China: a bird's-eye view

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The Economic Warfare School in Paris and the Japan University of Economics in Tokyo decided in 2012 to bring together their own academic background to realize a study on China. The objective of this one-year analysis is a better understanding of how China organizes its policy for building a global power in the geopolitical, economic and military fields. This French-Japanese research on China is a unique experience that does not know anything similar yet. It leans on Japanese teachers' renowned knowledge of Chinese environment and on French authors' information management analysis.

To learn everything from China

Bernard Carayon

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The success of the Chinese model depends on a crossroad where the logic of a state, incarnated by the Communist Party, meets capitalist needs, power and profits, and the quest for sovereignty and wealth, both in the collective sense as well as that of its principal actors...

In just 25 years, China has moved, from, what Christian Harbulot very appropriately calls "The Industrial Middle Ages", and has become the second most powerful economy in the World.

Alain Peyrefitte's book[1], was premonitory: China has become an alternative model, sui generis, which has nothing more to learn from the vagaries of Western policies on Competitive and Strategic Intelligence.

Buoyed by a political power whose institutional, legal, technological and financial means know no boundaries – neither democratic nor material – China's policies on Competitive and Strategic Intelligence provide a strategy for power for a State and its companies through almost every imaginable means: identifying and protecting strategic sectors, providing them with an army of hackers and particularly as a part of the PLA[2], legal and jurisdictional interlocks over markets, highly regulated access to the capital of national enterprises, comprehensive strategies for harnessing technology, systematically encouraging counterfeit, commanding instability in the national jurisdiction environment in order to weaken competing foreign companies and sending massive number of students to the best

[1] Peyrefitte, A 1973, *Quand la Chine s'éveillera… Le monde tremblera*, Fayard, Paris, France.
[2] People's Liberation Army.

universities in the world. China, for some years now, has no more lessons it can learn from the West, nor is it dependent on the latter.

Its universities and research institutes have achieved the highest international levels. Its sovereign fund, the China Investment Corporation (CIC), is worth 410 billion euros. Even after re-evaluation, its currency remains highly competitive against the Dollar and the Euro. In 2012 [3], the number of patents submitted in China (560 681), by resident Chinese, surpassed the figures in the USA (460 276) and it is developing its own models to rank universities (Shanghai Ranking) as well as the world of finance (Dagong).

China has surreptitiously undertaken “the colonisation” of Africa, much with nods from most of the leaders of the continent, where it has dug into essentially the global reserves in rare earth minerals and thereby calling all the shots in this strategic market. Its out-dated diplomacy has turned offensive, and as a consequence, China sees its naval environment as trading outposts. At the same time, China is inching closer to Russia for a common exploration programme into the mineral and energy Eldorado of Eastern Siberia. And by orchestrating a concert on common interest, it is building large-scale public infrastructure projects in other developing countries.

Having developed a substitute [4] for Internet, China, like the USA for the past 40 years, is working on a public policy on standards. On a similar note, it had found an alibi for imposing its “standards” when it joined in WTO in 2001 and when it joins the OECD in the future.

The growth of the Chinese model gets rid of Western ethics with success and cynicism. Corruption is rampant among public and private players (even though some political arrests tend to change the scenario), social, environmental and human-rights constraints [5] are disregarded. Although in a communist regime the societal question is of secondary importance, there is a mature public opinion in China, armed with an appetite for consumption, structured by constantly improving social networks and enlivened by Chinese students who

[3] World Intellectual Property Organisation 2013, *World Intellectual Property Indicators - Highlights*, p. 6, http://www.wipo.int/export/sites/www/ipstats/en/wipi/2013/pdf/wipo_pub_941_2013_highlights.pdf

[4] All physical infrastructure and software used there depend on state run groups, such as Huawei and ZTE. This allows Chinese authorities to control their use by their citizens.

[5] For example, in early 2012, Apple had to defend itself over reports of exploitation of Chinese employees by its sub-contractor, Foxconn. The abuses were revealed by the NGO Fair Labor Association.

have studied abroad and are returning home. Social conflicts, often hushed up by force, are being taken up increasingly by NGOs and the Western media. China's population is ageing, its economic growth is slowing and the competitiveness of its industry is falling amid rising salaries.

