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An electric aerial vehicle at the seventh China International Import Expo in Shanghai in November. ZOU HONG / CHINA DAILY

Healthcare firms look to fair for new vitality

Big pharmaceutical and healthcare companies have said the China International Import Expo, held this month in Shanghai, has helped connect them more deeply with partners and stakeholders from home and abroad.

The expo, in its seventh edition this year, has also allowed companies with the latest medical solutions to share opportunities of China's high-quality development and better realize the unmet needs of Chinese patients.

"We're grateful for the CIIE platform that helps the company transform cutting-edge research into effective vision solutions, which further reach consumers," said Kok Leong Lim, head of professional solutions for Greater China of the French-Italian eye care company Essilor-Luxottica.

Benefiting from the spillover effect of the expo, a slew of exhibits during previous expos have accelerated entry into China. They include a type of soft contact lens the company makes that is said to delay myopia progression in children.

After its global debut at the expo in 2020, the group accelerated the mass production of the lens at its factory in the Songjiang district of Shanghai and entered major hospitals and retail optical stores across the country.

The biopharmaceuticals company Amgen of Thousand Oaks, California, said two of its medicines which debuted at the fifth and sixth expos, have already benefited Chinese patients through pilot policies. The therapies treat certain types

of lung cancer and osteoporosis.

"China is a vital growth driver not only for our company but for the entire biotechnology sector," said Bob Bradway, chairman of the board and chief executive of Amgen.

Irene Hsu, vice-president of Amgen and general manager of Amgen China, said: "We believe that as China further opens up and optimizes its business environment, Amgen will have more opportunities to contribute to the development of China's healthcare industry in an even better way."

The company has introduced seven innovative medicines in China since its entry into the market 12 years ago. Five have been included in the National Reimbursement Drug List, Hsu said.

The kidney care business of Baxter Healthcare Corporation of Deerfield, Illinois, was spun off and formed as a separate company called Vantive, a move highlighted at this year's expo.

Chris Toth, executive vice-president and group president of kidney care business at Baxter, said: "We're excited to unveil our new brand Vantive at the CIIE, China's premier event for global companies to partner with government, suppliers, hospitals and patients to help address dynamic needs of today's clinicians and patients."

The company's therapies support hundreds of thousands of Chinese patients with end-stage kidney diseases as well as thousands of hospitals across the country, Toth said.

— ZHOU WENTING



Visitors try virtual reality headsets at the medical device and healthcare section during the seventh CIIE in Shanghai. ZOU HONG / CHINA DAILY

Import expo opens up opportunities

The seventh China International Import Expo that concluded in Shanghai on Nov 10 served as an important platform through which international companies can seek business opportunities in China and nurture innovation, officials and top executives say.

Tentative deals worth \$80 billion were concluded during the six-day exhibition, 2% more than last year, the expo's organizers said.

Wu Zhengping, deputy director of the China International Import Expo bureau, said that up to 450 new products, technologies and services made their debut at the expo, compared with 442 last year.

"The seventh CIIE manifested China's confidence and resolve to provide new growth opportunities to the world through its reform-driven development," Wu said.

This year's expo, covering more than 4.5 million square feet, attracted about 3,500 exhibitors, including a record 297 Fortune Global 500 companies and industry leaders. Of all participants, 186 companies and organizations have attended all seven editions of the exhibition.

Patrick Koller, chief executive of Forvia Group, a French auto-

motive technology supplier, said China, the world's largest carmaker and automotive market, is of strategic importance to his company.

"Participation in the CIIE helps to strengthen our ties with Chinese clients and the market, which is crucial to Forvia's development and success."

While the development of sustainable technologies, regional collaboration and efforts to tackle climate change are a global challenge, the expo provided an important platform to secure continued dialogue, collaboration and partnership, he said.

The German skin care company Beiersdorf, which first attended the expo three years ago with a new product to fight hyperpigmentation, made its second appearance this year.

Beiersdorf's chief executive Vincent Warnery said the product, which uses the company's patented innovative ingredient Thiamidol 630, has become the world's biggest-selling single item because of the cross-border e-commerce channels in China.

"Chinese consumers possess robust purchasing power, and the market demonstrates a trend of consumption upgrading. With a dynamic and

passionate vibe, the Chinese market offers huge opportunities and the warmest welcome to foreign investment and development in China."

Beiersdorf will continue to increase its investment in China, especially in innovation, digitalization and sustainability, he said.

The global business data analytics service provider Dun & Bradstreet, which attended the expo for the fifth year in a row, also spoke glowingly of the event.

