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CHINA PLANS TO BUILD AN INNOVATIVE STATE

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China Plans to Build an Innovative State

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Summary

China’s 11th Five-Year Plan (2006-2010) formally set up the goal of building China into an ‘innovative state’. It emphasised the importance of independent innovation as the key to scientific and technological development, and the new mode of China’s economic growth.

After more than 20 years exclusive focus on gross domestic product (GDP) growth, the Chinese leadership has found this mode of development unsustainable and believes that China has to improve its productivity and competitiveness to sustain its development.

Following China’s State President Hu Jintao’s initial idea of promoting firms’ independent innovation, the State Council issued the National Mid- and Long-Term Scientific and Technological Development Plan Guideline (2006-2020) (Sci-Tech Guideline) in December 2005. It sets the principle, aims and approaches for China’s innovative state strategy.

Based on objective analysis of the strengths and weaknesses of China’s scientific and technological development, the Guideline sets various qualitative and quantitative goals for China to achieve by 2020. It has specified the main approaches for China to build the innovative state, prioritising eleven sectors and eight technological areas (see Appendix), with many detailed sub-projects, which are believed to be decisive to China’s economic and social development.

China’s State Council has also issued a set of Complementary Policies (CP) to support the implementation of the Guideline. It highlights the importance of using government policy and financial support to motivate and induce firms’ independent innovation.

Chinese enterprises lack ‘innovation ability’, having limited investment in Research and Development (R&D), and occupying unfavourable positions in the science and technology market. It was understood that to improve their competitiveness by upgrading their innovation ability, the government would have to play an important role to give them policy support.

The plan to build an innovative state is ambitious. But China’s ‘innovation system’ faces enormous challenges that the Chinese leadership would need to address, such as inadequate investment, excessive reliance on imported technology, insufficient policy support for domestic products, ineffective management of scientific talent and irrational allocation of scientific research resources.

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There are a range of factors restraining Chinese firms’ innovation. China’s political-economic system provides Chinese firms with the opportunity to seek policy advantages to increase profit, which reduces the incentive for independent innovation. State-owned-enterprises (SOEs) have frustrating operation conditions, which restrict their ability to focus on, and spend for, R&D activities. The government funding system mechanism might not be able to ensure the success of R&D. China’s protection of scientific and technological innovation by the means of intellectual property rights is ineffectual.

The new plan of building an innovative state is strategically significant for China. It indicates that the Chinese leadership has understood that China has to introduce new modes of development for the country’s long-term interests. Whilst building an innovative state has been widely regarded as a new beginning for China’s industrial development, for China, the problem is how such a plan will be effectively implemented.
China Plans to Build an Innovative State

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China’s Goal to Build an Innovative State

1.1 China’s 11th Five-Year Plan for National Economic and Social Development (2006-2010), which was issued in October 2005, proposed a new mode for development, namely, ‘scientific development’. The plan formally set up building an ‘innovative state’ as one of the major goals for the country’s next stage of reforms. The concept of the ‘innovative state’ placed special emphasis on new sources of growth, such as innovation by Chinese companies and technological upgrading throughout the economy. It stressed that independent innovation was the key to scientific and technological development and the central link to the new mode of economic growth.

1.2 China’s State President Hu Jintao initially brought up the idea of encouraging firms’ independent innovation when he visited Henan, Jiangxi and Hubei provinces in August 2005, as he saw independent innovation as the major source for firms to improve their market competitiveness. Hu thus emphasised that enhancing independent innovation should be an important source for China’s further development.¹

1.3 Following Hu’s recommendation, China’s State Council issued the National Mid- and Long-Term Scientific and Technological Development Plan Guideline (2006-2020) (Sci-Tech Guideline) in December 2005. It emphasised the strategic importance of building China into an innovative state.

1.4 In January 2006 China’s National Science and Technology Conference further discussed the issue, and specified the necessity and importance of the task, and the aims and approaches required for China to achieve the target to become an innovative state within fifteen years.

1.5 China’s former leader Deng Xiaoping first brought up the concept that science and technology are productive forces at China’s National Science and Technology Conference in March 1978, when he came to power and initiated the reform and open door policy. During Deng’s era,² science and technology were given the highest priority in China’s development agenda. China achieved some significant successes such as the Beijing electron-positron collider reconstruction project. The still-influential

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² Late 1970s – early 1990s.
National High-Technology Research and Development Plan was outlined and approved in March 1986, since when it has been known as the ‘863 Plan’. This plan highlighted some frontier areas such as biotechnology, aerospace and information technology as focuses for making science and technology breakthroughs. In 1988 Deng re-emphasised that science and technology are the primary productive forces.

