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Innovation Pathway

Xi Stresses Role of Sci-tech Innovation in Modernization

By Staff Reporters

Chinese President Xi Jinping, also general secretary of the Communist Party of China Central Committee, stressed self-reliance and strength in science and technology as the "key" in building China into a great modern socialist country.

Xi made the remarks when he visited a national information technology (IT) innovation park in Beijing on February 9.

He urged efforts to concentrate strength for major undertakings, pool all quality resources to secure breakthroughs, and move faster to tackle prominent weaknesses to achieve the country's strategic objectives.

At the park, Xi learned about IT application and innovation, and was briefed on Beijing's efforts to expedite the development of an international sci-tech innovation center. He checked the display of sci-tech innovation outcomes, and talked with researchers and heads of sci-tech enterprises.

Established in 2019, the national IT innovation park has emerged as a pivotal engine for transforming cutting-edge research into industrial reality.

Dedicated to advancing China's IT application innovation sector, the park is building a fully localized ecosystem of hardware and software infrastructure. Attracting leading enterprises, investment institutions, and academic partners, it is systematically cultivating a robust industrial chain, accelerating breakthroughs in core and common technologies, and facilitating the commercialization of innovative applications.

To date, it has welcomed over 1,000 companies spanning critical domains such as central processing units of computers, operating systems, supercomputing, cybersecurity services, and application software, creating a dynamic, competitive innovation landscape.

It is also integrating next-generation technologies such as AI, quantum information, 6G communications, and intelligent hardware into its industrial framework, fostering deep synergy between established innovation systems and emerging tech frontiers. This is strengthening foundational technological capabilities while enhancing cross-sector collaboration.

The park's initial 530,000-square-meter development zone is already producing significant scale effects and driving industrial momentum. An additional 1.17 million square meters of high-tech industrial space is set to come fully online this year, injecting new energy into the ongoing transformation of China's digital economy.

Robot dogs perform with a human lion dance team for the opening of the Spring Festival flower market in Shenzhen city, Guangdong province in South China on February 10. (PHOTO: VCG)

STI Frontier

Traffic Safety Test System Gets Smart

By LU Zijian & WANG Yuhan

Today, it takes only three days to test vehicles in dangerous scenarios that traditional testing needed half a year.

This is because of the creation of a 'limitless' testing environment for autonomous driving vehicles in a limited physical space by Zhao Xiangmo, president of Xi'an University of Architecture and Technology and professor at Chang'an University (CHU), and his team.

They have developed a traffic safety testing system integrating intelligent in-vehicle terminals, roadside sensing equipment, traffic cloud platforms and trusted testing toolchains for autonomous driving vehicles.

Testing vehicle braking system

The automobile industry gained explosive growth around 2007. At that time, the equipment to test the anti-lock braking system (ABS) had to be mostly imported and only some vehicle parts were tested before assembly. The control effect of ABS for the entire vehicle could be checked only in a test field or on open roads through sampling.

Even field tests and open road tests were not safe enough. Besides, it is impossible to conduct these tests on every vehicle, according to Xu Zhigang, deputy director of the School of Information Engineering of CHU.

The question was how to test the real performance of ABS on each vehicle without disassembling the car by precisely simulating adhesion coefficients for different road surfaces and their combined operating conditions on the test bench.

The research team tried to improve upon German technologies at first, but it didn't work, as they were designed based on European road conditions, which are different from Chinese ones.

After an in-depth survey for half a year, the team took another approach. They built a changeable road surface test bench in the lab by precisely integrating a magnetic powder clutch with a flywheel assembly.

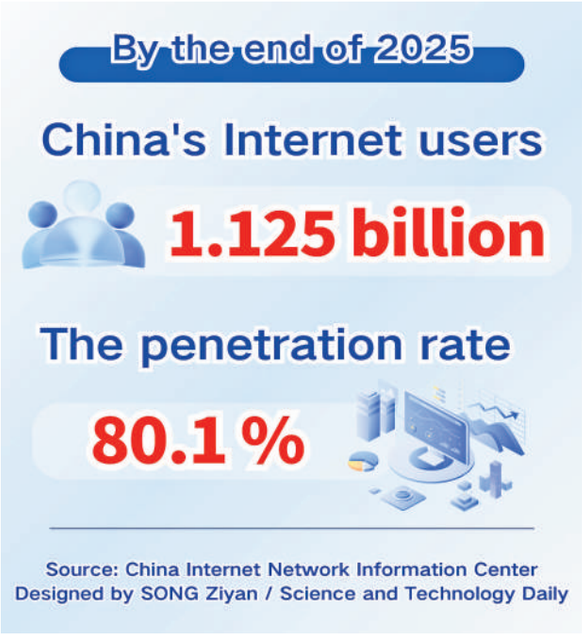
This system can switch between various complex road conditions such as ice, snow and corrugated surfaces within 0.5 second, completing a full vehicle test in 20 minutes. It was a breakthrough in non-disassembly ABS testing on a test bench.

CT for road testing

Another key element is road safety, and bridges play an important part in this.

See page 2

New Graphic



WECHAT ACCOUNT E-PAPER

Tech Goods Highlighted in Spring Festival Market

Edited by WANG Xiaoxia

The Spring Festival, also know as Chinese New Year, is the country's most important traditional holiday, marking the peak season for consumer spending — driven by family reunions, travel, dining, entertainment and gift purchases.

This year spending has seen a big splurge on tech goods, with AI glasses, AI toys and other products that were once "niche and pioneering" now finding their way onto many consumers' festival shopping lists.

It highlights the diverse potential of China's consumer market, a result of the joint drive of policy support, consumption upgrade, technological iteration and the evolution of the industrial chain.

At Huaqiangbei, the world's largest electronics market in Shenzhen, a Spring Festival shopping fair is in full swing. Sales of consumer electronics, smart devices and AI wearables have risen by around 30 percent compared to off peak levels, according to a *Global Times* report.

"AI glasses with translation functions and AI toys that can accompany children are very popular," said a distributor at Huaqiangbei.

In January, multiple e-commerce platforms launched Spring Festival shopping campaigns. Data shows that the search volume for AI toys soared. For example, the number of searches for AI toys on China's largest retailer JD.com, has increased by 125 percent year-on-year.

