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GEOPOLITICS, INNOVATION  
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STRATEGIC NATURE  
OF INNOVATION

*THE HAGUE* CENTRE FOR STRATEGIC STUDIES AND TNO



GEOPOLITICS, INNOVATION AND CHINA - THE STRATEGIC  
NATURE OF INNOVATION  
*THE HAGUE CENTRE FOR STRATEGIC STUDIES (HCSS) AND TNO*

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The TNO and *The Hague* Centre for Strategic Studies (HCSS) program Strategy & Change analyzes global trends in a dynamic world affecting the foundations of our security, welfare and well-being.

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# TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION</b>	<b>7</b>
<b>2</b>	<b>A POLICY OF 'INDIGENOUS INNOVATION'</b>	<b>9</b>
<b>3</b>	<b>DOMESTIC POLICIES</b>	<b>15</b>
3.1	Human resources	15
3.2	R&D expenditure	15
3.3	R&D investment climate	16
3.4	Government procurement	18
3.5	Intellectual property	21
3.6	Law enforcement	23
<b>4</b>	<b>POLICIES ABROAD</b>	<b>25</b>
4.1	Foreign mergers and acquisitions	25
4.2	Natural resources	28
<b>5</b>	<b>CONCLUSION: THE STRATEGIC NATURE OF INNOVATION</b>	<b>33</b>
5.1	Innovation takes center stage in Chinese policy making	33
5.2	Perceptions of China as a rising global political and economic power	35
5.3	Perceptions of hindrances to Chinese development	35
5.4	Perceptions that China's rise will hurt Western interests	36
5.5	Final remarks	36

# 1 INTRODUCTION

Since the first moments of increased economic openness under Ding Xiaoping's rule<sup>1</sup>, China has succeeded to make significant headway as an emerging economic, political and innovation power. The centrality of technological innovation in China's economic development model, and the alignment of innovation and industrial policy have resulted in a multiplier effect of its innovation policies, leading to a steep ascent on the value chain. This rise on the value chain both results from and reinforces shifts in the global dynamics of innovation. The approach has had large-scale results in terms of financial benefit, infrastructural development, expanding consumer markets, and increasing quality and quantity of the human resources R&D pool.

China's rapid catch-up in areas such as green technology and its endeavors to appropriate core technologies in sensitive military domains such as space, have made technology an important pawn in the power play between the West and China. China's rise has a large impact on the 21st century global landscape and has led US Secretary of Energy Steven Chu to define the current formative years of China's technological development as a new 'sputnik moment' for the US, signifying the momentous nature of Chinese endeavors by recalling the early years of the space race between Russia and US.<sup>2</sup> Chu's words are exemplary for the strategic glasses through which China's rise as an innovation power is seen.

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1 M. Springut, S. Schlaikjer, and D. Chen, 'China's Program for Science and Technology Modernization: Implications for American Competitiveness,' (prepared for The U.S.-China Economic and Security Review Commission) (January 2011), p. 78; E. Vogel, 'China under Deng Xiaoping's leadership', East Asia Forum blog, (September 27, 2011), <http://www.eastasiaforum.org/2011/09/27/china-under-deng-xiaopings-leadership/>

2 M. Springut, et al, p. 9

This vision paper examines how China has developed its innovation policy and strategically integrated it with other policies to strengthen its overall economic and political position. The paper provides an overview of the strategic policies adopted by China both in the innovation realm and in related policy fields, as well as the implications they have on European innovation abilities.

Chapter 1 goes into China's 'indigenous innovation' policy, which shapes a rather pragmatic relationship with foreign entities. Chapter 3 and 4 elaborate on the implementation of this policy in a number of related policy fields. Chapter 3 focuses on domestically oriented policies, such as human resources, outsourcing policies, IP policies, government procurement, etc. Chapter 4 takes a more international perspective, and looks at the connection between China's 'indigenous innovation' policy, and its policies on foreign investments and natural resources. In the conclusion, four key elements are mentioned that further increase the (perception of the) strategic nature of China's innovation policies.

## 2 A POLICY OF 'INDIGENOUS INNOVATION'

During the last decade, China's innovation policies have succeeded in shifting its position in the world economy from the 'workshop of the world' to that of an innovation power, a move from 'made in China' to 'designed in China'<sup>3</sup>. The key notion in China's innovation policy that has supported this accomplishment is 'indigenous innovation' (*zizhu chuangxin*), the slightly ambivalent term of choice to describe what is essentially a 'long-term aspiration to exercise sovereign control over the core scientific and technological capabilities that are the root of a nation's economy' and the need to rejuvenate China<sup>4</sup> through decreasing technological dependency on the west.

This approach is a more techno-nationalist view of scientific and technological development in contradiction to a techno-globalist or cosmopolitan perspective. Outsiders are perceived as instrumental to the nation's national innovation endeavors. The pursuit of technology is therefore intended to first and foremost serve China's interests. China strives to the goal of eventually possessing indigenous technological innovation capacity and gaining the initiative in international competition.<sup>5</sup> This is in contrast to being restricted to the low- and medium ends of the value chain in high tech innovation, where added value continues to be limited, due to dependency on foreign technology and costly licenses.

The concept of 'indigenous innovation' is laid down in the Medium to Long-term Plan for the Development of Science and Technology (2005-

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3 C. Roux, 'Designed in China', Bloomberg Businessweek, (October 9, 2006), [http://www.businessweek.com/magazine/content/06\\_41/b4004412.htm](http://www.businessweek.com/magazine/content/06_41/b4004412.htm)

4 M. Springut, et al, p. 10, 77

5 D. Ernst, 'Indigenous Innovation and Globalization - the Challenge for China's Standardization Strategy', UC Institute on Global Conflict and Cooperation and East-West Center, (June 2011), Honolulu, p. 23; M. Springut, et al, p. 11



2020) (abbreviated as MLP), the PRC's guiding document on innovation policy, which aims for China's rise to an 'innovative country' in 2020, and a 'global scientific power' by mid-century. It strives to further reduce China's dependency rate on foreign technology to less than 30 percent in 2020 from a 2007 dependency rate of 34%.<sup>6</sup> It is envisaged that this reduction will be brought about through a range of complementary policies, among which a raise of overall national R&D expenditures from 1.7% in 2009 to 2.5% of GDP by 2020<sup>7</sup>, and a number of other policy initiatives described in chapters 3 and 4.

The policy of 'indigenous innovation' has formed an important component of China's 11<sup>th</sup> and 12<sup>th</sup> Five Year Plans (FYP) and the recent and continuing development of China's innovation policy. It has fed into policies on public procurement, mergers and acquisitions of foreign high-tech high-brand companies, market access barriers, as well as in (sometimes forced) technology transfers, where a number of foreign companies who offshore activities in China suffer from.

The perception that 'indigenous innovation' is predominantly a domestic policy aimed at some sort of innovation autarky developed in relative isolation is a flawed one. It is a policy which actually seeks to stimulate and enable a pragmatic interaction with foreign entities. Part and parcel of 'indigenous innovation' policies is restricted market access for foreign companies<sup>8</sup>, technology transfers stipulated in contracts for those companies looking to enter the Chinese market<sup>9</sup>, and preferential access to China's large government procurement funds for domestic companies<sup>10</sup>. Therefore,

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6 M. Springut, et al, p. 11, 40. The technology dependency rate is the ratio of 'technology imports' to the total of technology imports plus national R&D expenditures.

