

China Science & Technology NEWSLETTER

No.5

Mar.15 2018

Department of International Cooperation Ministry of Science and Technology(MOST), P.R.China

Wan Gang talks about S&T progress and achievements over the past five years

[Important plan]

Opinions on comprehensively strengthening basic research issued by State Council

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Wan Gang talks about S&T progress and achievements over the past five years >>>

At the press conference on February 26, Minister Wan Gang talked about S&T progress and achievements over the past five years since the 18th CPC National Congress and took care of the questions.

Minister Wan remarked that since the 18th CPC National Congress the Central Committee of the CPC has put STI at the core of the overall development pattern of the Party and the country, made systemic deployment from ideology to strategy, worked arduously for implementation of the innovation-driven development strategy and embarked on a new journey of building China into a country strong on science and technology. As we have been forging ahead over the past five years, historic and comprehensive major changes have been witnessed and fruitful results made in building an innovative country. China has become a big STI country with global impact. This is manifested mainly in the following five aspects:

First, we have joined the world's first rank in STI and entered a historic new period of coexistence of leading and parallel running and following and increase of leading and parallel running. We have witnessed emergence of a number of major innovative outcomes such as Jiaolong, FAST, Wukong, Mozi and Huiyan as well as remarkable enhancement in the international impact of basic research. We have become global innovation leaders in multiple areas. The total social R&D expenditure in 2017 is expected to reach 1.76 trillion yuan, up by 70.9% compared with 2012. In addition, the proportion of enterprises' R&D input in total social R&D expenditure has for many years exceeded 75% and is probably able to reach 77-78% according to the current statistics. The number of international science papers and citations both ranked No.2 in the world, with invention patent application and authorization ranking among international top. The R&D personnel FTE topped the world, while the contribution rate of S&T has increased from 52.5% in 2012 to 57.5%. Moreover, for the ranking of national innovation capacity, China has risen from the 20th place in 2012 to 17th place.

Second, STI has served as a strong underpinning for supply-side structural reform and improvement of people's livelihood and realized a historic leap in STI integrating into and boosting economic and social development. For example, leapfrog growth has been made in priority areas of mobile communications, IC, CNC machine tool, large airplane and nuclear power; Fuxing Hao has been put into commercial operation; the hi-speed rail mileage has accounted for over 60% of the global total. The installed capacity and power generation of renewable energy both ranked No.1 in the world, and the production, sales and ownership of electric vehicles (EVs) and new energy vehicles (NEVs) all accounted for over 50% of the world. AI, big data and cloud computing have been boosting fast growth of digital economy, platform economy and shared economy, underpinning economic transformation and upgrading and development of new growth engines. The 19 national independent innovation demonstration zones and 156 national hi-tech zones have become core carriers and important engines of regional innovative development. STI has played a critical role in fighting against air pollution and poverty. As science and technology has helped bring tangible outcomes in increasing forestry coverage and controlling desertification, our country has been the first in the world to reverse desertification. More than 1.3 million innovative medical devices have been applied in primary-level medical institutions, serving a total population of 450 million. In addition to establishing a prevention and control technology system against urgent contagious diseases, we have showcased our strengths in



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international prevention and control of contagious diseases by succeeding in developing the Ebola vaccine.

Third, S&T system reform has been facilitated in an in-depth and systemic manner, and the S&T management pattern has realized historic transformation from R&D management to innovative services. The role of enterprises as the major innovation players has been further enhanced. They accounted for more than 70% of the total social R&D expenditure, research personnel and invention patent. Apart from historic breakthroughs in national S&T programs and funding management reform, we are also advancing reforms on academician system, S&T award and civil-military S&T integration. The CPC Central Committee and the State Council have promulgated distribution policies oriented to adding value of knowledge and pro-innovation policies such as R&D cost deduction. Moreover, we have accelerated the pace in establishing basic systems of national major S&T decision-making consulting system, S&T report system, innovation survey system and resource sharing system, and scientists and engineers have had a greater sense of gain.

Fourth, the STI force has expanded from research personnel to all social sectors, which has brought about a historic pattern of mass entrepreneurship and innovation. We have composed a trilogy of the transformation of S&T achievements by revising the *Law on Promoting Scientific and Technological Achievements*, *promulgating Opinions on Implementing the Law on Promoting Scientific and Technological Achievements* and *Plan on Building National Technology Transfer System*, and taking actions on facilitating transformation of S&T achievements. Some of the concerns of scientists and engineers have been initially accommodated and the quantity and quality of S&T outcomes have both been enhanced. We have set up over 1,000 technology transaction markets of all kinds, with the total national technology transaction volume increased from 1.1 trillion yuan in 2016 to 1.3 trillion yuan. The 4,298 makers' spaces, 3,255 incubators for tech-based enterprises, over 400 accelerators, 19 national independent innovation demonstration zones and 156 national hi-tech zones have formed an increasingly well-established chain of entrepreneurship and incubation. As S&T and finance have been integrated in an in-depth manner, the national fund for transformation of S&T achievements has guided local governments, financial institutions and private sectors in remarkably increasing their investment.