Wu Guangyu, general manager of Dun & Bradstreet China, said the company has enjoyed robust growth in the country over the past few years, something closely related to its taking part in the expo.

The company debuted at the third CIIE with a data module product that has now become its top income generator in China. The product has also helped China remain the fastest growing market among all of Dun & Bradstreet's operations worldwide.

China's close ties with the external market and its fast and deep digitalization in different sectors have provided ample room for the growth of data service providers, Wu said.

— SHI JING

RAYS OF LIGHT ON AN ANCIENT CULTURE

As early as four millennia ago those who lived in the middle reaches of the Yellow River, where the Taosi culture originated, had developed a comprehensive system to observe time, under the guidance of which they led a prosperous farming life.

Evidence of this is now on display at the Taosi Site Museum in Linfen, Shanxi province. The museum opened to the public this month.

Two hundred and thirty cultural relic items or sets of items in the museum, including pottery, jade, bone, bronze ware and lacquerware, bear witness to the archaeological excavations and research findings of the Taosi relics site, which dates back 3,900 to 4,300 years, said Gao Jiangtao, who has been leading the Taosi site's excavations.

Gao, a researcher at the Institute of Archaeology of the



People visit the Taosi Site Museum in Linfen, Shanxi province, after it opened to the public on Nov 12.

ZHU XINGXIN / CHINA DAILY

Chinese Academy of Social Sciences, said the museum has provided a venue to present the Taosi culture and offer visitors a better visual experience with digital technology.

The Taosi site was discovered in 1958, and since 1978 more than 5,500 relics have been unearthed. With city ruins on a huge scale and with numerous functional zones, palaces and tombs of clearly defined hierarchies, the site is

among the major ruins of capital cities in the early stages of Chinese civilization.

At the Taosi site archaeologists discovered the earliest observatory known in China, Gao said.

The observatory comprises 13 rammed earth columns arranged in a semicircle. Standing at a specific observation point, observers were able to determine the solar terms based on the position

of the sun during sunrise.

For example, the winter solstice occurs when the sun rises from the second narrow gap between the columns, and the spring and autumn equinoxes are marked by the seventh gap. Other astronomical instruments on display include a gear-shaped bronze ware that experts speculate was used to observe phases of the moon, as well as a *gui-biao*, a device that featured a perpendicular bar that cast a shadow on a horizontal scale to indicate the time of day.

All these instruments were used by the late Neolithic people, who grew wheat, maize, rice and millet. Diverse farming tools and cellars to store surplus grains were found, and relics of bamboo rats and crocodiles suggest the climate was warm and wet.

A painted pottery plate unearthed in 1980, with a two-

eared, curled dragon covered with scale markings and carrying a branch in its square mouth, is among the highlights of the museum.

The dragon pattern, which was abstracted from a variety of beasts, helps trace the origins of dragon totems in Chinese culture, Gao said.

The exhibited musical instruments such as *qing* (chime stones), a copper bell and a *tuogu*, a painted wooden drum that originally had a crocodile skin, reflect the culture's high level of ritual.

Li Qun, director of the National Cultural Heritage Administration, said the many archaeological discoveries and research findings of Taosi have provided fresh material for the exploration of ancient history, revealing the characteristics of the early development of Chinese civilization.

— FANG AIQING AND ZHU XINGXIN



Replicas of Sanxingdui relics on display at the Memor Museum in New York. MINGMEI LI / CHINA DAILY

Ancient world faces the 21st century

The history and mystery of ancient Sanxingdui in Sichuan province, spanning thousands of years, is reaching international audiences through modern digital platforms.

The exhibition *Sanxingdui Encounter: A 12K Micro-viewing of National Treasures* opened recently at the Memor Museum in New York, offering visitors an opportunity to have an immersive virtual experience of the relics and to see physical replicas of these treasures. The exhibition is on until Jan 19.

Sanxingdui, an archaeological site in what is today Guanghan city in Sichuan, illustrates the civilization of the ancient Shu kingdom, which flourished over 3,000 years ago. Sanxingdui was not discovered until the 1920s, and archaeological work continues to reveal new discoveries.

By the end of 2022 fieldwork on six newly uncovered sacrificial pits was nearly complete, yielding a wealth of precious artifacts. More than 4,000 items, including jade, stone and pottery, were unearthed during this phase of excavation. Archaeologists are piecing together the history of the Shu civilization and presenting these findings to the public.