This is undoubtedly the moment for China, from whom we have so much to learn, to seek inspiration in the Western model… of humanising capitalism.

What reading grid to study China?

Christian Harbulot

Head of the School of economic warfare (Ecole de guerre économique, www.ege.fr) and international expert in competitive intelligence, Christian Harbulot has been performing research on global strategies and economic competition for over 25 years.In 1990, his work "Pro-active stance and economic warfare" drew Edith Cresson's attention. She was then the French Prime Minister and thereby appointed him as chief adviser of the Plan General Commissioner Henri Martre.With Philippe Baumard and Philippe Clerc together, Christian Harbulot wrote the landmark report on competitive intelligence for France. He subsequently became Executive Director of INTELCO, a subsidy of Défense Conseil International, for which he designed seminars and operational concepts on competitive intelligence.After noting the gaps French firms had in global strategies and business intelligence, Harbulot, with General Pichot-Duclos, founded the the School of economic warfare in 1997.

Since the late 1990s, many studies have been published on China. Most of them come from international institutions that analyze this country in the well-defined framework of a monocultural approach and generally in an economical, historical and political point of view.

These studies do not allow to fully understand how China has gone, in a quarter century, from an industrial "Middle Age" to the world second economy. The conventional economic standards are not sufficient to explain such a fast progression. Therefore it seems indispensable to use a broader analysis scope through other frames of reference.

The links between sovereignty and economy

To understand China's change, it is necessary's to consider some past examples that have perhaps served to Republic of the People, not as a paragon, but as a study case in order to resolve the core problem: how to fill the gap of a lingering economy hit by a lack of power. The Japanese model is particularly illustrative on this issue.

Set up after a long period of isolationism (1641 - 1853), the reform policy which was initiated by the Emperor Mutsuhito cannot be separated from the fear of being colonized by states of the Western world. This will of independence preservation is one of the determining factors in the rise of the country on the international scene during the twentieth century.

Weakened militarily in technical terms for centuries while withdrawing on itself, the Empire of the Rising Sun had several challenges:

- the development of an industrial and port infrastructure to modernize its army and its navy,
- the transformation of the organization of society (revaluation of the role of retailers in relation to the peasantry),
- the creation of a sphere of influence in Asia.

To compensate for their lag behind European industrial revolutions, the Japanese had to seek some of the knowledge needed for development beyond their borders. This particular approach is thereat symbolized by the slogan “rich country, strong army”. This objective implied the creation of a defense economy in the broadest sense (military and civilian ship-building, port facilities, modern weapons factories, transport logistics, energy). The mobilization of private entrepreneurs was deliberately focused on the development of foreign trade in order to create the foundations of a competitive market economy.

The shortcuts policy

To reach this goal, Japan had to catch up in most industrial areas. The recovery was possible only by creating shortcuts. Priorities of national interest (marine, ports, defense industries), needed to independence preservation, and required a quick refresher of knowledge compared to the most advanced nations seen as a potential threat. Catching up with Western economies became possible through what is called a shortcut practice that means obtaining the highest level of technical knowledge developed by countries in industrialization process. By using such a tricky scheme, Japan merely reproduced a method initiated in the West at the beginning of industrial revolution era, either to upgrade factories, or to break arm’s length.

The shortcut practice was inducted in France in the aftermath of the Revolution. The revolutionary wars had slowed the country’s economic development and limited investment in research. Napoleon allowed offensive steps to reduce the backlog on the British manufactures. The shortcuts covered illegal practices like machines clandestine import or stolen

inventions and legal practices in the form of astonishment reports on British industrial and commercial practices. At the same time, the French government reinforced customs barriers in order to slow down an internal market invasion with more competitive products from the other side of the Channel.

The discovery of the spinning machine in cotton-mill gave English textile factories a large competitive advantage at the beginning of the Industrial Revolution. The interest aroused by this invention spurred them to forbid its export so that their leadership position would be kept up. Southern states cotton farmers in the Union decided to seize by all means this new manufacturing process to make worthwhile the raw cotton theretofore shipped to England. Another type of shortcut, the brain drain [6], allowed Americans to break the English cotton industry technological monopoly in the early nineteenth century.