The consumption craze for tech goods is supported by government policies. In December 2025, the National Development and Reform Commission and the Ministry of Finance jointly issued large-scale equipment renewal and trade-in subsidy policies for consumer goods in 2026, with smart glasses now included on the subsidy list.

For individual consumers buying any mobile phone, tablet, PC, smart watch, and smart glasses priced at under 6,000 RMB, a government subsidy of 15 percent will be provided.

See page 4

International Cooperation

China's Technology Empowers Zimbabwe's Agriculture

Edited by WANG Xiaoxia

In Zindi, a mountainous village in Zimbabwe's Mashonaland Central province, rows of solar panels stand basking in the sunlight. In the farmland, the pump operates on solar energy, sending clear groundwater along pipes to irrigate the flourishing maize fields.

It's hard to imagine that just two years ago, this China-Zimbabwe agricultural cooperation demonstration village used to be a poor community plagued by water and electricity shortages.

"In the past, we were dependent on the weather for our livelihood," said village head Weveson Zindi. "During droughts, there was no hope of a good harvest."

The landlocked southern African country is prone to recurrent droughts and flooding, and has long been confronted with challenges such as weak agricultural infrastructure and lagging rural development.

In recent years, agricultural cooperation has deepened under the framework of the Forum on China-Africa Cooperation and the Belt and Road Initiative. The Zindi demonstration village project was implemented in 2024.

Chinese agricultural experts began with the most urgent issue: water supply. They drilled wells, installed solar-powered pumps and laid pipelines, building an irrigation system with a daily water supply capacity of 55,000 liters.

Zindi said with irrigation infrastructure improving, there are bumper harvests of crops such as maize and sweet potato in the once barren land. After the irrigation problem was solved, Chinese agricultural experts taught the villagers the use of organic fertilizers, gradually transforming the sandy plots into fertile fields for cultivation. They also helped build a professional agricultural machinery team by training local management and maintenance personnel.

The advanced techniques they introduced have significantly improved villagers' living conditions. Villagers have learned to grow different crops, such as chili peppers, okra and sesame seeds, and the sale of vegetables and poultry has increased their incomes.

Chinese experts have organized local villagers to form management teams, making crop planting, poultry breeding and maintenance of irrigation facilities more orderly.

WEEKLY REVIEW

Home-developed Antarctic Vehicle Travels over 10,000 km

On February 10, China's self-developed Snow Leopard 6x6 wheeled vehicle successfully completed extreme environment tests in the Antarctic interior, covering over 10,000 kilometers with no malfunctions. The vehicle was tested across five typical Antarctic interior terrain areas: sea ice, gravel, hard snow, solid ice, and soft snow.

Reusable Experimental Spacecraft Launched

On February 7, China successfully launched a reusable experimental spacecraft from the Jiuquan Satellite Launch Center in the northwest, using a Long March-2F carrier rocket. The experimental spacecraft will support the peaceful use of space by conducting technological verification for reusable spacecraft.

Optical Fibers Made from Low-loss Silicon Wafers

A team from the California Institute of Technology has recently found a way to guide light on silicon wafers with low signal loss approaching that of optical fiber at visible wavelengths. This will have a profound impact on a variety of on-chip applications, including precision measurements.

Micron-level 3D Printing with Both Rigidity & Flexibility

A research team from the University of Texas at Austin has developed a new 3D printing method that can produce objects with dramatically different properties, including levels of hardness and transparency, on a pixel-by-pixel basis while using commonly available materials and low-cost 3D printers.

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Spring Festival Feature

Technology Quietly Improving Lives

By Staff Reporters

In the days leading up to the Chinese New Year, as trains and highways fill with travelers heading home, technology is a quiet integral part of daily operations such as essential services to keep the work going without human presence. Today's working systems are built to solve problems and keep these services running. This is how China's sci-tech innovation story is being written with steady, practical steps.

Winter watermelons in the Taklamakan

In Shule, a county in Xinjiang in northwest China, winter temperatures often drop to minus 10 degrees Celsius. Yet in a local agriculture demonstration park, watermelon seedlings are thriving in greenhouses. By February, the first harvest will be ready, something unthinkable a few years ago.

The secret lies in self-heating greenhouses developed by Weifang Guopai Watermelon Agricultural Technology Co., Ltd., a company from Shandong province in the east that came to Shule in 2021 through a local investment drive. The structures use multi-layer composite insulation that absorbs solar heat during the day and releases it at night, requiring no extra heating.

Inside one greenhouse, technician Buhaliqi Sidike checks a water fertilizer integration system. She presses a button, and nutrient-rich water flows directly to each plant's roots through drip lines. "It saves water, reduces labor, and gives every melon the same sweetness," she said.

After graduating from college, Buhaliqi joined an agricultural park. Within three years, she became skilled in climate control, plant grafting, pollination techniques, and automated greenhouse systems. She now oversees dozens of greenhouses.

To ensure consistent quality, the park uses a grafting machine. Workers place melon scions and pumpkin rootstocks into the device, and it fuses them with precision, eliminating the uneven results of manual grafting.

The melons sell for over 100 RMB each, several times the price of regular varieties, thanks to their thin rinds and uniform sweetness. The operation now provides stable jobs for more than 400 people and seasonal work for over 1,000 more.

The No.3 and No.4 main pier caps of the Chongqi Highway and Railway Yangtze River Bridge are both topped out on September 29. 2025. (PHOTO: XINHUA)

A local seed breeding company plans to move into the park to develop new watermelon varieties suited to Kashgar's intense sunlight and arid soil, aiming to build a full seed industry chain.

For Buhaliqi, the work is personal. "Growing melons is a sweet business," she said. "I want our fruit to reach markets around the world."

Crossing the Yangtze at full speed

More than 3,000 kilometers east, near where the Yangtze River meets the sea, two major projects are nearing completion: the Chongqi Highway Railway Yangtze River Bridge and the Chongming-Taicang Yangtze River Tunnel.

Together, they form the critical link of the Shanghai- Chongqing- Chengdu high-speed rail line. For the first time in China, trains will cross the Yangtze at 350 kilometers per hour without slowing down.

