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China's Innovation Capacity Sees Steady Improvement

The National Innovation Index Report 2013, recently issued by CASTED (Chinese Academy of Science and Technology for Development) shows a steady improvement of China's innovation capacity. China has climbed to No.19 in the innovation rankings among the selected 40 countries, a notch higher than that in previous year. The description is as follows:

1. China's innovation capacity takes the lead among BRICS countries.

With rich resources and exceptional performance in innovation, the U.S. is once again credited as the most innovative country. With great performance in innovation by businesses and in knowledge creation, Japan and ROK are frontrunners in Asia, ranking No.2 and No.4 respectively.

Comparing with the previous year, Switzerland falls to No.3, while Israel jumps from No.11 to No.5. European countries are maintaining strong momentum in innovation, with Sweden, Finland, the Netherlands, Denmark and Germany ranking No.6, No.7, No.8, No.9

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and No.10 respectively. China remains the leader among BRICS countries, while the other four-Russia, South Africa, Brazil and India are No.32, No.35, No.38 and No.39 respectively.

2. China is quickly upgrading its ability to create knowledge.

China's rise in ranking stems from its better ability to create knowledge and better innovation environment. In knowledge creation ranking, it has leapt from No.24 to No.18 as a result of a greater number of invention patent filings and grants. With innovation-friendly policies in place and thus greater support for business innovation by venture capital, China's ranking in innovation environment has risen from No.19 in the previous year to No.14. It ranks No.30, No.15 and No.14 in the innovation resources, business innovation and innovation performance.

3. China's enterprises are improving innovativeness on a sustained basis.

Business innovation index has seen dramatic increase from the year 2000. Specifically, R&D spending from enterprises was increasing rapidly, accounting for 76 percent of China's total. It is now 13 percent of the global total, 11.5 percentage points higher than that in the year 2000. Invention patent filings by enterprises reached 176,000 and the number of invention patents per 10,000 employees stood at 29 pieces, 21-fold and 9-fold increase from the year 2000 respectively.

4. China still needs long-term, sustained efforts to further enhance its innovation capacity.

The Report, on the other hand, indicates that China's innovation basis remains weak from an international perspective. China's cumulative R&D spending over the past two decades is less than the U.S.'s total over the past two years, and Japan's total over the past four years. China's full-time-equivalent R&D personnel per 10,000 employees amount to merely 41, far below that in developed countries, which stand at more than 100. In light of this, China needs to step up investment and efforts.

The Report, based on data in the year 2012, analyses overall performance of innovation with five core indicators -innovation resources, knowledge creation, business innovation, innovation performance and innovation environment and relevant 30 level-branch indicators. It was compiled by the Chinese Academy of Science and Technology for Development (CASTED), an institution affiliated with MOST.

(Source: MOST, April 1, 2014)

High-tech Zones Driving Regional Innovation

The establishment of high-tech industrial development zone (high-tech zones) is an important initiative launched by the Chinese government to implement reform and opening-up policy, promote the integration of science and technology and economy, and improve the layout for S&T undertakings and emerging industry development.

The Decision on Several Issues for Deepening the Reform of Scientific and Technological Management System, promulgated by the State Council in 1988, encouraged to establish high-tech zones (in knowledge-intensive areas). In the same year, China's first high-tech zone was born in Zhongguancun Beijing, known as

China's Silicon Valley.

In 1991, high-tech zones in 26 localities were approved by the State Council. A set of policies favorable to the zones were introduced. In 1992, another 25 cities join the ranks of national-level high-tech zones. By the end of 2012, a total of 105 high-tech zones were developed, contributing 10.1 percent to total GDP of the Country.

National-level high-tech zones, established with the approval of the State Council, attract a lot of talent people and gathered better R&D resources, funds and expertise from home and abroad. With incentives in place, favorable environment was created within high-tech zones, spurring the development of emerging industries and accelerating the commercialization of research achievements.

National-level high-tech zones offer an enabling environment for innovation to take place. In 2012, R&D expenditures from enterprises in high-tech zones reached 274.91 billion yuan, or 35.6 percent of the national total; R&D spending as a share of output value was 5.26 percent, 2.7 times that of the national average; invention patents owned by 10,000 employees stood at 107 pieces, 9.4 times that of the national average.

Today, national high-tech zones have become regional innovation hubs. With the role of promoting local economic mode transformation and high-tech industry development, they become an icon of local industrial innovation activities.

(Source: Science and Technology Daily, January 19, 2014)

Technology Business Incubators Nurturing Innovation and Entrepreneurship

In mid-May, an official from the Torch High-tech Industry Development Center (Torch Center) of MOST gave an overview of China's technology business incubators.

According to him, since the first incubator was born in 1987, China has scored considerable progress in the regard, offering a series of services such as infrastructure building, technology transfer, talent bringing-in, financial investment, market expansion and international cooperation. This, as a result, reduces the cost of starting a business and increases the possibility for a start-up to be successful. These incubators turn out to be an important contributor to commercialization of research achievements and growth of entrepreneurs. High-tech start-ups are an important part of innovation-driven growth. In light of the new circumstances, China's incubators are poised to offer more specialized, integrated and market-based services.