In Japan, the use of shortcuts is reflected by optimizing the collection of all-round information. The creation of industrial activities based in part on the transfer of technical knowledge between the Western industrial countries identified by their Japanese counterparts as well as looking for ideas to take from centers of excellence in industrial production abroad. Such an approach is identifiable only if placed in the context of power ratio between Great Powers. Researchers and Westerner experts are used to analyze situations based on parameters resulting from a relatively self-centered History perception. Colonization [7] was not perceived as an act of economic warfare in its own but as a natural extension of exchanges globalism process initiated by the discovery of “new worlds”. On the contrary, the Japanese reading of historical realities is significantly different. This difference in perception is the source of many ambiguities and misunderstandings that strongly affect the comprehension of the strategies of States in relation to the markets evolution. It emerges from this observation a trend among academic circles to deny or underestimate the importance and influence of power increase policies in the evolution of international relations.

[6] Emigration to the United States of an english textile technician is responsible for the reconstruction and the copy of the weave machine by U.S. manufacturers.

[7] Harbulot C 2012, “The study of economic warfare and related issues”, in *La inteligencia economica en in mundo globalizado*, Instituto Español de Estudios Estratégicos 2013, CESEDEN, Madrid.

The power increase through economy

In a different context from Japan, the development of contemporary China is in line with this problematic of political shortcuts whose purpose is to ensure the sustainability of a system opposed to the Western system. Since the establishment of the People's Republic in 1949, the strategy of the Chinese Communist Party leaders has been conditioned by their constant wrestling with the capitalist world. The development of the Chinese economy was designed according to criteria of socialist planning. There was therefore no question of competition between market economies, but of complementarity between socialist type economies. If the collapse of the USSR has questioned this differentiation in development mode, it didn't make disappear the geopolitical struggle between China and the United States. China remains a military and economic potential risk to the United States and vice versa.

To catch up with the industrialized countries, Communist China had no choice but to follow a path parallel to the road taken by Japan in the Meiji era. The transition to a market economy has forced the country to take shortcuts through the transfer of technology and knowledge uptakes [8] in industrialized countries. The maneuver execution speed (a century for Japan, thirty years for China) emphasizes the intensity of the Chinese approach which is comparable to Japanese and Korean approaches inasmuch as the development will is inseparable from a political vision of power. In the case of Japan (Meiji era), the shortcuts policy came in support of a desire to preserve independence. In the case of South Korea (post Korean War), it was part of the prospect of playing field and overcoming North Korea. In the case of China, the challenge was twofold: to change the economic model and reach the highest level of the world economy. The common point of these three approaches is the priority given to the conquest of external markets thereby piling up wealth in order to consolidate military bases and geopolitical power. In all three cases, the shortcuts policy was articulated with protectionist measures. For example in the case of China, the acquisition of local companies by foreign companies is subject to a mechanism that requires the approbation of the authorities and the communication about these foreign takeover projects to the Chinese competitors.

[8] Van Hoecke MP 2013, "Knowledge captations by companies in China", *Revue Stratégie et Sécurité*.

The doctrine of peaceful development

This shortcuts policy has been claimed by Japan in the preamble to its constitution which states that knowledge has to be sought beyond the borders as articulated in the fifth article of the Charter Oath, enacted in Japan at Emperor Meiji's enthronement on April 7, 1868: "Knowledge shall be sought throughout the world in order to strengthen imperial rule".

China tried to subtly get some profit from knowledge and innovation in industrialized countries that are ahead of the others, without, however, showing up the principle. The White Paper [9] titled "China's Peaceful Development" promotes a soothing speech while displaying a clearly expressed intention to play a major role on the international scene. This opening policy by optimizing foreign investment and attracting qualified personnel, answers to the rate of power increase driven by Beijing's economy for the last thirty years.

The opening on the world is conditioned by China's overall policy three major fundamentals:

- The will of independence.
- The defense of its national interests.
- The conditions of access to external energy resources.

In terms of technological development, China has chosen the investment path from abroad into its territory, unlike Japan, which had a long restricted access to its economy for foreign capital. This distinction is explained both by politico-historical differences and potential discrepancies (area, population and infrastructure). Trends in financial and military realms belong to the very chief principle. China wants to become a major global financial center. This ambition is contradicted by the recurring debate about an under evaluated Chinese currency. In the same vein, the diplomatic discourse on the search for harmony between peoples is offset by the revaluation of military power [10].

