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Xi Calls for Openness, Cooperation in Sci-Tech

Chinese President Xi Jinping called on all countries to strengthen openness and cooperation in science and technology.

Xi made the remarks while delivering a speech via video at the opening ceremony of the 2021 Zhongguancun Forum (ZGC Forum), which was held from Sept. 24 to 28 in Beijing.

Xi noted that nowadays profound changes unseen in a century are evolving rapidly in the world and the impact of the COVID-19 epidemic is far-reaching, presenting severe challenges for the recovery of the global economy.

All countries in the world need to strengthen openness and cooperation in science and technology, explore ways and means of jointly solving important global issues through sci-tech innovation, address the challenges of the times together, and promote the noble cause of peace and development for all, said Xi.

He emphasized that the development of science and technology must have a global vision, grasp the pulse of the times, and closely follow the new requirements by the production and life of mankind.

Xi said that China attaches great importance to sci-tech innovation and is committed to promoting global cooperation in sci-tech innovation.

China will strengthen international sci-tech exchanges with a more open attitude, and actively participate in global innovation networks to jointly promote basic research and push forward the application of sci-tech achievements, so as to foster new growth momentum for economic development, he said.

China will strengthen intellectual property rights protection, and create a first-class innovation ecosystem. China will also shape the concept of developing science and technology for good purposes, improve global sci-tech governance, and enhance the well-being of mankind, he added.

He noted that Zhongguancun is China's first national independent innovation demonstration zone, and the ZGC Forum is a state-level platform for global sci-tech innovation exchanges and cooperation.

China supports Zhongguancun in carrying out a new round of pilot reforms, speeding up the construction of a world-leading sci-tech park, and making new contributions to promoting global sci-tech innovation exchanges and cooperation, he said.

With a theme of "intelligence, health and carbon neutrality," the forum this year is jointly organized by the Ministry of Science and Technology, the Chinese Academy of Sciences, the China Association for Science and Technology, and the Beijing municipal government.

Source: XINHUA

Staff members of China Mobile tested the signals of the 5G base station built at an altitude of 6,500 meters at the advanced base camp of Mount Qomolangma on May 21, 2021. (PHOTO: XINHUA)

Editor's Pick

IPR Protection in China: A Step Forward

By LU Zijian

Chinese President Xi Jinping launched a six-pronged Global Development Initiative, including staying committed to innovation-driven development, on September 21, via video at the general debate of the 76th session of the United Nations General Assembly.

"We need to seize the historic opportunities created by the latest round of technological revolution and industrial transformation, redouble efforts to harness technological achievements to boost productivity, and foster an open, fair, equitable and non-discriminatory environment for the development of science and technology. We should foster new growth drivers in the post-COVID era and jointly achieve leapfrog development," said Xi.

Meanwhile China has been increasing its efforts in innovation and protection of intellectual property rights (IPR). From zero to a global innovation leader, China has come a long way.

IPR drives economy

Recently, China released a 15-year plan (2021-2035) on the development of IPR. The plan proposes more rigorous IPR protection, achieving and maintaining a high level of public satisfaction, and greater market value of IPR by 2025. By 2025, the added value of patent-intensive industries is expected to equal 13 percent of China's GDP, and the added value of the copyright industry for 7.5 percent.

This is not the first time for China to issue a long-term plan for IPR development. Thirteen years ago, the *Outline of the National Intellectual Property Strategy* was launched.

Great achievements have been made since then.

Ranking as the 12th most innovative economy this year, China has been moving up the list for nine consecutive years, according to the *Global Innovation Index 2021* report, released by the World Intellectual Property Organization (WIPO) on September 20.

The report says that the performance of China is at the frontier of achievement, notably in innovation output. For example, China's levels of patents by origin, scaled by GDP, rank first, as do its levels of trademarks and industrial designs by origin as a percentage of GDP. ***See page 2***

Chinese Scientists Synthesize Starch from CO_2

Edited by WANG Xiaoxia

Chinese scientists have developed an artificial method of synthesizing starch from carbon dioxide (CO2) — a world first which marks a revolutionary leap forward in the field of basic research.

The study, conducted by the Tianjin Institute of Industrial Biotechnology (TIB) under the Chinese Academy of Sciences, was published in the journal *Science* on September 24. The research team reported a chemical-biochemical hybrid pathway for starch synthesis from carbon dioxide and hydrogen in a cell-free system.

This study makes it possible to transform starch production from traditional agricultural planting to industrial manufacturing, and paves the way for complex molecules synthesis from carbon dioxide, according to the research team.

Chinese scientist Cai Tao showed a sample of synthesized starch at a lab on Sept. 16, 2021. (PHOTO: XINHUA)

Starches, a storage form of carbohydrates, are a major source of calories in the human diet and a primary feedstock for the bioindustry.

According to the TIB, starch synthesis in nature needs about 60 metabolic reactions and complex physiological regulations.

The artificial starch anabolic pathway (ASAP), developed by the research team, consists of only 11 core reactions. It was drafted by computational pathway design, established through modular assembly and substitution, and optimized by protein engineering of three bottleneck-associated enzymes.

In a chemoenzymatic system with spatial and temporal segregation, ASAP, driven by hydrogen, converts carbon dioxide to starch at a rate 8.5 times faster than starch synthesis in maize, said Cai Tao, the lead author of the paper and an associate professor at the TIB.

With sufficient energy supply, the annual starch production of a bioreactor with the size of one cubic meter is theoretically as much as that of about 0.3 hectares of cornfields in China.