The bridge spans 4.09 kilometers, with a main span of 400 meters, the longest of its kind for ballastless track for high-speed rail. It carries a six-lane highway on top and, below, tracks for both 350 km/h high-speed trains and the 250 km/h intercity rail.

Building it was not easy. The riverbed here is soft silt. To anchor the piers, the teams drilled piles 142 meters deep, with alignment tolerance under 0.5 per mille. Steel trusses were then pushed into place using synchronized jacks, millimeter by millimeter.

Underneath the river, the challenge was even greater. The Chongming- Taicang Yangtze River Tunnel is 14.25 kilometers long, making it the world's longest high- speed rail tunnel built with single-direction excavation. At its deepest point, it lies 89 meters below the surface, under water pressure of 0.9 megapascals.

Here, the Linghang, the world's largest diameter tunnel boring machine for high- speed rail, is carving its final stretch. Engineers describe its operation as "someone watches, no one steers." An automated system handles real-time geologic sensing, path adjustment, and safety controls.

To withstand extreme pressure, the team developed a new grouting material that forms a stabilizing layer around each concrete segment. They also added a sixth sealing ring to the shield tail, the first time in China, creating a strong waterproof barrier.

Every 500 meters, five color LED strips light the tunnel. When finished, this route will shorten travel time between Shanghai, Nantong, and Chongqing, making daily commutes and family visits easier for millions.

A mountain dam powers green future

Far southwest, in the steep valleys of Yunnan province, another transformation is underway at the Xiaowan Hydropower Station on the Lancang River.

Soaring 300 meters, it is the world's first concrete double curvature arch dam of this height. Completed in 2009 after a decade of construction, it generates an average of 19 billion kilowatt hours of clean electricity each year.

During construction, engineers faced near- vertical cliffs, fast currents, and unstable rocks. To stabilize the slopes, they installed 17,000 anchor cables into the canyon walls. Many contain sensors, so any movement in the dam is instantly known to technicians.

Today, the station is being reinvented through digital intelligence. Eighty-eight underground caverns and a powerhouse as deep as a 30- story building once made inspections slow and difficult. Now, drones equipped with AI, high- resolution cameras, and 3D lasers scan the entire dam structure under four hours, a task impossible for humans on their own.

Last September, Xiaowan became China's first hydropower station with fully domestically produced control systems for all four core functions: computer monitoring, relay protection, turbine governors, and excitation systems. Each of its six units has a capacity of 700,000 kilowatts.

"This year, for the first time, we can run the central control room with no staff on site during holidays," said Ma Chunli, head of operations. "Smart systems handle everything."

Xiaowan's transformation does not stop at automation. On hillsides near the reservoir, rows of blue solar panels shimmer in the sun. Beneath them, lemon trees grow in the shade, heavy with fruit.

Zhang Xiaodong, who leads the station's new energy division, explained the idea: "Solar power is clean but intermittent. Our dam acts like a giant battery and it can start and stop quickly to smooth out solar fluctuations and keep the grid stable."

His team works nonstop, even during Spring Festival. Their vehicles log nearly 300 kilometers a day. Some colleagues have worked over 350 days this year.

Soon, six new solar farms will connect to Xiaowan, adding 490,000 kilowatts of clean power. Combined with the dam, the total clean energy capacity will reach 5.435 million kilowatts.

"The shift from hydropower alone to a hybrid water solar system is a complete renewal," Zhang said. "And when our power reaches families far away, that's why we stay."

These stories don't announce themselves. They simply make things work more reliably, more efficiently, more sustainably for people far beyond the sites where they begin.

The Xiaowan Hydropower Station on the Lancang River. (PHOTO: SUN Yu / Science and Technology Daily)

Traffic Safety Test System Gets Smart

From page 1

In 2016, a 20- meter bridge pier on the Xi'an-Hanzhong High-Speed Railway developed cracks. Neither traditional method — core drilling nor ultrasonic testing — was suitable for tackling the urgent risk: the former would damage the structure, while the latter has a detection depth of only two to three meters.

A physical examination in hospital inspired Zhao: What if he conducted computed tomography (CT) on the bridge?

The first challenge was to create an effective detector. Traditional piezoelectric ceramic ultrasonic transducers have limited power, and their sound beams cannot penetrate steel concrete. The team therefore developed a new generation of transducers based on rare- earth magnetostrictive materials.

After 18 months of hard work, the team developed a 24-channel testing system. Coupled with the improved ray-tracing algorithm and CT system, it reconstructs three- dimensional images like "building blocks," achieving a detection depth exceeding 10 meters.

This not only precisely located areas of concrete porosity up to 10 meters deep in the large bridge at a section of the Xi'an- Hanzhong High- Speed Railway, but also realized the first 3D visualization of the bridge's inner defect, said Liu Zhanwen, a member of the research team and deputy director of Shenzhen Research Institute of CHU.

Now the system has been successfully applied in road and bridge engineering projects in many places.

Building a smart brain

Autonomous driving vehicles are developing rapidly, which brings a new challenge: How to ensure they are safe enough?

It is estimated that they have to drive billions of kilometers on open roads to experience all possible scenarios, Zhao said. Traditional testing cannot meet the demand of the fast iteration of technologies.

Here, Zhao's team proposed a virtual- real integration solution, i.e., building a smart and Internet- connected testing base integrating vehicles, roads and cloud technology.

During the test, vehicles driving on real roads, and virtual scenarios, such as pedestrians and extreme weathers, are incorporated via car networking communications, enabling limited physical space to simulate nearly limitless road conditions.

However, the initial simulator motion platform lacked sufficient precision, leading to severe distortion of the vehicle dynamics model. Inspired by the six-degree- of- freedom motion platform of the flying simulator, the research team redesigned the testing system.

On a 52- km all- feature test road in Shandong province in east China, the first of its kind nationwide, testing for scenarios is done in three days. With traditional methods, it would take half a year.

This integrated system has completed over 120,000 hours of equivalent testing, and some of its standards have been adopted by 16 domestic and international regulations.

Policy Express

2026 Rural and Agricultural Modernization Plan Activated

By LIN Yuchen

During the 14th Five-Year Plan period (2021- 2025), China strengthened its overall agricultural production capacity, consolidated the gains of poverty alleviation, raised farmers' living standards, and made tangible progress in all-round rural revitalization.