[9] Publication published in October 2011 by the Information Office of the State Council of China Affairs. This paper presents the development plan of China for the next ten years, its foreign policy principles, historical and economic contexts, social realities and changes to be made, as well as the global influence it wishes to exercise.

[10] The Chinese People's Army continues its modernization program. According to the Pentagon, the military budget of China could reach $238 billion by 2015, roughly double of 2011's.

If Japanese and Chinese development models are fundamentally different, there is a certain parallelism between their power increase policies through economy that is well summarized by the comparison of Meiji era Japan's slogan ("A rich country, a strong army") with China's current ("Only power can protect peace").

I Problems with the economic development and ancient regime

The development in China has been called for basically from two aspects and China has enforced several measures since having determined enforcement of the Reform and Opening Up policy in The Third Plenary Session of the 11th Communist Party of China Central Committee in December, 1978. In other words, one is the aspect of movement from a developing country to a fairly-developed country/developed country and the other is the aspect called economies in transition with the introduction of the market economy system to a socialist system. While being accompanied by various “fluctuations” in the interval of the demand from two sides, China has been doing it rapidly and accomplished dramatic development in utilizing the one-party rule system by the Chinese Communist Party to the full.

As is generally known, the essence of the Reform and Opening Up policy is the introduction of the market economy system to the socialist system. In the enforcement process, the reform for systems under the ancient regime is carried out and they have been working on construction of many new systems, maintenance of the law, system administration.

However, because China has done it rapidly and in dramatic ways, now many problems are being realized both inside and outside the country, and it is not an exaggeration to say that China itself is now standing at a big crossroads.

Therefore this chapter will, at first from the point of view of new system construction, the maintenance of law and the system administration with the economic development mentioned above, develop an argument about two themes shown below.

In Section 1, Mr. Morimitsu develops an argument about government procurement in the future in China, particularly defense procurement. Specifically, after having developed an argument about directionality and the potential role of administrative accounting information based on knowledge from government procurement in other foreign countries, in conclusion he posits that it is possible that consideration of the administrative accounting information should be regarded as an important examination item in national defense procurement

in China henceforth.

Next, in Section 2, Ms. Jin develops an argument about various problems of the company law that was established in 1993, undergoing a big revision and modification in 2005 after enforcement of the Reform and Opening Up policy in China after having examined the establishment process and characteristics of contents. For example, because it was established during a short period of time there is endemic confusion on the occasion of specific operations since it is based upon theory and not practice, and lacking in detailed regulations for enforcement.

Furthermore among the actual problems mentioned above, from the point of view of the certain long-standing arrangements based upon what it is not an exaggeration to call a socialist system even if it can be said that it is increasingly outdated in recent years, we take a close-up view of two domestic issues and improve and develop an argument about two themes shown below.

In Section 3, Mr. Yasugi will present an overview of the Chinese constitution that is the key for political stability in China, followed by a summary of the historical context and functions of the “leader,” “work unit,” “personal archive,” and “household registry” systems, together with an examination of how they have changed. He will also consider the potential for these systems to continue to function as a structure for social control.

Finally, in Section 4, Mr. Tada develops an argument about the stock circulation issues as symbolized by the existence of a circulation share and a non-circulating share which has been a longtime pending issue in the Chinese economy; especially with regards to the stock market, he illlustrates measures in detail related to the stock circulation reform. By indicating the point where the big change is not taking place in the actual situation, he creates an introduction to the problems of moving to a market-oriented economy in China.

1 Development of Chinese Government Procurement: the Direction and Potential Roles of Management Accounting

Takahiro Morimitsu

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Introduction

Governments and public sectors make numerous contracts as independent economic bodies to fulfill their missions. These contracts are called “public contracts”. They include contracts of construction, entrustments of operations, and selling of properties and so on. In these contracts, contracts whereby governments and public sectors purchase goods and services are called “government procurement” or “public works procurement”, further, they account for a large proportion of public contracts

Items which are procured by government procurement include a lot of categories, for example, public works such as roads, airports, railroads, water and sewage, aquatic resources, defense. In other words, they include everything that maintains the bread and butter of the nation with public money.