In 1995, UNDP and the Torch Center of MOST jointly held a workshop on international start-up hubs in Tianjin. Seven countries shared experiences and explored a pilot program on international business incubators. The workshop added international dimension to China's incubation undertakings.

By following Europe's example, in 2010, China initiated "innovation relay centers" (IRC) as a policy measure concerning a process from incubation to innovation, and matching enterprises' needs for R&D. As

a result, the number of IRC has reached 83 by the end of 2012, covering 26 regions.

According to statistics, China's technology business incubators exceeded 1,000 by the end of 2012, covering an area of 34 million square meters and incubating over 60,000 enterprises.

(Sources: High-tech Industry Herald, originally titled: incubators herald a new era; May 12, 2014; MOST, December 6, 2012, originally titled: workshop on the occasion of 25th anniversary of China's high-tech business incubators held)

China's Pioneering Parks for Overseas Students

In recent years the Chinese government kept improving policies and upgrading services to create a sound environment for overseas students back home to start up companies.

According to the Ministry of Education, about 1.09 million overseas students came back to China during 1978 to 2012. The returning trend was articulately visible after the 2008 global financial crisis and the number of the overseas students kept increasing with the steady growth of the Chinese economy, thus boosting the development of pioneering parks for the overseas returnees.

The first such park was established in Nanjing twenty years ago, and the number grew into 240 by the end of 2012, with 13,000 incubatees, 32,000 graduated enterprises and 26,000 overseas returnees working in the parks. According to a business source, nearly 80 percent of the Chinese NASDAQ companies are started by overseas scholars, with a total market value of $ 30 billion US dollars.

By integrating various resources including government grants, research achievements, overseas students, and social investment, the pioneering parks are creating an attractive environment for startups, which feature expanded financing channels, low operating cost, combination of scientific strengths and technology support. The parks not only provide the returnees with unprecedented opportunities, but also contribute tremendously to economic and technological progress in the country.

In the future, the pioneering parks will upgrade incubation capacity and create new brand to achieve international and professional development with respective uniqueness. The parks will surely grow into a key factor attracting overseas returnees and promoting sci-tech advances.

(Source: China High Tech Industry Herald, October 14, 2013)

Cases of Innovation in China

- **Huawei maintains high R&D input**

According to Huawei Technology Co Ltd 2013 annual report released in April, the company's R&D input in 2013 stood at 30.7 billion yuan (5.1 billion US dollars), a year-on-year increase of 3.1 percent and 12.8 percent of 2013 sales revenue. Huawei decided to further expand R&D input on major businesses, with the focus on innovation based on consumer demand and advanced technologies.

Huawei has, for ten consecutive years, kept its share of R&D input in sales revenue at over 10 percent. From 2004 to 2013, Huawei has invested a total of 151 billion yuan in R&D. Last year, the company announced its release of SoftCOM network architecture and developed the world's largest-capacity data center switches (64T). Its NFV solution has been recognized by the industrial world and leading network operators. Huawei LTE has made its presence in over 100 capitals and 9 financial centers. 400G core router has been commercialized since it has won 53 customers worldwide. Terminal market with smart phones at its core has been developed.

As a founding member of 5G Innovation Center (5GIC), Huawei has since 2009 started its R&D of 5G technology and worked with over 20 top-notch universities in 5G research. On METIS, an EU-led 5G research program, Huawei acts as a research and design leader of 5G wireless air interface technology. It is estimated that by 2018 Huawei will invest at least 600 million dollars in 5G R&D.

According to Huawei management, the company has been cooperating in R&D with diversified partners – enterprises, academic institutions and local governments of various nations. At present, Huawei has established 16 research institutes in Germany, Sweden, the US, India, Russia, Japan, Canada, Turkey and China.

By December 31, 2013, Huawei has in total applied for 44,168 Chinese patents, 18,791 foreign patents and 14,455 international PCT (Patent Cooperation Treaty) patents. Altogether 36,511 applications have been approved.

There are about 70,000 employees dedicated to R&D of products and solutions, accounting for 45 percent of the total. The 2013 global sales revenue is expected to stand between 238 and 240 billion yuan, a year-on-year increase of about 8 percent.

(Source: Science & Technology Daily, April 2, 2014)

- **ZTE Boosts Competitiveness through Stunning Patent Reserve**

With continuous investment in research and innovation, ZTE Corp. is now providing new technologies and product solutions to telecom operators and corporate clients from 160 countries and regions, building up a positive image which highlights innovation and IP protection for Chinese businesses.

ZTE Corp. has been allocating 10 percent of its annual income for R&D, and did not cut a dime even during the most difficult time of the global financial crisis. With the largest number of research professionals among listed companies in China, its R&D input amounted to 40 billion yuan over the past five years.

