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## New Quality Productive Forces

### Digital Tech Unleashes New Quality Productive Forces

By YU Haoyuan

China's ongoing advancements in science and technology are heavily influenced by "new quality productive forces". The forces are driving strategic future and emerging industries, which have the potential to introduce disruptive technological advancements in an era of intelligent information.

The emergence of "new quality productive forces" extends beyond mere changes in the productive forces. It fundamentally reshapes the relationship between production and the social system. For example, it enhances the capabilities of industrial chains, fosters the growth of emerging industries and promotes the development of future industrial layouts. Digital technology serves as a critical driving force in realizing these functions.

#### Upgrading traditional industries

In recent years, the integration of new-generation digital technologies, such as big data, AI, and 5G across various industries, alongside the rapid emergence of data-related businesses and models, has elevated data into a primary production tool. The production, processing and utilization of data have accelerated transformations in economic and social realms, fundamentally altering production methods and lifestyles. This disruptive change has not only driven improvements in total factor productivity, but also created vast opportunities for economic growth and profoundly influenced human production and life.

The *China Digital Economy Industry Development Research Report (2023)* highlights the increasing pull effect of highly digitized industries on China's economy. From 2012 to 2022, the proportion of highly digitized industries, primarily encompassing productive services such as finance and scientific research, surged from 16.8 percent to 22.4 percent, indicating a relative increase in their pull effect by 10.9 percent.

Researchers Qing Kaiqiang and Yang Yang, from Yunnan University, argue that the digitization of traditional industries enhances efficiency while reducing resource consumption and environmental pollution, thereby bolstering market competitiveness.

See page 2



Returned Chinese cultural objects are seen at a handover ceremony at the Chinese Consulate General in New York, the United States, on April 17, 2024. The U.S. side returned 38 pieces of Chinese cultural objects to the Chinese side during the handover ceremony. (PHOTO: XINHUA)

## Editor's Pick

### The Birth of 'Unbreakable Glass'

By WANG Xiaoxia & YONG Li

A short video that went viral online recently shows the screen of a Huawei smartphone remaining intact after being used to crack walnuts, hammer nails, and driven over by a car.

This remarkable strength and durability is attributed to the phone's nanocrystalline glass, or Kunlun Glass, a completely homemade product by a local enterprise called Chongqing Aureavia Hi-tech Glass Co., Ltd. (ATG), which has spent years perfecting the technology.

#### From lab to factory

So, how can a small piece of glass that is only about half a millimeter thick be so tough?

"That's because a palm-size piece of microcrystalline glass is filled with billions of high-strength nanocrystals," Ji-ang Hong, a renowned expert in the field

of specialized glass in China, told *Science and Technology Daily*. "The regular arrangement of these crystals endows the material with superior physical and chemical properties, which can effectively block cracks and greatly improve the strength and resistance of the glass."

Therefore, specialized glass, including the nanocrystal glass line, has a huge demand in many other emerging industries, apart from smartphones.

However, this market has long been monopolized by foreign manufacturers. Learning about this situation, Bai Yibo, an entrepreneur in Chongqing conceived the idea of stepping into the field of new materials. At the same time, Jiang's research results in aviation glass and mobile phone screens were urgently in need of industrialization. Sharing the same vision, the two visionaries joined hands and established ATG in July 2014.

Although ATG holds Jiang's pioneering technology, Bai soon realized that the industrial mass production was far more difficult than expected.

#### Removing the bubbles

From the construction of ATG in 2014 to the launch of the production line in 2018, an investment of up to 400 million RMB was pumped into the company. But the mass production faced a major challenge as the output was always plagued with defective glass filled with bubbles.

"The theoretic formula can be verified in the laboratory, but the production process can only be adjusted and demonstrated on the production line," said Peng Can, head of the equipment power department of ATG, who has rich experience in glass production and factory construction.

See page 4

### Consumer Expo Demos Unique Global Brands

By Staff Reporters

The 4th China International Consumer Products Expo in south China's Hainan province from April 13-18 shone a spotlight on international cooperation, welcoming new international brands, and providing opportunities for global companies to tap into the Chinese market and meet consumers' evolving demands.

The expo attracted more than 4,000 exhibitors from 71 countries and regions, featuring a diverse range of "new, unique, and special" products, highlighting the dynamism of the consumer market.

Vice Minister of Commerce, Sheng Qiuping, emphasized the Expo's role in promoting consumption upgrades and fostering international trade partnerships. He highlighted China's commitment to developing digital, green, health

and service-oriented consumption, driving innovation and creating new growth areas in the consumer sector.

The expo served as a comprehensive platform for showcasing cutting-edge technologies and aesthetic designs, such as a Silicon-based LED yellow light.

It also featured thematic events like the nationwide launch of the consumer goods trade-in program and consumer innovation sessions on a global scale, offering a platform for showcasing new products and facilitating business collaborations.

Domestic and international exhibitors showcased their strengths, with Guangdong and Hubei pavilions highlighting regional advantages and premium consumer goods. New products like a civilian off-road vehicle and innovative tea utensils attracted significant at-

tention, signaling opportunities for market expansion and brand promotion.

Ambassadors and representatives from various countries expressed their optimism about the Expo's impact on promoting their brands in China. Irish Ambassador to China Ann Derwin highlighted the positive reception of Irish products among Chinese consumers, encouraging continued participation in the Expo.

Overall, the Hainan Expo serves as a catalyst for global brands to tap into China's vast consumer market, promoting mutual growth and fostering economic partnerships.

The Expo's success underscores the country's commitment to consumer-driven economic development and innovation.

(Related story: see page 3)

## UNESCO Inspires Collaboration on Karst Research

### International Cooperation

By LIN Yuchen

An initiative to promote global karst science and technology cooperation, urging all parties to strengthen exchanges and cooperation in karst geological research, was released by the International Research Center on Karst, under the auspices of UNESCO in Beijing on April 16.