Public money spent for government procurement is the taxes that are gathered by the nation, and they are finite resources. Therefore, implementation of efficient procurement and achievement of value for money (VFM) are the duties imposed on governments and public sectors.

It is notable that defense procurement can be seen as the encapsulation of government

procurement because it buys all manner of equipment, goods and services (from warships to grass-cutting equipment, medicine to consultancy services, food and fuel…), it is an excellent example of how a major public sector organization can recognize, adopt, adapt, and develop new ideas and concepts within a rule-bounded environment, and produce considerable savings in respect of value for money on behalf on the taxpayer (Baily & al. 2008).

Based on this view, this section argues about the development of Chinese government procurement, especially defense procurement with the implications from foreign countries concerning the direction and potential roles of management accounting.

The implications of the research focusing on defense procurement seem to contribute to developments in other areas of government procurement. Therefore, in the government procurement, this section focuses mainly on defense procurement.

The Current Situation in Defense Procurement

By the end of the Cold War Era, substantial changes have been brought to defense procurement all over the world. For example, in the United States, in response to the changes in the international environment, and the threats to U.S. interests, U.S. national security and military strategy have immensely changed (Larson & al. 2001). In addition, there is a long-term restructuring of the defense industry in the UK (Boyce 2000).

In these arguments, the condition commonly suggested is that the substantial reductions were made in the defense budget in most governments all over the world. Furthermore, this condition was salient in the Western countries. Therefore, many governments have claimed that they have to implement government procurement, especially defense procurement, efficiently and effectively with a limited budget. For efficient and effective defense procurement, governments prepared numerous challenges, such as organizational reforms (Boyce 2000, McDonough 2005), revising contracting arrangements (Przemieniecki 1993, Kapstein & Oudot 2009) and so on.

However, procurement can’t be completed only within governments, because, generally governments do not maintain the manufacturing capacity by themselves, so that they have

to buy goods and services from the outside to fulfill their missions. Thus there are a lot of stakeholders around them, for example, prime contractors and their suppliers as the manufacturer of the goods and services, the Board of Audit as the auditor of contracts, and nations as the taxpayer.

In government procurement, traditionally sealed bidding has been favored by government as the purest embodiment of the ideal of free and open competition. Putting a set of specifications out to sealed bid and automatically awarding the contract to the lowest bidder may be viewed by some as the perfect way to introduce businesslike practices into government. But it is virtually unknown in the business world itself (Kelman 1990, p. 62).

In the private sector, companies have learned the advantages of developing informal long-term relationships to get the most value from vendors. Most firms have, thus, shifted their focus from competitive bidding to building long-standing and stable relationships with their counterparts (McMillan 1990, Richardson 1993), and various forms of collaborative interactions between buyer and supplier (e.g., joint venture, strategic alliance) have been discussed and promoted (Kogut 1988, Burdett 1992, Vollman and Cordon, 1998). In this context, the concept of “partnering” has been discussed and developed. Such relationships increase the incentives for vendors to perform well and to provide technical assistance. Free and open competition is likely to diminish the value created by relationships (Kelman 1990, p. 62).

Such aspect is particularly notable in defense procurement items with a tendency towards having high complexity, and therefore the construction of closer relations between government as the buyer and industry as the manufacturer is a very important requirement in effective procurement.

Almost as if in response to this private sector development, the term “partnering” became frequently used in defense procurement. For example, since the mid-1990s, “partnering” has been used as a template for the development of the UK public procurement policy (Erridge 1996, Erridge & Greer 2002, Nishiguchi 2007). The national defense budget for each country (particularly Western developed countries), has shown repeated increase and decrease with various factors. But in the situation where efficient and effective procurement

is demanded, even now much reform is enforced assuming cooperative relations with the industry.

The Situation in Chinese Defense Procurement

But, in China, the situation does not correspond to the trend in most countries. In recent years, the defense budget in China is increasing, and there are few such countries in the world.