Ma Yanhe, Director General of the TIB, said that in the future, if the cost of the ASAP process can be reduced to a more economically feasible level, compared with agriculture, it will save more than 90 percent of the arable land and freshwater resources, and avoid the negative effect on the environment from pesticides and chemical fertilizer.

"The work could provide a pathway to our future industrial biomanufacturing of this important global substance," said Meagan Phelan, Science Press Package Executive Director.

BDS Provides More Precise Time Service

By WANG Xiaoxia

A high-precision time-frequency system was released at the First International Summit on BeiDou Navigation Satellite System (BDS) Applications held in Changsha, Hunan Province, September 16.

The BeiDou research team at the National University of Defense Technology (NUDT) said the system has improved the precision of time service. The high-precision all-optical transmission architectural time-frequency system was developed based on the team's own intellectual properties.

As the core of a navigation satellite system, the time-frequency system directly determines the accuracy of satellite navigation timing.

With the new system, the time reference of BDS-3 can be controlled to within one second for every 3 million years, 10 times more accurate than the previous system, which has reached the advanced level in the field of satellite navigation around the world.

The BeiDou research team at NUDT has made breakthroughs in key techniques, including high-precision optical fiber time-frequency transmission and high-stability synthetic atomic clock, and applied them to the BDS. Thus the key components to support high-precision time frequency are all developed domestically.

High-performance time service is very important, because the stable operation of communication, electricity, finance and other systems depends on reliable time synchronization.

The research team has carried out in-depth research on time-frequency including its high stability generation, high security transmission, high precision measurement, and high performance monitoring, so as to solve the bottleneck problems of high-precision traceability and remote transmission under the new architecture of the BDS-3 ground system.

An innovative approach was devised to realize high-precision time-frequency transmission based on optical fiber, and a distributed time-frequency system with high reliability and low complexity was developed after years of efforts.

The BeiDou team's achievements, represented by long-distance, high-precision and high-security time-frequency transmission technology, are being applied to satellite navigation and time-frequency systems.

There will also be broader application of these advanced technologies, for example, in measurement and testing, intelligent systems, mobile communications and scientific research.

Xi Congratulates 2021 World Internet Conference Wuzhen Summit

By TANG Zhexiao

The 2021 World Internet Conference Wuzhen Summit was held from September 26 to 28 both online and offline. Chinese President Xi Jinping sent a congratulatory letter to the 2021 World Internet Conference Wuzhen Summit, noting that digital technology is being fully integrated into the economy, politics, culture, society and building an ecological civilization with new ideas, new forms and new models, having an extensive and profound impact on humankind. ***See page 3***

WEEKLY REVIEW

Gravitational Wave Research Center Launched in Guangdong

The Gravitational Wave Research Center of China National Space Administration (CNSA) was unveiled in Zhuhai city, Guangdong Province on September 26. According to CNSA, the research center will develop a series of experimental satellite platforms and payloads to promote China's detection of space gravitational waves.

Beijing Tops Nature Index Science Cities' Rankings

For the fourth year, Beijing has held the top spot on the listings of Nature Index Science Cities which released on September 25. The index is regarded as one of the crucial methods and indicators to evaluate the performance of institutions and cities in scientific research. Four other Chinese cities — Nanjing, Guangzhou, Wuhan and Hefei — also entered the list, all ranking within top 20.

***The Lancet*: COVID-19 origin should be investigated worldwide**

Jointly written by several Chinese scientists, an article recently published on *The Lancet* noted that the origin tracing of the novel coronavirus should be conducted worldwide for pandemic prevention in the future. The article said, any hypothesis that lacks scientific evidence may lead to separation within the scientific community and among different population groups.

Chinese COVID-19 Vaccine Candidate Shows 79% Efficacy Against Delta

On September 22, Clover Biopharmaceuticals, a clinical-stage biotechnology company in China, announced that the company's protein-based COVID-19 vaccine candidate showed 79 percent efficacy against the dominant Delta variant and overall 67 percent efficacy against any variants in a large trial.

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Beijing to Be a Global Sci-tech Innovation Hub

By CHEN Chunyou

Beijing was set to become a global sci-tech innovation leader and a preferred working destination for talented and innovative people, according to the plan issued by the State Council in September 2016.

Over the past five years, Beijing has focused on the world sci-tech frontier fields, continuously strengthened basic research, and tackled challenges in the field of key and core technologies. The R&D investment intensity of the city remained around six percent, and the proportion of basic research investment increased from 13.8 percent in 2015 to 15.9 percent in 2019.

The winners of national science and technology awards in Beijing accounted for about 30 percent of the whole country. The number of invention patents per 10,000 people is 10 times the national average.

A sci-tech innovation fund of 30 billion RMB was set up and three batches of 60 major application scenarios were released, with a total amount of 19.6 billion RMB. In 2019, the added value of high-tech industries in Beijing accounted for about a quarter of national GDP. The total revenue of Zhongguancun National Independent Innovation Demonstration Zone reached 6.6 trillion RMB, maintaining an annual growth rate of more than 10 percent.

Beijing has continued to deepen reform of sci-tech systems, and optimized the services to stimulate innovation. A series of regulations and policies were issued to promote the application of sci-tech achievements and improve the sci-tech environment.

Thanks to implementation of 20 entry and exit policies and 20 new policies for international talent, Zhongguancun attracts and cultivates a group of strategic sci-tech leaders.

In response to the major national needs and national strategic tasks, Beijing introduced measures to support the construction of new world-class R&D institutions in the fields of quantum science, brain science, artificial intelligence, and applied mathematics, so as to chart the way for the development of national laboratories.

Major sci-tech projects led by Beijing covered all civil projects, with the number and investment ranking first in China.