This initiative, released during an event featuring China-Slovenia karst carbon cycle technology innovation and cooperation, aims to support global carbon cycling, mitigate geological disaster risks, and protect karst geological relics, promoting extensive collaboration and drawing up a blueprint for the future of karst science and technology innovation worldwide.

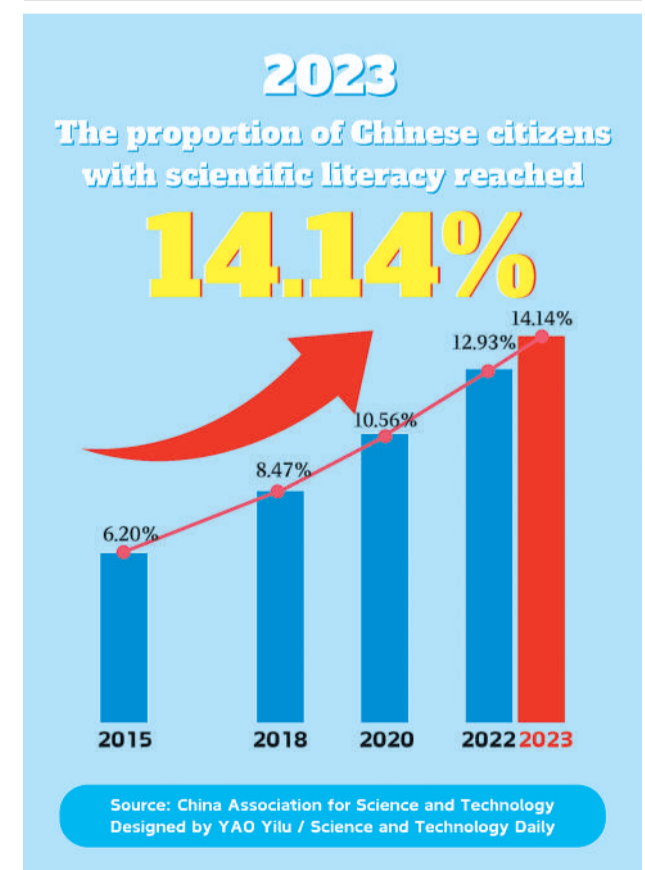
Karst is a landscape with distinctive hydrology and landforms that occur when the underlying rock is soluble. The word is originated from a karst plateau region in Slovenia, a limestone region renowned for its exposed rocks, caves and diverse formations. Karst covers about 15 percent of the Earth's land area, providing approximately 25 percent of the world's population with drinking water and boasting rich resources in water and minerals.

Gao Xiang, director general of the China Science and Technology Exchange Center (CSTEC), emphasized the importance of enhancing research on karst carbon cycling and its environmental effects. This effort not only contributes to the protection of global karst ecological environments, but also provides an innovative path for human cooperation in addressing climate change, carbon reduction and carbon neutrality.

China has been cooperating formally with Slovenia on karst research since the 1990s. Alenka Suhadolnik, ambassador of the Republic of Slovenia to China, highlighted their centuries-old tradition in karst research and over 30 years of collaboration with China, expressing hopes for joint efforts from scientists of both sides in nature conservation.

See page 2

## New Graphic



WECHAT ACCOUNT



E-PAPER



# Manufacturing Cities to Pilot Tech Upgrade

## Policy

By CHEN Chunyou

China will launch a pilot program for technological transformation in manufacturing cities, according to a notice issued by the Ministry of Finance and the Ministry of Industry and Information Technology in early April.

The notice emphasizes the pivotal role of central fiscal funds in catalyzing the technological transformation. Major moves will be implemented during this pilot period, including establishing a series of flagship demonstration projects, and encouraging enterprises to update their equipment, refine their processes and harness digital technologies to empower their growth.

This will drive the transformation and modernization of traditional industries, elevate the manufacturing industry to a high-end, intelligent and environmentally friendly development, and accelerate the cultivation of new quality productive forces.



Technicians inspect the newly commissioned intelligent spinning production equipment at a fiber material production company in Qingdao, east China's Shandong province. (PHOTO: VCG)

Prefecture-level cities or above are eligible to apply for the pilot program. Local governments are encouraged to jointly apply with central state-owned enterprises. The varying levels of development across the eastern, central, west-

ern, and northeastern regions will be taken into account to ensure a balanced layout.

Pilot cities should select about three leading sectors in manufacturing as the focus of the technological trans-

formation. During the implementation of the pilot program, it is expected that over 80 percent of enterprises above designated size would undergo digital technological transformation. The select industries should align with national strategic development plans and industrial orientations, and reflect the regional industrial foundation and strengths, while possessing features such as large output value and high industrial concentration.

The notice said within the identified key industries for technological transformation, the cities should select leading enterprises, industry leaders and enterprises with crucial roles in the industrial chain. The application and promotion of digital intelligence technology, green technology and innovative products will be accelerated in industrial clusters and sci-tech industrial parks.

Each industry should have at least one leading enterprise or industry champion, and each city should have at least one major project with an investment exceeding 500 million RMB.

The central government will reward each selected city, awarding a grant of no more than 300 million RMB in total.

## Case Study

# Beijing Sci-tech Innovation Hub Completes a Decade

By Staff Reporters

In 2014, it was planned that Beijing would become an international science and technology innovation hub, complementing its roles as a political and cultural center. To help achieve that goal, the International Center for Science and Technology Innovation was established the same year.

Since then, the center has helped Beijing make remarkable progress, emerging as a global leader in scientific research, high-impact researchers and innovation indexes. For eight consecutive years, Beijing topped the charts in the number of papers published in prestigious journals, showcasing the city's prowess in research and knowledge creation.

According to the Nature Index Science Cities 2023 rankings, Beijing maintained its position as the world's top city for scientific publications in over 80 nature sciences research journals for eight years in a row.