1.6 During the Jiang Zemin era, from 1989 when he came to power after the government’s crackdown on the pro-democracy movement until his full retirement in 2003, independent scientific and technological innovation was somehow de-emphasized. Whilst the leadership realized the importance of science and technology in facilitating economic development, it tended to be more interested in government procurement from foreign countries for the technologies or equipment that China needed.

1.7 Scientific and technological innovation is of strategic significance for any country; many countries have relied on scientific and technological innovation to increase their competitive advantage in global markets. Academic and policy circles usually define this type of country as ‘the innovative state’.

1.8 At present there are about 20 recognised innovative states in the world, such as the USA, Japan and Finland. These countries share some common features: innovative overall indices are considerably higher than other countries; the contribution rate of scientific and technological advancement to economic growth is over 70%; the ratio of research and development (R&D) investment over gross domestic product (GDP) is more than 2%; the rate of dependence on imported technology is less than 30%. Besides, these countries have obtained the majority of the tripartite patents (issued by the USA, the EU and Japan) in the world (97%).

1.9 After two decades of the single-minded pursuit of GDP growth, the Chinese leadership has realised that such a development mode is not sustainable. This inefficient old mode has generated enormous problems, such as environmental degeneration and serious energy shortages. To sustain its development, China needs to develop its own scientific and technological capabilities, in order to improve productivity internally and increase its competitiveness externally.
Rationale and Aims

2.1 In the last quarter of a century China has been on a fast-growing economic development course. However, its growth excessively relies on energy and resources consumption and is at a high cost to the environment. For example, currently China’s GDP only takes up roughly 4% of the world GDP, while its consumption of crude oil, raw coal, rolled steel and cement take up 7.4%, 31%, 27% and 40% respectively. China has earned the name of ‘world factory’ by its extensive output, and rapidly growing manufacture and export sectors.

2.2 However, taking advantage of low labour costs and preferential policy treatment, Chinese export products, the majority of which are produced by foreign invested enterprises (FIEs), have extraordinarily low value added. As a result, China has become the ‘world’s sweatshop’ with an an extremely low level of profit that is getting progressively lower. Meanwhile, the country frequently becomes the target of trade protectionism on the part of the developed world; trade disputes often arise between China and its major trading partners such as the US and the EU.

2.3 China has not developed a modern rational economic structure with a strong hi-tech industry and a developed services industry. It is Chinese firms’ lack of incentive and capability for independent innovation which have resulted in their weak international competitiveness and low economic efficiency.

2.4 The Chinese leadership has appreciated that the swift development of science and technology can profoundly shape the socioeconomic foundation of society. ‘Hi-tech’ knowledge, such as information technology, life science and biotechnology, energy science and technology, and nano-science and technology, has enormous strengths in the drive for economic growth, with the aim of continually raising the quality of people’s life. In this sense building China into an innovative state is a strategic choice of the Chinese leadership to adjust China’s economic structure, transform its growth model and harmonise the country’s social and economic development.

2.5 China has achieved some significant scientific and technological successes such as the so-called ‘two bombs and one satellite’ [两弹一星], and manned space technology. These achievements have undoubtedly enhanced the country’s comprehensive power and international status in the world. However, compared with developed countries, China’s overall development of science and technology is still on a relatively low level. Chinese scholars have identified various weaknesses: the degree of self-sufficiency of key technology is low; the number of patents is small; the quality of scientific research is unsatisfactory; top-notch scientific talent is lacking; investment in science and technology is inadequate; there are

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malpractices in the mechanisms of investment.\(^8\) Amongst all these weaknesses, the key is China’s low innovative ability.

2.6 However it is also recognised that China enjoys some advantages and favourable conditions, to accelerate its scientific and technological development. China’s rapid economic growth has provided a solid foundation for the development of science and technology, and China has also established a relatively comprehensive scientific research system. Needless to say China has rich human resources. Indeed, in some important areas China has already been at the top level in the world. A matter which is also important is that China’s open-door policy has enabled China to expand its international cooperation and thus share the fruits of scientific and technological evolution elsewhere.