On January 3, China released its 2026 "No. 1 Central Document," laying out a roadmap to advance agricultural and rural modernization and to promote all-round rural revitalization.

The document emphasizes that agricultural and rural modernization is fundamental to the overall quality and sustainability of China's modernization drive.

It comprises six parts, covering six key areas: enhancing overall production capacity, quality and performance of agriculture; implementing regular and targeted assistance measures; promoting stable income growth for farmers; building a beautiful and harmonious countryside desirable to live and work in, based on local conditions; strengthening institutional innovation; and continuing the Party's leadership over work related to agriculture, rural areas and farmers.

Agriculture and rural development are prioritized, with food security as the bottom line, and integrated urban- rural development.

Agriculture will be developed into a modern large- scale industry, ensuring that rural areas have modern living conditions, and farmers enjoy a more prosperous and fulfilling life.

Enhancing agricultural productivity and quality is central. The aim is to maintain total grain output at around 1.4 trillion jin (700 million tonnes), while promoting higher yields per unit area through improved farmland, seed varieties, machinery and farming techniques.

This will be assisted by diversifying oilseed supplies, stabilizing key agricultural sectors such as cotton and sugar, and advancing food conservation efforts.

The "vegetable basket" industries will be upgraded by developing a diversified food supply system that integrates farming, forestry, animal husbandry and fisheries.

Measures for this include strengthening livestock capacity regulation, promoting modern facility agriculture, expanding deep-sea aquaculture, and tightening food safety supervision across the entire supply chain.

Technological innovation is a key driver, supporting breakthroughs in core agricultural technologies, the industrialization of biological breeding, and the development of smart and adaptive agricultural machinery.

It will also be harnessed to integrate AI, drones, the Internet of Things and robotics into agricultural production, while reforming agricultural research institutions and strengthening grassroots extension services.

Boosting farmers' incomes remains a primary objective. The document outlines measures to stabilize farm earnings through coordinated pricing, subsidies and insurance policies, cultivate county-level industries that enrich local communities, promote stable employment for migrant workers, and expand rural consumption.

Simultaneously, targeted, regular assistance policies will prevent a large-scale return to poverty. Monitoring mechanisms will be improved, enhancing industrial and employment support, and tailoring policies for underdeveloped regions.

Farmers tend to grapes in a greenhouse in the Tangshan Port economic development zone, north China's Hebei province. (PHOTO: XINHUA)

China Upgrades Digital Services for Overseas Visitors

By ZHONG Jianli

China has issued a set of new guidelines to make digital services for the entry of foreigners and people from outside the Chinese mainland more convenient and further promote high- level opening-up.

The guidelines, by 11 Chinese authorities including the Cyberspace Administration of China (CAC), the National Development and Reform Commission, and the Ministry of Culture and Tourism, aim to address bottlenecks in digital services for personnel from overseas to create a more internationalized and convenient digital service environment.

There are 14 measures in five key areas:

- Strengthening digital basic services: simplifying telecom business procedures for foreigners, enhancing foreign-language digital services and building integrated digital service platforms.
- Improving digital payment services: making digital payments more convenient and upgrading consumer digital services by better supporting the use of overseas e-wallet services.
- Optimizing digital tourism services: expanding online cultural and tourism channels, facilitating digital transport services and boosting digital residence management.
- Enriching digital public services: providing digital medical services, strengthening digital education services, optimizing services for investment and entrepreneurship, and improving government digital services.
- Enhancing network and data security: elevating the protection of cybersecurity, data security and personal information.

By widening the scope of digital services for overseas visitors, the measures are expected to make cross-border travel and exchanges smoother and encourage deeper international cooperation, injecting more momentum for higher- level, broader opening-up, a CAC official said.

The official also said the guidelines will provide essential support for attracting foreign investment, expanding domestic demand, and promoting growth, injecting new momentum into China's high-quality development.

Blocking Ford's China Battery Ties to Hurt U.S. Industry

Clear Voice

By LIANG Yilian & HU Dingkun

Recently, John Moolenaar, chairman of the U.S. House select committee on China, sent a letter to Ford Motor Company CEO Jim Farley, questioning Ford's cooperation with Chinese battery manufacturers such as Contemporary Amperex Technology Co., Ltd. (CATL).

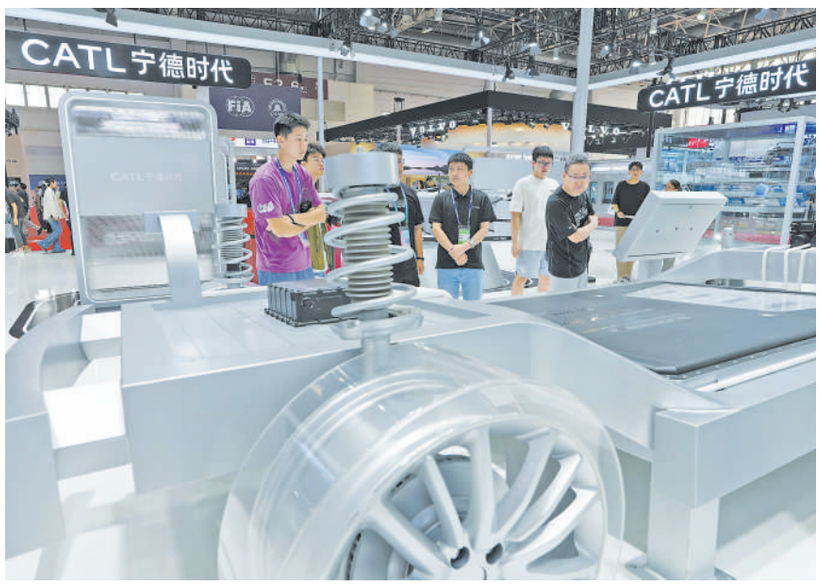
Moolenaar portrayed China as a grave threat to U.S. supply chain independence and economic security, and raised alarmist concerns about China "exploiting" key U.S. industries and the alleged risks of deploying batteries based on Chinese technology in critical American infrastructure.

The intent behind this move is clear: to exert political pressure on Ford and obstruct its technological cooperation with Chinese battery companies.

