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Innovation Pathway

China's Innovation Centers Enter New Phase

Edited by SUN Jin

China's efforts to develop international technological innovation centers in Beijing (Beijing-Tianjin-Hebei region), Shanghai (Yangtze River Delta), and the Guangdong-Hong Kong-Macao Greater Bay Area have entered a new phase of expansion, following new arrangements announced at the Central Economic Work Conference.

By accelerating the cultivation of new growth drivers, the three centers have made a series of groundbreaking achievements. In the WIPO's Innovation Cluster Ranking 2025, the Shenzhen-Hong Kong-Guangzhou cluster ranked first, Beijing fourth, and Shanghai-Suzhou sixth. China's sci-tech innovation system is stepping into a higher level and a broader range of fields.

Evolution of China's innovation centers

Behind the achievements are the years of efforts across the whole nation.

In 2013, Beijing was chosen to be built into a global innovation hub. Three years later, national plans were issued to strengthen the capital city's role as a core innovation center and to position Shanghai as a major science and technology innovation center.

In 2017, formal agreements were signed to develop the Guangdong-Hong Kong-Macao Greater Bay Area into an international innovation center.

In the report to the 20th National Congress of the Communist Party of China, to "coordinate the development of international and regional centers for scientific and technological innovation" was highlighted. This marks the transition of international science and technology innovation center development from isolated breakthroughs to a new stage of integrated, regionally coordinated growth.

Progress across three innovation centers

For 12 years, continuous investment and policy support has helped the innovation centers make remarkable achievement in science research and cultivate advanced manufacturing clusters.

During the 14th Five-Year Plan period (2021-2025), Beijing's R&D spending consistently exceeded six percent. It also introduced more than 40 industrial policies supporting key areas such as AI and commercial spaceflight.

In Shanghai, R&D spending accounted for about 4.4 percent of the city's GDP during the same period. The scale of Shanghai's three leading industries — integrated circuits, biomedicine and AI — exceeded 1.8 trillion RMB, and attracted 635 foreign-funded R&D centers.

In the Greater Bay Area, Guangdong has seen a surge in startup projects led by entrepreneurs from Hong Kong and Macao. See page 3



A freight train loaded with Chongqing-manufactured new energy vehicles departs from Yuzui Station at Guoyuan Port in Chongqing, southwest China, January 7, 2026. This freight train is expected to be transferred to a vessel bound for the Middle East via the Nansha Port in south China's Guangzhou city. With the rail-sea intermodal train service, the entire transport process is completed under a single declaration, a single inspection and a single release. (PHOTO: XINHUA)

STI Frontier

Intelligent Mining of Super Thin Coal Seams

Edited by WANG Xiaoxia

In China, thin coal seams account for 20 percent of the total reserves, but their output only makes up about 10 percent of the total coal production, due to the extreme mining difficulties. However, the industrial fine powder contained within the seams — coking coal, known as the "rare earth" of coal, is an indispensable and important raw material for steel enterprises.

To conquer the challenge of mining coal seams with a thickness of less than 1.3 meters, an R&D team led by Heilongjiang University of Science and Technology (USTH) has developed an intelligent mining system of extremely thin coal seams at a depth of over a kilometer underground.

This has led to the remote control and real-time monitoring of the mining of extremely thin coal seams.

Smaller machine

In thin coal seam mining, the major challenge is to integrate the small size and high power of the coal shearer machine, according to USTH Professor Wu Weidong.

Usually, the thinner the coal seam, the harder it is. To mine a coal seam over two meters thick usually requires a machine powered by 200 kilowatts. However, an installed power of 500 to 900 kilowatts is required for mining extremely thin coal seams.

The key is innovation in building the machine material and structure. By using high-performance material, the rigidity, wear resistance, and load-bearing capacity increase. Through structural reconstruction, the equipment's lifespan is prolonged, and the overall height is also reduced.

To further reduce the size of the machine's motor, the team decided to in-

crease the voltage from 1,140 volts to 3,300 volts, which meant that all electrical components had to be reconfigured. It took four months to adjust and testify parameters, finally reducing the height of the equipment from 630 mm to 588 mm, and even leaving 20 mm of extra space for the machine to pass through.

In October 2022, the sample machine was sent into the mine for testing, nimbly shuttling through the extremely thin coal seam. After its application, the mining efficiency of extremely thin coal seams was raised from 15,000 to 20,000 tonnes per month to 40,000 to 50,000 tonnes, while the number of workers has been reduced from around 20 to just five or six.