2.7 The Sci-Tech Guideline (2006-2020) sets basic guidelines for scientific and technological development in the coming fifteen years.\(^9\) According to the Guideline, to build an innovative state China should focus on enhancing its national innovative abilities, identifying essential and urgent areas, and efficiently allocating its resources to make progress in science and technology. Also, China should pay attention to emerging industries and to changing market demand to serve its long-term interests.

2.8 The Guideline provides some general targets which China is expected to achieve by 2020. These targets include: to increase significantly independent innovative abilities; to improve the ability to utilise science and technology to promote economic and social development and safeguard national security; to use science and technology to provide vigorous support for building a middle-class society; to enhance the research strength of basic science and emerging technology; and to achieve scientific and technological development with major impacts worldwide. The ultimate goal is to build China into a major scientific and technological power in the world by the middle of this century.\(^10\)

2.9 The Sci-Tech Guideline also details some quantitative goals for the achievement of an innovative state. By 2020 the ratio of the total investment of R&D over GDP should rise to over 2.5%; the ratio of contribution of scientific and technological advancement to economic growth should be over 60%; the rate of dependence on imported technologies should be reduced to less than 30%; both the number of patents obtained by Chinese citizens and the number of international citations of scientific papers by Chinese nationality authors should be within the top 5 in the world.\(^11\)

2.10 The Chinese leadership believes that these targets are realistic and achievable. As China’s President Hu Jintao stressed in his speech at the National Science and Technology Conference 2006, this strategic decision and the aims it sets are based on objective analyses of China’s conditions and intentional demands.\(^12\) In light of China’s economic and social development and its scientific and technological conditions and resources...
available (both material and human), the Chinese leadership expects that with strong policy support on the part of the government the country can be built into an innovative state.

Approaches

3.1 The Sci-Tech Guideline has specified various approaches to build the targeted innovative state. First, the Guideline suggests eleven priority areas, which are believed to be decisive to China’s economic and social development, and prioritises sixty-eight projects which have a high possibility to succeed in the near term. Second, the Guideline proposes sixteen important schemes to catch up with the developed world in the areas of knowledge and technology. Third, to boost innovation abilities, the guideline plans eight technology areas, which include twenty-seven emerging technologies, eighteen fundamental scientific disciplines and four major scientific research schemes.  

3.2 Major fields which China has identified to be prioritised include energy, water resources, environmental protection technology, information technology, new material technology, biotechnology, and space and oceanic technology. China has also emphasised obtaining independent intellectual property rights in equipment manufacture and information industries as a breakthrough which would upgrade its industrial competitiveness.

3.3 In February 2006 China’s State Council issued the ‘Complementary Policies’ (CP) to support the implementation of the Sci-Tech Guideline (2006-2020). The CP specifies that the government will support the strategy of building an innovative state strategy from ten areas, including investment; tax preference; finance; government procurement; the route of introduction – assimilation – innovation; creation and protection of intellectual property rights; management of talent; education; and building research bases for innovation and management.

3.4 The CP highlights the importance of using government policy and financial support to motivate and induce firms’ independent innovation. This includes not only using government public finance and science and technology agencies to give direct support to firms, especially in hi-tech industries and medium- and small-size firms, but also encouraging and inducing commercial and private funds to invest in the firms for the purpose of scientific and technological innovation.

3.5 An important act on the part of the government is government procurement. The CP requests that public financial funds be established exclusively for independent innovative products and that a motivating

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13 Xinhua Politics, 'Authorised Publication: the National Mid- and Long-Term Scientific and Technological Development Plan Guideline’.
14 Ibid.
assessment and purchasing order system be implemented to privilege domestic independent innovative products.

3.6 As China integrates into the world economy, it has begun to provide protection for intellectual property rights. This is not only because China is facing increasingly high pressure from the outside world, especially the United States and the European Union, but also because intellectual property rights protection plays an important role in building an innovative state. The CP thus puts a special emphasis on the protection of intellectual property rights.

3.7 The CP stresses the importance of rational allocation and utilisation of resources, involving talent, higher educational and research institutes, public finance departments, the military technology sector, and firms. According to the CP, China has to use both visible government forces and invisible market forces to ensure the effective functioning of a state innovation system.