Last December, Ford announced plans to produce lithium iron phosphate (LFP) batteries under a licensing agreement with CATL for use in energy storage systems. On January 15 this year, *The Wall Street Journal* reported that Ford was also in talks with Chinese high-tech company BYD for a battery deal for hybrid vehicles.

That same day, Moolenaar issued a statement calling the cooperation a serious "security risk" and insisting that Ford should work with U.S. allies rather than so-called adversaries.

In reality, the U.S. battery industry lags far behind China in both scale and technological capability. In January, the internationally renowned investment research firm Bernstein projected that by 2026, the U.S. would account for only about 10 percent of global battery production capacity, while China's share would reach as high as 80 percent.



People visit CATL's superfast charging battery at the third China International Supply Chain Expo. (PHOTO: XINHUA)

Across major battery segments — including lead-acid, lithium-based, sodium-ion, and nickel-metal hydride — China holds a commanding lead over the U.S. in patent ownership.

As a legacy automaker with decades of deep engagement in the Chinese market, Ford's pursuit of battery technology cooperation with CATL and BYD is not only rational but strategically sound.

In recent years, LFP batteries — thanks to their superior safety profile and cost advantages — have come to dominate the energy storage sector, capturing more than 90 percent of the global market.

They are also increasingly becoming the mainstream solution for electric vehicles, with global market share exceeding 50 percent by 2025. CATL is the undisputed leader in LFP technology, accounting for 48 percent of global installed capacity. In the hybrid vehicle battery segment, BYD ranks among the world's leaders, with its market share approaching 30 percent in the third quarter of 2025.

Cooperation with Chinese companies is therefore critical to Ford's transition toward new energy. In a June 2025 media interview, Lisa Drake, Ford's vice president for electric vehicle industrialization, explained the rationale behind introducing CATL's technology: "It's hard to innovate something when you've never seen it with your own eyes. That's why we need to bring it here."

Throughout its cooperation with Ford, the Chinese side has demonstrated confidence and openness. There has been no fear that licensing certain technologies to the United States would undermine China's leading position, nor has there been any attempt to stoke paranoia about American companies "stealing" advanced Chinese battery technologies — tactics frequently employed by U.S. politicians against Chinese firms.

On the contrary, a CATL representative stated plainly: "We are committed to supporting the global energy transition, including the U.S. market."

The real irony lies in the fact that some U.S. lawmakers are disregarding the interests of their own companies, repeatedly intervening to obstruct legitimate business cooperation. They seem oblivious to the reality that Ford stands to gain the most from such partnerships — and to lose the most if they are delayed or derailed.

Even without cooperation with Ford, CATL and BYD would remain global leaders in the battery industry. For Ford, however, every day of delay means falling further behind in acquiring high-performance LFP technology and entering the rapidly expanding energy storage market, with inevitable spillover damage to related U.S. industries.

At the root of these misguided actions is an obsessive tendency to overgeneralize national security concerns, driven by the paranoid assumption that the use of Chinese technology or products is inherently risky. This mindset reflects a classic case of projecting suspicion onto others.

Such U.S. politicians would do well to acknowledge the reality of China's technological progress, recognize the necessity of China-U.S. cooperation in science, technology, and industry, and stop interfering in normal commercial exchanges between companies.

Continuing down the current path will only delay U.S. industrial development and compound the difficulties a shrinking American manufacturing sector already faces.

Opinion

Future Industries Power Next Development Phase

By Staff Reporters

With the world entering a new era of technological and industrial transformation, future industries are key to long-term advantage — and China is moving fast to build them.

Reinforcing the digital foundation

Quantum technology and 6G are widely regarded as the pillars of the next-generation digital infrastructure. On January 21, the Ministry of Industry and Information Technology (MIIT) announced the launch of the second phase of 6G technology trials, laying the groundwork for commercial deployment before 2030.

China currently accounts for 42 percent of the world's declared standard-essential patents for 6G, ranking first globally.

Quantum computing is moving steadily out of laboratories and into real-world applications. According to a recent report by the China Academy of Information and Communications Technology, more than 800 quantum information enterprises have been established worldwide, over 140 of them in China.

"China's quantum technology has long been at the global forefront, and its application scenarios are continuing to expand," said Guo Guoping, professor at the University of Science and Technology of China.

However, the commercialization of quantum technology still faces challenges in core components, system integration, and the maturity of industrial ecosystems.

"Overcoming these obstacles requires driving technological iteration through pilot projects in real-world scenarios, while simultaneously building an independent and controllable manufacturing chain and developer ecosystem," Guo said.

"To enable these foundational industries to provide sustained support and broad spillover effects, long-term efforts are needed across technological R&D, capital investment, and standards-setting," said Yang Zhen, associate research fellow at the Institute of Industrial Economics of the Chinese Academy of Social Sciences.

Reshaping the material base

Alongside digital technologies, breakthroughs in energy and materials are redefining the physical foundations of industrial development. The energy transition driven by green hydrogen and the materials revolution centered on synthetic biomanufacturing are jointly reshaping global industrial structures, with implications for national energy security and resource autonomy.

China has already established a strong position in the hydrogen energy sector. Nationwide, 380 hydrogen refueling stations have been built, accounting for about 40 percent of the global total. By 2025, the global hydrogen market is expected to reach 320 billion USD, with China contributing more than 35 percent.

"The global fusion industry is developing rapidly, and China is showing particularly strong momentum," said Liu Zhihong, secretary-general of the Anhui Province Fusion Industry Federation.

China's fusion energy development model is also evolving. What was once dominated by state-led "national teams" is now increasingly driven by a combination of public institutions and private capital. Controlled nuclear fusion is currently at a critical transition point from laboratory research to engineering and commercialization, with expectations that the first fusion-powered electricity could be realized around 2030.

In biomanufacturing, growth has been equally striking. MIIT data shows that the global biomanufacturing market has surpassed 350 billion USD, with a compound annual growth rate exceeding 15 percent.

China's biomanufacturing sector has reached a scale of 1.1 trillion RMB, and its biotechnological fermentation products account for more than 70 percent of global output.

"Only by continuously tackling key technologies, building independent industrial chains, fostering innovation ecosystems, and conducting large-scale validation in representative scenarios can laboratory breakthroughs be transformed into powerful drivers of growth," said Yang.