The Shu kingdom, which arose in the Sichuan basin during the Bronze Age, is thought to have developed independently from Yellow River Valley societies, long regarded as the cradle of Chinese civilization. Its people produced finely crafted bronze, jade, gold and ceramic artifacts, depicting mythical creatures, rulers, gods and shamans with exaggerated features such as bulging eyes and enlarged ears.

"Sanxingdui's rich heritage deserves international attention, with its vast cultural significance needing to be shared with a broader audience," said the director of Memor Museum, Willa Ao.

"We want to present the Sanxingdui relics through a blend of digital and physical experiences."

Ao cited as an example a bronze figure that strikingly resembles the stance of a modern-day fitness coach performing a dead lift. A bronze tree is adorned with numerous small hanging artifacts, reminiscent of ornaments used to decorate Christmas trees.

Sanxingdui's unearthed bronzes were exhibited at the Metropolitan Museum of Art in New York in 2002 as part of a broader exhibition on bronze artifacts, but Ao said this time



A gold mask, a bronze dragon head and a bronze statue unearthed at the Sanxingdui site. PHOTOS BY JIANG DONG / CHINA DAILY AND PROVIDED TO CHINA DAILY

she wanted to provide visitors a younger and interactive way to feel the relics in person through 1:1 replicas from the Sanxingdui Museum's collection, using ultrahigh-definition 12K technology. AI interaction and VR immersion, which required three years of preparation.

UHD 12K technology refers to a video resolution of about 12,000 pixels across the width of the image, significantly higher than 4K and 8K resolutions.

Among the highlights of the exhibition are bronze masks, ceremonial altars and the renowned gold mask, each offering a glimpse into the sophisticated artistry and spiritual depth of Shu civilization.

Visitors have the opportunity to view the famous Bronze Mask with Crown and Protruding Eyes, a rare artifact that provides insight into the ceremonial and spiritual practices of the ancient Shu people.

Also on display is the striking Bronze Head Wearing a Gold Mask, which illustrates a unique blend of social status and ritual significance.

"Although they are replicas, they remain highly valuable," Ao said. The replicas were created with permission of the Sanxingdui Museum, using

the same materials to faithfully reproduce the original artifacts, she said. They were also shipped across the ocean according to the same standards used for authentic relics.

Visitors can explore the relics using VR technology, which brings large artifacts such as the Large Standing Man and the Bronze Sacred Tree into the gallery through virtual exploration. The exhibition also employs 12K video capture to document smaller artifacts, delicate bronze bells and bird sculptures, magnifying them for a closer look.

"We use the highest-resolution technology to capture every element of the artifacts," Ao said. "With 12K resolution, even the smallest artifacts are magnified, revealing intricate patterns that are invisible to the naked eye in a museum display."

"Digitization is not only a crucial method for preserving relics but also an essential tool for their protection. Archaeological work now includes digital methods to gather artifact data, and it's important for us to make use of this. Simply preserving these cultures is not enough, we must better promote our culture."

Sanxingdui is an incredibly important archaeological discovery, not just within Chinese archaeology, but within the world of archaeology, said Kristen Martucci, the exhibition's translator.

Martucci, 26, has studied Chinese since her high school days and pursued East Asian studies, particularly ancient Chinese history, at Harvard University. "I'm particularly interested in early Chinese history, so Sanxingdui is certainly part of that."

She primarily helps translate materials into English and curates the exhibition in a way that is approachable for international audiences.

"There's never just one perfect translation," she said. "Scholars spend months, sometimes years, figuring out the correct interpretation of something. And even then, there's debate."

Her work is also a learning process in both Chinese and history even as she uncovers the "mystery," she said.

"I've never been to the Sanxingdui Museum. I learned about Sanxingdui in my graduation school courses, but even for me, seeing these replicas and using this exhibition and VR to experience it—that's new to me, so it's really exciting."

—MINGMEI LI

An old master passes on artistic skills to the young

When he was 12 years old he painted strokes and ground pigments from dawn till dusk. Four decades later Nyingbum is a *thangka* master, passing on the ancient technique to a new generation.

Nyingbum recently concluded his latest exhibition, *Inheritance and Beyond*, in Pleasantville, New York, presenting 16 pieces celebrating Tibetan Buddhism, a culture deeply tied to the Xizang autonomous region, known for its towering mountains and sweeping river valleys.

The exhibition, at the Rockefeller State Park Preserve art gallery in Pleasantville, mirrored the essence of Northwest China, particularly Qinghai province, and Xizang in Southwest China, with its picturesque terraces, plateaus, rivers and mountains, at a gentler elevation, making Nyingbum's art "feel like home".