Beijing has also seen a significant increase in invention patents, with the number per capita quadrupling over the decade. This surge, from 48.2 patents per 10,000 people in 2014 to 262.9 patents in 2023, reflects the city's vibrant ecosystem for innovation and its relentless pursuit of technological advancements. The Science Citation Index also recognized Beijing as a global leader, with 411 highly cited scientists, surpassing American city Boston's count of 371.

The center also plays a crucial role in driving economic growth and job creation. The jump in the annual technology contract turnover from 313.6 billion RMB in 2014 to 853.69 billion RMB in 2023 highlights the

commercial impact of innovations emerging from Beijing's research institutions and startups. The rise in the number of national high-tech enterprises from 10,400 in 2014 to 28,300 in 2023, along with 114 unicorn companies, has solidified Beijing's position as a magnet for tech-driven entrepreneurship.

One of the cornerstones of the center's success is its focus on enhancing the innovation ecosystem. This includes initiatives to optimize national laboratories, promote breakthrough technologies, and nurture high-quality professionals. Establishing new industries and clusters, such as AI, aerospace, and biomedicine, has diversified Beijing's economic landscape and contributed to its global reputation as an innovation hub.

Looking ahead, Beijing's development roadmap includes perfecting research systems, building world-class science parks, implementing institutional reforms to support innovation, fostering international collaboration, and driving sustainable development initiatives.

These efforts underscore the city's commitment to remaining at the forefront of global innovation and shape the future of technology and research.

Overall, the International Center for Science and Technology Innovation's journey over the past decade exemplifies China's dedication to advancing science, technology and global leadership in innovation. With a solid foundation and strategic initiatives, Beijing is poised to continue driving impactful innovations that benefit society and propel economic growth in the years to come.

# Wider Opening Up of Value-added Telecom Services

By LI Linxu

In its latest move to align with high-standard international economic and trade rules, China will expand the opening up of value-added telecommunication services in pilot areas.

Foreign ownership limit in some value-added telecommunication services will be lifted in the pilot areas, according to a circular recently released by the Ministry of Industry and Information Technology (MIIT).

These services include internet data

centers, content delivery networks, and internet service providers.

Online data processing and transaction processing, information publishing platforms and information delivery services (excluding services related to internet news information, online publishing, internet radio and television, and internet culture management), and information protection and processing services, are also among the listed services.

The pilot areas consist of Beijing's national comprehensive demonstration zone for expanding opening up in the ser-

vice sector, the Lingang New Area of the China (Shanghai) Pilot Free Trade Zone and the pioneer area for socialist modernization in Shanghai's Pudong New Area, the Hainan Free Trade Port, and the Shenzhen Pilot Demonstration Area of Socialism with Chinese Characteristics.

The move is a follow-up to this year's government work report, as well as last December's central economic work conference, both of which vowed to ease market access in services sector such as telecommunications and healthcare.

It is China's latest effort to promote

high-standard opening up, advance the high-quality development of the country's telecommunication industry, and strengthen international cooperation in the sector, said an official from MIIT, adding that the country will expand the scope of pilot areas in due course based on the implementation of the pilot programs.

The policy is expected to further optimize the business environment for the telecommunication industry and facilitate foreign companies to invest in the sector.

# China to Update Industrial Equipment

By CHEN Chunyou

China will increase industrial equipment investment by more than 25 percent by 2027 compared to 2023. The utilization rate of digital R&D and design tools will exceed 90 percent in major enterprises, and more than 75 percent of the key production processes will be numerically controlled.

This is the goal of an industrial equipment renewal action plan co-released in early April by seven government departments, including the Minis-

try of Industry and Information Technology (MIIT), the National Development and Reform Commission and the Ministry of Finance.

Four measures will be implemented: advanced equipment renewal, digital transformation, green equipment promotion, and safety level improvement.

According to the MIIT, industrial equipment renewal will drive investment and enhance advanced manufacturing capacity, which is vital to the construction of a modern industrial system.

Digital transformation will cover all industrial enterprises above designated level in major industrial provinces, cities and key industrial parks. Production capacity below the benchmark level of energy efficiency in key industries will be phased out, and the energy efficiency of major energy-consuming equipment should meet the basic energy conservation requirement.

The action plan calls for eliminating outdated production equipment such as inefficient agricultural and con-

struction machinery. Enterprises in aviation, photovoltaics, power batteries and biological fermentation are encouraged to purchase advanced, high-tech and efficient equipment.

To push digital transformation, it stresses widespread application of technologies, such as AI, 5G and edge computing in the manufacturing process.

Special reboas by financial institutions will be set up for sci-tech innovation and technological transformation, and preferential tax policies will be also in place, as per the document.



The 2024 Zhongguancun Forum is scheduled to take place in Beijing from April 25 to 29. It will focus on cutting-edge fields such as AI, life sciences and new materials. The photo shows the permanent venue of the forum in Haidian district. (PHOTO: VCG)

# Digital Tech Unleashes New Quality Productive Forces

From page 1

Simultaneously, the digital economy enables global resource allocation and flow by transcending geographical constraints through online platforms. This efficient resource allocation expands market opportunities and encourages collaboration across regions and industries, facilitating the ongoing emergence of new quality productive forces.

## Creating new industries

Digital technology also promotes the emergence of new industries. In terms of enterprise development, China stands at the forefront globally in the expansion of digital economy unicorns and valuation as of 2022, capturing 38.0 percent and 47.1 percent of the total global share, respectively.

According to Cai Yuezhou, a research fellow from the Institute of Quantitative and Technological Economics at the Chinese Academy of Social Sciences, strategic emerging industries in

the digital realm, such as new energy, new materials, and advanced manufacturing, fall in the domain of new quality productivity.

Professors Gai Kaicheng and Han Wenlong from the Southwestern University underscored that the digital economy plays a pivotal role in supporting the development of new technologies, industries, and business models.

Firstly, it provides extensive application scenarios and data resources, driving the advancement of modern information technology.

Secondly, it fosters emerging industries, forging new avenues for high-quality productivity and optimizing industrial chains.