Fifth, S&T diplomacy has become an important component of the national overall diplomacy, and open innovative cooperation has made historic strides in proactive deployment. STI has been an impressive element in the Belt and Road Forum for International Cooperation, G20 Summit and BRICS Summit. China has become an increasingly important polar in the diversified global innovation pattern, as we have established S&T partnerships with 158 countries, participated in over 200 international organizations and multilateral mechanisms and gotten involved in many international mega-science programs and projects. New progress has been made in STI cooperation between Chinese mainland and HK and Macau. For example, we have accomplished the first pilot projects of cross-border research funding allocation.

When answering the question concerning transforming S&T achievements into productivity, Minister Wan remarked that we have witnessed tangible progress in that area, with the technology transaction volume increasing rapidly. As the transformation of S&T achievements is a dynamic system, we need to



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provide greater support of better innovation source and broader services from technology transfer agencies, including evaluation and review of S&T achievements. In the future, the priorities are: first, strengthen coordination of various kinds of policies; second, the knowledge created by institutions owned by the country and run by private sector, especially universities, should be included and managed as national assets; third, make innovation resources from universities open to the public and outcomes of basic research and frontier exploration transfer to market and enterprises; fourth, improve categorized evaluation system.

For the question of enhancing original innovation capacity, Minister Wan said that the *Opinions on Comprehensively Strengthening Basic Research* recently promulgated by the State Council represents the first guiding policy document regarding basic research and marks the start of a journey to become an innovative country and a country strong on science and technology. In recent years, our basic research input has rapidly increased by 65%, jumping from 49.9 billion yuan in 2012 to 82.3 billion yuan in 2016.

When responding to the concern of AI development in China, Minister said that last year we drafted the outline on new-generation AI development, which has been promulgated and implemented by the State Council. For the implementation of the outline, the first step is to apply existing knowledge for meeting social needs, the second is to accelerate transformation and application of AI innovative outcomes, third is to strengthen research into policies and regulations, fourth is to further international cooperation and exchanges on AI.

When taking care of the question of building National Innovation Demonstration Zones for the 2030 Agenda for Sustainable Development, Minister stated that the zones are an important link to the implementation of the 2030 Agenda for Sustainable Development. As we have participated in the whole of the Agenda, we launched the building of such zones under the approval of the State Council. Sustainable development is a broad objective, and the key to that is coordinated and harmonious development between man and nature. For implementation of the agenda, the primary mission is to boost economic, social and ecological development in strict accordance with the five development concepts. Sustainable development represents a specific action to meet future needs and implement new development concepts, so each and every locality should give play to their strengths. In the future, we must carry forward the new development concepts in line with local characteristics.

For the question of NEV development, Minister said that China has several major considerations for new energy development: first, we are heavily dependent on energy, with huge oil and gas import; second, we are a densely populated country, which makes it hard to totally get rid of air pollution through conventional energy technologies; third, the fight against climate change requires us to lower carbon emission with the greatest efforts and serve as a role model in tackling global climate change. Thanks to our efforts in the more than ten years, we now rank No.1 in the world in the installed capacity and electricity generation of wind, PV and hydro power. In light of the uneven distribution of renewable energy, we set up a UHV power transmission and transformation network of three vertical and three horizontal lines, which enabled renewable energy to transmit from the western regions to the eastern ones. Thanks to the country's support for EV R&D since



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2001, we produced and sold as many as 770,000 such vehicles last year. In line with the outline of NEV development issued by the State Council, we will produce and sell two million EVs in 2020. At present, various kinds of international renowned auto companies are deploying NEVs in China and starting R&D, production and selling of such vehicles in China. We hope that greater international cooperation can advance NEV development and transformation & upgrading of conventional auto industry, thus tackling the three problems haunting urban development, namely air pollution, energy reliance and traffic congestion.

For the concern of national S&T system reform, Minister remarked that the goal of the reform is to realize two-wheel drive of S&T innovation and institutional innovation. First, we will make enterprises the major innovation players. Second, we will make sure that S&T outcomes will be applied for economic & social development and innovation & entrepreneurship. Third, from the perspective of transforming government functions, we will integrate the nearly 100 national S&T projects distributed in various departments and establish cross-department system of national S&T programs and funding management. Fourth, we will embark on institutional innovation, including reform on academicians system, S&T award, S&T evaluation and national major S&T decision-making consulting system. Fifth, we will formulate universally beneficial policies for scientists and engineers, including the distribution system oriented to adding knowledge value, and put in place incentive mechanisms for enterprises, especially innovation-based SMEs, including tax reduction and exemption for hi-tech enterprises and R&D cost deduction. In general, we still have a great deal of work to do.