The sustained investment has led to significant breakthroughs in underpinning technologies for 4G communication system, high-end router and smart city. ZTE developed the software and core chips for its high-end routers all by its own. The routers can replace imported products to cut network cost by over 40 percent and save 5 billion yuan of procurement cost each year for domestic operators, governments and corporate clients. ZTE has also proposed 12 information solutions for China's smart city program, and is actively engaged in the building of 100 pilot cities.

The report released by IHS, a prestigious consulting company, shows that ZTE had signed 140 LTE/EPC contracts worldwide by the end of 2013, making it world's No. 1 in terms of growth in LTE products. ZTE is also the largest supplier of LTE solutions in China and one of the top three global suppliers of LTE equipment. According to Mr. Zhang Jianguo, Vice President of ZTE and FDD General Manager, ZTE holds 800 LTE essential patents or 13 percent of the world's total, and has already started its 5G program.

The company has filed over 50,000 international patents, among which 16,000 have been licensed and 90 percent are invention patents. It also holds a large number of essential patents concerning international ICT standard and core patents for key technologies in the industry. ZTE has also filed 13,000 PCT patents in major developed countries like the UK, France, Germany and the US as well as emerging countries.

A report released by WIPO in March this year showed that China surpassed Germany as world's No.3 in international patent filings last year, with the number of patent applications exceeding 20,000 for the first time. ZTE ranked 1st in terms of PCT patent filings in 2011 and 2012, and was No.2 in 2013 with 2,309 patents.

With years' efforts, ZTE has increased its market share and global influence tremendously. The company has built up technology reserve in a wide range of fields, such as operating system, data base, terminal and applications, security and basic chips. With international business taking up a larger share, ZTE will explore diversified patterns for international cooperation while focusing on indigenous innovation.

(Source: Science & Technology Daily, April 26, 2014)

- **LENOVO: Marching toward international market**

LENOVO Group Ltd developed from a small enterprise with a turnover of only 2 billion dollars to an international corporation with a turnover of over 34 billion US dollars and a global reach in over 160 countries. It is a successful case of Chinese enterprise going global.

According to market intelligence companies IDC and Gartner, the global market share of LENOVO reached 16.7 percent in the second quarter of 2013, surpassing HP to become No.1 in PC industry. This is the first time for a Chinese enterprise to become an industrial leader in a fully competitive market.

The success of LENOVO comes primarily from innovation. In 2013, R&D input exceeded 500 million dollars. Among its 11,000 patents, over 7,000 come from China, while over 4,000 from overseas. There are about 5,000 R&D personnel, including engineers, researchers and designers, and over 100 labs supporting R&D in a comprehensive manner.

To ensure constant generation of world-leading products and technologies, LENOVO has established its global R&D innovation system underpinned by three pillars: Beijing China, Raleigh US and Yokohama Japan. Moreover, the company headquarters and its business division will both launch R&D so as to bring greater efficiency. R&D at the company level is focused on cutting-edge industries and technologies which enhance competitiveness in the medium and long run; while R&D at the division level, highlights fast marketization of innovation achievements, with an aim to meeting consumer demand at present and in the near future.

When it comes to the development of the company, founder of LENOVO Liu Chuanzhi, said that an open market, internationalized team, technical forces are crucial for LENOVO to enter global PC arena. Its CEO Yang Yuanqing furthered that innovation in LENOVO is not only associated with technology and products, but also business model and management culture.

(Source: Science & Technology Daily, January 7, 2014)

➢ **Inspur TISSOT K1 System to Replace Imported Equipment**

In January, 2014, the Chinese company Inspur Group Ltd launched its project that will replace imported equipment from IOH (IBM, Oracle and HP) with TISSOT K1 system.

A mainframe refers to a high-end computer supporting over eight processors that is used for large-scale transaction. It is a key equipment of strategic importance, equipped with core data processing functions in the information system of key industries — bank settlement, telecom billing, population management and power dispatching.

TISSOT K1 is the first mainframe product with full IPR, which is developed by the company independently. Thanks to the system, China has become the third country mastering the latest mainframe technology. K-UX, the TISSOT K1 operating system, is China's only UNIX system reaching the standard of Open Group UNIX 03. This means that all kinds of software currently used in UNIX are compatible with K1. Over the year, TISSOT K1 has been realized compatible operation with mainstream database and middleware, and applied in finance, energy, public security, fiscal taxation and government administration.

Through technical support of four specialized transfer and test centers and teams, the project will adopt various measures including methods and tools, service guarantee, ISV (Independent Software Vendor) cooperation and incentive awards to facilitate utilization of the domestic mainframe system, with the focus on risk control and other associated links. The company will help subscribers transfer database, middleware and all kinds of application systems from IOH equipment to TISSOT K1, thus minimizing the risk of transfer.

(Source: Science & Technology Daily, January 16, 2014)

(Editor's Note: All news in the issue are translated from Chinese texts for your reference. They are subject to checks and changes against official release of original Chinese or English texts.)