Thirdly, through data-driven innovation and digital integration, it forms the backbone of new industries and breakthrough technologies, accelerating progress in sectors such as new energy and biotechnology, they said.

## Furthering digitalization

In the future, digital technology will continue to enhance production capacity, particularly in human labor, means of labor, and the subject of labor.

With the proliferation of "black-light factories," the increasing application of drones, and growing commonality of "machine for man," many jobs requires a smaller workforce, leading to changes in worker requirements. Consequently, individuals are increasingly pursuing new occupations, especially those related to digital technology.

The *Future of Jobs Report 2023* published by the World Economic Forum predicts that global businesses will create approximately 69 million new jobs over the next five years. The fastest-growing types of jobs are predominantly driven by artificial intelligence and digitalization.

In China, the number of emerging digital occupations is also on the rise.

For example, according to a report released by the Chinese Academy of Personnel Sciences, the short video live broadcasting ecosystem has nurtured and spawned 174 new occupations including Internet marketer, store scouting person, and Internet recruiter. Moreover, it has introduced over 30 new career forms, encompassing roles like anchor, assistant broadcaster and product selector.

The increase in digitalization brings economic growth. According to the *2022 Digital China Development Report*, China's digital economy soared to 50.2 trillion RMB in 2022, accounting for 41.5 percent of the GDP, a significant increase compared to a decade ago. Forecasts indicate a continued upward trend, the digital economy is expected to reach 70.8 trillion RMB in 2025 and its contribution to China's GDP will exceed 50 percent in the near future.

# UNESCO Inspires Collaboration on Karst Research

From page 1

Prof. Dr. Shahbaz Khan, UNESCO representative to China, DPRK, Japan, Mongolia, and ROK, emphasized the role of karst landforms in carbon sequestration and maintaining ecological balance, stressing the continued efforts needed in this regard.

"This event, and the collaborations it fosters, like the China-Slovenia Joint Laboratory on Karst Geology and the Technical Committee on Karst under the International Organization for Standardization, are critical platforms for advancing our understanding and actions in these vital areas," he said.

The joint laboratory, initiated and supported by the Ministry of Science and Technology (MOST) in 2020, with

joint effort from China and Slovenia, aims to promote global monitoring and research in karst regions through cooperation.

The event, hosted by the CSTEC, aims to create a platform for domestic and foreign innovative entities in the karst carbon cycling field. It was jointly organized by the International Karst Research Center of UNESCO and the Institute of Karst Geology, Chinese Academy of Geological Sciences.

The organizers of this event also introduced the Talented Young Scientist Program initiated by MOST in 2013, welcoming foreign youth to conduct research in China and promote the long-term development of karst science and technology with their innovative thinking.

## INSIGHTS

## Hainan Expo Injects Vigor into Global Economic Recovery

## Voice of the World

By TANG Zhexiao

The 4th China International Consumer Products Expo (CICPE) showed just how much of an impact high-quality global consumer goods can have when showcased in a vibrant trading platform, particularly when that platform also fosters international cooperation and injects a measure of urgency into the ongoing efforts toward global economic recovery.

Held in Haikou, the capital city of south China's Hainan province, from April 13 to 18, the Expo attracted various world-renowned brand exhibitors as well as newcomers, all aware of China's huge market potential and growing consumption appetite.

Cooperation with other brands would be a very good thing, Hutch Hutchison, co-founder of XOR UK Corporation Limited told media. "The reason we came here is to get our name into the public eye, for people to realize that we exist."

On the occasion of the 45th anniversary of the establishment of diplomatic relations with China, Ireland participated as the guest of honor of this year's Expo.

With an expanded exhibition area six times larger than its predecessor, the



Intelligent robots attract a visitor to stop and watch at the 4th China International Consumer Products Expo in Haikou, China's Hainan province, April 14, 2024. (PHOTO: VCG)

Irish pavilion brought together 29 exhibiting companies and institutional representatives to display more than 200 exhibits from more than 50 Irish brands. The country's wine, agricultural products, shopping blocks, tourism, lifestyle and health sectors were all showcased.

Derek Lambe, economic counselor of the Embassy of Ireland to China, said, "We get more and more Irish companies coming to join our pavilion, and this [Expo] is very interesting to Irish business-

es, because we see this as a way for Irish businesses to gain access to the huge and valuable Chinese market."

"We are particularly interested in strengthening cooperation with China in the areas of clean energy and green transition. Ireland is committed to a green transition, and we have great potential in wind and tidal energy, [so] we hope to cooperate with Chinese companies," according to Derek Lambe.

The Expo can unleash the con-

sumption potential of Chinese people by showcasing innovative and desirable products, Matteo Giovannini, a China-based finance professional and a member of the Global Young Leaders Dialogue, wrote in an article published in CGTN, adding that the CICPE is a crucial platform that can promote cross-border business and allow international firms to display their products directly to Chinese consumers and businesses.

Zeng Senhong, president of Thailand Tencel Group China, said, the Expo is not only a stage to showcase their heritage and innovation, but also an indicator that helps them perceive market consumption trends. Based on this platform, the Group hopes to further gain insights into the needs of Chinese consumers and do well in product innovation and market strategies.

In addition to China's growing consumption market, a series of new measures across key areas including services trade, digital trade and its policy for developing a free trade port have attracted many companies to settle in Hainan.

According to provincial governor Liu Xiaoming's remarks at a news conference on April 11, the number of newly established foreign-funded enterprises in Hainan has grown at an annual rate of 65 percent since 2018, reaching a total of 6,543, signaling a strong vote of confidence from international investors.

## Comment

## Minister's Visit Shows Weight of China-France Ties at 60

By TANG Zhexiao

French Minister for Europe and Foreign Affairs Stephane Sejourne's visit to China on April 1, within three months of assuming office, reflects the great importance France attaches to its relations with China.

This year marks the 60th anniversary of the establishment of diplomatic ties between China and France. Since the beginning of the year, the two countries have engaged in a series of high-level exchanges, giving bilateral ties renewed vigor and vitality.