"I feel truly proud as an artist bringing such rich cultural heritage to the United States and the world," Nyingbum, 53, said.

"It's more than just art," he said at the exhibition, which concluded last month. "It's a historical record. This painting tells the stories of the past. I want

more people to see the value of *thangka* art ... and understand its beauty. I believe people will appreciate it, learn to preserve and build upon it, and share it."

Thangka is a traditional style of Tibetan painting on silk or cotton, usually depicting a Buddhist deity, scene or mandala. They are religious paintings usually with a bamboo-cane rod pasted on the bottom edge by which they can be rolled up.

Regong arts, which include Regong *thangka* painting, clay sculpture, applique and wood and stone carving, have been passed down through the generations by local artisans. The distinctive arts originated from the Regong region of Qinghai province and extended to nearby provinces.

They were recognized as a national intangible cultural heritage in 2008 and were inscribed by UNESCO on its Representative List of the Intangible Cultural Heritage of Humanity in 2009.

Nyingbum grew up in the Regong region of the Huangnan Tibetan autonomous prefecture in southeastern Qinghai. He began an

apprenticeship under Shawa Tsering, a *thangka* master, who was a student of Zhang Daqian, one of the most famous Chinese artists of the 20th century.

Initially, painting *thangka* was merely a way for Nyingbum to earn money, but he soon developed a deep passion and talent for it. Over the years he became dedicated to studying Regong *thangka* painting.

In August 2006 he established the Qinghai Huangnan Regong Painting Institute, the first *thangka* art institute in the region, and became its director.

"Our goal in starting this institute was to open up learning opportunities for more people," he said. "Traditionally, this art was passed down within families, from father to son, but that just wasn't enough."

The institute focuses on protecting, preserving and promoting the intangible cultural heritage of Regong *thangka*, as well as training local artists.

The pieces he took to New York took an average of two to three months each to complete. They featured not only the vibrant, colorful Buddhist figures, but also line-drawn sketches.



A *thangka* artwork of Nyingbum.

These paintings displayed detailed color-mixing techniques that Nyingbum uses, with precious mineral pigments such as gold, silver and cinnabar, along with natural dyes from plants, such as saffron and gardenia, which can make the art last for decades.

"It's amazing to see how so many beautiful works have been preserved because artists used mineral pigments," Nyingbum said.

"Take the murals at Dunhuang, Gansu province, or the Potala Palace in the Xizang autonomous region, for example. They've stayed vibrant for hundreds of years without fading. That's something unique about our Eastern murals."

The use of the pigments makes the art form hard to replace with today's digital painting, he said. *Thangka* art has strict requirements for color-mixing, outlining and more. It not only requires the meticulous techniques of traditional Chinese painting but also demands the artist's skill in grinding pigments and controlling temperature and humidity.

—MINGMEI LI



Nyingbum at work in his studio in Huangnan Tibetan autonomous prefecture, Qinghai province. PHOTOS PROVIDED TO CHINA DAILY

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Growth drivers

Supportive policies, rise in consumption will to buoy economy, earnest gardeners' oust

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BUSINESS

Quality focus rules shopping gala

Chinese consumers have exhibited robust purchasing power for high-quality and intelligent products containing innovative technologies during the Singles Day shopping extravaganza, on and around Nov 11.

This has played a vital role in promoting the recovery of consumer spending and shoring up economic growth in the country, experts said.

This year major Chinese e-commerce platforms extended the promotional period and adopted a simple and more pragmatic approach by canceling presale campaigns.

Instead, direct price cuts became the preferred strategy to attract price-conscious customers and bolster sales during China's biggest online shopping event.