7 M. Springut, et al, p. 39

8 M. Springut, et al, p. 77

9 N. Mihalakas, 'China's Innovation Policies - The Real Danger for the U.S. Economy', Foreign Policy Association blog, (May 10, 2011), <http://foreignpolicyblogs.com/2011/05/10/china%E2%80%99s-innovation-policies-%E2%80%93-the-real-danger-for-the-u-s-economy/>

10 M. Gechlik, 'China's Perceived Threat to Transatlantic Security', Atlantic Community website, (February 24, 2011), [http://www.atlantic-community.org/index/articles/view/China's\\_Perceived\\_Threat\\_to\\_Transatlantic\\_Security](http://www.atlantic-community.org/index/articles/view/China's_Perceived_Threat_to_Transatlantic_Security)

'indigenous innovation' can be best described in the words of US-CESRC as *'not technological autarky, but a laser focus on shaping foreign interactions to serve national innovation goals.'*<sup>11</sup>

According to president Hun Jintao 'indigenous innovation' is about 'increasing the nation's innovation capacity [by] accumulating original (*yuanshixing*) innovations, [but also accumulating] integrated innovation and innovation through importing, digesting, absorbing and re-innovating.'

MLP therefore looks at:

- Original innovation: increase the production of original innovations, for instance through its national new products program<sup>12</sup>,
- Integrated innovation: the development of a process in which a new product is created through the integration of several technological innovations, and
- Re-innovation: the creation of new products by absorbing and acquiring imported technologies.<sup>13</sup>

The policy framework as laid down in the MLP has been subject to several changes. Although the MLP was initially interpreted as an approach mainly focusing on high-tech and neglecting the entrepreneurial component of innovation, changes are underway in its practical implementation with regards to the latter.<sup>14</sup> The 12<sup>th</sup> FYP takes a slightly different direction from the 11<sup>th</sup> version, focusing far more on domestic consumption and meeting the social development needs of the country. The 12<sup>th</sup> FYP indicates a shift towards an innovation policy seeking to create an open research environment<sup>15</sup>, in which knowledge and ideas aimed at the improvement of social and economic stability and the creation of a free and creative academic environment are central. The 12<sup>th</sup> FYP essentially endeavors to strengthen the 'Apple'-dimension of China, the open, creative, and transparent atmosphere needed for technological breakthroughs, the lack

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11 M. Springut, et al, p. 78

12 Idem, p. 35, 78

13 D. Ernst, 'Indigenous Innovation', p. 24

14 Idem, p. 26

15 M. Springut, et al, p. 60, 131

of which is widely perceived as China's main weakness.<sup>16</sup>

The 12<sup>th</sup> FYP is far more techno-globalist in tone than its predecessor, emphasizing the need for international S&T cooperation and the participation of foreign companies with Chinese partners in national R&D programs. It attempts to bridge the key dichotomy in Chinese innovation policy formulation, by finding a balance between market forces and state directed innovation on the one hand and domestic technological development and employment of foreign technology on the other hand.<sup>17</sup>

Despite this increased interest in more techno-globalist, creativity-enhancing policies, other, more techno-nationalist tendencies of 'indigenous innovation' continue to form important components of the 12th FYP. 'Strategic emerging industries', which should form the innovation motor of Chinese technological development, for example, play an important part in the FYP. Many of these industries, including high-tech sectors such as computers, telecommunication installations, software, and new energy, are supported through government procurement policies resulting in preferential treatment for domestic companies.<sup>18</sup>

Although enterprises have seen their role in innovation increase, both as sources of funding and as performers of R&D, and the 12th FYP pays increased attention to early commercialization, market demand and private-public partnerships, science continues to be a mostly top-down state-sponsored affair. The 'indigenous innovation' policy and its three-pronged strategy of 'original innovation', 'integrated innovation', and 're-innovation', continues to foster a strong position for the state as an orchestrator of innovation policy. The state provides policy frameworks demarcating particular innovation policy directions and is a key investor in, for instance, basic research. Its grasp on innovation also comes to the fore through its continued role in

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16 'China ends policy favoring local firms, Shanghai Daily, (July 1, 2011), <http://www.shanghaidaily.com/nsp/Business/2011/07/01/China%2Bends%2Bpolicy%2Bfavoring%2Blocal%2Bfirms/>; N. Mihalakas, 'China's Innovation Policies'; Liang Jun, 'Chinese students lack imagination, creativity', People's Daily Online, (August 04, 2010), <http://english.peopledaily.com.cn/90001/90776/90882/7093100.html>;

17 M. Springut, et al, p. 131

18 D. Ernst, 'Indigenous Innovation', p. 24; M. Springut, et al, p. 7,8, 58 77, 131,

state-owned and state-controlled enterprises that are often subject to preferential treatment.<sup>19</sup>

China's state-centralized system allows for quick policy shifts and large-scale reforms. The intricate connection of innovation policy with industrial policy in the shape of strategic policies of foreign direct investments, government procurement, trade policy, resource policy, and science-related fields such as IPR protection, both emanate from and enforce the continued central position of the state in the innovation realm. Particularly in 'strategic', 'heavyweight' and 'pillar' industries, the state intervenes as a techno-industrial power with a range of policies, among which income tax preferences, value-added tax rebates, subsidies, soft loans, national technical standards, trading rights restrictions, local content rules, government procurement regulations, etc.<sup>20</sup>

However, China's system suffers from a number of problems, harming the potential success of its innovation policies. Despite the central role of the state, the innovation system continues to be essentially fragmented, resulting in significant differences in policy formation between regions and different government layers. For instance, next to the state council, NDRC

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- 19 M. Springut, et al, p. 6, 8, 12, 13, 19, 24, 50, 55, 56, 57, 72, 75, 115, 130, 131; D. Ernst, 'Outsourcing of Innovation through Global Innovation Networks -Implications for China and Europe'. (presentation at China and Europe: competition and cooperation in innovation, The Hague, March 23-24, 2011), <http://www.strategyandchange.nl/wp-content/uploads/2011/04/ERNST.pdf>, (accessed August 9, 2011); D. Ernst, 'Indigenous Innovation', p. 24, 25, 58, 93; N. Mihalakas; M. Grueber and T. Studt, '2011 Global R&D Funding Forecast: China's R&D Growth Engine', R&D Magazine, (December 15, 2010), <http://www.rdmag.com/Feature-Articles/2010/12/Policy-And-Industry-Government-Funding-2011-Global-RD-Funding-Forecast-Chinas-RD-Growth-Engine/>
- 20 M. Springut, et al, p. 55, 72, 92; N. Mihalakas; S. Roborgh and G. Gijsbers, 'Sino-European collaboration on innovation: four key issues', (November 2011), The Hague Centre for Strategic Studies; 'Streaks of Red -Chinese investment in Europe - Capital and companies from China are sidling into Europe', Economist website, (June 30, 2011), <http://www.economist.com/node/18895430> (accessed October 31, 2011); D. Ernst, 'Indigenous Innovation', p. 64, 66; S. An and B. Peck, 'China's indigenous innovation policy in the context of its WTO obligations and commitments', Georgetown Journal of International Law, Vol. 42, Issue 2 (Winter 2011), <http://gjiil.org/wp-content/uploads/archives/42.2/ChinasIndigenousInnovation.PDF>

(National Development and Reform Commission) and SASAC (State-owned Assets Supervision and Administration Commission), local governments of localities such as Beijing and Jiangsu are also important players.<sup>21</sup> Infighting and turf battles between different ministries, and between state, provincial and local levels, are a frequent occurrence. These different (state) institutions sometimes prioritize their short term interests, for instance the support of particular local corporations, over supporting the innovation system at large. Moreover, the implementation of government-supported innovation is often not performed in a coherent manner and goals are not aligned beforehand.<sup>22</sup>

The state system suffers from rampant corruption practices as well. An example of this is the high-tech enterprise certification management policy, introduced by MOST (Ministry of Science and Technology), MOF (Ministry of Finance) and the State Administration of Taxation in 2008, in which firms recognized as high-tech enterprises are considered eligible for large tax reductions and other privileged treatment. However, due to extensive fraud of the certification process, more than 70% of 20,000 enterprises have gotten certification under dubious circumstances.<sup>23</sup> Moreover, aspects such as its winner-takes-all competition and the 'manufacturing' of innovation, which contribute to a research culture unresponsive to intellectual property protection, continue to be important aspects of its innovation policy.