(Source: China.org.cn, February 26, 2018)



[Important plan] >>

>> Opinions on comprehensively strengthening basic research issued by state council

To strengthen basic research, markedly enhance original innovation capacity and lay a solid foundation for building an innovative country and a country strong on science and technology, the State Council promulgated the *Opinions on Comprehensively Strengthening Basic Research* (hereinafter referred to as the Opinions), to make deployment on strengthening basic research in all-round manner.

The basic principles of the Opinions are as follows:

◆ Adhering to the laws of science and categorized guidance. We should respect the features in conducting scientific research, namely unpredictable moments of inspirations, randomness of approaches and uncertainty of channels, cultivate pro-innovation environment and culture and encourage scientists to think freely, assume boldly and seek proof conscientiously. In working for integration between curiosity-driven exploration and target-oriented exploration, we should ensure that the former will focus on scientific issues of the unknown and the latter will meet demand of economic and social development and enhance forward-looking deployment in strategic areas.

◆ Highlighting original innovation and facilitating integrated development. We should put enhancement of original innovation capacity higher on the agenda, be more confident in innovation, be bold to challenge frontier science difficulties, put forward more original theories and make more original discoveries. We should also strengthen integration between science and education, military & civilian application and industry, academia & research, adhere to the orientation to demand, facilitate integration between basic research, applied research and industrialization, and promote effective matchmaking of innovation factors from varied industries and fields.

◆ Boosting institutional innovation and vitality for innovation. We should ensure that people comes first, further the reform on research projects and funding management, build a relaxed research environment and make researchers concentrated on enduring basic research. We should also improve categorized evaluation mechanism, mobilize the creativity of scientists, research institutes, universities and enterprises, and make innovations on model of government management, guide enterprises in strengthening basic research and enhance market competitiveness.



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◆ Strengthening coordinated innovation and expanding open cooperation. In line with the new requirements of big science, big data and internet era, we should explore on new approaches of coordinated research, crowd sourcing and funding, resolve scientific difficulties and share innovative outcomes. We should also have a global vision, create new mechanisms for talent production and introduce talented people from various sectors. Efforts should also be made to integrate into global innovation network proactively, strengthen open cooperation in innovation capacity, build new platforms of international cooperation and jointly tackle major scientific challenges of global concern.

◆ Strengthening steady support and optimize investment structure. We should strengthen steady support of central budget to basic research, establish a diversified investment mechanism of basic research, and encourage localities, enterprises and social sectors to invest more in basic research. We should also set up an investment mechanism featuring coordination between steady support and competitive support and facilitate comprehensive development of scientific research, talent cultivation and base construction.



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The Opinions formulated the three-step development goals of basic research:

★ By 2020, we see marked improvement in the general level of basic research and international impact, join world top rank in important areas, bring major original outcomes in frontier science areas, resolve major forward-looking science challenges to meet national strategic needs, remarkably enhance the source supply capacity of innovation-driven development and provide strong underpinning to building a moderately prosperous society in all respects and joining the rank of innovative countries.

★ By 2035, we realize a huge leap in the general level of basic research and international impact, lead global development in a greater number of important areas, produce original science outcomes of vital importance to world S&T development and human progress and lay a solid foundation for basically realizing socialist modernization and joining the first rank of innovative countries.

★ By the middle of the century, we build our country into a major science center and innovation highland in the world, produce a number of major original science outcomes and international top-notch science masters and provide strong scientific underpinning to building a strong, democratic, culturally advanced, harmonious and beautiful socialist modernized country and a country strong on science and technology.

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The Opinions identified 20 major missions in improving layout of basic research, building high-level research bases, developing stronger teams of basic research, enhancing international level of basic research and optimizing mechanism and environment of basic research. The missions are as follows:

1. strengthen systemic deployment of basic research
2. optimize supporting system of national S&T programs
3. optimize regional layout
4. advance national major science infrastructure building
5. plan for building national labs
6. enhance building of innovation bases for basic research
7. cultivate world-class strategic and leading scientists and engineers
8. strengthen cultivation of young talents and future scientists and engineers
9. stabilize high-level teams of experimental technology staff
10. build high-level innovation teams
11. implement international mega-science programs and mega-science engineering projects
12. further international cooperation in basic research
13. strengthen top-level design and coordination
14. establish diversified investment mechanism
15. further reform on research projects and funding management
16. advance integration between basic research and applied research
17. facilitate open sharing of S&T resources
18. establish and improve evaluation mechanism in line with features and rules of basic research
19. promote research integrity
20. advance science popularization and carry forward the spirit of science and culture of innovation