France is seeking more strategically stable and forward-looking China-France relations. During Sejourne's visit, the two sides agreed to lead innovative development, deepen cooperation in traditional areas such as aviation and aerospace, nuclear energy, agriculture and finance, and explore cooperation in emerging areas such as green transition and intelligent manufacturing, according to the Chinese Ministry of Foreign Affairs.

Looking back at history, China-France science and technology cooperation has made significant achievements. In the 1980s, the French Atomic Energy Commission donated a flywheel generator to the Hefei Institutes of Physical Science in east China for the construction of the Hefei Tokamak-7, an experimental superconducting tokamak nuclear fusion reactor.

Other joint projects have consoli-

dated the relationship. They include the international thermonuclear experimental reactor, known as the world's largest "artificial sun," as well as the management of aging nuclear power plants. Liu Jing, deputy director of China Atomic Energy Authority, said the China-France technological cooperation has injected new connotation and vitality into their nuclear energy cooperation.

During French President Emmanuel Macron's visit to Beijing in 2023, the two countries signed a pact on future sci-tech cooperation, notably renewable energy.

Space technology is also an area of close cooperation. The Space Variable Objects Monitor (SVOM) is the first astronomical satellite jointly developed by China and France.

Karine Mercier, payload manager of the French National Center For Space Studies, said, "The cooperation is very pleasant because we have worked together for a long time."

Currently, she and her other French colleagues are working on a project at the Innovation Academy for Microsatellites in Shanghai, where the SVOM is being assembled.

Being comprehensive strategic partners, China and France's common interests far outweigh their differences. France has stressed that it will work with China to address global challenges such as climate change and biodiversity conservation to improve global governance, giving more stability to a turbulent world.

## 'Overcapacity' an Excuse to Slap Tariffs on Chinese Products

## Opinion

By Marco Fernandes

China has reaffirmed a fundamental goal in the coming decades: to develop new quality productive forces, in other words, to raise the level of technological and human development in all sectors of the country's economy.

I don't think it's a coincidence that at a time when China is preparing to take a new leap in the quality of its industrial production, the collective West — through its powerful media — is creating new accusations against China. The current buzzword now is "overcapacity". China is accused of overproducing some goods, mainly new electric vehicles (NEVs) and renewable energy equipment and facing low domestic demand,

which means the country needs to seek even more foreign markets to sell its production at lower prices.

However, the accusation of "overcapacity" reveals the psychology of the West. That is, "We in the collective West can no longer compete with China, so we're going to invent an excuse to slap tariffs on their products."

The countries of Southeast Asia have been accelerating the pace of their industrial development, thanks in large part to the relocation of Chinese factories and Chinese investment in the region. But in Latin America and Africa, the two continents have generally suffered a process of deindustrialization in recent decades. This has had serious consequences for economies in the Global South. So, Brazil's President Lula, for example, has made re-industrialization the main task of his government.

China offers opportunities for the

Global South. After substantial Chinese investments in infrastructure through the Belt and Road Initiative (BRI), recent developments indicate a higher level of cooperation between China and developing countries. For instance, at the China-Africa Leaders' Dialogue in August 2023, African leaders expressed their appreciation for China's efforts over the past two decades to promote infrastructure on the continent, but also called on China to shift its investment focus from infrastructure to industrialization.

Meanwhile, numerous partnerships between Chinese state-owned and private companies in Global South countries have been established recently, many of them related to local processing of high-demand minerals, or the production of electric vehicles.

For example, China is investing billions of dollars in lithium processing

plants in Bolivia, another lithium plant and one mega steel plant in Zimbabwe, nickel processing plants in Indonesia, and a hub of electric vehicle factories in Morocco. Mexico and Brazil are also now destinations for Chinese NEV factories.

There are high expectations that regional initiatives like the BRI, the expanded BRICS-10, and the Shanghai Cooperation Organization can serve as levers to strengthen this process, even though they face opposition from Western powers. We need to deepen this kind of cooperation.

Marco Fernandes is a Brazilian researcher at the Tricontinental Institute for Social Research, a network of research institutes in the Global South. Fernandes gave the above talk at an international symposium in Beijing, held by the Chongyang Institute for Financial Studies at Renmin University of China.



An aerial drone photo taken on March 19, 2024 shows the permanent venue of the 7th China-France Forum on Urban Sustainable Development in the Sino-French Wuhan Ecological Demonstration City, in Wuhan, central China's Hubei Province. (PHOTO: XINHUA)

## New Smart Fiber Emits Light Without Being Plugged in

## Hi! Tech

By TANG Zhexiao

Researchers from Donghua University in Shanghai developed a new type of luminous smart fiber that can emit light and generate electricity without being plugged in.

The research group accidentally discovered that fibers emit light in a radio field in an experiment. Based on this, they developed a new type of smart fiber with a "non von Neumann architecture," integrating functions including wireless energy collection, information perception and transmission into a single fiber.

Textiles with such fiber can emit light with just a touch. Researchers also achieved human-computer interaction functions such as luminous display and wireless command transmission without

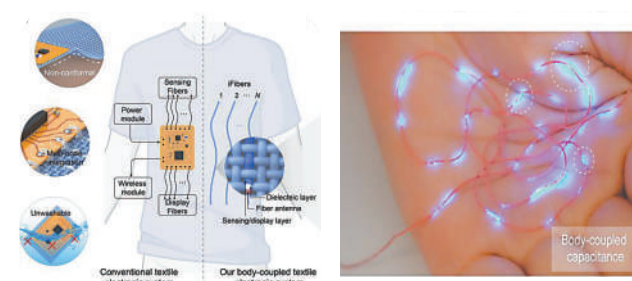
chips and batteries.

The new fiber offers comfort and stability as well. Compared with the traditional rigid semiconductor components or flexible thin film devices, electronic textiles made of smart fibers have better air permeability and softness.

