NSFC to Boost Science Popularization

Policy

By ZHONG Jianli

As communicating science to the people is an important part of building the national innovation system, the National Natural Science Foundation of China (NSFC) recently issued clear guidelines on strengthening science popularization in the new era.

NSFC will focus on enhancing the public's understanding of basic research, and make more efforts to popularize the innovative projects it funds, according to the guidelines.

The primary target audience for science popularization work should be the youth and the general public, while the sci-tech community should be kept informed about the latest developments in basic research and sci-tech frontiers to improve its interdisciplinary research capabilities.

A girl interacts with a robot arm at an exhibition held for science popularization in Beijing on September 17. (PHOTO: XINHUA)

Inspiring scientific thoughts and methods should be promoted and importantly, scientists' stories should be disseminated among the people, said the guidelines.

Researchers working on NSFC-funded major projects or research programs should communicate their progress and achievements to the public. Researchers involved in youth science fund projects and regional science fund projects should actively engage in science popularization and include those achievements in their project results.

The NSFC will increase support for international cooperation and exchange projects, encourage international science popularization activities, and support researchers to join or take the lead in establishing international science popularization organizations to promote high-quality science resource-sharing at home and abroad.

The guidelines also stated a talent pool for science popularization should be established, which could tap the expertise of the considerable number of basic research experts funded by the NSFC. Efforts will be increased to strengthen cooperation with professional science popularization institutions and conduct regular skills training for various departments and researchers.

China's R&D Investment Hits 3 Trln RMB in 2022

By CHEN Chunyou & LIU Yin

China invested over three trillion RMB in research and development (R&D) in 2022, a year-on-year increase of 282 billion RMB, according to a communique on national science and technology expenditures last year released by the National Bureau of Statistics (NBS), Ministry of Science and Technology and Ministry of Finance on September 18.

New record for basic research funding

The total funding for basic research exceeded 200 billion RMB for the first time, accounting for 6.57 percent of R&D funding.

The proportion of basic research expenditure in R&D expenditure increased by 0.07 percentage point over the previous year, remaining above 6 percent for four consecutive years. The proportion of applied research expenditure also increased, reaching 11.3 percent.

China has implemented various measures to encourage corporate and social funds to support basic research for consolidating sci-tech innovation and enhancing original innovation, Xuan Zhaohui, a researcher from the Chinese Academy of Science and Technology for Development, told *Science and Technology Daily*. These measures include establishing joint funds and promoting social donations.

Xuan called the increase in basic research expenditure the result of improved awareness of original innovation across society and favorable measures, which have enhanced China's original innovation ability and facilitated high-quality socioeconomic development.

Enterprises contribute to R&D expenditure growth

In 2022, the R&D expenditure of enterprises was 2,387.86 billion RMB, signifying an 84-percent contribution to the growth of R&D funds, 4.6 percentage points higher than in 2021. Government-affiliated research institutions' expenditure was 381.44 billion RMB while universities spent 241.24 billion RMB.

"In recent years, enterprises have been prioritized in applications for science and technology plan projects. They also benefited from pre-tax deductions on R&D expenses and gaining access to scientific equipment because of the sharing mechanism," Xuan said.

The researcher added that these factors have motivated enterprises to engage in R&D activities, contributing to the increase in R&D investment.

The R&D expenditure of enterprises accounted for 77.6 percent of the total gross domestic R&D expenditure in 2022, a proportion close to those in Japan, the Republic of Korea and the U.S.

China's high-tech manufacturing is a pillar of industrial transformation and upgrading. Not surprisingly, R&D investment in this sector crossed 600 billion RMB in 2022, an increase of 14.5 percent over the previous year.

Zhang Qilong, an NBS official, said the increased R&D intensity in key fields has created conducive conditions for core technology research and improvement of industrial capabilities.

According to the communique, the number of provinces and municipalities with R&D funding exceeding 100 billion RMB has increased to 12. In terms of regional distribution of R&D expenditure, Beijing, Shanghai and the Guangdong-Hong Kong-Macao Greater Bay Area, as well as the Yangtze River Delta region have played a crucial role in spearheading the advancements.

