measures to promote S&T reform and development, so as to speed up the building of an innovative country. Dr. Wan Gang, Vice Chairman of CPPCC and Minister of science and technology made a work report and Dr. Wang Zhigang, Vice Minister of science and technology chaired the conference.

Wan Gang said in his report that under the leadership of CPC Central Committee and the State Council, government and the science community have worked jointly to implement innovation-driven development strategy, promote S&T system reform and try to solve existing problems. Efforts were also made to transform government functions to improving its macro control capability and enhance home-grown innovation capability to meet the strategic demand. We have made great contributions to promote stable economic and social development under the New Normal.

In 2014, China's R&D expenditure reached 1340 billion yuan, in which enterprises take up more than 76 percent. The R&D expenditure accounted for as much as 2.1 percent of GDP. China ranked 2nd in the world in terms of the number of international science papers and rose to 4th in the terms of citation frequency of the papers. There are 660,000 domestic patents for invention, an increase of 12 percent over the previous year. The country's turnover from technology contract reached 857.7 billion yuan, an increase of 14.8 percent over the previous year. The total revenue of national high-tech zones was 23 trillion yuan, a year-on-year increase of 15 percent.

Wan Gang said that we need to focus on four aspects to do work well in 2015. First, we should conduct our work with the orientation to major demands and solving problems and enhance the capacity of home-grown innovation, so as to support the relatively fast economic growth and better economic performance. Second, we should resolutely remove institutional hurdles to encourage creativity, fostering a favorable environment for starting business and conducting innovation. Third, we will accelerate the translation of research achievements, so that the research results can be applied sooner in the production, bring economic benefit and create new points for economic growth. Fourth, we need to further transform government functions to improve its governance of science, technology and innovation (STI) and enhance the capacity of administration according to law.

According to Wan Gang, the government will focus on the following eight missions in the future: 1. To enhance the top-level design of innovation-driven development strategy and draft the thirteenth five-year plan for STI. 2. To map out a new S&T program management model and optimize the allocation of scientific resource. 3. To deepen S&T system reform and remove institutional hurdles for the development of science, technology and innovation. 4. To accelerate the layout and implementation of key projects to support economic and social development. 5. To enhance STI and step up efforts. 6. To implement regional development strategy and enhance regional innovation. 7. To promote transformation of research achievement and the development of S&T services for more creativity and vitality. 8. To Expand international S&T cooperation to gain advantages in international innovation competition.

More than 200 representatives attended the meeting, including officials from CPC Central Committee and government bodies responsible for S&T management, leaders form MOST and other ministries, officials from local S&T departments, representatives from national innovation demonstration zones, national high-tech zones and innovation bases.

(Source: Science & Technology Daily, January 11, 2015)

Vice Minister Wang Talks about STI's Adaptation to "New Normal"

The 2015 National S&T Work Conference closed on January 11, 2015 in Beijing. Vice Minister of Science and Technology Wang Zhigang stressed in his summary remarks that the S&T community should strengthen its sense of responsibility and urgency to do a good job in 2015.

Wang said that we should follow the requirement of the CPC Central Committee for the work of science and technology, putting STI at the core of national development. According to the vice minister, the government with science community, should regard enhancing indigenous innovation capacity as the most important task and work to break the bottlenecks constraining economic and social development. We should regard removing institutional hurdles as the most urgent task to facilitate economic and social development through STI. We should also make personnel training our top priority, so as to improve industrial capacity and national strength by giving full play to the role of outstanding personnel and advanced science and technology. We will create a favorable environment in which people are willing to start their own businesses and conduct innovation. It will fully unleash the potential of science and technology as the primary productive force.

Wang also pointed out that there are still institutional barriers blocking innovation. For example, obstacles impeding translation of research achievements still exist, the environment for collaborative innovation is to be further improved, and technological evaluation and some incentive measures fail to meet the requirement for development. In order to solve these problems, we must deepen the reform in a way of problem-solving in regarding its systematic features, integrity and coordination, effectively implementing the varies measures of reform. Meanwhile, we will follow, examine, evaluate and adjust the measures in a timely manner.

Wang also said that proper management and usage of research funds under central budget will be one of the top priorities. With a confirmed direction, the reform of national S&T program management will focus on some basic work, including taking actions, setting up platform and buildings system so as to ensure an integration and implementation of new programs.

Wang also put forward requirements for work in the following aspects: arousing the initiative of scientists and engineers, improving evaluation and incentive mechanism, rewarding science and technology contributions and promoting regional innovation.

(Source: Science & Technology Daily, January 12, 2015)