However, the volume, weight and rigidity of textiles may increase as the current smart fiber uses complex multi-module integration, according to the researchers.

The study, published in the journal *Science* on April 5, said the smart fiber is expected to change the way people interact with the environment and between people.

The research group said the next stage of their work would be in-depth research on how to make new fibers more effectively collect energy from space and use it to drive more functions including display, deformation and computing.



The working mechanism of the new smart fiber and the display of hand-touch luminescence control. (PHOTO: Donghua University)

## 6G Technology Needs Joint Exploration

By YU Haoyuan

From April 16-18, scientists from multiple countries gathered at the Global 6G Conference in Nanjing, Jiangsu province in east China, to discuss the future of 6G research and development, as well as application scenarios and fostering cooperation.

The conference is actually in response to the International Telecommunication Union (ITU)'s proposal in 2023 to develop the next generation of IMT standards, that is, the Framework and Overall Objectives of the Future Development of International Mobile Telecommunication for 2030 and Beyond (IMT-2030).

According to the IMT-2030, besides 5G's usage scenarios of immersive communication, massive communication, hyper-reliable and low-latency communication, 6G will add integrated AI and communication, sensing and communication, and ubiquitous connectivity.

During the conference, FuTURE FORUM, a communication platform

with significant influence in the scholar field, released the Initiative for Collaborative Advancement of Global 6G Consensus and Cooperation, which urges jointly building 6G as a technology with clear positioning, exploration of multiple new scenarios, a unified industry-wide definition, and a platform and organizational collaboration mechanism.

## The potential of 6G

6G will turn 5G's "Internet of Everything" into "Intelligent connection of everything."

Wu Hequan, an academician of the Chinese Academy of Engineering, said, "6G is supposed to meet the needs of multiple human-machine-object connections, and the multi-dimensional communication-sensing-computing scenarios, taking into account multiple requirements for bandwidth, time delay, energy efficiency and cost."

Johan Söder, head of Radio Networks at Ericsson Research, said, "I believe in 2030 there will be what we call a digitalized and programmable world. We

have the digitalization and automation trend going on for several years and it will continue to move on."

## Navigating challenges

"The use of millimeter wave hasn't gained popularity as a business-to-consumer solution, especially in terrestrial environments. That is why we need societal agreement in terms of need-pull for 6G," said Professor KyungHi Chang from Inha University in South Korea, who is also the chairman of the Executive Committee of the 6G Forum.

Kai-Kit Wong, chair professor of wireless communications at University College London, said overcoming technical, commercial and non-technical challenges is paramount for the development and commercialization of 6G.

## Global cooperation for 6G advancement

IMT-2030 has already defined the vision for how 6G technologies will be developed. "Internationalization and openness are fundamental characteristics and values of 6G, and a unified standard is the endogenous demand of technology. Therefore, 6G's R&D needs glob-

al cooperation and collaboration," said Wen Ku, president of the China Communications Standards Association.

"It is the shared goal of the global industry to avoid technological and standard fragmentation, persist in shaping a unified international standard for 6G, and construct an open and shared healthy industry ecosystem," said Wang Xiaoyun, chief scientist of China Mobile.

Sun Sumei, executive director at the Institute for Infocomm Research, A\*STAR, Singapore, said, "We are in the study phase, examining various candidate technologies for the 6G standard. We believe in and are open to collaborating with different partners to ensure a unified technology development and adoption."

Rahim Tafazolli, director and Regius professor of 5GIC and 6GIC at the University of Surrey in the UK, also said that internationalization and openness are fundamental values in the field of mobile communication and the foundation for the success of global mobile communications.

# Finding Meaningful Life in China

## Dialogue

By LONG Yun & BI Weizi

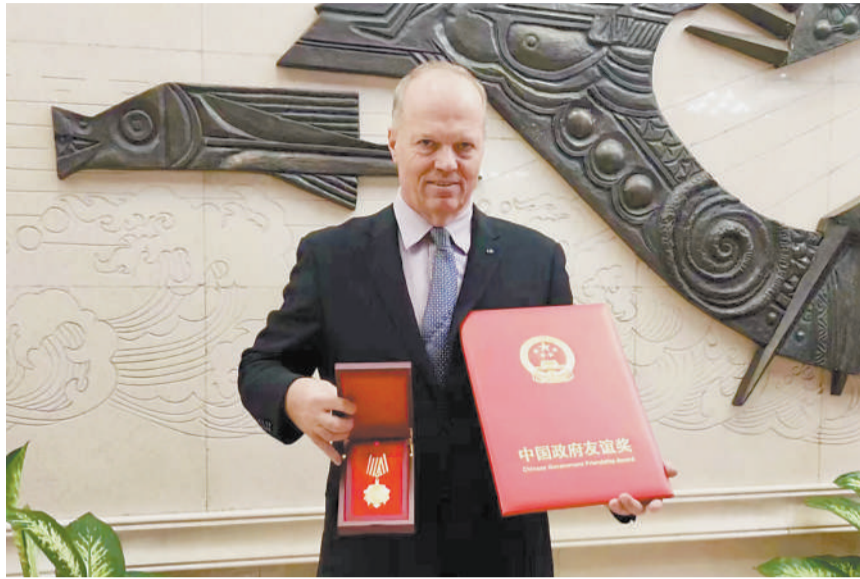
"I do like being a scientist, exploring the sci-tech world with endless possibilities," Czech scientist Dr. Pavel Neuzil told *Science and Technology Daily*.

In 2015, those endless possibilities eventually took his academic odyssey to China, where he serves as a distinguished professor in the School of Mechanical Engineering at Northwestern Polytechnical University (NPU) in Xi'an, northwest China's Shaanxi province. In the process, he has built up a bond of affection with the people and the country.

