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INTERNATIONAL COOPERATION

China-EU Cooperation in Applications

In January, 2006, XU Guanhua, Chinese Minister of Science and Technology, and Viviane Reding, Member of the European Commission responsible for Information Society and Media inked a joint statement on establishing high speed network infrastructures and associated strategic cooperation in applications. The event indicates a full-fledged collaboration between China and EU in the field of Internet research and development. According to the statement, an advanced 2.5Gbps high speed interconnection will be established between China and Europe, in an attempt to support joint R&D efforts between two sides in high speed broadband networking.

China and the EU launched the collaboration as early as in 1996, hallmarked by the establishment of a low speed 64Kbps network between Chinese CERNET and German DFN. In 1998, a 512Kbps network was established between CERNET and British JANET, which was later upgraded to a level of 45Mbps, and has become the only Internet connection between China and the EU dedicated to scientific research activities. Unfortunately, the connection at such a low speed seriously restricted the increasingly expanded cooperation between the two parties.

Along with numerous major projects launched between China and the EU, including the Galileo Project, Grid Project and Dragon Project, further upgrading bandwidth and performance has become an urgent must. The conclusion of the cooperation agreement will help to establish 3-D and multi-level collaborating channels, with the Galileo Project in space and a high speed connection on the ground. In the meantime, it offers China with more alternatives for connecting to the world, which will in turn lower the costs for international cooperation and exchanges, noticeably raising China's overall level in scientific cooperation with the EU, and facilitating a deeper development of

the strategic partnership between China and the EU.

RESEARCH AND DEVELOPMENT

Enhanced S&T Input for 10th Period

In 2005, China research and development expenditure reached approximately RMB 236 billion, or 20% up compared with the preceding year, calculated on the current price. It makes 1.3% of China's GDP in the year. During the 10th Five-year period(2001-2005), China has registered a greatly raised research and development expenditure to RMB 819.5 billion, or 2.7 times that of the 9th Five-year period, calculated on the current price.

In 2005, China's R&D activists reached 1.2 million in number, or 4.1% up compared with the preceding year. During the 10th Five-year period, China's R&D activists amounted to 5.439 million person/year, with an increase of 1.305 million compared with the 9th Five-year period. Scientists and engineers engaged in R&D activities went up to 4.322 million person/year, or 1.473 million more against the 9th Five-year period, with a 52% growth. The proportion of scientists and engineers in R&D activist population witnesses a growth of 10.7% compared with the 9th Five-year period.

In 2005, China had made an appropriation of RMB 127 billion for S&T activities, with an increase of 15.7% compared with the preceding year, calculated on the current price, or 3.8% of the total appropriations from the state treasury, or 2.1 times that of the 9th Five-year period.

Sparkle Program Spurs Regional Economy

During 10th Five-year period, the Sparkle Program, aiming at raising the core competitiveness of the

township enterprises, created a platform for addressing common technological difficulties, raising the township enterprises' overall capacity in developing innovative technologies, and for enhancing their job creating capability, through supporting innovation demonstrations, and developing innovative technologies and products by the lead township enterprises. These efforts have spurred up the development of special industries in the localities. For example, during the 10th Five-year period, Hebei Province has rendered support for pillar industries in ten areas practicing the Sparkle Program at the national level, and for pillar industries in 40 areas at the provincial level. Up to date, some 30 areas practicing the Sparkle Program in the province have registered an output value exceeding RMB 100 million.

It has become an effective approach to spur up the regional economic development by taking advantage of local geographic positions and resources, optimizing resource distributions, enhancing S&T input, nurturing areas with more Sparkle technologies, and establishing Sparkle industrial belts. With the boom of areas teemed with Sparkle technologies, a development pattern featured with "a pillar industry for a county, and a brand name product for a town" has been created in many localities. There are 103 townships with special industries in Guangdong, whose annual output in 2004 hit RMB 320 billion. Coastal provinces such as Zhejiang and Fujian also witnessed a vigorous economic development. Since the establishment of the Sparkle industrial belt over the Hexi corridor in Gansu Province two years ago, the six corridor cities have harvested noticeable benefits from 369 Sparkle projects, with an investment of RMB 919.19 million. The Chongqing Municipality has created a line of Sparkle industrial belts along the Three Gorge Dam area, featured with special industries and lead enterprises engaged in in-depth processing of agricultural produces and by-products.

