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Special Issue: Reform of China's Science and Technology System

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Release of Implementation Plan to Deepen Reform of the Science and Technology System

In September 2015, the Implementation Plan to Deepen Reform of the Science and Technology System ("Implementation Plan") was officially released. The Implementation Plan consists of 32 reform measures in ten aspects including technological innovation in enterprises, reform of scientific research institutions and incentives on talent development, which further break down into 143 policy points and specific outcomes.

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The Implementation Plan, which focuses on the Strategy of Innovation-driven Development, aims to build a national innovation system with Chinese characteristics to promote comprehensive innovation with technological innovation at its core. It sets forth guidelines on deepening reform of the science and technology system, emphasizes reform-driven innovation, and clearly establishes the principles of the reform, i.e. "innovation stimulation, problem orientation, overall advancement, open coordination, and thorough implementation".

The main tasks outlined by the Implementation Plan include 1) establishing a market-oriented mechanism of technological innovation; 2) building a more efficient scientific research system; 3) reforming talent development, performance evaluation and incentive mechanisms; 4) improving mechanisms for promoting transformation of S&T results; 5) putting in place a sound mechanism which integrates S&T with finance; 6) establishing a well-coordinated innovation governance mechanism; 7) bringing about open innovation; 8) fostering a favorable ecosystem that encourages innovation; and 9) promoting local innovation reforms.

The Implementation Plan has quite a few highlights, such as strengthening the principal role of enterprises in technological innovation, establishing a sound market-oriented mechanism of technological innovation, improving inclusive policies, breaking industry monopoly and market fragmentation, implementing factor price reform, and requiring a significant percentage of entrepreneurs and industry experts in relevant advisory panels for national innovation policymaking. With respect to the reform of scientific research institutions, it requires formulation of articles of association, exploration of a legal person governance structure with the governing board system at its core, gradual cancellation of administrative ranks, increase of the percentage of academy presidents and research institute directors recruited globally, and the establishment of performance evaluation and incentive fund allocation systems. With respect to transformation of S&T results, it requires efforts to explore new mechanisms of administration of intangible assets at public institutions and formulate policies of exemption to transfer of state-owned technology shares.

The Implementation Plan puts forward the goal of achieving major breakthroughs in important fields and key links of reform of the S&T system and basically establishing a national innovation system with Chinese characteristics which meets the requirements of the Strategy of Innovation-driven Development by 2020.

(Source: Science and Technology Daily, September 25, 2015)

Interpretations of Implementation Plan to Deepen Reform of the Science and Technology System

Interpretation 1: Highlight Technological Innovation Led by Enterprises

The Implementation Plan to Deepen Reform of the Science and Technology System ("Implementation Plan") puts "establishing a mechanism of industry technology innovation where enterprises play the principal role and stimulating the internal impetus of enterprise innovation" in the primary position in the effort to "build a market-oriented mechanism of technological innovation". After the release of the National Program for Medium- and Long-term Scientific and Technological Development (2006-2020) in 2006, the principal role of Chinese enterprises in technological innovation has been strengthened, especially in relation to R&D spending and

the output and application of R&D results.

The Implementation Plan states that "entrepreneurs and industry experts shall account for a significant percentage in relevant advisory panels", providing a new channel for entrepreneurs and experts to be involved in innovation policymaking.

After the release of the Implementation Plan, government's fiscal support will increasingly take the form of post-spending subsidy and indirect investment and the methods of investment in technological innovation by enterprises will largely change to ordinary fiscal and tax revenue policies.

State-owned enterprises, whose R&D spending accounts for approximately 40% of the total R&D spending of all Chinese enterprises, are an important force in China's technological innovation. For this reason, technological innovation of state-owned enterprises features importantly in the Implementation Plan. The reason the State-owned Assets Supervision and Administration Commission is included in the National Basic Innovation Project is to effectively promote technological innovation of state-owned enterprises. In recent years, there has been a significant growth of R&D spending of state-owned enterprises. The Implementation Plan continues the existing performance evaluation mechanism for responsible persons of state-owned enterprises and lists it as an important reform measure by turning the former economic performance-based evaluation into evaluation based on comprehensive indicators of innovation-driven development with an eye to increasing their initiative for innovation and stimulating their entrepreneurial spirit.

