

From Frontier Technologies to Development Engines

Observer

By Staff Reporters

From the innovation of humanoid robots to the rise of intelligent connected vehicles, and the establishment of a commercial spaceflight ecosystem, a series of practices are transforming cutting-edge technologies into productive forces all over China.

A crucial step for the industrialization of science and technology is its entry into real application scenarios. Some 300 robot ecosystem enterprises in the Beijing Economic-Technological Development Area vividly demonstrate how this works.

The Beijing Innovation Center of Humanoid Robotics in the development area collected data from real scenarios like supermarkets and talent apartments, and achieved rapid technology iteration via dedicated pilot factories, establishing a closed-loop "scenario-data-computing power" system, Wei Jiaying, brand and public relations lead at the Center, said.

Qingdao in Shandong province in east China conducted a sci-tech innovation project with 10 demonstration projects, building 100 innovation platforms, tackling 1,000 technological barriers, and fostering 10,000 sci-tech enterprises.

During the 14th Five-Year Plan (2021-2025) period, Qingdao's smart home appliances, rail transit equipment, instruments and meters, and marine engineering equipment industries were selected as national advanced manufacturing clusters.

To truly translate into productive capacity, technological innovation must



An AI workshop in Nanjing, Jiangsu province, demonstrates various robots. (PHOTO: XINHUA)

seamlessly integrate multiple stages — from R&D and pilot testing to industrialization — ensuring technologies smoothly enter the market.

The Xiang'an Biomedicine Laboratory in Xiamen in southeast China, established in 2021, harnessing the biomedicine research team of Xiamen University, has been granted full autonomy to build platforms, assemble teams and innovate mechanisms to overcome bottlenecks in commercialization. This will drive the commercialization of biomedicine innovation achievements.

The efficient coordination mechanism between research institutions and enterprises has a huge contribution in the successful launch of products, Wang

Daning, R&D director at Xiamen Inovax Biotech Co., said.

The research teams in universities focus on "zero to one" fundamental research, conducting mechanism research, technological path exploration and concept verification during the lab phase, while enterprises undertake the "one to 100" industrialization, rapidly advancing process development, enlarging commercial scale, and quality control to ensure stable and efficient production of products, Wang added.

The automotive supply chain has also achieved critical linkages across multiple cities. Chongqing in southwest China has accelerated the development of intelligent connected new

energy vehicles by increasing R&D investment and launching multiple industrial innovation initiatives.

In Heihe in Heilongjiang province in northeast China, the world's largest year-round low-temperature testing facility enables winter testing throughout the year. Previously, they had to be done overseas. This has halved the time taken by corporate R&D cycles and enhanced the automotive supply chain.

In addition, localized innovation ecosystems also play a key role in promoting new quality productive forces.

Previously known for its coal industry, Hebi in central China's Henan province has been transformed into a hub for commercial spaceflight, gathering nearly 40 upstream and downstream enterprises. The city also set up the first batch of satellite industry fund worth 400 million RMB and leveraged nearly four billion RMB in social investment. The fund primarily supports the development of satellite manufacturing, launch, application and related industries.

Jilin province in northeast China cultivates new quality productive forces in agriculture tailored to local conditions and has established a number of high-level breeding innovation platforms.

Jiang Hongwei, director of the institute of soybeans at the Jilin Academy of Agricultural Sciences, said the Academy has established five demonstration bases for soybean yield enhancement across eastern, central and western parts of the province, showcasing over 20 new varieties to advance crop improvement.

Concurrently, Jilin's laboratory system development has reached a new height, establishing a multi-tiered, high-level innovation platform matrix.

Case Study

Tech Empowers Agriculture in Shandong

By Staff Reporters

At the Agricultural High-tech Industrial Demonstration Area of the Yellow River Delta of Shandong province, the area of cultivated land has seen a net increase for four consecutive years, with a successive series of new saline tolerant crops being introduced. Saline-alkali land has been transformed into fertile soil, vividly demonstrating how technological innovation boosts agricultural output in the province.