Beijing promoted the construction of sci-tech facilities, including 12 supercomputing centers, 46 of the world's top 500 supercomputers, and 19 big science infrastructure projects, represented by the high-energy synchrotron radiation light source.

The exhibition center of Zhongguancun National Independent Innovation Demonstration Zone. (PHOTO: VCG)

Beijing's key innovation clusters—the Zhongguancun Science City, Huairou Science City, Beijing Future Science Park, and the Beijing Economic-Technological Development Area, have jointly contributed one-third of the city's GDP with less than six percent of the land area over the past five years.

The China (Beijing) Pilot Free Trade Zone and the Comprehensive Demonstration Zone for Further Opening up the Service Sector were launched by Beijing's municipal authorities, with a slew of business-friendly policies introduced to deepen the city's opening up to the outside world.

Chen Jining, the mayor of Beijing, said this September at the World Robot Conference that the city will make full use of the sci-tech advantages and talent resources, accumulate a wide range of innovation factors through market-oriented mechanisms, and strive to create industry-leading enterprises.

Bold Roadmap Drawn Up for China's IPR

By LI Linxu

China has laid out a bold roadmap to build a powerful country in intellectual property rights (IPR).

The roadmap, titled *Guidelines for Building a Powerful Intellectual Property Nation (2021-2035)*, has set a series of goals for IPR.

By 2025, remarkable progress is expected to be made toward building a powerful country in IPR, according to a release jointly issued by the CPC Central Committee and the State Council on September 22.

The added value of patent intensive industries and copyright industries shall have accounted for 13 percent and 7.5 percent of China's GDP respectively by 2025.

By that time, the total annual import and export amount of intellectual property royalties is expected to reach 350 billion RMB, and the number of high-value invention patents per 10,000 people is expected to reach 12.

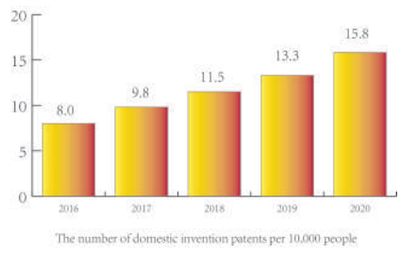
Meanwhile, IPR protection will be more stringent, and social satisfaction on IPR protection will reach a relatively high level in the next five years.

The guideline maps out a number of key tasks including building an IPR protection system that supports world-class business environment, establishing an IPR market operation mechanism that encourages innovation, and stepping up participation in global IPR governance.

To build a powerful intellectual property nation is an important strategic deployment made by the CPC, a necessity for building a modern socialist country, and an important foundation for constructing a new development pattern, said Shen Changyu, commissioner of the China National Intellectual Property Administration (CNIPA).

Since the 18th National Congress of the CPC, China has made historic achievements in IPR protection, and the awareness of the entire society to respect and protect IPR has significantly improved.

The number of domestic invention patents per 10,000 people has reached 15.8 by the end of 2020, quadrupled from 2012.



The number of domestic invention patents per 10,000 people

"In recent years, China has stepped up efforts in an unprecedented way to protect IPR," said a relevant person in charge of CNIPA, adding that the country plans to further boost the level and efficiency of IPR protection.

China would accelerate IPR legislation on emerging industries such as big data, artificial intelligence and gene technology, and enhance international law enforcement cooperation in the field of IPR, according to the guideline.

The roadmap also has set the goals for the next fifteen years. By 2035, China's comprehensive competitiveness in IPR should be among the world's top tier, with the country taking part in the global governance of IPR in an all-round and multi-dimensional way.

Internet Hi-tech Unveiled

A total of 14 world-leading internet sci-tech achievements were unveiled on Sept. 26 in World Internet Conference Wuzhen Summit held in Wuzhen, Zhejiang Province.

The applications of the BeiDou Navigation system and the HarmonyOS, were among the released items recommended by a panel composed of nearly 40 internet experts from home and abroad. (PHOTO: XINHUA)

IPR Protection in China: A Step Forward

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Zhou Huiguo, Deputy Commissioner of the China National Intellectual Property Administration (CNIPA), said since the 18th National Congress of the Communist Party of China (CPC), China's comprehensive strength of IPR has grown rapidly and the IPR quality has been continuously improved. By the first half of 2021, valid invention patents and trademark registrations have reached 3.324 million and 33.548 million respectively.

According to CNIPA, China filed 68,720 PCT applications in 2020, leading the world in this field for the second time.

The quick enhancement of China's IPR comprehensive strength offers solid support for the country's economic and social development.

IPR protection valued

The strengthened IPR capability of China is the beneficiary of the continuously intensified protection of IPR in the country. A series of laws and regulations on IPR, following internationally recognized practices, have been enacted in China since the 1980s, such as the Trademark Law and the Patent Law.

Unprecedented efforts have been made to protect IPR since the 18th CPC National Congress.

Major legal principles for IPR protection have been established in the *Civil Code of the People's Republic of China* enforced in 2021. The patent law, trademark law and copyright law have been amended, and a punitive compensation system for infringement in line with international standards has been established, offering a strong legal guarantee for strict IPR protection.

In addition, the judicial protection of IPR has been considerably reinforced through the establishment of many local IP courts and the IP court of the Supreme People's Court.

IPR protection and rapid IPR service centers have also been established. In 2020, these centers assisted in 17,000 cases, with a closing rate of 98.3 percent and a closing cycle of 11.6 days.

According to a report by CNIPA, China's social satisfaction on IPR protection in 2020 scored 80.05 out of 100, highly improved from 63.69 in 2012. Joint venture companies scored 82.41, while foreign-invested companies 81.70. The results suggest that China's achievements in IPR protection have been widely acknowledged by society.