Expanding the boundaries of intelligence

Breakthroughs in brain-computer interface (BCI) and embodied intelligence are redefining the relationship between humans, machines, and the physical world. Once confined to science fiction, the deep integration of AI, robotics, and human cognition is increasingly shaping real-world applications.

In a rehabilitation center in Tianjin, a 67-year-old stroke patient recently regained partial movement in his left arm with the help of the world's first interventional BCI clinical trial designed to restore motor function.

The system uses minimally invasive vascular surgery to install microelectrodes in target areas in the brain, enabling stable and precise neural signal acquisition without damaging the skull, according to Duan Feng, a professor at Nankai University who led the project.

Beyond technical challenges, ethical and safety considerations remain central. "The proximity of this technology to the human brain makes it fundamentally different from other industries," Duan said, warning against uncritical replication of conventional expansion models.

Embodied AI, by contrast, is already integrating rapidly into daily life. From robotic vacuum cleaners capable of sorting objects to humanoid robots performing power inspection tasks, applications are expanding across industries.

Still, experts caution that intelligence software has yet to fully match advances in hardware.

"Robots still face clear limitations in long-sequence behavior planning and cross-scenario generalization, while safety constraints remain largely physical," said Zhang Weinan, executive dean of the School of AI at Harbin Institute of Technology. "True industrial maturity will be marked by safety and reliability."

Euro Businesses Step Up Investment in China

Voice of the World

Edited by QI Liming

Since 2025, trade and investment between China and Europe has remained on a steady upward trajectory, with the current investment boom from European companies in China showing no signs of slowing down.

Data from China's Ministry of Commerce (MOC) shows that in 2025, British investment in China increased by 15.9 percent and Swiss investment by 66.8 percent. A report from the German Economic Institute (IW) indicates that Germany's new investment in China between January and November of 2025 was approximately seven billion euros, an increase of over 55 percent compared to 2024, reaching the highest level since 2021.

Shifting more production processes to China

The latest British Business in China Sentiment Survey 2025-2026, released by the British Chamber of Commerce in China, shows that the expectations for development of British companies in China for 2026 have peaked since 2020, and around one-third of companies plan to increase investment in 2026.

Recently, the French Air Liquide Group announced a 25 million euro investment to carry out an electrification transformation of their air separation plant in Yulin, Shaanxi province, northwest China. Once the project is completed, it will achieve both emissions reduction and production increases.

An article in the *Financial Times* said that "A complete industrial chain ecosystem, continuously upgraded manufacturing capabilities, and an extremely large market, together constitute the strong pull of the Chinese market on European enterprises. An increasing number of European enterprises are now looking eastward with a more pragmatic attitude."

Combining cost and effectiveness

The *Business Confidence Survey Report 2025/26*, released by the German Chamber of Commerce in China in December 2025, showed that 93 percent of German companies in China plan to continue to engagement in the Chinese market, and 56 percent of the companies have explicitly stated that they will increase their investment. This data reflects the strong resilience of China-Europe economic and trade cooperation.

In November 2025, the German chemical giant BASF invested in Zhanjiang, Guangdong province, southeast China, and built the core facilities of an integrated base. The first batch of products has successfully gone into production, marking a crucial step for this company's largest single investment to date.

"For the global supply chain, China is an ideal choice that offers both cost-effectiveness and an optimal industrial ecosystem," Jens Eskelund, president of the European Union (EU) Chamber of Commerce in China, said. China's competitive edge has evolved from the traditional cost advantage to an all round advantage consisting of "comprehensive industrial chain support, large-scale production capacity, and mature industrial infrastructure."

Integrating deeply through investment and cooperation

The industries of China and Europe have achieved solid integration in investment and cooperation. This integration not only benefits both sides, but also injects valuable certainty into the uncertain global economy.

The *Business Confidence Survey Report 2025/26* of the German Chamber of Commerce in China also shows that 68 percent of the surveyed German companies have already carried out overseas business cooperation with Chinese enterprises.

In addition, a survey by U.S. Rhodium Group shows that since 2021, direct investment by the EU's manufacturing sector in China has continued to increase.

In the second quarter of 2024, the greenfield investment by the EU's manufacturing sector in China reached 3.6 billion euro, setting a new record. According to data from the MOC of China, as of the end of 2024, the cumulative actual investment by EU enterprises in China had exceeded 150 billion USD.

Since entering the Chinese market in 2014, the German engineering giant, the Siempelkamp Group has expanded its Qingdao base three times. The fourth phase of the project is scheduled to commence in 2026. Konstantinos (Kosta) Karakolidis, CEO at Siempelkamp (Qingdao) Machinery & Equipment Co., Ltd., said the growth potential of the Chinese market is clearly evident to all. They are willing to share the development benefits through continuous investment.

Soil-free Strawberry Grown on Shelves

Hi-Tech

By QI Liming

Strawberries from Pinglu, a county in Yuncheng city in Shanxi province, northwest China, have entered their harvest period. Different from the traditional ground planting, these strawberries are grown in hanging belts on scaffoldings in greenhouses.

Compared with the traditional ground planting, strawberries grown on shelves yield over 30 percent more per unit area, and the incidence of pests and diseases has decreased.

The strawberries are cultivated without soil, using high organic matter substrates such as peat and vermiculite. A combination of automated irrigation and fertilizing ensures precise fertilization, water saving and fertilizer reduction.

The greenhouses have intelligent monitoring equipment, which collects real-time data such as temperature and humidity, substrate electrical conductivity value and nutrient content. Thanks to this, the cultivation is done scientifically, with a significant reduction of pesticides.

Strawberries grown on shelves have also created a new leisure agricultural scene, integrating "production, picking and sightseeing." Tourists can enjoy a stroll and pick the fruit.

An engineer demonstrates a BCI rehabilitation system during a themed exhibition in Beijing. (PHOTO: XINHUA)

A Place to Grow and Contribute Meaningfully

Dialogue

By LONG Yun, QIN Mian & BI Weizi

In 2017, when Pakistani scholar Muhammad Salman Nasir first arrived in China to begin his PhD, he had a clear scientific mission: to advance catalytic technologies for renewable energy. What he didn't anticipate was how deeply the country would shape his sense of purpose and belonging.