**Conducting trailblazing research**  
Neuzil's research endeavors extend beyond the academic community, also aiming to bring tangible benefits to society. His work in developing Digital PCR technology for prenatal diagnostics stands as a vivid example of his commitment to public welfare. By offering simpler and more efficient methods for detecting genetic abnormalities in unborn children, Neuzil strives to lower the incidents of conditions such as Trisomy 18 and 21, commonly known as Edwards syndrome and Down syndrome, respectively.

Neuzil joined NPU keen to do further research after he found China provided a flourishing academic landscape. Speaking highly of Chinese universities, he attributed their rapid academic progress to the conducive research environment.

Reflecting on his own experience at



Professor Pavel Neuzil. (COURTESY PHOTO)

NPU, Neuzil appreciated the support he has been receiving from the university, with a functional laboratory established within a year of his arrival.

Moreover, he finds himself particularly drawn to the diversity of the working environment, where collaboration with Chinese colleagues provides a source of pleasure. "Professor Neuzil is a pragmatic and down-to-earth scientist, who diligently dedicates himself to his work and lives a modest lifestyle," say his colleagues at NPU.

**Guiding the next generation**  
Despite his reserved character, Neuzil's dedication to his work is evident in his interactions with students, who express sincere gratitude for his guidance. "Essentially, I guide my students to the door, but they take the steps to walk through it on their own.

They are determined individuals with aspirations, and I merely assist them in realizing their goals," he said.

In his classes, Neuzil highlights the value of curiosity in propelling his students' careers forward. Drawing from his own experience, he advises researchers to remain open-minded and receptive to learning from their peers, emphasizing the importance of collaboration and knowledge-sharing. Additionally, he attaches great importance to problem-solving skills and seeking guidance when faced with challenges, cautioning against repeating mistakes without seeking assistance.

Whether it is guiding his students toward academic success, or enjoying outdoor activities in nature, Neuzil instills a sense of dedication and perseverance in them. This helps foster a mutual-

ly beneficial relationship. He considers the holistic growth of his students as one of his "greatest accomplishments" in China.

He also commended the diligence and passion shown by Chinese students, recognizing China's efficient talent cultivation system as instrumental in providing young individuals with abundant opportunities.

**Exploring cultural harmony**  
Neuzil's journey has taken him across the globe, but it's in China where he feels a profound connection. Xi'an, known for its deep-rooted history, resonates with him. "I am a conservative person, and I like history," he said, finding comfort in the city's ancient character. Shaanxi province's tranquil atmosphere also appeals to him, offering a peaceful escape from the busy city life where he enjoys exploring the Qinling mountains.

Immersing himself in China's vibrant culture, Neuzil cherishes his encounters with locals from all walks of life. His time in China has been marked by admiration for its people and traditions, transcending cultural differences. Despite these distinctions, he finds inner peace in the enduring Confucian values ingrained in Chinese society.

Driven by the "Chinese spirit of helping one another," he has taken part in a number of volunteer activities in China, finding fulfillment in lending a helping hand where he can, and he is deeply touched by the gratitude of those he assists.

*This article is also contributed by NPU.*

## Letters | Green China

# A Young Ghanaian's Journey for Greener World

By YIN Wei

They say good things come to those who work hard and persevere. This is certainly true in the case of Jeffrey Dankwa Ampah.

Hailing from the Republic of Ghana, Ampah's academic journey has led him from humble beginnings to currently being a doctoral candidate majoring in Power Machinery and Engineering at Tianjin University (TJU), located in northern China.

From his master's program to his current ongoing doctoral pursuit, Ampah has published nearly 50 high-level academic papers in the field of renewable energy and climate change, 13 as first author or co-first author. His works have been cited more than 1,000 times on Google Scholar, showcasing his influence and impact within the academic community.

Professor Liu Haifeng from TJU's School of Mechanical Engineering, who is mentoring Ampah for his doctoral studies, thinks highly of the young man. "Jeffrey is a talented and dedicated researcher. He has demonstrated extraordinary innovative thinking ability and commitment to work and research."

Looking back, Ampah traces the origin of his life aspirations to a childhood wish that has lingered in his mind for years.

**A childhood wish materializes**  
When he was in primary school, the young Ampah became increasingly frustrated by the frequent power outages at home and school. "Back then in my country, electricity was expensive and unstable. During one of those blackout moments, as a young inquisitive kid, I looked up at the blazing sun and wondered when my country would start generating electricity from the sun as other countries were already doing, since it is free, clean, and inexhaustible."

This burgeoning thought later evolved into a big dream, as he elected to study renewable energy engineering when he entered the University of Energy and Natural Resources (UENR) in Ghana for his bachelor's degree.

In 2019, two years after he completed his undergraduate studies and served as a teaching assistant at UENR, he decided to further his study in renewable energy abroad and chose China as his destination.

"I have long noticed that as a major economic power, China has made remarkable advancements in the development of renewable energy sources," said Ampah, adding that between 2005 and 2010, China constructed 39 percent of the world's new renewable energy capacity. "It [China] has showcased a major country's commitment to combating climate change and transitioning towards a

more sustainable future." He was thrilled with the prospect of meeting like-minded people in Chinese universities.

Ampah shared his experience of finding the ideal university to achieve his aspirations. Putting together school rankings, recommendations from friends, major preferences, and campus environment, he ultimately chose Tianjin University.

"TJU is one of the most prestigious Chinese universities. And the campus environment is amazing. The pictures I saw on the university homepage captured my heart immediately," he said.

**A dedicated researcher**  
Associate Professor Jin Chao took Ampah into her research group during his master's program. In her eyes, Ampah is a very dedicated researcher, fully committed to work and study.

For his master's program, Ampah's research primarily focused on the development and optimization of biofuels, particularly low-carbon alcohols for environmentally friendly use in marine engines. He published four high-level research papers as either the first or corresponding author through collaboration with Professor Liu Haifeng from the Department of Energy at the School of Mechanical Engineering, who later became his mentor for doctoral studies.

Ampah's work on clean and low-carbon alternative fuels for marine use has attracted significant international attention. The International Maritime Organization (IMO) technical officials and library directors have since contacted Ampah to obtain full texts of his publications.