International cooperation on IPR essential

Apart from promoting IPR domestically, China has also been cooperating with other parts of the world.

China is deeply involved in the multilateral affairs under the framework of WIPO, and resolutely maintains the IPR multilateral system. The WIPO Office in China opened in Beijing in July 2014. The Beijing Treaty on Audiovisual Performances, the first international IPR treaty named after a Chinese city, entered into force in 2020.

Two High-level Conferences on Intellectual Property for Countries along the Belt and Road Initiative were successfully held in China, and eight cooperation projects have made great achievements, covering IPR protection, review cooperation, basic capacity building, and public awareness enhancement.

China has also been actively promoting in-depth and pragmatic IPR cooperation with the other IP5 countries, the other BRICS countries, ASEAN, and Africa.

The five IP offices (IP5) is a forum set up by the five largest intellectual property offices in the world. The members of IP5 are the European Patent Office, the Japan Patent Office, the Korean Intellectual Property Office, CNIPA, and the United States Patent and Trademark Office. In the 14th annual meeting of the IP5, the IP5 offices regarded it necessary to take a long-term perspective on IP and recognized its indispensable role in coping with social challenges.

The BRICS intellectual property offices drafted a cooperation road map in 2013, aiming at enhancing the value of IP and to ensure its contribution to the economic development and growth in member countries.

With the achievements already gained, China is ready to make the next step up.

China's R&D Spending Rises to 2.439 Trillion RMB in 2020

By LI Linxu

China's R&D intensity in 2020, expenditure on R&D as a percentage of GDP, hit a record high at 2.4 percent, up by 0.16 percentage points from the previous year, according to the latest data jointly released by the National Bureau of Statistics, the Ministry of Science and Technology, and the Ministry of Finance.

"The increase in R&D intensity is the biggest jump in recent 11 years," said Zhang Qilong, a statistician at the bureau, adding that the country's R&D intensity has caught up with the average level of OECD.

The country's total expenditure on R&D rose 10.2 percent from a year ago to 2.439 trillion RMB, according to the data.

"The figure has continued to register double digit growth for five consecutive years, " said Zhang, adding that the country's growth rate in R&D spending leads the world.

According to Zhang, the country has become a major force driving the growth of global R&D spending, with an average net annual increment of more than 200 billion RMB during the 13th Five-Year Plan period.

A Record High

Now, China's spending on R&D is about 54 percent of that of the U.S., ranking No.2 in the world.

Expenditure on R&D by enterprises rose 10.4 percent year-on-year to 1.867 trillion RMB, accounting for 76.6 percent of the total.

The steady increase in corporate R&D spending in key fields has created a favorable environment for making breakthroughs in key core technologies, said Zhang.

Meanwhile, R&D investment in the hi-tech manufacturing sector reached 464.9 billion RMB, or 2.67 percent of the sector's total operating revenue, up 0.26 percentage points from a year ago.

Investment in basic research reached 146.7 billion RMB, up 9.8 percent year-on-year, accounting for 6.01 percent of the R&D expenditure.

In the next five years, the country's R&D spending is expected to grow by more than 7 percent annually, according to the 14th Five-Year Plan.

China Closer to Top 10 Innovative Economies

By LI Linxu

China is edging closer to top 10 on global list of most innovative economies.

The country climbs two places from last year to 12th, with outstanding scores in hi-tech exports, patents, trademarks and industrial designs, according to Global Innovation Index 2021, released by the World Intellectual Property Organisation (WIPO) on September 20.

The 2021 edition of the index presents the latest global innovation ranking of 132 economies, relying on 81 different indicators.

"This year's index shows us that in spite of the massive impact of the COVID-19 pandemic on lives and livelihoods, many sectors have shown remarkable resilience, especially those that have embraced digitalization, technology and innovation," said WIPO Director General Daren Tang.

In its annual ranking of the world's economies on innovation capacity, the index shows that only a few economies, mostly high income, consistently dominate the ranks.

However, selected middle income economies, including China, Turkey, Vietnam and India, are catching up and changing the innovation landscape.

The 12th

"These emerging economies have been able to successfully complement their domestic innovation with international technology transfer, develop technologically dynamic services that can be traded internationally, and ultimately have shaped more balanced innovation systems," said Soumitra Dutta, former Dean and Professor of Management at Cornell University.

Since 2013, China has moved steadily up the index ranking, establishing itself as a global innovation leader.

Relative to GDP, China's performance is well above expectations for its level of development, and also performs well above the upper middle-income group average in the index.

It ranks 1st among the 34 upper middle-income group economies.

The performance of China is at the frontier of achievement, notably in innovation outputs. The country boasts 19 of the top science and technology clusters worldwide, with Shenzhen-Hong Kong-Guangzhou and Beijing in the 2nd and 3rd spots, respectively.

Voice of the World

Blueprint: China to Lead IPR Competitiveness by 2035

Edited by QI Liming

China released a 15 - year plan (2021 - 2035) on the development of intellectual property rights (IPR) on Sept 22. The plan demands stricter IPR protection, a high level of public satisfaction, and greater market value of IPR by 2025. Meanwhile, China's IPR comprehensive competitiveness will rank among the top in the world by 2035, accordding to the plan.

Once the outline was released, it drew close attention from both home and abroad. Business circles and media are among the most concerned. Actually, China's achievements and progress in IPR protection in current years, have gotten much praise from the world.

IP system facilitates economic recovery

The U.S. Chamber of Commerce Global Innovation Policy Center (GIPC) released its ninth annual International IP Index, "Recovery Through Ingenuity," in March this year, highlighting the extraordinary role of IPR in delivering pandemic -ending solutions.