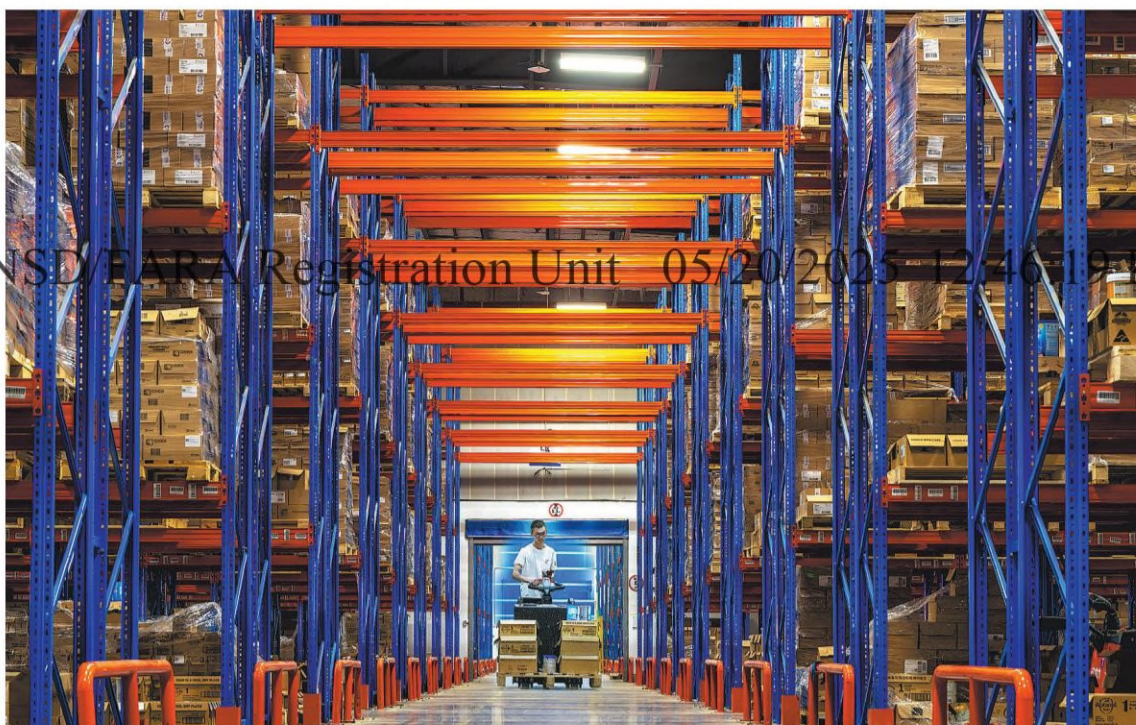
Experts said that unlike in the past, when record-smashing gross merchandise volume through discount-led sales had come to characterize the 11-11 or Double Eleven promotional campaign, chasing such figures was no longer the focus.

Chinese shoppers are becoming more rational and carefully reviewing their needs, with an emphasis on the quality and value of commodities, they said.

In the first four hours after the shopping carnival opened at 8 p.m. on Oct 21, Tmall, the business-to-customer platform of the Chinese technology company Alibaba Group, reported that the value of sales of 174 brands had exceeded 100 million yuan (\$14 million).

In this period, the turnover of more than 12,000 brands doubled compared with the corresponding period last year, and the sales of nearly 6,000 brands rose more than 500% compared with the corresponding period last year.

The transaction volume of Apple Inc's products on Tmall



An employee picks imported goods for sale during the Singles Day shopping festival at a warehouse in Jinhua, Zhejiang province, on Oct 23. YANG MEIQING / FOR CHINA DAILY



Workers sort packages on an intelligent sorting line in Nanchang, Jiangxi province, on Nov 3. ZHU HAIPENG / FOR CHINA DAILY

exceeded 1 billion yuan within five minutes, and sales of Chinese smartphone brands such as Huawei, Xiaomi and Vivo all surpassed 100 million yuan in the first four hours of the promotional event, Tmall said.

Consumers preferred to snap up bargains through livestreaming on e-commerce platforms, with the value of sales of some top-tier livestreamers on Taobao Live,

Alibaba's livestreaming arm, surpassing 100 million yuan in a short time.

JD, another major Chinese e-commerce company, launched a subsidy campaign worth 10 billion yuan and gave discounts for commodities included in the consumer goods trade-in program, such as home appliances and computers. It also stepped up efforts to upgrade supply chains and logistics services.

JD said nearly 3,000 home appliance brands doubled their transaction volume over the weeklong shopping festival, with sales of mini LED televisions and robotic vacuum cleaners surging more than twofold year-on-year.

The transaction volume of gaming laptops increased 120% year-on-year, and AI smartphones and 4K projectors experienced 100% growth in turnover via JD's online marketplaces. Sales of AI learning devices and 3D printers skyrocketed more than tenfold from a year earlier.

The sales of consumer electronic devices grew strongly during the first days of the shopping extravaganza.

The Double Eleven festival was just a 24-hour event on Nov 11 when it was unveiled by Alibaba in 2009, but by this year it had stretched into a shopping spree lasting from mid-October to mid-November. This year online retailers initiated the promotional event one week earlier than previously.

"Consumption has become the main driving force boosting China's economic growth, and the Singles Day shopping carnival is pivotal to unleashing consumers' purchasing potential, bolstering domestic demand and promoting consumption recovery," said Wang Yun, a researcher at the Chinese Academy of Macroeconomic Research.