China's 'indigenous innovation' policy, despite recent efforts by the Chinese states to tone down its most extreme outcomes, continues to draw international criticism.

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21 M. Springut, et al, p. 72

22 K. Gordon, S. Pool, E. Paisley, S. Lyon, 'Rising to the Challenge - A Progressive U.S. Approach to China's Innovation and Competitiveness Policies', Science Progress website, (January 14, 2011), <http://www.scienceprogress.org/2011/01/rising-to-the-challenge/>

23 M. Springut, et al, p. 74

## 3 DOMESTIC POLICIES

China adopts several policies at home to achieve its goals in original innovation, integrated innovation and re-innovation. It attempts to increase its human resources stock in R&D as well as its expenditure on R&D. In addition, its goals come to the fore in its policies on outsourcing, government procurement and intellectual property rights protection.

### 3.1 HUMAN RESOURCES

China's R&D labor stock has quickly increased, reaching an overall number of 1,426,000 in 2009<sup>24</sup>. This is partly a consequence of the high overall enrolment rates in Chinese universities, which have increased five-fold between 1998 and 2006, to 5.5 million enrolled students.<sup>25</sup> In addition, one third of Chinese students graduates with a degree in engineering, exceeding dwindling Western output rates in engineering as well as in science.<sup>26</sup> However, China continues to suffer from brain drain, as a meager 8% of Chinese PhD students studying in the United States return, which has resulted in the establishment of a number of incentives to lure graduates back.<sup>27</sup>

### 3.2 R&D EXPENDITURE

On paper China's R&D expenditures provide a picture of an unprecedented surge. China's R&D expenditure as share of GDP has increased to 1.8% in 2010, with an annual R&D investment growth rate of approximately 20% per year

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24 M. Springut, et al, p. 18

25 M. Grueber and T. Studt

26 National Science Foundation, 'Science and Engineering Indicators: 2010, Chapter 2', National Science Foundation Website, (January 2010), <http://www.nsf.gov/statistics/seind10/c2/c2h.htm#s4>

27 M. Springut, et al, p. 96

over the 2000-2008 period (21.7% in 2011 alone).<sup>28</sup> Moreover, the enterprise sector spent 377 billion RMB (2009) on R&D, a seven-fold increase to 2000 rates, increasing the share of funding provided by industrial enterprises on R&D in China to 70%, reflective of the increasing prominence of enterprises within China's innovation model.<sup>29</sup>

Next to direct funding of R&D, a number of other pecuniary initiatives have been taken to boost innovation, such as R&D tax credits, allowing tax deductions ranging between 50% and 150% of R&D expenditures, loans, land grants, patenting support, domestic supplier preferences in public-private procurement and several SME sector support programs.<sup>30</sup>

However, a number of reservations can be made. Although government expenditure on R&D has increased to 0.4% of GDP, it still lags behind considerably to the US' rate of 0.75%.<sup>31</sup> While expenditure on basic research has risen in absolute terms, it accounts for a mere 4.7% of total R&D spending, a percentage that has even fallen over the past five years. To increase its basic research rates, China has set out plans for a basic research spending ratio of 15% of total R&D expenditures by 2020.<sup>32</sup>

Furthermore, despite the inroads being made, the level of R&D support as a share of company income was only 0.7% overall. Also, the money, is not always spent wisely. Particular industries, such as wind power in green technology, have suffered from over-investment and overcapacity.<sup>33</sup>

### 3.3 R&D INVESTMENT CLIMATE

Foreign companies have increased their outsourcing of R&D to China as global production networks and global innovation networks are widening

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28 National Science Foundation, 'Global Expansion of Research and Development Expenditures', (2010), <http://www.nsf.gov/statistics/seind10/c0/c0s2.htm> ; Xinhua News Agency, 'Spending on R&D rises 21.7 pct in 2010.' China Daily, (September 29, 2011), [http://www.chinadaily.com.cn/china/2011-09/29/content\\_13813943.htm](http://www.chinadaily.com.cn/china/2011-09/29/content_13813943.htm)

29 M. Springut, et al, p. 20, 21

30 Ibid, p. 45, 57

31 Ibid, p. 16

32 M. Grueber and T. Studt

33 M. Springut, et al, p. 22, 74

and consumer markets continue to grow. China perceives outsourcing by foreign companies as instrumental to its 'indigenous innovation' efforts. About \$90 billion (2009) of foreign FDI in China was designated for building manufacturing and R&D facilities. During the first half of 2010, this number rose by 10%.<sup>34</sup>

In addition to the outsourcing of production, R&D outsourcing is making a major contribution to the development of China's innovation capacity. A number of policies are therefore specifically targeted at reaping the fruits of the presence of these foreign companies. MIIT (Ministry of Industry and Information Technology), for instance, wants China to become the top developer of battery-powered cars. It therefore requires foreign car makers to opt for a minority stake with a domestic joint venture party, resulting in the sharing of critical technologies with the Chinese partner.<sup>35</sup>

According to the Ministry of Commerce, there are over 1200 foreign MNC R&D centres in China, encompassing \$12,8 billion in investment. Over 400 companies of the Fortune 500 maintain R&D centers in mainland China. In 2006, MNCs spent over \$804 million in R&D in China. In 2007, foreign investment enterprises accounted for US\$ 24.7 billion in R&D spending, approximately one-quarter of total R&D spending in China that year. In large and mid-sized manufacturing, for instance, a rise took place in share of total R&D expenditure by foreign entities from 19.7% in 2002 to 27.2% in 2008. In addition, 29% of all invention patents in China are held by foreign companies.<sup>36</sup>

China offers foreign companies cheap labor, a large consumer market, government subsidies for R&D, modern infrastructure, a period of free rent, good lease terms, assistance in construction loans, and a number of tax incentives, such as reduced taxes, reduced taxes and sometimes even tax holidays as well as tax exemptions on equipment imports. However, these

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34 M. Grueber and T. Studt

35 Norihiko Shirouzu, 'China Spooks Auto Makers: Foreign Companies Fear New Rules on Electric Cars Will Erode Intellectual Property,' *The Wall Street Journal*, (September 16, 2010), <http://online.wsj.com/article/SB10001424052748704394704575495480368918268.html>

36 M. Springut, et al, p. 88, 89; D. Ernst, 'Indigenous Innovation', p. 31



advantages come at a price. Foreign companies are often required to transfer technology, and to agree to local content requirements. In addition, some companies feel they had to establish an R&D presence in China in order to 'appease PRC officials who demanded it', and to support long term interests, such as securing access to China's increasingly affluent consumer market. Due to the risk of technology leakage, brought about by weak IPR enforcement and cases of technology theft, many companies are reluctant to outsource core technologies to Chinese companies. Also by Chinese partners themselves, the degree of technological spin-off from foreign companies is hotly debated, with proponents pointing at technology transfer and the stimulus they provide for local firms to engage in technological competition, while opponents emphasize the fact that foreign centers snap up the best and brightest researchers to the detriment of local firms, and increase technological dependency of Chinese companies.<sup>37</sup>