In a year of unprecedented challenges, China, as an emerging market, continued making solid progress.

China's improved score is due in part to new legislation to strengthen its domestic IP framework. "Trade remains critically important to global IP standards," Neil Bradley, chief policy officer at the U.S. Chamber of Commerce, said on the chamber's website after the announcement of the index.

"The international IP system gave the innovative scientific community the capacity to respond to the global pandemic," said David Hirschmann, president and CEO of GIPC, on the same website.

"Countries with the most effective IP ecosystems — as measured by the 2021 Index — become trusted partners in our mission to develop, manufacture, and distribute the solutions needed to defeat COVID-19 in record time. Now is the time to build greater international consensus and capacity on IP, to enable all countries and the next generation to build a sustained economic recovery through ingenuity," said Hirschmann.

According to *South China Morning Post,* IP continues to be a massive economic driver for jobs and investment. Experts have noted that China's stake in IP has been growing as its economy moves up in the value chain and expands overseas.

China ramps up IP protection for international market

"China's IP policy is part of the government's overall development plan," Elizabeth Chien - Hale, a veteran China IP expert and a partner of international law firm Appleton Luff, told *South China Morning Post* this May. "Patents and IP in general are just a way to bolster the transition from a manufacturing- based economy into a knowledge-based economy," she said.

Elliot Papageorgiou, head of IP strategy for China at multinational law firm Gowling WLG and chairman of the IPR working group of the European Union Chamber of Commerce in China, commenting on the same portal, said that IP was the "most obvious way" for China to capture and retain as much as possible the value added to products going to market internationally.

"As Chinese companies are embarking on ever-growing numbers of foreign investments under the Belt and Road Initiative (BRI), they will need to protect Chinese - developed innovations in the countries in which they invest," Papageorgiou commented, "It is expected that Chinese IP filing in BRI countries will continue to grow steadily."

Protecting China's IP

The China National Intellectual Property Administration (CNIPA) has outlined several ways designed to increase protection for IP this April, including the introduction of harmonizing laws and common judicial and administrative standards.

Besides, new rules and regulations will be introduced, dedicated to the protection of future technologies, including big data, artificial intelligence and genetic engineering.

Meanwhile, as for overseas protection, China will push foreign governments to strengthen their protection of Chinese IP. China will actively participate in the global governance of IP through the World Trade Organization and the World Intellectual Property Organization (WIPO), and strengthen government support to help Chinese enterprises safeguard their IP overseas.

China's IPR record improving

According to Japan's media *Nikkei Asia*, in 2020, China was the biggest source of applications for international patents in the world for the second consecutive year, with a total of 68,720 filing. An increased number of Chinese technology- oriented companies see IP protection as a key element of their business strategy.

As reported in *Foreign Policy* magazine, China's record on IPR is getting better and better.

The country is making the transition from net importer of ideas to net innovator, and as it does, it is looking for that good patent laws matter. Overall, IP regime in China has made significant strides in just a few decades.

IP protection in China. (PHOTO: VCG)

French Media: China's Leapfrog Development in Internet Sector

Edited by BI Weizi

China Internet Network Information Center released the 48th Statistical Report on China's Internet Development on August 27.

The report shows that as of June 2021, the size of China's Internet users had reached 1.011 billion, forming the world's largest and most vibrant digital community. Recently, French media published several related reports praising China's leapfrog development in the Internet realm.

France's *Siecle Digitial* reported on August 30 that China's rapid growth in the Internet sector has been driven by many factors, which even include the pandemic. In addition, the continuous improvement of logistics and digital service facilities has not only improved the development of e - commerce, but also facilitated the emergence of new online services, such as online government service platforms and online education.

The report said people could do many things without leaving home via the Internet, including paying gas and electricity bills, ordering take - out, online shopping, and remote medical consultations. Data provided showed the extent of this online activity.

Examples include: 944 million online video users, 638 million online live streaming users, 469 million online takeout users, 397 million online taxi users, 812 million online shopping users, and 872 million online payment users. This shows the development of the various Internet industries, and how they make a significant contribution to China's economic transition and recovery.

The report concluded by focusing on China's efforts in the area of Internet legislation, noting that China's *Data Security Law* and *Personal Information Protection Law* would take effect in September and November respectively.

French newspaper *Le Figaro* reported on August 29 that the number of China's Internet users exceeded one billion, and the Internet penetration rate reached 71.6 percent, which shows that China has come on in leaps and bounds in the Internet field in the past two decades.

On August 27, the French newspaper *Libération* also reported that it was expected that the size of China's Internet users would exceed one billion, because the number of Chinese Internet users has been growing since 2000 and doubled between 2010 and 2018, from 400 million to 800 million.

Furthermore, *Radio France Internationale* reported that smartphones have become an integral part of people's lives, with some people using them for about seven hours a day. The article said analysis showed the popularity of the Internet also augurs well for the development of e-commerce in China.

The picture shows a representative of Zhejiang Lab is introducing "800G ultra-high-speed optical transceiver chips and engines" to the public during the 2021 World Internet Conference Wuzhen Summit on September 26. (PHOTO: XINHUA)

Xi Congratulates 2021 World Internet Conference Wuzhen Summit

From page 1

Xi emphasized that China is willing to work with other countries to shoulder the historical responsibility of promoting human progress by stimulating the digital economy, enhancing the government's digital efficiency, optimizing the digital social environment, setting up a digital cooperation structure, and building a strong digital security shield. China is also willing to work with other countries to make digital civilization benefit people of all countries, and promote the building of a community with a shared future for humankind, he added.