However, he owes his academic success to the excellent environment the university provides. "My tutors are both very responsible and inspiring. They provide insightful guidance to my research." He also admitted that the personal traits he observed in most of his lab peers have significantly influenced his work ethic and approaches.

"I firmly believe that China's remarkable growth as a nation is fundamentally rooted in attributes such as discipline, commitment, patriotism, hard work, and humility that are easy to find in most of my lab friends." He was convinced that these very traits can contribute to one's development.

He never forgets his initial intention and pays close attention to the development of his homeland. After completing his MSc studies and while awaiting the start of his doctoral program, Ampah undertook research focused on modeling hybrid energy systems for decarbonization efforts in both Ghana and China.

*The author is a staff working at TJU.*

# Fermentation Art of Dark Tea

## Traditional Eastern Wisdom

By ZONG Shihan

Dark tea is named for its dark brown color, which results from the use of coarse aged tea leaves and the long period of pile-fermentation during processing. Different from the oxidation of

oolong tea and black tea, the post-fermentation of dark tea is a unique process of piling with microbial participation.

The production process of dark tea involves fixation, rolling, piling and drying. Among them, piling is a unique feature of dark tea. It requires stacking tea leaves and adding water appropriately to encourage the rapid growth and multiplication of microorganisms on the tea leaves at a specific temperature. This

process can last from a few hours to several months, endowing dark tea with its unique non-bitter, non-astringent taste and mellow flavor.

The long production process and the waiting time for piling of dark tea demonstrate respect for time. Unlike other teas, the quality of dark tea is not valued for its freshness but for its aging, as it becomes more fragrant over time.

In history, dark tea was a great com-

panion for people living in China's border areas to drink and counteract the greasiness from food. It traveled from inland areas, along the Ancient Tea Horse Road, traversing thousands of miles, to reach China's northwest and southeast border areas. Later, dark tea was exported to Central Asia, Russia and Europe, creating a glorious history of the Sino-Russian Tea Road, also known as the 10 Thousand Li (5,000 kilometers) of Tea Road.

feel unwell or if the condition becomes serious, seek medical attention immediately. If the wind and sand storms are particularly strong, wear windproof goggles when outdoors.

In sandy and dusty weather, the concentration of respirable particles in the air increases significantly. Bacteria and viruses are absorbed on the surface of these particles and can enter the human airways and alveoli, increasing the risk of respiratory diseases such as pneumonia and emphysema.

Try to avoid direct contact with sand and dust on your skin when you are outdoors. Even when you are indoors, protective measures are still essential. A humidifier can be used to maintain proper indoor humidity.

# How to Cope in Sand and Dust Storms

## Science Outreach

By Staff Reporters

Recently, sand and dust storms have occurred in parts of northern and northwestern China. An often asked question is why this phenomenon tends to occur in spring, and how can people protect themselves against it?

Sandy and dusty weather, or windstorms, typically occur when strong winds blow across dry areas without vegetation cover, explained Wu Chenglai, an associate researcher at the Institute of Atmospheric Physics, Chinese Academy of Sciences. When the wind hits the earth, it breaks up the layer of dust on the ground and lifts the light, tiny dust particles into the air. Eventually, the dust and wind combine to form huge clouds that roll across the landscape.

In addition, there is less precipita-

tion in spring and it is difficult to suppress sand and dust, which provides the material conditions for sand and dust to occur, said Wu, adding that during this season, cold air activity in the north is frequent and windy weather is common, which can easily loosen the soil or sand on the surface, causing sand and duststorms.

How to deal with windstorms?  
If dust enters the eyes, do not rub them vigorously, but rather rinse out with running water as soon as possible, to remove any grit. If you continue to

# The Birth of 'Unbreakable Glass'

From page 1

After in-depth analysis, the engineers found that bubbles are generated when the glass liquid comes into contact with the bottom of the kiln. To reduce bubbles, it is necessary to cool the kiln. But the cooling effect of conventional air blowing is limited. To solve the problem, some young technicians have put forward a bold idea to throw a "water bag" into the kiln.

After careful calculation, the technicians introduced a "water bag" made of steel plates (similar to an iron water pipe) into the kiln by 10 millimeters every two hours to cool the wall, while finely adjusting various parameters. Half

a month later, the bubbles in the glass finally disappeared.

This technological innovation has increased the qualification rate of glass to 80 percent, paving the way for large-scale production. With continuous improvement of the process, the qualification rate has gradually increased to 97 percent.

**More benefits**  
In 2021, China's first nanocrystal glass line was finally produced. Jiang said that the key to success lies in ATG's technology to integrate a large number of nano microcrystals into the glass. The core of the technology is the precise control of temperature by

their self-developed equipment called a tunnel kiln.

After ten years, ATG's dedication to innovation has finally shattered international barriers. Its nanocrystalline glass obtained the Swiss SGS five-star glass drop resistance certification, a testament to its resilience against impact.

Currently, the company has applied for more than 350 patents at home and abroad, including 282 invention patents. The products are widely used in fields such as smart home appliances, aviation, high-speed rail and new energy vehicles, providing strong support for the development of China's high-end manu-

facturing industry.

In the future, Bai envisions constructing an electronic cover glass industrial cluster. He predicts that by 2025, the company can generate sales revenue of more than two billion RMB, which can drive upstream and downstream enterprises in the industrial chain to create tens of thousands of jobs.

As China has emphasized the development of new quality productive forces, the company will remain committed to innovation of original and cutting-edge technologies, contributing to industrial modernization, and fostering advancements that benefit both the nation and the world, said Bai.

## Expats Activity



On the morning of April 14, 2024, the "Beijing 2024 Beijing International Friendship Forest Tree Planting" event was launched in Changping district.

Nearly 200 representatives, including foreign envoys, foreign experts in Beijing, and international students from about 47 countries, participated in the event.

These pictures show foreign experts attending the tree-planting activity. (COURTESY PHOTO)

