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Observer

Production Lines Implement Lab Breakthroughs

By Staff Reporters

The deep integration of industry, academia, research and application, led by enterprises, should be promoted to smooth the innovation chain spanning basic research, application development and commercialization, according to a symposium on strengthening basic research in April.

This vision is becoming a reality, with measures carried out nationwide to integrate technology and industry, providing the "maximum driver" for modernization.

A more resilient industrial chain

Located 150 km southeast of Sanya, Hainan province, "Deep Sea No. 1" — the world's first 100,000-tonne-class deep-water semi-submersible production and storage platform — produces up to 15 million cubic meters of natural gas and over 1,600 tonnes of condensate oil daily.

"Key core technologies cannot be bought but need independent innovation," said Wang Huifeng, vice president and chief engineer of Offshore Oil Engineering Co., Ltd. From "Deep Sea No. 1" to "HaiKui No. 1," Asia's first independently designed and built cylindrical floating production, storage, and offloading facility, these breakthroughs have made China the third country globally capable of independently developing ultra-deepwater oil and gas resources.

Lei Zhensheng, chief expert of the Ministry of Agriculture and Rural Affairs' high-yield and quality wheat breeding innovation team, has developed 55 high-quality wheat varieties with his team. "These varieties are deeply integrated with processors through order-based production, generating 4.85 billion RMB in premium value and 6.99 billion RMB in processing efficiency gains," Lei said.

The resilience of industrial chains, consolidated in the deep sea and the fields, is branching out into more sectors. 5G and gigabit optical networks have been integrated into 91 major economic categories, with over 25,000 "5G+industrial Internet" projects nationwide. Key components of green energy including large-capacity wind turbines, ultra-long blades, floating platforms, and flexible DC converter valves have all been localized.

Industrialization of frontier technologies

The Nanjing Steel Group has partnered with Huawei to develop an AI large model that has transformed its ironmaking process. See page 2

New Graphic

IN 2025

China's Digital Industry Revenue Reached

39.6 Trillion RMB
8.8% Y-O-Y

Source: Cyberspace Administration of China
Designed by SONG Ziyi / Science and Technology Daily

WECHAT ACCOUNT



E-PAPER



The photo shows the Ming'antu observation station of the National Space Science Center, the Chinese Academy of Sciences, in Zhengxiangbai banner, Xilin Gol league, north China's Inner Mongolia autonomous region, August 1, 2026. (PHOTO: XINHUA)

STI Frontier

Traditional Turbine Factory Turns Intelligent

By Staff Reporters

In a production workshop of Harbin Turbine Company Ltd. in Heilongjiang province, northeast China, huge digital screens display real-time data on production progress, the operating status of equipment and quality inspection, updated in milliseconds.

Established in 1956, the company has been developing and manufacturing turbines for seven decades. Now with new technologies like 5G, digital twin and AI intelligent testing, operations have been digitalized, greatly enhancing production capacity.

Total process upgrade

Production workshops are the main battlefield for the transition to intelligent manufacturing.

In a workshop for turbine blade production, precise and agile robotic arms

sequentially grip, position and process the blades, while automated guided vehicles shuttle materials between production lines and component warehouses without human intervention, creating a fully automated closed-loop workflow.

Fan Yu, deputy director of the company's digital information department, said this is the turbine industry's first automated production line cluster covering every manufacturing operation across the entire production workflow for small and medium-sized turbine blades.

Built on a 5G-enabled flexible manufacturing management and control system, the production line is equipped with a "superbrain" and a central nervous system, enabling a seamless end-to-end workflow from receiving incoming material and code marking them to intelligent machining, sawing, milling, grinding and automated polishing.

After upgrading, the comprehensive utility rate of machine tools has increased by eight percent and comprehensive production capacity by 20 percent.

Welding, critical for core turbine assemblies, is one of the most demanding jobs in traditional heavy manufacturing. When key turbine components are welded, the temperatures must be above 350°C, which, in the past, exposed the workers to intense heat and pervasive welding fumes.

That situation has changed in the cold working factory of the company. At the new intelligent welding production line welding robots work with precision. A digital control system manages the welding parameters, temperature and trajectory during the entire process, resulting in flexible automated welding of key components. See page 4

Industrial, Information Sectors Maintain Strong Growth

By LIANG Yilian & CUI Shuang

China's industrial and information sectors continued to advance toward higher quality and greater technological sophistication in the first half of the year, according to a press conference held by the State Council Information Office (SCIO) last month to brief the media on the development of China's industrial and information sectors.