In the latest phase in the development of global innovation networks, innovative Chinese companies have been establishing R&D centers abroad as part of a strategic approach. Huawei established R&D centers in locations from Bangalore to Stockholm, often embarking on joined ventures with other MNCs. It built an R&D centre next to Ericsson's Swedish head office, snapping up its employees when the Swedish company was forced to reduce its staff. Of the 280 employees in Kista, 200 used to work for Ericsson.<sup>38</sup>

### 3.4 GOVERNMENT PROCUREMENT

'Indigenous innovation' requirements as laid down in government procurement regulations have led to an outcry among foreign companies. Officially, foreign companies are allowed to compete in the public procurement process, as agreed with China's access to the WTO, where

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37 C. Wang, with J. McCarthy, S. Yates and A. Herald, 'Handling IP Protection With Chinese Outsourcing Vendors - While The Concerns Are Real, Judicious Firms Can Minimize Outsourcing Risk', (October 24, 2008), <http://www.freeborders.com/wp-content/uploads/04-Forrester-Governance-Report.pdf>; M. Springut, et al, p. 55, 79, 80, 89, 90; Quote from K. Walsh, 'China R&D: A High Tech Field of Dreams,' Asia Pacific Business Review, Vol. 13, No.3, July 2007, p. 323; N. Mihalakas.

38 M. Grueber and T. Studt; F. Godement and J. Parello-Plesner with A. Richard, 'THE SCRAMBLE FOR EUROPE', European Council on Foreign Relations, (July 2011), [http://www.ecfr.eu/page//ECFR37\\_Scramble\\_For\\_Europe\\_AW\\_v4.pdf](http://www.ecfr.eu/page//ECFR37_Scramble_For_Europe_AW_v4.pdf), (accessed October 31, 2011), p. 5

it signed TRIPS (the Agreement on Trade-Related Aspects of Intellectual Property Rights), and promised to join the WTO-GPA, the agreement on government procurement. However, to this day, terms of its membership are still under negotiation with the inclusion of SOEs as the main topic of contention.<sup>39</sup>

In order to gain access to China's multi-billion government procurement market (in 2008, it purchased for approximately \$88 billion excluding local level acquisitions through its public procurement process), foreign companies in information technology, communication devices, office equipment, software, energy saving products and new energy need to have a Chinese domestic partner, and agree to compulsory transfer of technology and in some cases trademarks.<sup>40</sup>

In other cases, they need to become part of a government's public procurement catalogue with recognized vendors, in which only vendors whose products adhered to 'indigenous innovation' requirements, and were free of foreign intellectual property were allowed to register. According to strictly enforced stipulations, intellectual property needed to be developed and owned in China, and associated trademarks originally registered in China. This was a problematic issue for the foreign companies, since IP rights of MNCs were mostly first acquired abroad, and hardly transferred to the Chinese counterpart or JV subsidiary. If companies licensed IP to their partner, this was done under strict conditions, particularly since China's IP enforcement needs improvement.<sup>41</sup>

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39 WTO Press release, 'WTO successfully concludes negotiations on China's entry', The World Trade Organization website, (September 17, 2001), [http://www.wto.org/english/news\\_e/pres01\\_e/pr243\\_e.htm](http://www.wto.org/english/news_e/pres01_e/pr243_e.htm); 'China ends policy favoring local firms', Shanghai Daily, (July 1, 2011), <http://www.shanghaidaily.com/nsp/Business/2011/07/01/China%2Bends%2Bpolicy%2Bfavoring%2Blocal%2Bfirms/>; D. Ernst, 'Indigenous Innovation', p. 62

40 M. Gechlik; P. Heyue, 'China's Indigenous Innovation Policy and its Effect on Foreign Intellectual Property Rights Holders', China Law Insight, (September 9, 2010), <http://www.chinalawinsight.com/2010/09/articles/intellectual-property/chinas-indigenous-innovation-policy-and-its-effect-on-foreign-intellectual-property-rights-holders/>; B. Shobert, 'Beijing's consensus lesson', Asia Times, (July 8, 2011), [http://www.atimes.com/atimes/China\\_Business/MG08Cb01.html](http://www.atimes.com/atimes/China_Business/MG08Cb01.html)

41 P. Heyue

Often foreign companies suffered even if they had been awarded a tender, due to conditions concerning sourcing and technology transfers that often harmed long-term competitiveness. The German company Siemens arranged a contract with China's CNR (China National Railroad Corporation) for the building of high speed trains, in which certain technology was transferred, eventually resulting in a loss of competitiveness for Siemens. In a later tender, CNR secured a \$5.7 billion contract for high speed trains, while Siemens was contracted to supply only certain components for \$1 billion. Moreover, not only on the domestic market is CNR outcompeting Siemens. Despite the potential loss of their technologies, many high-tech companies, as testified by a group of US high-tech and intellectual property-dependent companies at the US International Trade Commission hearing last December, often see themselves forced to comply with Chinese regulations, fearing a loss of the Chinese market to competitors<sup>42</sup> and needing the revenues in a time of economic pressure.

Pressured by foreign MNCs and foreign governments, China recently adjusted its regulations with regards to the hosting of foreign companies. In April 2010 the "2010 Notification Regarding the Development of Determining 'Indigenous Innovation' Products (Draft Seeking Opinions)" was issued, in which the requirements concerning 'indigenous innovation' were relaxed, in order to accommodate foreign invested enterprises (FIEs). As long as the applying company indisputably possesses the rights to use IP, conditions for the 'indigenous innovation' classification are met. In practice, however, it is reported that of the 523 products mentioned in the 'indigenous innovation' procurement catalogue in Shanghai, only two are produced by FIEs. Moreover, in the same month, China required a number of high-tech companies to turn over the encryption codes to their smart cards, Internet routers, and other technology products in order to become part of the catalogue. In June 2011, a statement was issued by MOF, eliminating additional restrictive measures. However, it is uncertain to what extent this turns out to be a cosmetic procedure and to what extent it signals real change.<sup>43</sup>

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42 M. Springut, et al, p. 79; D. Ernst, 'Indigenous Innovation', p. 3

43 P. Heyue; M. Gechlik; B. Shobert

Ironically, some foreigners are missing the privileged treatment, when they still stood apart from domestic producers. Even if awarded less bids, their nature as non-indigenous producers offered them easy access to government authorities. Although recent measures have enhanced their equality in the government procurement process, their emancipation has decreased their special access.<sup>44</sup>

### 3.5 INTELLECTUAL PROPERTY

China's assertive IP policy is strengthened by its perception that it has a weak IP position, which feeds into its goal to rapidly increase ownership of core technologies. Its approach towards its patent and standard setting policy is driven by the notion that the current standards system was established without adequate representation, and is harmful to catch-up innovation powers. This attitude is exemplified by State Councilor Liu Yandong, who stated it 'will forever be under the control of others' in the current system. For example, in a scenario described as the 'patent trap', Chinese firms have to pay 30% of the price for each PC produced in China to foreign patent holders. Due to these high payments, the Chinese value share is a meager 10-15% in general, while the majority of added value is captured by subcontractors and MNCs.<sup>45</sup>

China is eager to change this situation, which it considers to be unjust, and views patents and standards as strategic instruments to increase its technological prowess and generate rents. Both in the areas of patents and standards it adopts a two-pronged policy. On the one hand, it develops domestic patents and standards, challenging international ones. On the other hand, it works within the system, and tries to improve its position within the limitations. In other words, it operates a dichotomous policy of challenging the system both from the outside as from within.<sup>46</sup>