High-yield, high-quality

In the breeding industry, it is almost impossible to breed a crop species that can guarantee high yield and high quality simultaneously, yet Cao Xinyou, director of Crop Research Institute, Shandong Academy of Agricultural Sciences, and his team managed to do just that.

To breed a new wheat species, selection of at least six generations is needed, said Cao, adding that they had to experiment with the best combination from thousands of hybrid combinations balancing multiple characters like yield, quality, disease resistance and lodging resistance.

The species Jimai 44, developed by Cao's team, was approved in 2018. Its highest yield per mu (one mu equals 666.7 square meters) has reached 808.6 kilograms to date, breaking the record for super high-gluten wheat across the country. Jimai 44 has been planted in 42.51 million mu of land.

The success of Jimai 44 was no accident in the laboratory, as the researchers focused on the actual needs and fit for production ideas. Having bred 15 new species of wheat, Cao said the key to breeding lies in the field, and agricultural researchers can achieve actual results only when they truly immerse themselves in grassroots work.

At the Industrial Demonstration Area, 46 innovation teams from across China have now converged to tackle key core technologies, aiming to breed varieties suitable for saline-alkaline land.

Tian Zhixi, a researcher at the Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, has rooted himself in this saline-alkaline area. Challenges have been constant companions on his research journey. During the first year of trial

planting, nearly none of the seedlings survived.

"What to do? If it fails, we try again!" said Tian. For four consecutive years, his team battled with field tests, experimentation, elimination and selection. After screening over 8,000 soybean samples, they ultimately identified 56 that had significant salt-tolerant germplasm, 18 that had outstanding potential, with two soybean varieties that practically performed particularly well.

In 2023, Tian's team demonstrated the cultivation of Keduo 35 on 600 mu of saline-alkali land in Dongying, Shandong. This saline tolerant soybean achieved an average yield exceeding 300 kilograms per mu — far surpassing China's national average of 132 kilograms and the U.S. average of 225 kilograms.

Last year, Keduo 35 was planted over 4,000 mu in Dongying, and holds the potential to provide high-quality seed sources for 200,000 mu of saline tolerant soybeans in the future.

Soaring value of smart agriculture

Today, pomegranate cultivation in Zaozhuang covers over 120,000 mu, and the adoption of modern technologies like smart greenhouses and integrated water-fertilizer systems has ushered pomegranate farming into a new smart era.

"In the past, pomegranate yields were low and techniques were rudimentary," said Liu Yuan, a villager from Liuyuan town in Zaozhuang.

By adopting insect-trapping sticky tape technology and water-saving irrigation techniques, Liu has boosted his annual pomegranate profits from 20,000 RMB to nearly 100,000 RMB.

Zaozhuang pooled scientific research resources to introduce facility agriculture into the pomegranate industry, and built a modern pomegranate deep-processing industrial park, achieving multiple value leaps along the industrial chain.

Advanced technologies like the Internet of Things, big data and AI have propelled local specialty produce in Shandong — such as Shouguang vegetables, Jinxiang garlic, Zhangqiu scallions, and Zhanhua winter jujubes — toward intelligent and precision production, expanding the value-added potential of the agricultural industry.



A farmer picks strawberries in a greenhouse in Liutong village, Binzhou city, Shandong province. (PHOTO: XINHUA)

Policy Express

China Releases Mandatory Drone Standards

By Staff Reporters

China has introduced two mandatory national standards to strengthen the management of civilian unmanned aircraft systems (UAS), according to the State Administration for Market Regulation (SAMR). One is the *Regulations on Real-name Registration of Civil Unmanned Aircraft Systems* and the other is for the operational identification of relevant systems. They will both take effect on May 1, 2026.

'Real-name registration'

The measures are designed to implement requirements laid out in the Interim Regulations on Unmanned Aircraft Flight Management, particularly those covering real-name registration, activation procedures, and identity reporting

for civilian drones. SAMR and the Civil Aviation Administration of China jointly led the drafting process.