3.8 The role of firms is highly appreciated in this new document. China’s scientific and technological development activities have long been isolated within academic research institutes, and firms are marginal in such activities. This has resulted in a situation in which China’s scientific and technological achievements are slow to be applied in the industrial sector, and slow to contribute to the international competitiveness of Chinese firms. In today’s world there are around 60,000 multinational firms that control about 90% of technology transfer and 80% of the world’s investment. China is apparently not able to appropriate a fair share due to its poor performance in innovation.\(^\text{16}\)

3.9 In the National Science and Technology Conference, 2006, companies are identified as the key to building an innovative state. China will build a market-oriented innovative system in which firms are the main actors and production and academic research are integrated. Firms would upgrade their independent innovation capabilities, since they constitute the main body of R&D investment, technological innovation activities, and the application of innovation achievements.

3.10 Until now, Chinese enterprises still lack independent innovation ability; investment in it is rather limited. For example, in 2003 in medium- and large-size enterprises, the investment in R&D was merely 0.75% of their total investment, whilst in developed countries this figure was over 2.5%. Also, in 2003 only 25% of China’s medium- and large-size enterprises have R&D departments, and only 43% of them undertook R&D activities, whilst in developed countries 80% of the scientific research is conducted in large enterprises.\(^\text{17}\)

3.11 Firms are the principle area of technology innovation, and also the ultimate creators of social wealth. Company managers deal with customers and know the demand in the market, and report market demand to R&D staff. Technological innovations through such a closed circuit would meet the demands of the market and the user.


As the main actor in technological innovation, firms are where the core competitive power lies. Lu Feng, Professor of Management at Peking University, suggested that independent innovation should become the main strategy for the next stage of reform of China’s state owned enterprises (SOEs). If SOEs want to gain competitive advantage, they have to learn new technologies, by their own innovation. Only if enterprises have the ability to develop and design their own products, can they stand in an indomitable position.

Mu Rongping, President of the Institute of Policy and Management at Chinese Academy of Sciences, suggested that China should form a policy environment that stresses on innovative ability construction and protecting innovation pioneers’ rights and interests. Chinese firms should be encouraged to increase investment in assimilating foreign advanced technologies, and to carry on significant innovative tasks to boost innovation ability. By doing so, China could gradually free itself from dependence on imported technologies.

It is believed that the course of independent innovation actually is a process of the introduction of firms’ technological ability, consisting of production ability – investment ability – innovation ability. During this course the government would have to give firms policy preference, such as public finance and tax incentives to form a supportive environment.

The old approach of ‘using market to exchange for technology’ is believed to be outdated and to no longer suit China’s development. It has now become widely accepted that independent innovation is China’s inevitable choice to realise its sustainable development. For example, technological innovation and upgrading will not only increase production efficiency, but also can make resource recycling more effective and deliver better pollutant treatment.

Challenges to China’s Innovation System

Building an innovative state is a major element of China’s development strategy. Nevertheless, China confronts enormous challenges to achieve this goal. To begin with, China lacks investment in science and technology and a system for steadily increasing the investment. By the international standard of an innovation state, the ratio of a country’s science and technology input to its GDP is over 2%. In China this percentage reached its peak, 2.32%, in 1960 in the midst of the country’s first wave of state-led industrialisation. Then it decreased year on year to its nadir, 0.69%, in 1998. Since 2000 it has started to rise again and reached 1.23% in 2004. There is still a big gap between China’s status quo and its target. By 2020, according to China’s plan, its

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18 Ibid.
19 Ibid.
20 Ibid.
21 It refers to a strategy that China opens its domestic markets for foreign investment in order to gain foreign technologies.
R&D input will be six times what it is now. It is evident that increasing investment in R&D is a huge challenge for China, meaning that it has to increase its financial expenditure as well as induce other social resources to invest in R&D.

4.2 China has relied heavily on imported technologies and, consequently, its own industrial capacity in terms of scientific and technological development is very limited. Over 60% of the equipment investment, which takes 40% of the fixed assets investment, is imported. Most of the hi-tech key equipment, including in the military area, is imported. Having realised that this situation may pose a threat to China’s national security, the Chinese government intends to use policy guidelines to direct its firms to increase investment and enhance their ability to assimilate and absorb imported technologies, in order to improve their innovation ability and to put an end to passive dependence on foreign supplies.

4.3 Domestic brands and products do not enjoy a favourable position in domestic market competition, even though they seem to have a good level of recognition. It is believed that China’s independently-developed products lack sufficient policy support, which potentially poses a major barrier for China to be an innovative state. To alleviate this concern, government procurement might play an important role in performing its function of supporting domestic industry. It must be noted that this assumed linkage has not yet been tested.