With respect to the improvement of the service system for innovation of small- and medium-sized enterprises (SMEs), the Implementation Plan highlights inclusive policies and the building of a network technology innovation platform to provide services for innovation of SMEs.

(Source: Science and Technology Daily, September 26, 2015)

Interpretation 2: Enable the Scientific Research System to Run Efficiently

The Implementation Plan states that "great efforts will be made to strengthen research institutions' original innovation capacity and ability to serve economic and social development". "[Efforts will be made to] deepen reform of classification of research institutions and reform of research systems and mechanisms of higher learning institutions, build clearly positioned administration structures that are in line with the laws of innovation, improve organization and operation administration of research activities, strengthen classification management and performance evaluation, and increase knowledge creation and supply." The government will take measures to further stimulate the innovation vigor of research institutions and universities.

Regarding the deepening of reforms and the incentives for research institutions to promote innovation, the Implementation Plan proposes expanding the scope of research institutions for piloting of performance-based appropriation and gradually establishing a fiscally supported performance-based appropriation system for research institutions. With respect to basic and frontier technology research, orientation to medium- to long-term goals is brought to greater prominence, with the focus of evaluation being shifted from the quantity of research results to research quality, original value and practical contribution. With respect to research for the public good, alignment to national goals and social responsibility are highlighted, and research institutions engaged in research for the public good will be evaluated by a third party on a regular basis. The Implementation Plan also proposes evaluating the performance of research personnel according to the type of their research activities, such as basic research and research result conversion, which means that talent evaluation will be more scientific and systematic.

The Implementation Plan also proposes formulating

the Regulations on Administration of Leading Personnel of Public Research Institutions to provide for eligibility, selection and appointment, and performance evaluation. Where conditions allow, research institutions may implement the president employment system. Efforts will also be made to promote reform on the classification of research institutions for the public good and guarantee the decision-making power of research institutions in such aspects as staffing management, personnel recruitment, professional title appraisal, and performance pay.

The Implementation Plan specifically points out that efforts shall be made to improve the scientific research system of higher learning institutions and build a number of international first-rate universities and disciplines. As important bases which train high-caliber talent and concentrate high-end technology elite, research universities are a strong force for the implementation of China's strategy of innovation-driven development.Technological innovation at the world's research universities is mainly characterized by the organic integration of "goal-driven scientific research" and "exploratory research", and its essence is knowledge creation, frontier exploration and innovation dually driven by stimulation of research vigor and improvement of talent training. The Implementation Plan also proposes starting reform of organization of research activities at higher learning institutions within this year, piloting independent determination of scientific research positions, and promoting reform of the researcher employment system at higher learning institutions.

(Source: Science and Technology Daily, September 27, 2015)

Interpretation 3: Further Reform Government Functions and Improve Administration of Major National S&T Programs

The Implementation Plan puts forward more specific directions for reform of five major S&T programs funded by the central government and requires that "the initiation of future projects of the five programs - National Natural Science Foundation of China, National Science and Technology Major Project, National Key R&D Project, Innovation Guidance Project (fund), and Base and Talent Development Project – shall be subject to the review of the Inter-ministerial Joint Meeting on Management of National S&T Programs and the Strategic Advisory and Comprehensive Review Committee before being put under the management of authorized professional organizations". Government agencies will no longer have direct management of specific projects. The unified national S&T program management platform will provide clear information about project fund application, progress and outcomes. Unified review and supervision mechanisms will implement strict check of eligibility for and efficient utilization of fiscal support.

The government's functions of S&T administration will shift to formulation of S&T strategies, plans and policies. Only by improving innovation policies and fostering a fair environment is it possible to steadily promote the modernization of the S&T administration system and governance capabilities.

In addition to improving management of national S&T programs, the government has also been deepening reform in other aspects such as project selection, fund allocation and supervision and evaluation. The Implementation Plan proposes establishing a National Innovation Advisory Committee which regularly reports to the CPC Central Committee and the State Council on international S&T developments. The mechanism will improve the position and role of S&T in national decision-making and provide advisory support for the formation of national S&T strategies and policies.