More stimulus policies are needed to stabilize and expand employment, improve household incomes and boost people's ability and willingness to spend, so as to further drive up spending, Wang said.

China's retail sales, a significant indicator of consumption strength, rose 3.3% year-on-year in the first three quarters of this year, the National Bureau of Statistics said.

Online sales remained a bright spot, rising 8.6% year-on-year during the January-September period.

Online retailers have made promotional methods simpler this time, with a key focus on improving user experience and seeking high-quality and long-term growth, because Chinese are more prudent and rational about potential purchases, said Jason Yu, managing director and vice-executive president of CTR Media Convergence Institute.

Retailers hoped to introduce new products to attract consumers and build brand image during the shopping spree, Yu said.

High-quality and intelligent commodities are crucial for stimulating the purchasing appetite of consumers and unleashing new consumption potential, he said.

"A series of pro-consumption policies, such as a consumer goods trade-in program, have played a significant role in bolstering the sales of consumer electronic products and household appliances on major online marketplaces."

—FAN FEIFEI

CHANGSHASPECIAL



New quality productive forces create city of dreams

With its strong growth momentum in intelligent manufacturing industries, Changsha is appealing to businesses from home and abroad. SHI LIANG / FOR CHINA DAILY

Changsha is revving up the development of new quality productive forces, which is injecting new vitality into the city, said local officials.

With a host of tech companies springing up and gaining momentum and foreign-funded businesses expanding investment, the capital of Central China's Hunan province is providing more development opportunities for talent from around the world and it has become a popular destination for budding entrepreneurs and young job-seekers from home and abroad.

The city witnessed a continuous influx of people from other regions in recent years, with the majority of them being of the young generation. Official data show that more than 110,000 college graduates have settled in the city over the past three years.

Changsha's rapid progress in intelligent manufacturing industries is the driving force behind the influx. The city is now at the forefront nationwide in sectors such as autonomous driving, information technology and artificial intelligence.

Xu Hu was aware of huge opportunities in the intelligent driving sector. Having studied in the United Kingdom for 14

years, Xu graduated from the University of Dundee in the UK. He turned down the opportunity to teach at a university in the UK to join Changsha Intelligent Driving Institute in 2017 and later became its chief scientist.

After years of research and development, Xu led his team to create the first unmanned logistics heavy truck in China that can exceed a speed of 62 miles per hour. He also promoted the construction of the country's first "vehicle-road-cloud" integrated smart public transportation line and participated in the top-level design of the system architecture for intelligent connected vehicle projects in cities such as Changsha and Chongqing.

Xu said he and his team are now focusing on expanding the vehicle-road collaborative solutions to overseas markets, becoming a typical representative of China's intelligent-connected vehicle solutions providers going global.

In a move to build itself into a city friendly to youth development, Changsha has introduced a series of encouraging policies, forming a comprehensive policy system covering not just industry but also the agricultural and service sectors, attracting more talents from home and abroad to pur-

sue their dreams in Changsha, and integrating the demand for talent with the city's growth strategy and industrial development.

In September, the 2024 Research Report on China's Talent-friendly Cities, compiled by the China Association of Human Resource Development and several authoritative institutions, was released, and Changsha was named a talent-friendly city.

As an important base for advanced manufacturing in China, Changsha is brimming with opportunities, as it is ramping up the cultivation of new quality productive forces.

Currently, the city is developing an advanced manufacturing industry and a full-chain industrial innovation system with its own unique characteristics, providing fertile ground for innovative development for both domestic and international companies.

The city has nurtured six major industries each worth over 100 billion yuan (\$14.01 billion) in annual output value, including electronic information and new materials. It has become the world's second city that is home to more than five companies ranked among the world's top 50 engineering machinery manufacturers.

In Changsha, key industry enterprises in engineering machinery and electronic information can seamlessly complete the entire chain from R&D and design to production and sales within a small scope and short amount time.

Sustained innovation has earned Changsha the reputation as the capital of engineering machinery, while the improvement of the industry chain has created favorable conditions for the long-term development of Changsha's manufacturing industry, empowering local enterprises to participate in the global market.

Changsha's advanced manufacturing companies highly value innovation, continuously scaling industrial technology heights and achieving fruitful results both domestically and internationally.

The number of various innovation platforms in Changsha has increased to 3,167. They have made breakthroughs in 123 key core technologies. There are 7,842 high-tech enterprises in the city, and the added value of the high-tech industry has increased by 8.3% year-on-year.