5G remote control

In extremely thin coal seams, the narrow space and strong electromagnetic interference make it impossible to deploy conventional 5G equipment. See page 2

International Cooperation

China-BRICS New Quality Productive Forces Research Center Opens

The China-BRICS New Quality Productive Forces Research Center has opened in Beijing recently, according to the Ministry of Science and Technology.

Speaking at the center's opening ceremony, China's Vice Minister of Science and Technology Chen Jiachang stated that the BRICS cooperation mechanism is the most influential platform for cooperation among emerging markets and developing countries today.

The center will be an international platform for research exchange and cooperation within the BRICS cooperation framework.

The center will operate under a "physical + digital" model, building an international platform for research, exchange, and cooperation under the BRICS cooperation mechanism.

It will focus on joint theoretical and applied studies on new quality productive forces, cooperation on sci-tech innovation, the exchange of personnel and professional training programs to foster interdisciplinary talent with a global outlook, and the development of a collaborative research network that provides intellectual and decision-making support for policy formulation and shared prosperity among BRICS member states and partner countries.

For BRICS countries, the joint development of new quality productive forces is a key arena to deepen mutually beneficial cooperation, a powerful engine for inclusive and shared development, and an effective step toward building a community with a shared future for humanity, said Chen.

During the center's opening ceremony, topics such as strengthening BRICS cooperation in new quality productive forces and promoting the transnational optimization of innovation resources were discussed among experts.

Source: Xinhua

WEEKLY REVIEW

Breakthrough in Flexible Solar Cells Made

Chinese researchers, led by Soochow University in east China, have resolved key challenges in maintaining efficiency and stability in flexible tandem solar cells. This is a milestone breakthrough in silicon-based flexible photovoltaics. The study was published in *Nature*.

Lithium-ion Battery Experiment in Space Station

The Shenzhou-21 crew has conducted a novel experiment on the fundamental science of lithium-ion batteries aboard China's Tiangong space station to uncover the mechanisms behind battery performance by leveraging the unique conditions of space.

Robots Smaller Than Salt Grain Can Think

Researchers at the University of Pennsylvania and the University of Michigan have built the smallest fully programmable autonomous robots ever created. They are barely visible and smaller than a grain of salt (around 200x300x50 micrometers), yet smart enough to sense, decide and move completely on their own.

New Viruses Found in Whales and Orcas

An international research team has discovered two previously unknown viruses in short-finned pilot whales and orcas from the Caribbean region of the North Atlantic Ocean. This is the first time circoviruses have been detected in cetaceans from this region and adds to the growing list of viruses known to infect marine vertebrates.

New Graphic

During the 15th Five-Year Plan period (2026-2030)

CHINA'S RAILWAY OPERATING MILEAGE IS EXPECTED TO REACH

180,000 km

HIGH-SPEED RAIL

60,000 km

Source: China State Railway Group Co., Ltd.
Designed by SONG Ziyan / Science and Technology Daily

Innovation Fast-tracks Agricultural Renewal

By LU Zijian & MA Aiping

In 2025, China made great strides in transforming agricultural innovation to actual productive forces, with sci-tech innovation in agriculture becoming a crucial support system for rural revitalization.

The country unveiled its "No. 1 central document" for 2025 in February last year, outlining priorities to deepen rural reforms further and specific steps to advance all-around rural revitalization.

China plans to support the development of smart agriculture and expand the application scenarios of technologies such as AI, big data and low-altitude systems, according to the document.

In March 2025, a "100 counties, 10,000 hectares" technology integration demonstration project was initiated. The

year-end data shows that this led to the increase of yield and income with less usage of fertilizer and pesticide in over 50 kinds of crops planted in 61 counties across 18 provinces.

The field crops witnessed an average yield growth of five to eight percent, and the figure for cash crops is 10 to 15 percent.

An interest sharing mechanism was also established among governments, enterprises, research institutes and farmers during the project, to ensure maximized value for each party, according to Mei Xurong, project leader and researcher at the Chinese Academy of Agricultural Sciences.

Through clear obligation and benefit distribution agreements, the four parties united and achieved a win-win situation where governments get grain, enter-

prises get access to market, experts get data, and farmers get income.

In May 2025, seven departments, including the Ministry of Agriculture and Rural Affairs and the Ministry of Science and Technology, jointly released guidelines on accelerating the overall efficiency of the agricultural science and technology innovation system.

Substantial achievements were made throughout the year. One example is unmanned aerial vehicles (UAVs), which have become a new type of farm tool in Gansu province, driven by the "low-altitude economy + rural revitalization" practices spearheaded and promoted by the provincial science and technology department. This has seen the development of a new generation of tech-savvy rural UAV pilots.

See page 3

WECHAT ACCOUNT



E-PAPER