High Tech Industry and Trade Booms

In 2005, China's import and export volume of high tech

products hit an amount of USD 415.96 billion, with an increase of 27.2% compared with the preceding year, or 29.2% of the nation's import and export total. In the same year, China's high tech products export volume accounted for USD 218.25 billion, with an increase of USD 52.71 billion compared with the preceding year, or 28.6% in the nation's export total, with a growth of 0.7%. During the 10th Five-year period, China's high tech products export amounted to USD 608.42 billion, or 5.5 times that of the 9th Five-year period.

In 2005, the added value derived from high tech industry reached RMB 793 billion, or 23.3% up compared with the preceding year. During the 10th Five-year period, the added value for the same industry hit a level of USD 2616.9 billion, or 2.8 times that of the 9th Five-year period.

In the same year, China's high tech industrial parks have housed 45,000 enterprises. The total revenue of the high tech industrial parks amounted to RMB 3381.3 billion, or 23.1% more compared with the preceding year. These high tech parks produced a net profit of RMB 156.9 billion, with an increase of 10.3%, a taxation worth RMB 146.7 billion, with a growth of 18.3%, and hard currency of USD 104 billion, 26.2% up compared with the preceding year. During the 10th Five-year period, the business revenue, net profit, taxes, and foreign exchanges created by the high tech industrial parks are 4.2 times, 3.4 times, 4 times, and 6 times that of the 9th Five-year period respectively.

In 2005, China witnessed signing of 264,000 technology contracts, with a total amount of RMB 155.1 billion. Technology contracts undersigned made even with that in 2004 in number, but showed a large increase of amount by 16.2%. In 2005, technology contracts had an average amount of RMB 588,000, or 16.7% up compared with the preceding year. It makes 2005 the year enjoying the highest average amount for a single technology contract. During the 10th Five-year period, technology contracts registered a deal worth RMB 563.7 billion, or 2.5 times that of the 9th Five-year period.

Transformed Institutes with Better Innovations

During the 10th Five-year period, China has landed a major breakthrough in restructuring its S&T management system. Aiming at turning R&D institutes into S&T oriented enterprises, the efforts has made transformed institutes enjoy an increasingly enhanced innovation capability.

During the same period, the transformation of R&D institutes into S&T oriented enterprises, into parts of industrial groups, or into S&T intermediaries, has redefined the orientation for the development of science and technology. Research and development has been maneuvered from relying on government sponsored projects into looking for projects from the market, and S&T assessment from mainly focusing on the level that a finding has reached to combined consideration of both finding's level and associated market perspective.

Statistics show that in 2004, S&T input in 263 transformed institutes reached RMB 3.58 billion, or 21% more compared with 2000. The proprietary funds raised by transformed institutes for research and development activities accounted for RMB 730 million, with a growth of 45% against 1999. Transformed institutes have played an important role in carrying out major national S&T assignments, though through bidding processes. In 2004, patent applications filed by 263 transformed institutes saw a growth of 22.06%, with 1150 patent grants, or 42.68% up compared with the preceding year, of which invention patent grants enjoyed a growth of 57.74%.

In 2004, 263 transformed institutes absorbed 5750 talented personnel, and recruited 1492 personnel from public. In the same year, outflow of personnel (with higher education background) reached 3242 personnel. The increasingly improved quality and capability of personnel raises the level of innovation capacity.

The transformation of S&T management system has greatly improved the scale and strength of China's S&T industries, and resulted in numerous S&T oriented enterprises with strong market competitiveness. Transformed institutes have witnessed a noticeably accelerated industrial development, through restructuring and regulating the management system. An enhanced cost control has brought up impressive returns. Statistics show that in 2004, 263 institutes have produced a combined revenue of RMB 45 billion, or 95% up compared with 2000.

China's S&T Output Harvested

In 2004, China's S&T papers collected by SCI, EI and ISTP reached 111,000 in number, or 18,000 more compared with the preceding year, with a growth of 19.3%. The collection makes 6.3% of the world total for 1.761 million papers. The proportion is raised by 1.2% compared with 5.1% in 2003.

In the same year, SCI collected 57,000 Chinese papers, or 15.2% more compared with the preceding year. The first four years of the 10th Five-year period has enjoyed a collection of 347,000 Chinese papers by SCI, EI and ISTP, or 1.8 times that of the 9th Five-year period. SCI alone collected 184,000 Chinese papers, or 1.7 times that of the 9th Five-year period.