4.4 China seriously lacks top-level scientists and talents. In the 158 international first class scientific organisations and the 1,566 second class organisations, only 2.26% scientists of Chinese nationality are leading the research. There is only one Chinese president in a first class research organisation, and 1% of the second class organisation presidents are of Chinese nationality. The government will have to attract and bring together talent by initiating major research projects, and using policy incentives to impel firms to increase R&D investment and thus attract talent to work in firms and relevant industrial sectors. If China wants to discover those who have a mastery of science, and expects its talent to realise their best potential, it will have to provide them with an innovation-friendly stage on which to work.

4.5 The existing management and assessment system for researchers is rigid and stereotyped. Many Chinese institutes simply assess the achievement of their research staff by the quantity of their publications, regardless of the quality or other non-publishable contribution. This system has caused some major problems, amongst which three are outstanding. First, there is a severe imbalance between the quantity and quality of academic papers. For example, from 1993 to 2003 there were no Chinese scholars in the top 20 internationally cited scientists and only two in the top 100. Second, China’s production of patents, which is closely related to economic growth, is much underdeveloped. The number of Chinese-
owned patents amounts to only 2% of the world total. Third, the current system has also generated enormous pressure for Chinese researchers to cut corners in order to satisfy the hunger for success in the short term. The strong appetite for technological progress has encouraged a culture of corruption. The latest high-tech scandal at the Shanghai Jiaotong University, one of the top universities in the country, is one of the indicators of the development of academic corruption.

4.6 China's scientific research resources are scattered, repetitive, and not used efficiently. The utilisation rate of large-scale scientific research equipment in China is barely 25%, whilst in developed countries this ratio ranges from 170% to 200%. At present, resource shortages and waste coexist in China. Therefore, the planning and allocation of any major scientific infrastructure have to be rationalised; also, the Chinese government will have to improve the management of resources and encourage resource-sharing between different institutes and regions.

Factors Restraining Chinese Firms' Innovation

5.1 China's new plan has identified firms as the key to building an innovative state. Whilst there are good reasons behind this strategy, Chinese firms are also facing enormous difficulties. Currently only 0.03% of Chinese firms own independent intellectual property rights of their core technologies. In 2004 large-scale industrial firms spent 39.7 billion RMB (Chinese currency yuan), approximately US$4.96 billion, on importing technologies, whilst spending only 6.1 billion RMB, approximately US$0.76 billion, on assimilating technologies. In addition to the fact that Chinese firms are deficient in technological innovative ability and R&D investment, independent innovation has not been the preferred choice for firms, for the purpose of development, or of increasing profit. Firms often find it easier for them to seek policy advantages or other irregular opportunities to increase their profit than to work on technological innovation on their own. The Chinese government will have to reduce the scope of such policy advantages by reforming and improving its political and economic system in reference to the relationship between government authorities and firms.

5.2 It has been found that the majority of the medium- and large-size firms in China do not have a special R&D department. Each year China delivers over 30,000 achievements in scientific research, of which less than 30% could be transferred to practical application and less than 10% could be
applied at the industrial level. Furthermore, China’s SOEs are in a period of transformation and are beset with difficulties. In 2005 SOEs had a total loss of 102.6 billion RMB, about US$12.8 billion, which was a year-on-year increase of 56.7%. This amount of loss was the second highest in SOE history, following the level of 1998, and the percentage increase was the highest in the past 16 years.

5.3 Chinese firms face unfavourable conditions for market competition. Whilst many firms are keen to market information and have the ability to fund R&D, they do not have autonomy to undertake large R&D projects, since they will usually have to get authorisation from the government for their R&D initiatives. On the other hand, large state-owned scientific research institutes are the major undertakers of research projects and have favourable financial and policy support from the government. However, these research bodies are not sensitive to market demand and do not have the experience of industrial operation. Such a mismatch has caused the disconnection between academic research, industrial application, and market operation.

5.4 Whilst the government has begun to fund firms in their R&D activities, the mechanism of government funding is problematic. Although limited funds are made available, an effective supervision and management method for the funds after they are granted to the firm does not exist. The funding follows a simple process of project proposal – grant – R&D. However there is much that might happen which is unforeseeable and unpredictable during R&D activities. Hence, when the authority loses its control of the use of the funds after they are granted to the firm, it also loses the control necessary to ensure the success of R&D.