The conference, themed "Towards a New Era of Digital Civilization—Building a Community with a Shared Future in Cyberspace," set up 20 sub - forums focusing on hot topics such as 5G, artificial intelligence, and open-source ecology, as well as major topics of cyberspace governance and development, aiming to build an international platform of interconnectivity between China and the world.

This year's leading Internet scientific and technological achievements, along with a section showcasing projects on jointly building a community with a shared future in cyberspace, were also on display at the summit.

More than 1,000 online attendees watched the conference in real time for the first time through the Online Conference Video System. Nearly 2,000 representatives from more than 80 countries and regions attended the conference both online and offline, said Zhao Zeliang, vice - minister of the Cyberspace Administration of China.

Located in the core exhibition area of the World Internet Conference with a total construction area of about 30,000 square meters, the Wuzhen World Internet Science and Technology Museum is planned to be unveiled in 2023. It will present Internet technology in a panoramic view with four functional sections including "History Review," "Leading Technology," "Composite Space" and "I Future."

Two reports titled World Internet Development Report 2021 and China Internet Development Report 2021 were also released during the event.

Hi! Tech

Bamboo High-speed Train on Track

By YU Haoyuan

China leads the world in terms of high - speed train technology, owning a wide range of intellectual property rights in this field. Taking cognizance of the growing pressure from environmental protection trends, Chinese engineers are experimenting with construction of high-speed trains made from bamboo, in line with sustainable development goals.

A kind of advanced composite material is used to manufacture high-speed trains. Compared with the traditional high - speed trains, the bamboo version, along with other components integrated into an appropriate material, demonstrates the following three distinctive advantages:

Firstly, using renewable resources, a bamboo high - speed train features low carbon emissions and it is environmentally friendly. Bamboo produces less pollution than steel when processed. Every 1,100 million tons of bamboo material can lead to a reduction of carbon emissions by as much as 350 million tons.

Secondly, the bamboo high - speed railway is light in weight, low in cost and high in profit, which is conducive to the maximum utilization of resources available. The wood fiber derived from the bamboo material weighs less than carbon fiber and glass fiber, which makes the bamboo material weighs less than other traditional materials, meaning the train will use less energy to run. As calculated by Chinese experts, the amount of energy consumed by one bamboo train carriage is 30 percent less than that of the ordinary one. Besides, for a train made completely of bamboo composite materials, its total energy consumption will reach the level of being about 20 percent lower than traditional bullet trains.

Finally, the bamboo high - speed train is safer and stronger in structure. Though the wood fiber of bamboo is inferior to carbon fiber or glass fiber in strength, it remains stronger than steel given the same weight. As suggested by the experimental results, the carriages made out of bamboo can withstand the pressure applied by an 80 - ton truck, which is impossible for various steel materials. In addition, bamboo performs well in absorption and flexibility, which makes the new bamboo-made train resistant to impact.

Currently, the bamboo high - speed train has passed standard compliance test. It is believed to be suitable for widespread use in large - scale high - speed railway operations across the country in the near future.

Chinese Shield Machines: Tunneling above and below Sea Level

By QI Liming

China's deepest undersea tunnel boring machine, Shenjiang - 1, rolled off the production line of China Railway Construction Heavy Industry Corporation Ltd. (CRCHI) in Changsha on August 23, 2021. It will serve in the construction of China's deepest submarine tunnel: the Pearl River Estuary Tunnel of the Shenzhen - Jiangmen Railway.

This shield machine, with a cutter head decorated with the face of a lion, has an excavation diameter of 13.42 meters with a total length of 130 meters and a total weight of 3,800 tons.

Shenjiang - 1 will excavate a tunnel that crosses a section measuring 3,590 meters, passing through the Pearl River estuary. With a maximum buried depth of 106 meters and high water pressure construction area of 110 meters, it is currently the underwater shield tunnel with the longest buried depth and the highest water pressure in China.

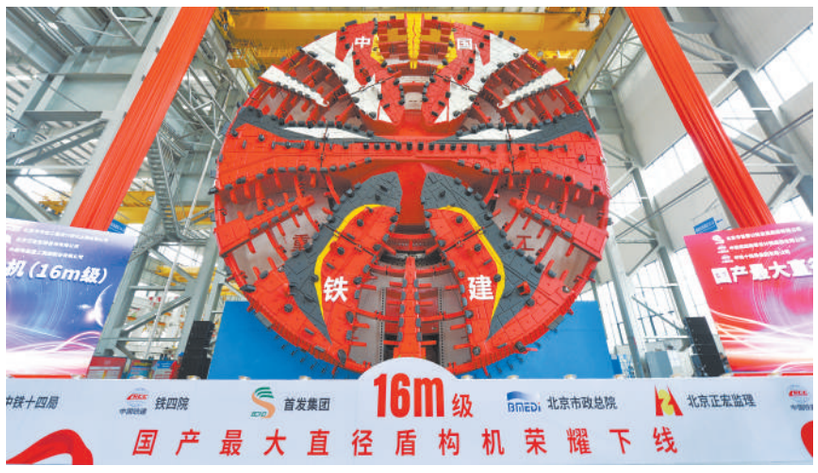
Considering these construction difficulties in the sea areas, such as ultra-high water pressure, super - hard rock formations, long - distance downhill excavation, continuous crossing of fractured zones, and strong seawater corrosion, the development team has carried out a targeted selection design and a configuration of a normal and heavy composite cutter head, a retractable main drive and a double - layer shell.