In the patent domain, the State Intellectual Property Office announced in its 'National Patent Development Strategy (2011-2020)' its targets to increase the production of patents to as much as 2 million annually by 2015, a goal

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44 D. Ernst, 'Indigenous Innovation', p. 60

45 D. Ernst, 'Indigenous Innovation', p. 2, 4, 51, quote of state councilor Liu Yandong, p. 4; M. Springut, et al, p. 7

46 D. Ernst, 'Indigenous Innovation', p. v, 2, 4, 5, 21, 51

which has been described by David J. Kappos, Director of the United States Patent and Trademark Office as 'mindblowing'. Policies include the provision of cash bonuses, improved housing for individual filers, and tax breaks for patent producers, as well as more critically perceived practices, such as government procurement and technical standards policies, compulsory licensing of patents, strategic buying of foreign high-tech companies, and improvements of foreign patents.<sup>47</sup>

In the area of standard-setting, a similarly strategic approach is adopted. China views standard setting policies as a means to circumvent high costs licensing and high royalty fees, which have both been eating away at its profit margins. In addition, it helps to protect domestic industries, reduce its dependence on foreign technology and strengthen its bargaining power. China considers standards to be a means to reduce dependence on others and strengthen domestic innovation capabilities. Its differing approach towards standardization is partly enabled by a policy vacuum on standardization policy on the international level, which fails to address even the most basic questions.<sup>48</sup>

China asks its companies not to buy any 'core technologies in key fields that affect the lifeblood of the national economy and national security'. Examples of this are next-generation internet technologies and high-resolution earth observation systems. It attempts to achieve self-sufficiency in the supply of key products, and to leapfrog in key scientific disciplines, for instance, in biotechnology and nanotechnology.<sup>49</sup>

China called on domestic enterprises to formulate standards, in order to protect domestic industry and enable the creation of national leaders of innovation. Huawei and other important innovation frontrunners have succeeded in becoming important international players in standardization. In some industries, China attempts to create domestic standards rivaling international ones.<sup>50</sup>

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47 S. Lohr, 'When Innovation, Too, Is Made in China', *New York Times*, (January 1, 2011), [http://www.nytimes.com/2011/01/02/business/02unboxed.html?\\_r=1](http://www.nytimes.com/2011/01/02/business/02unboxed.html?_r=1), quote D.J. Kappos ; N. Mihalakas; D. Ernst, 'Indigenous Innovation', p. 20; M. Springut, et al, p. 92-94

48 D. Ernst, 'Indigenous Innovation', p. 8, 9, 10, 20, 21, 24, 48, 69, 82, 102, 103

49 D. Ernst, 'Indigenous Innovation', p. 23, 24, quote MLP, p. 24

50 *Idem*, p. 20, 21, 52, 94, 95

### 3.6 LAW ENFORCEMENT

Despite efforts by the Chinese authorities to improve intellectual property rights protection, China continues to suffer from high profile scandals highlighting its weak IPR regime and flawed research culture. A recent government study found over a third of 6000 scientists at six top national institutions admitted to plagiarism or fabrication of results. Another telling example was the Hanxin (China chip) scandal in 2005, in which the renowned engineer Chen Jin bought Motorola chips, scratched off the trademarks, and replaced them with Hanxin symbols, playing into China's urge to become a leader in the semi-conductor chip industry. Many companies are therefore hesitant to outsource core technologies to R&D departments in China, fearing technology theft. In 2010, a survey among US businesses operating in China, showed that 11% rated IP enforcement as totally ineffective, 63% as ineffective, and a small 26% as effective or very effective. In cases of fraud, law enforcement is lacking in strength. Perpetrators, if prosecuted and found guilty, are rarely prevented from starting a career in the same field elsewhere, and seldom face prison.<sup>51</sup>

Espionage abroad continues to take place. US counterintelligence officials assess China to be implicated in corporate espionage at companies such as Google, Motorola, Cisco Systems, General Electric and Siemens. In 27 cases of espionage (accounting for 19% of a total of 140), China was implicated. In July 2010, Motorola saw itself forced to accuse twelve former employees and competitor Huawei of trade secrets theft.<sup>52</sup>

Despite these practices there are signs of improvements on China's side, as China develops to become one of the important patent holders itself. However, 'schmoozing with powerful bureaucrats and their favorite experts' continues to be more important than good research<sup>53</sup>, signaling the real issue pertains to China's research culture, which is as of yet rather unsupportive of open competition on innovation.

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51 J. Qiu, 'Publish or perish in China', *Nature* 463, 142-143 (2010), *Nature* website, (January 12, 2010) <http://www.nature.com/news/2010/100112/full/463142a.html>; M. Springut, et al, p. 33, 71; P. Ford, 'China targets an academic culture of cut-and-paste', *Christian Science Monitor*, (March 23, 2009), <http://www.csmonitor.com/World/Asia-Pacific/2009/0323/p01s01-woap.html>

52 M. Springut, et al, p. 105, 107

53 Y. Shi and Y. Rao, 'China's Research Culture', *Science*, Vol. 329, (September 3, 2010), <http://www.sciencemag.org/content/329/5996/1128.full>

## 4 POLICIES ABROAD

This section focuses on the relationship of China's external policies and its innovation policy. It addresses the degree to which considerations of innovation figure in foreign investment policies as well as in policies on natural resources.

### 4.1 FOREIGN MERGERS AND ACQUISITIONS

Mergers and acquisitions by Chinese firms are on the rise around the world. According to the Heritage Foundation, in the past five years, China's non-bond investment was larger than \$200 billion. In 2010 alone investments rose by 12% to US\$56.5 billion (compared to US\$20.8 in 2006). China's overall direct investment is projected to soar from \$311 billion in 2010 to \$1 trillion in 2020. According to The Heritage Foundation, the majority of these investments went to the Western Hemisphere and West Asia in the 2005-2010 period, with Australia as the single largest receiver at \$34.0 billion. On paper, 63% of outbound investment (2009) was headed towards Hong Kong. However, often Hong Kong functions merely as a station of passage. In addition, many take-overs are managed through third-party managers.<sup>54</sup> Despite the fact that Europe only accounted for \$34.8 billion in non-bond investment in the 2005-2010 period, the value of Chinese European assets has risen by 69% (2009), the largest increase of all regions. Within Europe, Britain was the top receiver at \$8.5 billion in the 2005-2010 period. However, PIIGS states (Portugal, Italy, Ireland, Greece and Spain) now make up over 30% of investments and trade facilitation by Europe, while Central and Eastern European countries account for 10%, a disproportionate to their economic importance.<sup>55</sup>

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54 D. Scissors, 'China's Investment Overseas in 2010', Reuters, (February 7, 2011), <http://blogs.reuters.com/india-expertzone/2011/02/07/chinas-investment-overseas-in-2010/>; F. Godement, et al, p. 5; 'Streaks of Red'

55 D. Scissors; 'Streaks of Red'; F. Godement, et al, p. 2

Mergers and acquisitions are stimulated by official policies, as, for instance, laid down in the 'Implementation Rules for the Plan on Adjusting and Revitalizing the Equipment Manufacturing Industry', which includes passages encouraging enterprises to actively engage in mergers or regrouping of enterprises and research institutes from overseas. In addition, the provision of loans is encouraged, such as the 2009 \$30 billion loan provided by the China Development Bank to China National Petroleum Corp, enabling these enterprises to invest abroad.<sup>56</sup>