5.5 Further, there is no adequate intermediary information service agent in the technology market. Firms, especially private firms, have difficulty in obtaining necessary information. As a result, they are in an inferior position in market competition, and ineffective in innovation.

5.6 After decades of the practice of the planned economy, a mind-set of innovation is not commonly present in China’s industrial circle. Most Chinese entrepreneurs are conservative about scientific and technological innovation. Firms are not provided with the necessary financial and human resource policies.

5.7 China’s protection of scientific and technological innovation by means of intellectual property rights is not effective. Firms often suffer big losses in their R&D activities due to the lack of the protection of their intellectual property rights. Moreover China’s mixed ownership system often leads to difficulty in separating individual profit and group profit, and differentiating technology profit and product profit. These factors often discourage firms from engaging in R&D activities.

5.8 It is worth noting the role of central SOEs in building an innovative state. ‘Central SOEs’ refers to those firms that are directly governed by the

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State-Owned Assets Supervision and Administration Commission (SASAC) of the Chinese State Council, as distinct from SOEs governed at provincial level. They operate in essential industrial sectors and are generally larger in terms of assets, operations and employees. Central SOEs are expected to play a leading role in building an innovative state. For example, in the fourteen large scientific and technological projects planned by China's 11th Five-Year Plan, central SOEs will directly participate in twelve of them.

Central SOEs have increased their R&D investment and the number of their independent innovation patents is growing. For example, they have won 30,520 patents so far and the figure is increasing at an average 28% annual rate in recent years. In 2004 central SOEs’ R&D investment was 76.8 billion RMB, about US$9.6 billion, a 218% and a 76% increase on the figures of 2002 and 2003 respectively. In 2005 the ratio of central SOEs’ R&D investment over their sales reached 1.5%, in which industrial SOEs’ percentage reached 2%. However this ratio is still relatively low compared with some developed countries where the ratio is normally above 5%. Li Rongrong, Director of SASAC, believed that besides the irrational distribution of resources, and the many problems in the country’s innovation system, the insufficient, though rapidly growing, R&D investment was the major obstacle to SOEs’ ability to innovate.

To encourage R&D investment SASAC has appended a new index of 'science and technology investment' to the assessment system of performance of SOEs’ senior managers. This procedure is aimed at providing a strong incentive to SOE managers to diversify their focus from short-term profit to the long-term interest which is associated with innovation.

The Chinese leadership intends to gradually shift the main practice of independent innovation from higher education and scientific research institutes to firms. In the short and medium term, as discussed above, China is facing major difficulties. Despite all kinds of barriers, the establishment of the new plan of building an innovative state means that the Chinese leadership has realised that China has to introduce new modes of development to sustain the country’s economic growth. In China's political system, strong and sustainable political willingness on the part of the Chinese leadership will be necessary to help China to overcome the difficulties and succeed in building an innovative state. Whilst building an innovative state has been widely regarded as a new beginning for China’s industrial development, for China, the problem is as always how a good plan can be effectively implemented.

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34 Xinhua news, 23/04/2006,'Central SOEs Have been the Backbone of Technology Innovation, 'Science and Technology Investment' Has been Augmented to be a New Assessment Index'. Available at, http://news.xinhuanet.com/fortune/2006-04/23/content_4462960.htm, accessed on 24 April 2006
37 Xinhua news, 23/04/2006,'Central SOEs Have been the Backbone of Technology Innovation, 'Science and Technology Investment' Has been Augmented to be a New Assessment Index'.

Appendix

Details of The National Mid-and Long-Term Scientific and Technological Development Plan Guideline (2006-2020)

A. Eleven Priority sectors:
   (1) Energy
   (2) Water and mine resources
   (3) Environment
   (4) Agriculture
   (5) Manufacture
   (6) Transport
   (7) Information industry and modern services industry
   (8) Population and health care
   (9) Urbanisation and urban development;
   (10) Public security
   (11) National defence

B. Eight Technology Areas:
   (1) Biotechnology
   (2) Information technology
   (3) New materials technology
   (4) Advanced manufacturing technology
   (5) Advanced energy technology
   (6) Oceanic technology
   (7) Laser technology
   (8) Space technology

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38 For more detailed schemes please refer to: Xinhua Politics, ‘Authorised Publication: the National Mid- and Long-Term Scientific and Technological Development Plan Guideline’.