Zhang said there should be targeted support for key technology fields while investment in the commercialization of research results should be increased to improve funding efficiency.

Sustainable Growth of Chengdu High-tech Zone

By ZHONG Jianli

The first of its kind in western China, a virtual power plant platform was recently launched at the Chengdu High-tech Industrial Development Zone (CDHT) to make digitalized and smart energy management a reality.

"Through this digital platform, big data analysis and artificial intelligence models can be used to assist decision-making in energy management," said a spokesperson of CDHT, adding that they will start a number of new energy infrastructure projects to optimize the energy structure and achieve sustainable development.

Compared with traditional power plant, the virtual power plant can collect and analyze a large quantity of data related to distributed power supply, energy storage, charging piles and industrial adjustable electronic loads. This allows for improved energy conservation and reduced carbon emissions and facilitates the transition towards clean energy.

As one of the 12 national high-tech industrial zones that initiated the *National High-tech Zone Carbon Peaking and Neutrality Action Declaration*, CDHT has been dedicated to developing low-carbon industries and nurturing high-tech enterprises specializing in energy saving and environment protection.

Recognizing the actual needs of enterprises, CDHT has built a pool of experts engaged in green and low-carbon technologies, and recommended quality technicians to enterprises. In future, CDHT said it will further improve its policies on supporting enterprises, universities and R&D institutions along the entire green low-carbon industrial chain.

To pursue long-term sustainable development, the CDHT administrative committee has also partnered with the United Nations Development Programme (UNDP) to establish the SPARK Sustainable Development Innovation Laboratory (Chengdu). SPARK Lab has provided more channels for various stakeholders to communicate and cooperate on the low-carbon development of Chengdu.

The Re:Think SDG Innovation Week, a flagship activity co-organized by UNDP and CDHT, focuses on sharing sustainable development practices and experiences. This year's event, held on September 15, featured a panel discussion themed "ReThink & ReShape: Shaping a Sustainable Future through Circular Transformation." Participants discussed how the circular economy can promote sustainable development and how sustainable consumption can shape a sustainable future.

Yang Bin, an associate researcher of the Institutes of Science and Development, Chinese Academy of Sciences and deputy director of the China High-tech Zone Research Center, said that CDHT has outstanding features and advantages in international communication and innovation, especially in talent introduction, free trade zone development and industrial competitiveness.

Integrating Development with Global Prosperity, Stability

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Various parties have expressed their support and approval for GDI through bilateral and multilateral mechanisms. Currently, more than 100 countries and international organizations have voiced support for the GDI, and over 70 countries have joined the Group of Friends of GDI.

UN Secretary-General Antonio Guterres said that China-proposed GDI aligns with the UN 2030 Agenda and that China's efforts in their common development goals are unparalleled.

Former Pakistan Prime Minister Muhammad Shahbaz Sharif believed that the GDI calls on the international community to prioritize development, and responds to the international community's concerns about people's livelihood and development, providing a realistic path for countries to coexist harmoniously and seek common development.

The GDI is based on China's own development experience and solves global development problems, which is of great practical significance to global development, said Robert Lawrence Kuhn, Chairman of the Kuhn Foundation.

Chinese firms operating in Africa contributed over 20 percent to the continent's economic development in the last decade, according to Cavince Adhere, a Kenya-based international relations scholar.

Xulio Rios, director of the Observatory of Chinese Politics in Spain, told Xinhua that China's great contribution to global development is reflected not only in its own development, but also in sharing development experience with other countries and assuming global responsibilities, hailing China's development experience as the common wealth of all mankind, which is particularly important to the countries in the Global South.

Development is the eternal pursuit of human society. Looking ahead, building a community with a shared future for mankind relies on uniting as one and working together through consultation.