"Beyond my research, my time in China, moving from Xi'an to Shanghai, and now [to] Tianjin, has profoundly influenced both my personal growth and professional perspective," Nasir said. "What started as a pursuit of a PhD, transformed into an immersion into the living, breathing fabric of Chinese society."

Muhammad Salman Nasir. (COURTESY PHOTO)

A deliberate choice

Currently, Nasir is an associate professor at Tianjin University (TJU). "My decision to pursue doctoral studies and a research career in China was really driven by three key factors: academic ambition, alignment with global sustainability trends, and the unique research ecosystem here," he said.

At the time, China was accelerating its commitment to the "dual carbon" goals, aiming to peak emissions before 2030 and achieve carbon neutrality by 2060. That national vision, combined with massive investment in hydrogen, solar fuels, and carbon utilization, convinced him this was where research could make a real impact. "China's emergence as a global leader in clean energy research presented an incredible opportunity," Nasir said.

He chose TJU not just for its reputation. "My lab is renowned for interdisciplinary energy research, bridging materials science, chemical engineering, and mechanical systems, which perfectly matched my integrated approach to catalyst and reactor design," he said. He also appreciated the university's strong industry ties and support for international researchers.

Science that serves society

Nasir's current work focuses on using sunlight to turn CO_2 and plastic waste into green hydrogen, sustainable fuels, and useful chemicals. Rather than chasing small improvements, he aims for solutions that can scale up. "Instead of isolated projects, I see my work as contributing to an integrated toolbox for green transformation," he said.

Nasir stressed that university labs play a special role in the transition to carbon neutrality. "University laboratories, like the one I work in at TJU, are innovation hubs where big ideas meet real-world challenges. We serve as essential testing grounds for high-risk, high-reward technologies, those that industry may see as too uncertain but that hold transformative potential."

Importantly, his team designs with global access in mind. "The solutions we're advancing, low-cost, modular, and solar-powered, are designed to be adapted and scaled in varied contexts," he said. "By sharing these technologies and the knowledge behind them, we aim to support countries in leapfrogging fossil fuel dependency."

The culture of collaboration

Nasir has been consistently impressed by the students and young researchers he works with. He noted their diligence, technical skill, and ability to connect lab work to bigger social goals. "Their thinking is often highly strategic. They quickly grasp not only the 'how' of an experiment but also the 'why' behind it, aligning their work thoughtfully with broader scientific and national sustainability objectives," he said.

He also values the cross-disciplinary teamwork in his lab, where chemists, materials scientists, and engineers regularly collaborate on complex energy problems. This spirit, he added, reflects China's wider research environment: well-funded, strategically focused, and increasingly open to global talent. "This environment has been instrumental to my work," Nasir said. "The strategic alignment with national energy priorities gave my research on solar-driven hydrogen and CO_2 conversion a clear sense of purpose and relevance."

A home, not just a workplace

In China, Nasir has found a sense of community. "From morning tai chi sessions to lively debates on AI and sustainability in campus cafés, there is a tangible spirit of collective aspiration, where education is viewed not just as personal advancement, but as a contribution to the broader society," he said.

Beyond the university, China's cities shaped his view of modernity. "You can taste centuries of history in a bowl of hand-pulled noodles, then minutes later ride a high-speed train or pay for groceries with your phone. This seamless coexistence of old and new taught me that modernization in China doesn't erase tradition — it converses with it."

He also spoke warmly of everyday kindness: strangers offering help on the subway, vendors remembering his order, colleagues inviting him to Mid-Autumn Festival dinners. "I felt a consistent culture of warmth and mutual respect," he said.

For Nasir, his academic journey has come full circle. He came seeking a place to do meaningful science and over time that place has become much more. Nasir has stayed because he found something rarer: a place where his work, his family, and his values all fit.

Tech+Culture

'Deep Sea Warrior' Rescues Shipwrecked History

By BI Weizi & LI Zhaoyu

Against the backdrop of blue lighting and the sounds of ocean waves and distant whale calls, 377 pieces of Ming Dynasty treasure are telling the story of the Maritime Silk Road as it was 500 years ago, at the Grand Canal Museum of Beijing.

These artifacts come from the No. 1 and No. 2 shipwrecks on the northwest slope of the South China Sea. The two Ming Dynasty shipwrecks were discovered on the seabed of the South China Sea in October 2022, at a depth of approximately 1,500 meters. Shipwreck No. 1 was laden with export ceramics from Jingdezhen, while Shipwreck No. 2 was carrying ebony that had been brought back from overseas. This discovery filled a gap in China's historical record of import trade return voyages along the Maritime Silk Road and bears witness to the prosperity of two-way trade along this ancient route.

So how did archaeologists manage to find these exquisite artifacts? At this depth, the seabed is perpetually dark, with water temperatures ranging from 3°C to 4°C. Without technological support, the deep seabed is an archaeological blind spot, necessitating the use of a variety of deep-sea technologies and equipment during this discovery.

For example, archaeologists used 3D laser scanners and high-definition cameras to create panoramic photographs and scan the shipwreck site in 3D, gaining an initial understanding of where the artifacts were located.

Furthermore, archaeologists deployed the Deep Sea Warrior, a manned submersible independently developed by China with a maximum diving depth of 4,500 meters, to conduct underwater operations. The archaeologists aboard the Deep Sea Warrior then descended to a depth of 1,500 meters to conduct thorough investigations and record and study the site, as well as extract artifacts and samples.

As soon as the Deep Sea Warrior reached the bottom of the planned route, its lights were switched on. Two robotic arms, each with a robotic hand at the end, were connected to the outside of the manned submersible. One of these robotic hands, covered in a flexible material, carefully extracted artifacts that had lain buried for hundreds of years.

Due to the environment being drastically different once the artifacts had surfaced, without proper treatment, they would quickly crumble.

The high salinity of the deep sea, coupled with chloride ions filling the pores of ceramics, causes repeated crystallization and dissolution due to rapid changes in temperature and humidity. Therefore, the immediate priority for newly recovered artifacts is cleaning and desalination.