Despite the relevant low sums involved, the strategic nature of China's shopping policy is clearly visible, leading a French official to state that '*a real war*' was taking place, pointing out '*it's not capitalism, it's not trade, it's predatory policy*'. The PRC had expressed the goal to acquire assets in agriculture and technology. However, technology continues to occupy a small part of China's investment budget, as companies with oil, gas, and mineral resources receive prominence, and investment in technology, media and telecommunications made up only 7%, industrials 6%, and pharmaceuticals, medical and biotech firms a mere 1% of acquisitions in the period of 2003 to the third quarter of 2009.<sup>57</sup>

Nevertheless, once technological companies are bought, clear choices are made for companies that offer either needed technology or a strong brand name, as was the case with Volvo and Manganese Bronze. A Chinese company attempted to buy Draka, a Dutch company with patents in fibre-optic cables, offering twice its market value, and bidding 20% more than the second, European, bidder. The failed acquisition raised questions on China's support policy for mergers and acquisitions, and further inflamed the debate on the need to set up investment review mechanisms. These investments have had positive side effects for European companies as well. Chinese investments have supported Southern European economies, and deals have opened up the Chinese market for European companies, as was shown in the case of Club Med, which was able to open its first resort in China after an acquisition of a share of ultimately 9.3% by Chinese investment conglomerate Fosun.<sup>58</sup>

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56 M. Springut, et al, p. 94

57 Quoted in F. Godement, et al, p. 8; D. Scissors; M. Springut, et al, p. 93

58 'Streaks of Red'; F. Godement, et al, p. 5



## China's Worldwide Reach

The United States is second to Australia in drawing Chinese non-bond investment.

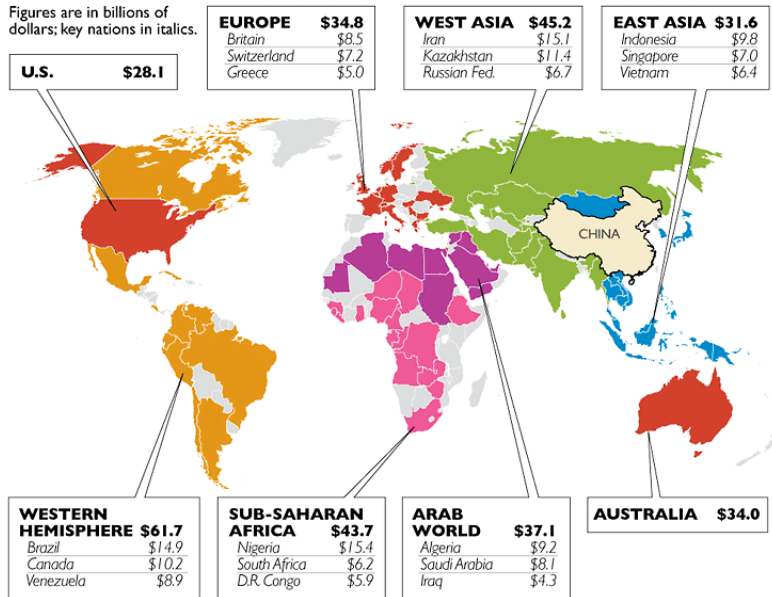


FIGURE 1 'CHINA'S NON-BOND OUTWARD INVESTMENT OVERVIEW', JANUARY 2005-DECEMBER 2010, SOURCE: THE HERITAGE FOUNDATION, D. SCISSORS

In return, mergers and acquisitions by European companies in China also continue to be hampered by government protection of 'strategic sectors', such as air transport, alternative energy and banks, in which foreign stakes are limited to 20% of capital. This exclusion was allowed under the terms of China's accession to the WTO in 2001, when China's economic prowess was considerably smaller. This has led to frustration among European states, complaining of a lack of a level playing field. Meanwhile, China also continues to suffer from barriers against its investments, for instance in the USA, where companies such as Huawei have suffered several instances in which its bids were thwarted by the Committee on Foreign Investments in the United States (CFIUS).<sup>59</sup>

59 F. Godement, et al, p. 6, 7; A. Goldberg and J. Galper, 'Where Huawei Went Wrong in America', Wall Street Journal, (March 3, 2011), <http://online.wsj.com/article/SB10001424052748703559604576175692598333556.html>

## 4.2 NATURAL RESOURCES

China is one of the main drivers in the growing demand for energy, mineral, food, and water resources. Its increasing dependency on foreign powers to satisfy its large demand, in concordance with dwindling domestic supplies, has resulted in policies of resource diplomacy and resource nationalism.<sup>60</sup> China's thirst for resources and its ensuing policies have large implications for both its innovation agenda, as well as its innovation and production capabilities. Moreover, China's policies also influence the ability of other states to innovate.

A booming economy, strong population growth, as well as rapid urbanization and industrialization are swiftly transforming China. Increased economic development in conjunction with shifting consumption patterns causes Chinese demand for natural resources to rise rapidly. China is the main contributor to the rise in global energy demand, as it has taken the top spot as the world's largest individual energy consumer in 2010.<sup>61</sup> China's growing energy requirements have resulted in a large import dependency on foreign energy resources. It is estimated that by 2030 China will import at least 13.1 mb/d of oil, causing its share of imports to rise from 40-50% (2006) to 80%.<sup>62</sup>

A similar picture is visible in mineral resources. In the area of key metals, for instance, China is bound to become the largest consumer of metals in the world. Between 2000 and 2008, China's consumption of key metals such as aluminium, copper, lead, nickel, tin and zinc showed an annual increase of 16.1 %. By comparison, metal demand in the rest of the world rose by less than 1% per year.<sup>63</sup>

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60 G. Gijssbers, S. Roborgh and T. Sweijts, 'The Rise of Asia and Strategic Questions for Europe', TNO and The Hague Centre for Strategic Studies, (2010), The Hague

61 J. Watts, 'China overtakes US as world's biggest energy consumer', *Guardian*, (August 3, 2010), <http://www.guardian.co.uk/environment/2010/aug/03/china-overtakes-us-energy-consumer>

62 Cindy Hurst, 'China's Global Quest for Energy - LCDR', (2007); International Energy Agency (IEA), 'World Energy Outlook 2007. Executive Summary. China and India Insights', p. 7

63 World Bank, 'Global Commodity Markets Review and price Forecast: A Comparison to Global Economic Prospects 2010', (2010), p. 7

In the complex and asymmetric commodities markets this has led to large state involvement. In energy supply for instance, China has adopted policies that pertain to the protection of the domestic energy market through trade restrictions, subsidized domestic consumption and special treatment for companies such as CNPC/PetroChina, Sinopec, and CNOOC. In addition, it systematically invests in R&D to decrease dependency on foreign supplies, for instance in technologies such as deep sea drilling and green technology. In 2010, it was the world's largest investor in clean energy.<sup>64</sup>

Internationally, China has adopted a policy of resource diplomacy in natural resources. China has become a frontrunner in the control and development of the entire resource supply chain. Drilling rights are often coupled with infrastructural developments and can be considered as mutually reinforcing, for example in the building of pipelines to Kazakhstan and Turkmenistan. The building of energy transport infrastructure often leads to competition with other Asian states, as was the case with Japan and China on the building of a Russian pipeline to the east, resulting in the September 2005 agreement on the Russia-Daqing pipeline.<sup>65</sup>