The machine integrates a series of intelligent systems to improve the adaptability of the shield machine and provide a guarantee for the safe and efficient construction of the project. The shield machine will be disassembled and transported to the construction site, where it will be reassembled.

Another big challenge for domestic shield machine construction is excavating through the Himalayas.

China has constructed a 4,300 - ton shield machine Jinghua, digging through the Himalayas to build the world's highest railway: the China - Nepal Railway.

Jinghua is 150 meters long, with a maximum excavation diameter of 16 meters and as high as a five-storey building. It is also the largest diameter shield machine developed in China, combining mechanical sensing, optics, hydraulic and information technology. The technology used in these machines is the most advanced of its kind worldwide.



Homemade shield machine "Jinghua". (PHOTO: XINHUA)

Foreign Sci-tech Team Sparks Xiamen Development

By Staff Reporters

A volunteer team made up of more than 20 foreign sci-tech experts was set up in Xiamen, Fujian province on August 25. The team received verification letters of their certified professional skills and letters of appointment as sci-tech special representatives. The evaluation mechanism, the first of its kind in China, broke the traditional paradigm of evaluating professionals only from their educational backgrounds, certificates, research papers and work period.

The first batch of 10 foreign sci-tech special representatives come from India, Singapore, Australia, Japan, Denmark and other countries. They specialize in various fields such as electronic information, intelligent manufacturing, animation and design, and will provide local sci-tech enterprises with targeted assistance and support through technical advice, project matchmaking, and concerted action.

Ohashi Nobuo, general manager of Electric Glass (Xiamen) Co., is a member of the volunteer team. He applauded the efforts the Xiamen municipal government made to support the company, which in turn contributed to its rapid development. Meanwhile, Ohashi hopes that his rich experience in electro-optical technologies can help local sci-tech enterprises enhance their management.

In 2020, Mr. and Mrs. Hala from Egypt came to work in Xiamen. Currently they are engaged in marine ecology research at the Third Institute of Oceanography of the Ministry of Natural Resources. "As a member of the sci-tech special representatives team, we are glad to use my research achievements to boost the development of Xiamen's Marine industry. I hope that people from China and other countries can further enhance communication and cooperation in Xiamen," they said.

The new era entrusts sci-tech special representatives with new missions, and also puts forward higher requirements for improving the system of science and technology special representatives. In recent years, Xiamen has gradually implemented several measures to improve the system of sci-tech special representatives through diversity. For example, it has stepped up efforts to expand the channels for selection and recognition of science and technology special representatives, stimulating innovation, improving services and upgrading relevant systems and mechanisms.

The development of the sci-tech special representatives has played a major role in promoting the revitalization of rural industries, culture, human resources and the ecological system.

Xiamen has made bold attempts to explore new modes of sci-tech special representatives' work. Among these efforts, opportunities to participate in selection are given to professionals both at home and abroad. Luo Lei, an official from the city's science and technology bureau, noted that Xiamen is ready to provide a stage for expats to unleash their potential and facilitate them serving as the intelligent power to advance corporate technological innovation, commercialization of sci-tech achievements, and industrial development.

Some foreign professionals with rich experience and strong operational skills fail to apply for jobs in Xiamen due to their educational background, work experience and other restrictions.

In response to some key industries' urgent need for introducing foreign professionals with such concerns, the Xiamen Science and Technology Bureau and other local governmental departments have launched a professional skill evaluation mechanism for foreign professionals and carried out pilot projects.

A total of 11 professionals from the U. S., Canada, Japan, Turkey, and Spain as well as BRICS countries received their certificates for being sci-tech special representatives. Among them, the newcomers were also issued work permits and residence permits.

Zfusion Tech Big Data Platform is the agency that evaluates foreign talent. Zhang Longhui, the head of Zfusion Tech told *S&T Daily* that the platform will collect the information on the current status and development trend of relevant industries and technology. Based on the information gained, it makes a comprehensive analysis of the adaptability, innovative ability and urgency of foreign professionals and potential posts, before compiling a multi-dimensional profile of professionals, which serves as a reference for relevant departments to review work permits.

Source: Xiamen Science and Technology Bureau

The certification ceremony for foreign professionals. (PHOTO: Xiamen Science and Technology Bureau)

Andre Rosendo: China Facilitates Cutting-edge Research

By TIAN Xueke & WEN Haoting

Dr. Andre Rosendo is working on a robotic arm. (Photo provided by author)

Dr. Andre Rosendo chose China to continue his professional studies because he felt the country has world-class laboratories with cutting-edge equipment, as well as being well connected to appropriate industries. The assistant professor at Shanghai Tech University hails from Brazil, having studied in Japan and the UK before coming to China.

His research area is in evolutionary robotics, soft manipulation and robotic locomotion. Robots are increasingly present in our lives, and they must be safe to interact with humans while also being capable of adapting to our world. Rosendo's research combines walking robots capable of intelligently creating themselves, with safe humans and environment interactions through soft materials.

S&T Daily recently had the opportunity to conduct a written interview with Rosendo and learn more about his experience working in China.

S&T Daily: What is your view on the academic environment in China and what are some of the benefits of doing researches here versus other places?

Rosendo: China has been investing a lot in science and technology. As a researcher, that is really important. It represents stronger collaborations between academic institutions and industries. Robotics, specifically, is a very expensive research field that many countries around the globe cannot afford. While advances in computer vision and machine learning only require fast computers (many times clusters, geographically far away from the research institution), robotics work is built upon expensive hardware, and this interplay between academia and industries in China allows cutting-edge research to happen.

S&T Daily: Based on your experience living in China, do you feel that new technologies in China, such as e-payments and high-speed railways, have improved your day-to-day life?