The Implementation Plan points out that measures will be taken to improve the macroeconomic statistical indicator system and official performance evaluation mechanism and include the performance in implementing

the strategy of innovation-driven development as part of the evaluation of official performance. This is the first time that progress in innovation-driven development is included in the scope of government performance evaluation in a central document, reflecting the great importance attached by the central government to innovation-driven development.

(Source: Science and Technology Daily, September 28, 2015)

Interpretation 4: Further Promote Transformation of S&T Results

The Implementation Plan stipulates that, in the light of the reform of public institutions classification, efforts shall be accelerated to delegate the right to use, dispose and benefit from S&T results to the eligible institutions that obtain such results. This is to be achieved with fiscal support given that such results do not relate to national defense, national security, national interests, and critical social and public interests. The use and dispose of such results inside China will no longer require the review, approval of and filing with the supervision and fiscal authorities. Incomes from the transfer of the results will entirely go to the institutions, be included in their budgets and put under unified management, without being turned over to the state treasury.

The Implementation Plan further incentivizes the transformation of S&T results, stipulating that incomes from the transfer of job-related inventions in state-sponsored research institutions and higher learning institutions shall be reasonably distributed between key researchers and their institutions. The percentage of incomes as rewards to major individuals and teams such as team leaders and key researchers shall be increased from the current level of not less than 20% to not less than 50%, in line with the amended Law of the People's Republic of China on Promoting the Transformation of Scientific and Technological Achievements.

With respect to improving transfer mechanisms, the Plan proposes the following aspects. 1) Strengthening intellectual property management in higher learning institutions and research institutions; improving the technology transfer systems. 2) Studying on the promotion of piloted incentives on equity and personal income tax in national innovation demonstration zones. 3) Preparing policies to exempt the transfer of state-owned shares derived from technology investments by research institutions and higher learning institutions.

According to analysts, the new policies will further stimulate the translation of S&T results. In addition, the Plan also proposes formulating measures to promote incentives of equity and bonus across the country.

(Source: Science and Technology Daily, September 29, 2015)

Interpretation 5: Attract Overseas Professionals and Promote Internationalization of Chinese Enterprises

The Plan puts forward a series of reform measures to open national S&T programs in an orderly way, implement more proactive policies to introduce human resources, encourage enterprises to build international innovation networks, and adjust regulations on overseas investments in innovation, among others.

In recent years, China has implemented a series of plans on overseas professionals, including the Recruitment Program on High-caliber Overseas Personnel introduced in late 2008 and the Plan of 1000 Foreign Experts (of non-Chinese ethnicity) introduced in 2011. By the end of May 2014, the Recruitment Program had introduced more than

4,180 high-level overseas professionals in ten batches. By June 2015, the Experts Plan had recognized 313 experts (including 46 experts recognized retroactively).

While implementing the introduction plans, China has also released a number of supportive policies to facilitate overseas experts introduced. The Measures on Entitlements of Foreigners with Permanent Residency in China released in late 2012 clearly establishes the rights and obligations of foreigners holding a permanent resident card in China. The Exit-Entry Administration Law effective from July 2013 adds a visa category for introduced personnel to expedite their entry, exit and residence.

The Plan proposes formulating guidance on the administration of permanent residency of foreigners in China, accelerating the legislation of foreigners' permanent residency, regulating and facilitating the obtention of permanent resident status by skilled foreigners, exploring the possibility of a skilled migrant system, and granting equal rights to skilled foreigners with permanent resident status as Chinese citizens in innovation activities such as setting up technology companies.

The Plan also proposes the following: 1) accelerating the formulation of regulations on foreign workers in China. Facilitating the employment, the visa application, and residency of eligible foreign personnel and their accompanying family members; 2) lifting the employment age restriction for eligible foreign personnel; 3) introducing high-caliber professionals such as chief scientists in line with major national needs; and 4) establishing a visiting scholar system to attract overseas personnel to innovation activities in China.