"In the global top 100 science and technology cluster rankings released by the World

Intellectual Property Organization, Changsha has risen to 32nd, up five places from the previous year. That indicates Changsha's construction as a global R&D center city is gaining momentum," said Li Zhijian, a senior official of the Hunan Provincial Department of Science and Technology.

Changsha's strength in innovation has attracted global attention. Global chemical giant BASF established BASF Shanshan Battery Materials Co Ltd in Changsha, a joint venture in partnership with Shanshan, a leading Chinese supplier of lithium ion battery materials.

BASF Shanshan has invested in Changsha in recent years, locating its Asia-Pacific R&D headquarters for cathode materials and the Chinese headquarters for the battery materials business in the city.

To date, 201 Fortune Global 500 companies have settled in Changsha, setting a new record high. Changsha saw the establishment of 168 new foreign-funded enterprises during the first three quarters of this year, a 20.9% increase from the same period last year, bringing the total number of foreign-funded businesses in Changsha to 1,433.

—YUAN SHENGGAO

SOCIETY



A photovoltaic power generation plant sprawls across grassland in Otog Front Banner in Ordos, Inner Mongolia autonomous region. WANG ZHENG / XINHUA

Space rice headed for the table

Dong Qi, an agricultural expert, was thrilled to reap a batch of upland rice in a special experimental field in Jinzhong National Agricultural High-Tech Industry Demonstration Zone in Shanxi province.

Unlike other rice varieties, seeds in the high-tech zone are the descendants of upland rice seeds that were carried into space in May last year by the crew of the Shenzhou XVI spacecraft and underwent a genetic mutation process called space breeding inside the Tiangong space station.

Nine crop seeds, including upland rice, sorghum, corn and wheat, from the high-tech zone were sent to space for mutagenesis experiments. They were exposed to cosmic radiation and microgravity during the mission, resulting in genetic mutations.

Back on Earth these mutations were evaluated, and some gave the seeds properties favored by farmers such as greater yield, shorter growth period and better resistance to diseases.

The upland rice seeds returned to Earth on Oct 31 last year, after more than 150 days in space, and were sent to be multiplied at the national seed breeding base in Hainan province.

"Space breeding is a fundamental method, similar to hybrid breeding and radiation breeding," said Dong, a professor at Shanxi Agricultural University.

"But for space breeding, the environment holds more value, which cannot be replicated on Earth. Traditional breeding usually takes eight to 10 years, but space breeding has the potential to reduce the time by half. Such seeds look no different but undergo important genetic variations internally."

Jia Yuchen, head of the organic dryland agriculture project at the high-tech zone, said Shanxi, on the Loess Plateau, which has an arid climate and low rainfall, is highly suitable for cultivating and promoting new varieties of upland rice.

Dong said the aim is to bring high-quality upland rice varieties mutated through space breeding to the table of the ordinary person soon.

"I believe that the future market value of space breeding will be significant."

— ZHU XINGXIN AND ZHOU HUIYING



Dong Qi (right) investigates the progeny of upland rice in a special experimental field in Jinzhong, Shanxi province. ZHU XINGXIN / CHINA DAILY

New Great Wall will generate economic and green benefits

Ordos in the Inner Mongolia autonomous region is advancing an ambitious initiative known as the Solar Great Wall, aiming to combine the development of renewable energy with efforts to combat desertification, local authorities said.

This gargantuan wall, 249 miles long and an average of 3.1 miles wide, not only promises to supply sustainable electricity to Beijing and its environs, but also stands to make a substantial contribution to the preservation of the Yellow River.

The project, launched this year and that will have total installed capacity of 100 million kilowatts, is expected to generate about 180 billion kilowatt-hours of electricity a year by 2030 when it is completed, the Ordos energy administration said.

For comparison, Beijing used 135.8 billion kWh of electricity last year.

The project, on the south bank of the Yellow River and the northern edge of the seventh-largest desert in China, the Kubuqi, will also help prevent soil erosion and thus reduce sediment entering the Yellow River. Overall, it will help treat almost 67 million acres of desert, the administration said.

Li Kai, an official with the energy administration of Dalad Banner, talked of the huge



Workers install photovoltaic panels at a new energy base in the Kubuqi Desert in Ordos. PROVIDED TO CHINA DAILY

"About 50,000 jobs will be created by 2030, with individuals in these roles having average annual income growth exceeding 20,000 yuan (\$2,800)."

LIKAI

economic and ecological benefits the project is expected to generate.

About 83 miles of the Solar Great Wall will be built in the banner, and the average width of the section is designed to

be 16 miles, Li said. Thanks to the project, Dalad's total renewable energy capacity will reach 19 million kW by the end of this decade.