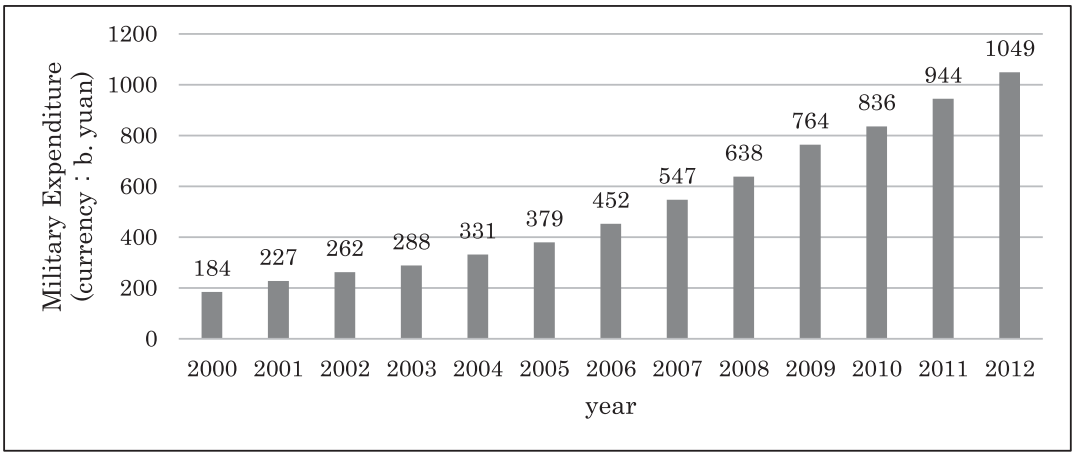

figure I-1-1; Change in the recent military expenditure of China

SIPRI (2013)

Lately the military spending of China has shown a tendency to explosively increase as I understand it from this figure, and such a country is almost unique worldwide. For reference, I illustrate the changes in the defense expenditure of Japan of the same period as follows.

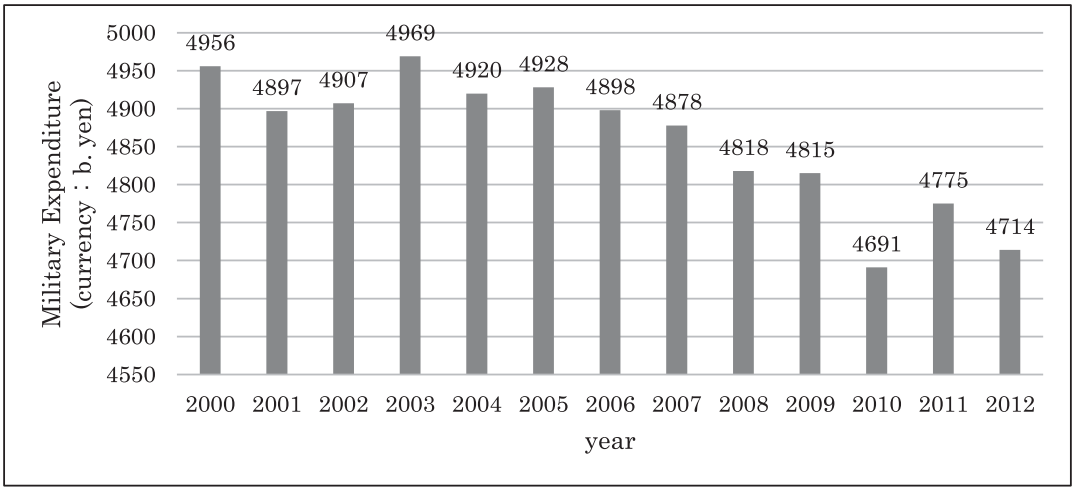

figure I-1-2; Change in the recent military expenditure of Japan

SIPRI (2013)

However, China may not continue escalating the national defense budget as it is. Though, the rapid expansion of the national defense expenditure of China depended on the rapid growth of the GDP, in recent years the slowdown of the growth rate of this GDP has been pointed out already (IMF 2013).

In addition, the influence of low birthrate and aging in China can not be avoided in future. I would suggest that the economic growth of China will come to a deadlock from these factors sometime soon. Therefore, it is apparent that the defense procurement tracing the course of the expansion current, will require effectiveness and efficiency. The thing that will play an important role in future under such situation is management accounting information.

The Roles of Management Accounting Information in Defense Procurement

The management accounting information in the procurement process will serve in important roles in this way as it is effective, and effective procurement has been demanded.