While adopting more proactive introduction policies, the Plan also encourages Chinese enterprises to go international and establish innovation networks. In this regard, the Plan proposes further improving the innovation dialogue mechanism with main countries, actively involving enterprises, and building a communication and dialogue platform for enterprises in such aspects as collaborative research, technical standard formulation, intellectual property rights, and cross-border M&As. Meanwhile, it also outlines efforts to establish a sound coordination mechanism to support the internationalization of domestic technologies, products, standards and brands. It is important to encourage Chinese enterprises to set up overseas R&D centers and take part in the formulation of international standards; improve the evaluation of measures for technology trade and the mechanisms of risk warning.

(Source: Science and Technology Daily, October 10, 2015)

Interpretation 6: Integrate S&T and Finance for Innovative Enterprises

The Implementation Plan explicitly proposes putting in place a sound S&T-finance mechanism and emphasizing that “financial innovation plays an important role in promoting technological innovation”.

The Plan proposes “scaling up entrepreneurship investment while giving more support to innovative enterprises in the embryonic stage” and “setting up a national SME development fund and continuing the focus on investment to technology SMEs”.

The Implementation Plan particularly proposes improving “regulations on foreign investment in Chinese companies and foreign startups; channeling foreign capital into innovation fields”. According to analysts, workers of foreign-funded enterprises and foreign invested institutions have great significance as providers of information about international consumption and production. “Many invested institutions have rich experience in the global markets and such experience will help drive the growth of domestic projects.”

The Plan also proposes “establishing compensation mechanisms for market risks related to the collateralization of intellectual property rights; streamlining the collateralization processes. Encouraging regions to establish reward and compensation systems,

and reinsurance system where conditions permit". Many young entrepreneurs are not well aware of IP financing, while the mass entrepreneurship and innovation initiative is expected to create a significant amount of knowledge-intensive intangible assets. "Startup teams must establish clear IP ownerships; otherwise it will be the source of endless troubles," said cautioning budding entrepreneurs. "Second, there may be great differences between startup teams and market-based organizations in their valuation of IPRs. It is advisable for startup teams to pledge their IPRs after they have generated certain incomes and economic benefits."

In addition, the Plan proposes "launching pilot schemes for equity crowd-funding; vigorously exploring and standardizing the development of Internet finance for innovation". Regarding the novel model of crowdfunding, one insider explained, "crowdfunding serves as a low-cost way for fledgling entrepreneurs to find partners. For them, traditional financing models are too costly, while crowdfunding is more cost-effective. For the traditional capital market, crowdfunding is disruptive, expected to unfold its full potential in the coming ten or twenty years."

(Source: Science and Technology Daily, October 18, 2015)

Interpretation 7: Implement a Stringent System for Intellectual Property Protection

The Plan proposes implementing a stringent IPRs protection system, destroying oligopoly and market fragmentation that inhibit innovation, improving market access and regulation, promoting factor price reform in support of innovation, and fostering a robust innovation culture.

During a government press conference in April 2015, Shen Changyu, Director General of the State Intellectual Property Office of China (SIPO), said the following, "IPRs are the prime mover of innovation and bridge the gap between S&T results and real-life productivity. To protect IPRs is to protect innovation; profitable use of IPRs will fuel innovation. Strengthening the creation, utilization, protection and management of IP will ignite the entire society's enthusiasm for innovation and entrepreneurship, providing more momentum to innovation-driven development."

One of the frequently mentioned challenges facing IPRs protection is easy infringement and difficult claim. In order to strengthen law enforcement and better deter violation, the Plan proposes to improve IPRs-related laws and regulations, lower the threshold of legal liability, adjust compensation standards, explore the possibility of a punitive compensation system, improve claim mechanisms, and rationally define the burden of proof.

The Plan also proposes improving the legal system for protection of commercial secrets, clarifying the definitions of business secret and infringement, researching corresponding protection measures, exploring the possibility of a pre-trial protection system, and studying on ways to protect IPRs in novel formats such as business models.

(Source: Science and Technology Daily, October 19, 2015)