This achievement will result in annual green power output of 38 billion kWh, leading to savings equivalent to nearly 13.9 million short tons of standard coal and a reduction in carbon dioxide emissions of about 34.5 million short tons, Li said.

By 2030, he said, Dalad will be able to transmit 48 billion kWh of green electricity a year to the Beijing-Tianjin-Hebei region through an ultra-high-voltage electricity transmission line now being built.

While solar panels can directly contribute to desertification control by serving as

windbreaks and sand fixers, as well as by providing shade to reduce the evaporation of soil moisture, 5,930 acres of commercial crops will also be planted beneath the panels to help treat the desert, Li said.

The initiative of using the space under the panels underscores the local government's commitment to achieving a symbiotic relationship between ecological preservation and economic progress, he said.

"All the projects are invested in by State-owned companies, some of which are centrally administrated ones, and so local governments do not have to make any investment at all."

Li also highlighted measures the authorities in Dalad have adopted to pave the way for the implementation of the huge project.

The local government has coordinated on-site approval sessions that have brought together officials from departments involved. In addition, they have designated special officials to provide essential support in managing all official procedures across various stages, he said.

"About 50,000 jobs will be created by 2030, with individuals in these roles having average annual income growth exceeding 20,000 yuan (\$2,800)."

— HOU LIQIANG AND YUAN HUI

A viper expert's life: often bitten, never shy

"Not venomous, it's *Elaphe carinata*," Kevin Messenger said to his companions with a smile, as a colorful king ratsnake sank its teeth into his left forearm.

The 42-year-old herpetologist from the United States, who is also a professor at the College of Life Sciences of Nanjing Forestry University, was conducting a field survey in Shennongjia National Park in Hubei province.

"He's not attacking, he's defending. I attacked him," he said calmly, clutching in his left hand the snake, which was almost as long as the height of an adult human, while one of his companions wiped away the fresh blood trickling from the wound.

Such a scene is a regular occurrence in Messenger's work. Over the years he has conducted scientific research in various ecological reserves in China, and his colleagues have nicknamed him Doctor Snake.

Messenger has been fascinated by snakes since he was a boy. His earliest memory of a snake is at the age of 3, when his father, an emergency vet, brought home a python.

"I remember looking in the back of the truck and seeing this massive snake, and falling in love with it, I just thought it was the coolest thing I'd ever seen."



Kevin Messenger after being bitten by a snake during a field survey in the Shennongjia National Park in Hubei province. ZHANG CAN / FOR CHINA DAILY

In May 2006, while he was finishing his undergraduate degree at North Carolina State University, Messenger noticed an online job posting that offered the chance to do a survey of reptiles and amphibians in the unexplored mountain range of Shennongjia.

He applied for the job, which was provided by a China-U.S. collaborative research program, and just five days after his graduation he flew to China and embarked on a four-month exploration of Shennongjia.

"It was like a dream come true. Hiking and getting into the woods to catch reptiles and amphibians. ... That is exactly doing what I love."

Messenger's interest in China continued to grow in the following years, and he

decided to do field work in China for his PhD.

In 2017 he gained two PhDs, one from Alabama Agricultural and Mechanical University and the other from Nanjing Forestry University. He then received a job offer in the U.S. but stayed in China to continue his research.

"One of the reasons why I wanted to continue my work in China is because the state of herpetology in China is still wide open. You can still go out to many different places and find new species. And the natural history of many of these species we still don't have a full understanding of."

During a field survey, Messenger usually spends about a week at a field station, going out numerous times a day to find and identify the reptiles

and amphibians, trying to get a complete picture of their distribution.

He photographs them, sometimes collects a specimen and occasionally does genetic work to identify their species. Following the survey, he returns to the university or home base and documents all the recordings in a database.

Shennongjia is a place that Messenger holds dear, having visited the area as many as 16 times. He has discovered about 10 new species within this UNESCO World Heritage Site and he is now working on what may be a newly discovered species of toad.

"I've noticed more and more local people having an appreciation for the environment and wildlife and being more interested in doing whatever they can do to help," he said.

In June the Shennongjia National Park Administration appointed him as an external expert to conduct long-term field research in the area.

Messenger explores new areas of Shennongjia to study the local flora and fauna. If these areas meet the criteria for inclusion within the protective zone, new boundaries will be drawn accordingly.

"Protecting the environment is protecting ourselves, because we belong to the environment," he said.

— ZHOU LIHUA, LIU KUN AND PENG CHAO

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