Rosendo: Absolutely! Life as a foreigner in China would be very difficult without e-payment systems, such as Alipay and Wechat, and the constant advances in the railway [system] are proving to be tough competition for the aviation industry (not only in cost but also in the door-to-door commute time). When I need to shop in the city or travel to other provinces, language is not a barrier anymore, and payment is just a QR code scan away.

S&T Daily: You have been working in Shanghai for almost five years. Which part of the country has impressed you most?

Rosendo: How fast things are changing. There is always new construction happening here and there, a new payment system or a more streamlined procedure that trims down the waiting time. Lots of innovation is happening at the same time, and it is very exciting to live in a place like this.

S&T Daily: As a foreign scientist conducting research in China, what suggestions do you have for academic institutions in terms of international sci-tech cooperation?

Rosendo: China has a chance to establish itself as a world leader in robotics by doing strong collaborations with other fast developing countries, such as India, South Africa, Russia and Brazil. These countries have formidable researchers without the resources to conduct their research there, and a good strategy would be offering "visiting scholarships" to PhDs and postdocs from these countries to maximize research output.

At the end of the interview, Rosendo suggested that articles on science and technology should include more technical information, as some readers interested in such articles will want to know about technological advances with a higher degree of details.

Experts Call for Int'l Cooperation in Public Health Sector

By Staff Reporters

The International Science & Technology Cooperation Forum on Biomedicine for Prevention and Control of Infectious Diseases was held in Beijing on September 25, aiming to further facilitate international people-to-people exchanges among the sci-tech community. As one of the sub-meetings of 2021 Zhongguancun Forum, this forum is led by the Department of Foreign Expert Services, Ministry of Science and Technology (MOST), and hosted by China Science and Technology Exchange Center, Foreign Talent Research Center, MOST, and Bill & Melinda Gates Foundation.

Experts from relevant international organizations, government departments, research institutions and enterprises engaged in comprehensive dialogues on cooperation in the prevention and control of major infectious diseases and international collaboration on vaccine and drug research and development.

Participants agreed the current sci-tech revolution and industrial transformation are profoundly changing the economic landscape and daily life. In particular, as COVID-19 continues to spread around the globe, society sees an increasing need for deepening cooperation among the global scientific and technological communities, so as to jointly promote building a community of common health for mankind.

Service Info

Beijing Offers New Recruitment Platform for Global Talents

By BOTC

The first GT2HR Recruitment Fair for Global Talent kicked off in Beijing on September 15, 2021. This special event was jointly launched by the Beijing Overseas Talent Center (BOTC), Beijing Youth Federation and FESCO.

It aims to create an exchange platform to accelerate the gathering of talents with expertise and strong scientific research abilities.

Furthermore, this will in turn connect with high-end resources worldwide, thus contributing to building Beijing into a global sci-tech innovation hub.

The platform strives to introduce, employ, retain outstanding young talents around the world through activities such as recruiting 100 organizations and companies in Beijing in 100 days online.

Convenient services will be provided for the experts in their work permit application, innovation and entrepreneurship promotion, and integration into Beijing life.

GT2HR 2021 will be ongoing from mid-September to December this year. Activities include the launch, online platform connection and offline exchange activities.

At present, 31 well-known scientific research institutions, universities, hospitals and technology enterprises in Beijing, such as the Suzhou Institute of Nano-Tech and Nano-Biotics of Chinese Academy of Sciences, National Children's Medical Center, Xiaomi Corporation and ByteDance, have released 177 posts on the platform, which are open to experts globally.

The launch meeting was held both online and offline in Beijing on September 15. Representatives from relevant organizations, companies and institutions attended and jointly set the GT2HR 2021 in motion.

GT2HR 2021 will continue to release posts provided by the 100 organizations and companies campaign to global talent during the year, and focus on providing professional and personalized services to employers and international talent in the fields that include sci-tech innovation for the high-end industries and international business services.

Source: Beijing Overseas Talents Center

Expats Enjoy Cultural Trip at Yuelu Academy

On September 17, more than 30 foreign experts from 10 countries took a cultural trip to Yuelu Academy, Changsha, aiming to appreciate the time-honored traditional Chinese culture and deepen their understanding of the unique festival customs.

The expats, wearing Han Chinese clothing, got to experience Mid-autumn celebrations, including lantern riddle guessing and making Mooncakes. The immersive cultural experiences gave expats an opportunity to see traditional Chinese culture up close, gain meaningful perspective, and interact with local communities.

Hunan province has embraced innovation and opening up to development, which has grown international trade with more than 200 countries and regions, attracting nearly 1,500 foreign experts to Hunan in innovative fields and to take advantage of entrepreneurship opportunities.

This event belongs to a series of activities themed *Traditional Chinese Culture Trip*. In the future, the Hunan Provincial Science and Technology Department will provide foreign experts in Hunan with an increasing number of culture themed activities, which could help them develop a better understanding of Hunan and China, and increase their sense of belonging.

Source: Hunan Provincial Science and Technology Department

Expats in Hunan are experiencing traditional Chinese culture. (PHOTO: Hunan Provincial Science and Technology Department)

Scientists Gathered to Discuss Development of Interdisciplinary Studies

In response to the new development trend of interdisciplinary studies, the 2021 Annual Conference of National Association of Academies for Interdisciplinary Studies was held in Peking University on September 25. More than 150 renowned scientists, experts and scholars from more than 40 universities and research institutes specialized in interdisciplinary studies gathered in Beijing to discuss the organization and future development of interdisciplinary research.

The photo on the left shows the conference site.

Source: the Academy for Advanced Interdisciplinary Studies at Peking University