As the specifications of an item raised by the government are complicated, it becomes diffi-

cult to make a judgment whether the specifications of such items are equal to the demands of the government. Such a tendency is particularly notable in the defense procurement. In addition, when it comes to weapons for national defense, something for which there is no previous procurement experience exists, and clear grounds of pricing are necessary at the time of the contract conclusion about such items.

In this case the existence of the cost accounting rule to give the pricing of the item for which there is no market price on grounds becomes important. There is CASB (Cost Accounting Standards Board) which is a cost accounting standard in U.S. national defense procurement as an example of such a standard. Such a cost accounting standard plays an important role for not only the pricing but also for the purpose of the accountability for the nation which is a tax payer.

It is pointed out that CASB had a positive influence on not only pricing and accountability but also cost accounting duties of the contract company. In the relations with the cost accounting practice, the establishment of the cost accounting standard improves the cost accounting method of the company, and it may be said that it lets contract firms pay more attention to the improvement of the cost accounting system. I can consider that the request for the disclosure report leads to improvement of the business in particular in that respect. This is because a surge in interest in the issue of cost accounting on the occasion of disclosure reports provides a chance to review the cost accounting method of the individual firms the comparison document with the company being provided other than a cost accounting method again (Sakurai 1980)

In addition, the extra work load that there was not conventionally will be imposed to firms based on a standard and it must be incurred as a rise factor of the office work cost. But this formulates accounts system of the firms and gives them an opportunity to simplify an entry and, therefore, must not overlook that there is the positive side to come to be able to manage the management duties of the company more appropriately (Sakurai 1980).

Besides, with the maturity of the domestic industry and the complexity of the raised item, cooperation with the industry mentioned above is necessary. The appropriate sharing of the management accounting information including the cost price information under such

situations identifies opportunities for potential cost management that were not recognizable in the government and the company simple substance as well as pricing and an accountability purpose and can point out that It contributes to the inter-organizational cost management effort (Kajüter & Kulmala 2010). It is a study domain where in recent years the inflection of the extended management accounting information attract their attention between such a plural organizations, and various arguments are done about the significance and need, advantage. The management accounting information has imposed a duty for pricing and accountability in national defense procurement initially, but, depending on the way cooperation with the industry occurs, management accounting information can be assumed to possess possibilities for bigger advantages. I may point out that adoptability of management accounting information will be an important issue that we should examine in national defense procurement in the future in China.

Conclusion

This section argued about the development of Chinese government procurement, especially defense procurement with the implications from foreign countries concerning the direction and potential roles of management accounting.

In recent years China has pushed forward with the expansion of defense spending with rapid economic growth as a background, but one can point out that the growth that is so rapid by various factors will come to a deadlock in future. If so; like many countries, efficient, and effective enforcement will be strongly demanded. Under such a situation, the potential role and usefulness of management accounting information will greatly spread including pricing and the accountability purpose. I would place the consideration of the management accounting information in the future national defense procurement of China as an important topic.

As for the importance of the cooperation with such an industry, the role of the cost price information for securing rational price calculation and transparency, even fields outside of the national defense procurement are similar. For example, there is not often a market price for things that the public construction such as engineering works or the large-scale construction projects. In addition, regarding procurement of computer systems which the central

government uses, long-term, close contract relations with a sorted supplier are desirable in cases where here is a high degree of customization or in cases where updates are necessary continuously. In this case it may be said that the knowledge obtained from the national defense procurement gives a very useful point of view.

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2 Development of Company Law in China

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Introduction

It was in 1903 that a company law was first enacted in China by the government of Qing dynasty. Since then, some company laws were enacted in the first half of the 20th century in China, such as the Company Law of 1914 by the Beiyang Government and the Company Law of 1929 by the National Government of Nanjing. However, since People's Republic of China as a socialistic state was born in 1949, there has been no company law for a while in China, because the new government abrogated all of the existing law. Under such conditions, the business enterprises were regulated exclusively by policies. Behind this background is the history that China advanced the government-led planned economy on the basis of "socialist public ownership". "The stock company system" as a product of "capitalist private ownership" was thought to be excluded from China, which stuck with socialist public ownership. As a result, "state-owned enterprises", which were engaged in business activities entirely under the control of the state as a single capital investor, took the central role in economic development. Therefore, the state-owned enterprises did not establish corporate governance or finance systems in a modern sense and there was no company law which stipulated them.