Case Study

First Tea-related Site Inscribed on World Heritage List

By Staff Reporters

As the first World Heritage site related to tea, the Cultural Landscape of Old Tea Forests of the Jingmai Mountain was inscribed on the UNESCO World Heritage List during the extended 45th session of the World Heritage Committee of UNESCO in Riyadh, Saudi Arabia on September 17.

The area is located in Pu'er city, southwest China's Yunnan province, and becomes China's 57th site on the list. In the 10th - 14th centuries, ancestors of the Blang and the Dai people discovered wild tea plants when they immigrated to the Jingmai Mountain area.

Chen Yaohua, director of the World Heritage Research Center at Peking University, said that the old tea forests in Jingmai Mountain also proved that tea originated in southwest China, where tea plants were discovered, used and planted the earliest in the world.

Incorporating five old tea tree forests, nine traditional villages and three shelter belts, the landscape maintains robust vitality until today, and is a model of sustainable development and the positive interaction between humans and nature.

The World Heritage Committee recognized that the landscape met the standards of a World Heritage site, stating that their unique protection and management system respects the local climate, topographic features and the population of animals and plants, and realized the protection of cultural and biological diversity and the sustainable utilization of natural resources. It displays the unique tradition of complementary utilization of natural resources by the Blang and the Dai people, who have long been living in the mountainous area.

The site selection, pattern and architectural style of the villages and traditional dwellings, which are elements of a heritage site, also demonstrated the knowledge and utilization of the ecological environment, the committee noted.

The application for entering the World Heritage List began in June 2010, and a lot of work has been done since.

Li Qun, deputy minister of culture and tourism and commissioner of the National Cultural Heritage Administration, said the administration has offered support and guidance to Pu'er city and Yunnan province, to systematically enhance the capability of heritage protection, management and demonstration, which enabled the good momentum of old tea forests and villages.

It's worth noting that in the past few years, Pu'er city and Yunnan province have published and implemented three specific laws and seven regulations providing legal and regulatory basis for the protection work.

Li also shared the experience in the successful application for the heritage site, including actively exploring a management system that fits the characteristics of agricultural civilization, promotion of the combination of modern technology and local traditional ideology, and driving the practice of world heritage application and protection facilitating rural revitalization.

A traditional village is surrounded by forests and tea gardens of the Jingmai Mountain in Pu'er, southwest China's Yunnan province. (PHOTO: XINHUA)

SKA Milestone Displays China's Dedication to Science

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The main reflecting dish of the entire antenna is a hexagonal space frame structure, consisting of 66 aluminum alloy triangular panels with different curvatures.

These 66 panels have different curvatures, so 66 special molds need to be made separately. In order to ensure the precision requirements, the design team needed to make the panels fit the molds as closely as possible during forming process. Designing an effective forming process alone took more than three months, according to the institute.

"The precision of our panel reaches 0.03-0.1 millimeters, which means the precision of the surface shape is better than one hundred microns. It is less than the thickness of two hair strands and represents the highest level of panel design and manufacturing in China," said Yang Jinrong, the project designer of the SKA mid-frequency dish antenna structure.

Behind the high precision requirement is the extreme precision of each installation link. The back frame of mid-frequency dish antenna uses a space frame structure, making the overall weight light. According to CETC54, the back frame is installed by connecting a bolt ball to a rod screw, and there are more than 100 bolt balls and 300 rods screws on each side of the antenna.

What poses challenges in this installation process is that the number of screw holes on the many bolt balls is different, and the angle of each screw hole on each bolt ball is also unique. A small designing error would make it impossible to install.

According to CETC54, in order to quickly and accurately complete the installation and disassembly, the craftsmen conducted dozens of tests, constructed four calculation models, and repeatedly studied the assembly process. They now have fully mastered the best installation method after more than two months of dedicated work.

"Obviously the government came onboard. We have seen a continuous and strong determination from the Chinese government. And a very good example of this is the FAST. The FAST is built here in China, which is one of the path finders of the SKA. The FAST is already in operation and is already delivering fantastic scientific insights, which really paves the way for the future of the SKA," said Garnier.