A comprehensive approach is required for cleaning, utilizing physical scrubbing and chemical solvent soaking depending on the artifact's material, glaze and degree of contamination. This ensures that the historical information and artistic value of the artifact are not damaged when removing the dirt.

After cleaning comes desalination. Cultural relic conservationists soak the artifacts in deionized water and use desalination technology to gradually remove the salt that has seeped into the ceramics. This process often takes several months, or even longer.

Project to Boost Space Resource Development

Science Outreach

By Staff Reporters

China will carry out a major project, "Tiangong Kaiwu," during the 15th Five-Year Plan period (2026-2030) to advance space resource development, the China Aerospace Science and Technology Corporation announced on January 29.

The project will build an integrated experimental system and ground support infrastructure, with priority to breakthroughs in small celestial body prospecting, intelligent autonomous mining, low-cost transportation, and in-orbit processing.

Pang Zhihao, a spaceflight technology expert and veteran space writer, said the core of this project is to establish a full-chain system, "prospecting, mining, transportation, and in-orbit processing," to shift deep-space resource use from scientific exploration toward engineering implementation.

This will support lunar bases, deep-space missions, and the space economy.

What are space resources?

Pang explained that all exploitable matter, energy, environments, and information beyond Earth's atmosphere constitute space resources. They can be roughly classified into four categories.

Material resources include helium-3 on the moon, rare precious metals and rare earth elements on asteroids, and water ice on extraterrestrial bodies. These can enable in-situ oxygen and water production, mining, and future nuclear fusion fuel supply.

A researcher demonstrates the lunar 3D printing process at the Deep Space Exploration Laboratory in Hefei, east China's Anhui province, paving the way for moon "houses" built from soil sourced on-site. (PHOTO: XINHUA)

Energy resources refer to uninterrupted solar power in space, which offers higher intensity and stability than on Earth, enabling space-based solar power stations.

Environmental resources, such as microgravity, high vacuum, and strong radiation, allow production of ultra-pure materials and biological agents impossible on Earth, and provide ideal conditions for astronomical observation and scientific experiments.

Information resources come from communication, navigation, and remote-sensing satellites that build global networks, and space telescopes that capture fundamental cosmic data to support governance and basic research.

"Space resources span from near-Earth orbit to interstellar space," Pang said. "They are a strategic reserve to transcend Earth's limits, carrying both practical value and long-term civilizational significance."

Developing these resources can ease Earth's resource shortages and environmental pressures. This will drive cross-disciplinary advances in aerospace, materials science, and AI, with civilian applications upgrading entire industries. It will also foster new sectors like commercial spaceflight, in-space manufacturing, and asteroid mining, forming a space economy that is a global growth engine.

Crucially, it will expand human survival options through off-world settlements, helping safeguard civilization against planetary threats.

The biggest challenges

Pang said the main obstacles are technological, cost, and regulatory constraints.

Extreme environments pose immediate hurdles: Lunar surface temperatures swing by 300°C, Mars suffers planet-wide dust storms for about one-quarter of the year, and asteroids have near-zero gravity, requiring stable operations under micro- or low-gravity conditions.

Communication delays further limit control. A one-way signal between Earth and Mars can take up to 20 minutes, making remote operation impossible. Systems must rely on AI to autonomously conduct prospecting, mining and fault response, demanding highly reliable algorithms and sensors.

Transportation economics remains prohibitive. Under current technology, shipping raw space ore to Earth costs more than the material's value. Solutions include reusable rockets, in-orbit processing, and electromagnetic launch systems to cut costs.

Realistically, resources should first serve in-space needs, such as refueling or habitat construction, rather than Earth return.

Pang emphasized that while space resource development remains in its early stage globally, it will become a key enabler as we move from an Earth-bound civilization to an interplanetary one.

Traditional Eastern Wisdom

Legendary Chinese Bows

By BI Weizi

The bow served as the dominant weapon in ancient Chinese combat, and mastering its use was regarded as a vital military and ritual skill for thousands of years. Over the centuries, archers were used as infantry, chariot riders and cavalry. Although the significance of this weapon was challenged by the sword and crossbow, it continued to be an essential part of a commander's strategy on the battlefield, particularly during initial maneuvers, withdrawals and city defenses.

The bow has consistently been a key element of Chinese culture, with hunting and shooting from horseback being a popular activity among the aristocracy in China, possibly as far back as the Shang Dynasty (1600-1046 B.C.). The Shang notably granted the designation of Archer-Lord to the chiefs of conquered tribes, illustrating the great regard the bow enjoyed in ancient China, similar to the sword's status in western Europe.

The designs of both the bow and the arrow changed over time and across different locations. The most basic bows were crafted from wood or horn, whereas composite bows began to emerge during the Shang period — these bows consisted of as many as eight parts, including individual bamboo strips joined together or fastened with silk. Various types of wood utilized included silkwood thorn, wild mulberry, orange wood and quince.

All these woods, bamboo and horn were meticulously chosen and blended for their compressive or elastic qualities to achieve the most potent firing power.

Glues were created from plant or animal substances, and eventually fish glue was discovered to be the most effective. Animal sinew or tendon was utilized to wrap the completed bow and enhance its flexibility. The last step was to apply lacquer to the bow, safeguarding it from moisture. The bowstring was probably crafted from twisted strands of silk, leather or plant fibers, particularly bamboo.

It is noteworthy that arrows were often included in tombs, representing their significance to the deceased in the afterlife.

In the sixth century B.C., Confucius reinforced the significance of archery in the national consciousness by asserting it was among the six skills in the aristocratic education system in ancient China for self-cultivation.

An ancient Chinese bow is on display in Jincheng, Shanxi province, September 29, 2024. (PHOTO: VCG)

Tech Goods Highlighted in Spring Festival Market

From page 1

Behind the diverse and novel tech goods lies the rapid development of China's evolved industrial chains. Enterprises have established a complete industrial ecosystem that integrates technology R&D, core components manufacturing and assembly.

According to the Ministry of Industry and Information Technology, China's digital industry is developing rapidly. By the end of 2025, the industrial revenue exceeded 38 trillion RMB.

The country now has one hundred 5G-enabled manufacturing plants that have reached world-leading performance levels, with an average production capacity increase of 25 percent and operating costs reduced by 19 percent.