China's successful energy diplomacy is sustained by large outbound FDI streams 'Equity participation' plays an important role in its resource diplomacy, as China combines its energy relationship with other interests. In its efforts, China's approach of non-conditionality trumps Europe's approach of conditionality. It is not hindered by international norms, when it comes to choosing its international energy suppliers, allowing it to offer a less interventionist deal and circumvent international agreements such as ILSA, which forbids striking deals with energy suppliers like Iran. China was for example able to secure a 30 year energy deal between Sinopec and Iran.<sup>66</sup>

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64 International Energy Agency (IEA), p. 10; F. Yan and K. Wills, 'China raises bar for fuel-saving car subsidies', Reuters, (September 15, 2011), <http://www.reuters.com/article/2011/09/16/us-china-auto-subsidies-idUSTRE78FOE720110916>; Y. Korniyenko and T. Sakatsume, 'Chinese investment in the transition countries,' European Bank for Reconstruction and Development, (January 2009), <http://www.ebrd.com/pubs/econo/wp0107.pdf>. p. 16; Y. Lu, 'Science & Technology in China: A Roadmap to 2050. Strategic General Report of the Chinese Academy of Sciences', Chinese Academy of Sciences, (2010); J. Melik, 'China leads world in green energy investment', BBC, (September 15, 2011), <http://www.bbc.co.uk/news/business-14201939>

65 C. Hurst, p. 6, 11

66 Idem, p. 7, 16, 17

Meanwhile, China has embarked on a policy of resource nationalism when it comes to its own reserves. It currently holds one of the top ten reserves in minerals such as bauxite, iron ore, copper, gold, diamonds and coal, and REEs (Rare Earth Elements). The government protects the national mineral extraction industry by establishing domestic supplier preference mechanisms and through the installment of non-tariff barriers. Furthermore, preferential supply of minerals to domestic industries, and the installment of export quota and export duties must prevent the increase of foreign influence. This approach is visible in the export policy on REEs, in which China seeks to secure control and future access to these minerals, as well as increase its leverage over downstream industries. Chinese export policies on REEs have, for instance, resulted in immediate shortages in importing nations, such as Japan. REEs are a crucial component in many innovative industries, among which green technologies (e.g. hybrid cars), and the opto-electronic industry (e.g. lasers). Since China accounts for 97% of the world's REE mining, any adjustment in policy, such as the recent export caps announced in August 2011, may result in shockwaves on the commodity markets. Increasing export restrictions on Chinese REEs to Japan, the US, and Europe have led to a deterioration in trade relations.<sup>67</sup>

Also, in the domain of water and food supply, where scarcity is on the rise, China is an important player on the regional level. China harbors approximately 20% of the global population, but holds access to only 7% of global water resources, and therefore has trouble meeting its water needs. Moreover, 70% of all Chinese rivers are polluted, harming water and food supply and leading to social unrest. China controls the Tibetan Plateau, where more than half of the drinking water for 40% of the world's

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67 World Economic Forum, 'Mining & Metals Scenarios to 2030', Geneva: World Economic Forum, (2010), p. 10; The Hague Centre for Strategic Studies, 'Scarcity of Minerals: A strategic security issue,' No. 2 (2009), p. 9, 63; . Yang, (2011): Resource Scarcity & Green Technology - China and Europe: cooperation? China and Europe: competition and cooperation in innovation, The Hague, <http://www.strategyandchange.nl/wp-content/uploads/2011/04/Yongxiang-Yang.pdf>; United Nations Environment Programme (2011): Green Economy Vulnerable to Rare Earth Minerals Shortages. [online], United Nations Environment Programme (UNEP), <[http://na.unep.net/geas/science/alert\\_2011\\_01.php](http://na.unep.net/geas/science/alert_2011_01.php)>; C. Isidore, (2010): Global trade wars: China turns up the heat. CNN Money, (October 21, 2010), [http://money.cnn.com/2010/10/21/news/international/china\\_rare\\_earth\\_dispute/index.htm](http://money.cnn.com/2010/10/21/news/international/china_rare_earth_dispute/index.htm)

population originates, and where rivers such as the Indus, Ganges, Mekong, and Yangtze spring. However, its endeavors to secure water supply through the re-routing of rivers and the building of dams has led to political contention with neighboring states, particularly India.<sup>68</sup>

In addition, population growth, increasing demand for bio fuels, and the shift towards more land and water intensive food products have led to an overall increase in food demand in China. Despite a 5% decrease in undernourishment, still over 127 million Chinese were undernourished in 2006. Moreover, China continues to suffer from food safety scares, such as the 2008 Chinese milk scandal, when 300.000 Chinese children fell ill due to the presence of melamine in milk.<sup>69</sup> Scarcity of (qualitative) water and food resources has proven to be an important source of anger among the population, resulting in civil protests against government policies and institutions. Partly because of this destabilizing effect, as well as the economic growth potential of sectors such as agrifood and water, innovation in these areas figures in Chinese innovation planning.<sup>70</sup>

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68 J. Yardley, 'Beneath Booming Cities, China's Future is Drying Up', *New York Times*, (September 28, 2007), <http://www.nytimes.com/2007/09/28/world/asia/28water.html?pagewanted=all>; Xinhua News Agency, '70% of rivers, lakes polluted in China', *People's Daily*, (November 24, 2005), [http://english.peopledaily.com.cn/200511/24/eng20051124\\_223630.html](http://english.peopledaily.com.cn/200511/24/eng20051124_223630.html); A Chinese filmmaker in 'Water on the Tibetan Plateau - Ecological and Strategic Implications for the Region' - Roundtable with His Holiness the Dalai Lama' *The Hague Centre for Strategic Studies* (2009), p. 13

69 Katie Allen, 'Food prices to rise by up to 40% over next decade, UN report warns', *Guardian*, (June 15, 2010), <http://www.guardian.co.uk/business/2010/jun/15/food-prices-rise-un-report>; ANP, 'Bijna 300.000 Chinese kinderen ziek door melamine', *NRC Handelsblad*, (December 1, 2008), [http://www.nrc.nl/buitenland/article2078960.ece/Bijna\\_300.000\\_Chinese\\_kinderen\\_ziek\\_door\\_melamine](http://www.nrc.nl/buitenland/article2078960.ece/Bijna_300.000_Chinese_kinderen_ziek_door_melamine); ANP, 'Europees verbod op Chinese melkpoederproducten', *NRC Handelsblad*, (September 25, 2008), [http://www.nrc.nl/europa/article1997870.ece/Europees\\_verbod\\_op\\_Chinese\\_melkpoederproducten](http://www.nrc.nl/europa/article1997870.ece/Europees_verbod_op_Chinese_melkpoederproducten)

70 Xinhua News Agency, 'China urges farming innovation', *China.org.cn*, (February 2, 2012), [http://www.china.org.cn/china/2012-02/02/content\\_24527738.htm](http://www.china.org.cn/china/2012-02/02/content_24527738.htm)

## 5 CONCLUSION: THE STRATEGIC NATURE OF INNOVATION

This paper has highlighted how China considers its innovation policy as crucial to its overall economic, social and political development. In addition, it has analyzed how innovation policies and other domestic as well as international policies are aligned to improve China's overall position.

China's practical innovation policies and the vision behind its innovation strategy are strongly influenced by certain perceptions both in China and abroad, as to the importance of innovation within China's development, and the prominence of China has regained on the global level. China's activities in the field of technology and connected realms such as finances, investments, trade and resource diplomacy are perceived to be strategic moves. The perception of China's innovation policies as a strategic instrument is strengthened by four elements, laid down below.