In 2005, China has registered 476,000 patent applications with 214,000 grants, of which invention patent applications accounted for 173,000, with 53,000 grants. During the 10th Five-year period, patent applications totaled 1.595 million in number, or 2.48 times that of the 9th Five-year period, and patent grants amounted to 832,000, or 2.3 times that of the 9th Five-year period. During the 10th Five-year period, patent applications totaled 552,000, or 3 times that of the 9th Five-year period, and invention patent grants accounted for 176, 000, or 5.6 times that of the 9th Five-year period.

Experimental Ultra-wideband Telecommunication

A national key lab for telecommunication and millimeter waves, a part of the Chinese Southeast University, rolled out China's first ultra-wideband (UWB) telecommunication system for experiment and demonstration purposes. The project has passed a validation check by the National 863 Program that also supports and finances the project. Equipped with a proprietary Dual Carrier Orthogonal Frequency Division Multiplexing (DC-OFDM) solution, with a transmission speed of 110 Mbps and a range over 10m, the new system can transmit 4 channels of high definition TV programs or uncompressed video images, in addition to high speed wireless data transmission.

The University took a lead in domestic R&D of UWB telecommunication technology as early as in 2000. It has obtained several national patent grants in the field. Its DC-OFDM solution has led to China's first proprietary DC-OFDM telecommunication system that has stood up hardware tests. With a transmission speed faster than 480Mbps, the new system expects broad application perspectives in digital wireless network for household and office applications, information household appliances, and multimedia telecommunication.

Marine Biotechnology Produces More

During the 10th Five-year period, a marine biotechnology component under the National 863 Program tilted its priority weight on genetic engineering, cellular engineering, biochemistry engineering, functional genomics, and bioinformatics. These disciplines distributed their research topics in seawater aquatics, marine natural products, functional genes, and salt tolerant plants. Research activities have been conducted surrounding three emerging industries, including seawater aquatics, marine pharmacy, and marine bioprocessing, which stimulates China's leaping development in the area.

Research activities on marine natural products have resulted in several hundreds of precursor compounds for new drugs, with a dozen of class I new marine drugs

into pre-clinical or clinical trials at different phases. The development has laid a solid foundation for working out China's proprietary novel marine drugs. China's has shaped up a preliminary marine enzyme preparation industry, with marine biomedical materials moving onto the phases of clinical trials. Industrial demonstration projects have been staged for advanced marine products processing technology, with noticeable economic and social returns. Chinese scientists have obtained a great number of original marine biological genes of different functions, with some major pharmaceutical genes, diseases resistant genes, and diseases causing genes into the substantial development phase.

In working on the solutions for manufacturing deep water cages with wind and wave resistant functions, a line of innovative deep water cage products have found diffusive applications along the nation's coasts, which upgrades the scale and commercial applications of deep water cage breeding. Researches on sub-unit vaccines and toxicity reducing vaccines applaud for major progresses, with 5 vaccines reaching the level of registration. Immunity boosters for marine animals have realized commercial applications. Salt tolerant vegetables, sugar beet feeds, energy plants, and pharmaceutical plants have put into pilot production, and a number of demonstration zones have been established for offshore aquaculture.

The marine component has produced 386 national invention patent applications with 101 grants, and 19 international invention patent applications, in addition to 872 domestic papers, and 297 international papers. It also nurtured up a group of high caliber young and middle aged experts for marine biotechnology.

Novel Breeds for Seawater Aquatics

Not long ago, novel breeds for seawater aquatics, a major project under the National 863 Program in the 10th Five-year period, applauded success. The implementation of the project has landed a historical breakthrough in producing novel breeds for seawater

aquatics.

Four new breeds have been granted with new species certificates, after reviewing and assessing by the national authorities for original and improved aquatic species. Huanghai I is a new Chinese prawn species that filled up a blank in the area; Dalian I offers a new ormer hybrid that has produced huge economic returns for the industry; Haida Penglaihong, a novel scallop variety, brought up new hopes for scallop growing industry that is vulnerable to diseases; Rongfu kelp is a new species that fits a wide range of temperatures. The project also realized the full artificial breeding of sole fish, the first of its kind in the world. Technical breakthroughs in artificial breeding of rock cod have resulted in the world's largest breeding base for the fish. The industrialized breeding of a range of fine seawater aquatic species has led to China's leaping development in the area, and rendered a stimulus for shaping up China's own seawater aquatic breeding system.

The project has brought up 145 national invention patent applications with 36 grants, 5 international invention patent applications, 412 domestic papers, and 92 international papers.

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