Under the Regulations on Real-name Registration, manufacturers, operators, and management authorities must follow a standardized workflow for registering and activating drones. The standard clarifies registration responsibilities, information management and inquiry rules, deregistration procedures, and data-exchange interfaces. It explicitly requires that drones remain incapable of flight both before activation and after deactivation, ensuring that unregistered or inactive devices cannot take off.

Tracking drone movements

The second standard requires drones to automatically transmit their identity, location, speed, and status

information to regulators from the moment they are powered on, and throughout the entire flight. This allows authorities to maintain real-time oversight of all airborne drones.

According to the requirements, civilian drones must support both broadcast-based and network-based operational identification. They must also be able to receive network-based identification information transmitted via cellular networks, wired ground networks, and satellite communication links. The update and transmission interval for this data must not exceed one second.

Transition period for existing drones

The standards include a transition period for manufacturers to upgrade existing models.

For drones already sold and in use, the standard for operational identification requires manufacturers to retrofit operational identification modules within 12 months of the standards' publication. Once upgraded, these drones will be given a 36-month transition period. After that transition period expires, all civilian drones must fully comply with the new standards before they are permitted to operate.

According to the administration, the new technical standards address safety questions of "who is allowed to fly" and "who is flying," which will ensure the safe and orderly development of China's rapidly expanding drone industry.



New Finance Policy to Boost Green Factory Growth

By LIN Yuchen

In a major push for sustainable manufacturing, the Ministry of Industry and Information Technology (MIIT) and the People's Bank of China (PBOC) have jointly issued a new notice to support green factory construction with green finance policies, aimed at accelerating the development of green factories.

This strategic initiative is a key part of China's efforts to achieve its "dual carbon" goal — carbon peaking and carbon neutrality — by 2030.

Green factories are critical to the nation's green manufacturing efforts, representing over 20 percent of total industrial output. With China's ongoing industrial transformation, the

establishment and expansion of green factories is a pivotal component of reaching environmental targets. The country has already nurtured 6,430 green factories, and this new policy is expected to enhance their development.

The notice outlines three key areas of focus for financial support.

- It encourages backing transformative innovations in traditional industries, such as major technological breakthroughs in low-carbon processes and the development of critical technologies.
- It promotes the financing of green upgrades, including energy-saving, water-conservation, pollution reduction, and resource recycling projects.
- It supports zero-carbon factory initiatives and identifies carbon reduc-

tion potential in existing green factories.

A cornerstone of this initiative is the role of financial innovation. The PBOC has already committed 800 billion RMB through carbon reduction support tools, enabling financial institutions to increase investment in clean energy, energy efficiency, and carbon reduction technologies.

This policy aims to expand financial products tailored to green manufacturing, such as long-term loans, renewable debt financing, and green bonds, which will directly support factory construction and technological upgrades.

The policy also sets ambitious goals for the future. By 2030, the proportion of green factory output is expected to reach 40 percent of total industrial

output. To achieve this, MIIT plans to refine the green factory evaluation system and introduce a multi-level cultivation management approach.

The notice also emphasizes expanding direct financing channels, including the issuance of green and transition bonds, and strengthening risk-sharing mechanisms.

In recent years, MIIT and PBOC have pioneered industry-finance collaborations, utilizing platforms and pilot programs to match green factory financing needs. More than 130 billion RMB in green financing has already been allocated, with a focus on developing financial products for industrial green upgrades.



Hainan Special Customs Operations to Boost Trade

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The island's ocean resources can be leveraged to cultivate deep-sea technology and industry. The Wenchang Commercial Space Launch Site will attract more aerospace-related enterprises.

Supportive policies and regulation measures are adding to the boost. For example, the new regulations on tax-related professional services in the Hainan FTP allow overseas personnel to take

the certified tax agent examination and support cooperation with overseas institutions to better serve cross-border business.

According to the Overall Plan for the Construction of the Hainan FTP, the island will see liberalization and facilitation "basically established" by 2025, become "more mature" by 2035, and develop into a globally influential duty-free trading center by 2050.