### 5.1 INNOVATION TAKES CENTER STAGE IN CHINESE POLICY MAKING

First, the unparalleled centrality of innovation, particularly technological innovation, in China's economic development, which is widely regarded as the number one driver for economic prosperity,<sup>71</sup> Innovation is perceived as a driver of economic development, an instrument to solve societal problems and an instrument for China to gain its rightful place in the global political, economic and military system.

This increased centrality of innovation in China's development strategy sets it apart from the way innovation is perceived in the West. Much more

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71 H. Jianguo, 'China and Europe: Cooperation and Competition', presentation at the conference China and Europe: competition and cooperation in innovation, The Hague, the Netherlands, <http://www.strategyandchange.nl/wp-content/uploads/2011/04/Han-Jianguo.pdf>

than an enabler of economic growth, China regards innovation as both the primary driver and the instrument of choice to reach economic prosperity. Hu Jintao, China's president, and himself an engineer, underlined this message by stating in 2010 that 'a nation's technological competitiveness determines its place and future'. Unsurprisingly, China's recently published Twelfth 12th FYP emphasized its desire to become an 'innovation-oriented society' by 2020, and underlined innovation as a way to 'rejuvenate China through science and technology, and reinvigorate China through human resource development'.<sup>72</sup>

Innovation is seen as a necessary step towards a more harmonious society, a force that should assist in creating an 'overall well-off society' by 2020. Despite large economic growth rates, China suffers from ever increasing disparities between regions and growing social unrest driven by increasing civil assertiveness. Moreover, innovation is regarded as a means to tackle substantial challenges to China's stability including, aging, climate change and resource scarcity.<sup>73</sup>

The centrality of innovation for its economic development has resulted in a comprehensive policy approach in which its innovation policy is dispersed through a plethora of policy areas, ranging from foreign economic policy, foreign policy and security policy to foreign trade policies. China's innovation takes center stage in its economic growth model, often referred to as 'Beijing Consensus' as coined by Joshua Ramo. This approach is characterized by state-orchestrated economic liberalization and an authoritarian political system. This is a policy approach aimed at controlling resources, establishing and supporting state-owned and state-run enterprises, a mercantilist export policy, protectionism of the internal market and a nationalistic innovation

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72 M. Springut, et al, p. 11 (quote Hu Jintao, p. 11); 'OECD Review of Innovation Policy - China - Synthesis Report', OECD website, (2007), <http://www.oecd.org/dataoecd/54/20/39177453.pdf>, p. 17; H. Jianguo

73 S. Roach, 'China's 12th Five-Year Plan: Strategy vs. Tactics', Morgan Stanley website, (April, 2011), [http://www.morganstanley.com/im/emailers/inst/pdf/China\\_12th\\_Five\\_Year\\_Plan.pdf](http://www.morganstanley.com/im/emailers/inst/pdf/China_12th_Five_Year_Plan.pdf), p. 3; H. Jianguo; L. Keqiang, 'Seeking common development', China Daily, (January 11, 2011), [http://www.chinadaily.com.cn/opinion/2011-01/11/content\\_11823297.htm](http://www.chinadaily.com.cn/opinion/2011-01/11/content_11823297.htm); Freedom House, 'China - Freedom in the World 2011', Freedom House website, (2011), <http://www.freedomhouse.org/report/freedom-world/2011/china>

culture.<sup>74</sup> China is posing a competitive challenge to the West in the area of innovation, sub areas such as intellectual property right protection and standardization, and connected areas such as foreign direct investment, resource nationalism and an assertive resource diplomacy abroad.

## 5.2 PERCEPTIONS OF CHINA AS A RISING GLOBAL POLITICAL AND ECONOMIC POWER

Due to the sheer size of its economy, China will be an important player in the development of any global innovation networks. The developmental nature of China's economy, as is often reasoned domestically, would entitle it to particular exceptions on international regulations, which would allow it to catch up more quickly. Abroad, the picture is very different. International perceptions consider China as a developed state that is sometimes nothing short of an economic predator, and that needs to step up its game as a global power and the level of responsibility attached to this. Such differing perceptions are often framed, as was visible in the statements of Li Ruogu, chairman and president of the Export-Import Bank of China, as a 'competition for dominance in global economic development', more specifically, a debate on 'which country and what kind of concept should take the leading role in global economic growth'. Moreover, it is not just a competition between China and the world, it is about the 'defense of development rights and competition for a leading role in development between the developing and the developed world.'<sup>75</sup>

## 5.3 PERCEPTIONS OF HINDRANCES TO CHINESE DEVELOPMENT

In China, the view is taking hold of Western hindrances to Chinese technological development in several specific innovation policy realms, such as the international patent system and standard setting procedures. The aforementioned Li Ruogu, for instance, argues that 'China is justified in

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74 M. Springut, et al, p. 23; J. Ramo, 'The Beijing Consensus', The Foreign Policy Center, (May, 2004), <http://fpc.org.uk/fsblob/244.pdf>

75 D. Bosco, 'Who's a "developing country"? You'd be surprised', Foreign Policy, (February 18, 2011), [http://bosco.foreignpolicy.com/posts/2011/02/16/whos\\_a\\_developing\\_country\\_you\\_d\\_be\\_surprised](http://bosco.foreignpolicy.com/posts/2011/02/16/whos_a_developing_country_you_d_be_surprised); Quotes from L. Ruogu, 'West should embrace competition', China Daily, (January 11, 2011), [http://www.chinadaily.com.cn/opinion/2011-01/11/content\\_11829673.htm](http://www.chinadaily.com.cn/opinion/2011-01/11/content_11829673.htm)



defending its rights and adopting further measures to support innovation', pointing at the fact that 'in a market where fair competition is not guaranteed, reasonable interventions, including policy financing' should be allowed.<sup>76</sup>

#### **5.4 PERCEPTIONS THAT CHINA'S RISE WILL HURT WESTERN INTERESTS**

Strategic Chinese export caps of raw materials, resource acquisition, FDI policies, forced technology transfers and flawed intellectual property protection system are perceived by some in the West as harming Western economies and innovation systems. A strong notion has taken hold of China as a strategically driven nation, exploiting the West's current economic weaknesses in a bid to gain economic and technological prominence at its expense.<sup>77</sup>

Sparse data and a lack of transparency in China's decision making on innovation policy has increased apprehension and has obstructed the ability of various Western states to properly assess China's endeavors, both on a technological and an economic level. This has led, for instance, American commentators to describe Chinese policies as a 'trade-distorting ploy to challenge American supremacy in global knowledge economy'. Despite these challenges, cooperation is considered necessary by policymakers on all sides in order to tackle shared challenges, such as aging and resource scarcity. Moreover, the modern international nature of innovation, which has to deal with challenges of increased complexity, rising costs and highly specific skill sets requires cooperation.<sup>78</sup>

#### **5.5 FINAL REMARKS**

Innovation is increasingly becoming a pawn in the geostrategic play for dominance between the West, specifically the United States, Europe, and China. Western perceptions of the strategic nature of China's policy making on innovation and Chinese views of the politicization of the international innovation system, some more justified than others, cloud a more objective view of Chinese innovation activities and increase the perception of

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76 D. Ernst, 'Indigenous Innovation', p. 4; quotes from L. Ruogu

77 F. Godement, et al.

78 Quote in D. Ernst, 'Indigenous Innovation', p. 2-3; H. Jianguo; D. Ernst, 'Outsourcing of Innovation'

innovation as a geopolitical instrument to gain economic, technological and military supremacy. Although increased awareness of Chinese innovation policies may take away some of the fears of the West, it should not hamper increased technological cooperation, from which both Western and Chinese business and society at large could benefit.

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