Wang Weiming, chief engineer of the Ministry of Industry and Information Technology (MIIT), said the value-added industrial output of major industrial enterprises grew 5.4 percent year on year, while industry contributed more than 35 percent to economic growth. Corporate profitability also improved significantly,

with total profits of major industrial enterprises rising 18.8 percent year on year in the first five months.

The latest data released at the press conference showed that more than 30 percent of China's major manufacturing enterprises have adopted AI technologies. China's open-source AI foundation models recorded more than 10 billion cumulative downloads worldwide.

Wang said high-quality development will be the MIIT's top priority. It will issue and implement sectoral and specialized plans for the 15th Five-Year Plan period (2026-2030), accelerate the development of a modern industrial system centered on advanced manufacturing, and improve the quality and efficiency of industrial economic performance.

Next-generation networks taking shape

By the end of June, China had over five million 5G base stations. It is advancing the construction of commercial 5G-Advanced networks, while 10-gigabit optical networks are being piloted in residential communities, factories and industrial parks. The second phase of 6G technology trials is also being accelerated.

Xie Cun, spokesperson for the MIIT, said the next generation of communications networks will be "new" in four major respects.

The objects being connected will expand from traditional individual users to a diverse range of entities, including people, machines, physical objects and embodied AI. See page 3

International Cooperation

Sci-tech Backyard Makes Brazilian Agriculture Smarter

Edited by WANG Xiaoxia

On a typical morning at the Fazenda Água Limpa (FAL) on the outskirts of Brasília, Brazil, the crops are thirsty. FAL is a 500-hectare experimental and educational farm that is a university-run research project. In a nearby workshop, agricultural expert Sergio Sauers monitors real-time data of the fields on his screen. He swiftly draws an irrigation zone, sets a 25-minute timer, and clicks "start" to activate the irrigation equipment in the fields.

This is a snapshot of daily operations at the "Sci-tech Backyard (STB)" for smart agriculture jointly built by China and Brazil. To date, over 400 hectares at FAL, about 200 hectares in Apodi municipality in northeast Brazil, and nearly 133 hectares in the city of Londrina in southern Brazil have been transformed into smart demonstration zones. Chinese-backed solutions have nearly doubled the efficiency of large-scale corn farming.

The backstory was one of real struggle. Nearly five million family farms across Brazil, mostly in the north, were long trapped in low-efficiency cycles — plowing with oxen, hauling with donkeys, and relying entirely on muscle power. Mechanization was a distant dream, and digital farming almost unheard of.

Around 2020, some farmers started looking eastward for solutions. In early 2024, China's Sinomach Digital Technology dispatched a dedicated team deep into Brazil's agricultural heartlands to assess local practices and infrastructure, map out the core needs of family agriculture, and build a bridge among governments, universities and enterprises.

By November of that year, with backing from China's Ministry of Education and Brazil's Ministry of Rural Development, the China-Brazil Joint R&D and Technology Transfer Center for Family Agriculture Mechanization — better known as STB — was launched in Brasília and Apodi.

Then the magic began. Chinese and Brazilian researchers rolled out the "Smart Farm Management Platform" on pilot farms. IoT sensors began monitoring the temperature, humidity, and pest activities, while BeiDou base stations relayed soil data from the intelligent machinery working the fields.

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WEEKLY REVIEW

World's 1st Boring & Blasting Machine Rolls Off Production Line

On August 1, the world's first boring and blasting machine developed by Chinese researchers officially rolled off the production line in Wuhan. This innovative piece of equipment combines the advantages of the two mainstream construction methods — tunnel boring machines and the drill-and-blast method — to provide a brand-new technical solution for the construction of long tunnels in complex geological conditions.

Catalyst for Acidic Water Electrolysis Developed

Chinese researchers proposed a novel design strategy that differs from the traditional spinel structure, leading to the development of a new cobalt-based oxygen evolution catalyst that significantly enhances the activity and stability of anode catalysts for acidic water electrolysis.

Cross-species Chromatin Atlas Reveals Gene Switching Rules

A Spanish research team constructed the first cross-species chromatin atlas spanning diverse eukaryotic lineages. The study found that the signals that switch genes on in cells have remained virtually unchanged over two billion years of evolution, while the mechanisms that switch genes off have evolved into radically different schemes across different lineages of life.

Magnetic Nanoparticles Clean Water of Forever Chemicals

German scientists have developed a new method that uses functionalized magnetic nanoparticles to efficiently remove a variety of PFAS, also known as forever chemicals, from water. Its most notable advantage lies in the tailored surface chemistry of the nanoparticles.