In 1978, under the guidance of Xiaoping Deng, China changed its policy to the "reform and opening-up" and concentrated all its energies into economic development. While the review of the economic system, the state-owned enterprises reform and the development of legal systems became an urgent issue, the policy of reform and opening-up made it possible for foreign companies to expand their business to China. At that time, the foreign companies

in China should have adopted the form of a joint enterprise as a limited liability company with joint Chinese-foreign equity. However, there was no law which regulated this kind of joint enterprise, and the Standing Committee of the National People's Congress enacted "the Law on Chinese-Foreign Equity Joint Ventures" on July 1979 in order to diffuse such a condition. This law did not generally stipulate the rules for a limited liability company or a stock company and was applied only to foreign companies.

With the reform and opening-up and the economic development, how the law which was applied not only to some above-mentioned enterprises but also to stock companies in general should be enacted and the traditional state-owned enterprises with the characteristics of China should be changed for companies whose corporate governance system was complete became an important issue. It is assumed that China became aware that many developed countries had established mature stock company systems, which had played a very important role in the development of capital market and thus their own economic prosperity.

In order to deal with the changes in the domestic social environment, satisfy the demand for an enactment of company law in China and catch up with global trends in corporate governance, it became an urgent problem for the legislature in China to establish a systematic legal system and prepare various kinds of laws on companies or enterprises.

The Legislative Process of the Company Law of 1993

It took about ten years to enact the company law in China from the first planning for its legislation to the enactment and promulgation of it. The work on the enactment of company law was initially started in 1983 and mainly the State Council attempted to make out the draft for the company law. However, at that time, the clear answers were not provided to the fundamental problems, such as the range of the application of company law or the definition of a company, because there had been no economic entities as companies and very few theoretical studies on company law since the birth of the nation in 1949. The State Council finally decided that the enactment of company law was not ready and had to abandon it. Therefore, the State Council tried to prepare some drafts of "the rules for companies with limited liability" and "the rules for companies limited by shares" on behalf of company law but did not finally submit them to the legislature. In this way, the first attempt to enact a

company law in China ended up in failure.

After that, Momentum for the enactment of company law got rolling again in the 1990s. Before the enactment of company law, the Commission for Restructuring Economic System enacted and promulgated “the guideline for companies with limited liability” and “the guideline for companies limited by shares” in May, 1992. The State Council prepared a draft of “law on company with limited liability”, submitted it to the Standing Committee of National People’s Congress (“the Standing Committee”), and put it on the table in August, 1992. However, this law was not enacted, because the Standing Committee thought that they needed to enact a general and systematical company law in order to prompt the development of the socialist market economy in the future.

When the 14th National Convention of Communist Party of China was held in October, 1992, the existing planned economy was abolished and the course of market economy, the so-called theory of socialist market economy, was established as a new national strategy. This further increased the need to enact a company law. Actually, the Legislative Affairs Commission under the Standing Committee started work on the enactment of company law in late September, 1992, summarized its draft in February, 1993, and put it on the table at the 30th meeting of the 7th Standing Committee in March of that year. The draft, after hearing a wide range of views in the various fields, was modified several times and through deliberation at the 5th meeting of the 8th Standing Committee, the company law was enacted and promulgated in December, 1993 (“the Company Law of 1993”). This law was put into effect on July 1, 1994.

It should be noted that the “decision on some issues of the socialist market economic systems in China” was adopted at the 3rd plenary meeting held by the 14th Central Committee of Communist Party of China in November, 1993 in the course of enacting the company law. This decision referred to the clear property relations and establishment of “a modern enterprise system”, which meant a stock company-based company system and had the four features of “clear property rights”, “clarification of authority and responsibility”,” separation between government and enterprises”, and “scientific management”. The Company Law of 1993 plays a very significant role in supporting this kind of a modern enterprise system.

The outline of the Company Law of 1993

The Company Law of 1993 consisted of 11 chapters and 230 sections, specifically including general provision, incorporation and organizational structure of companies with limited liability, incorporation and organizational structure of companies limited by shares, issue and transfer of shares of companies limited by shares, corporate bonds, financial affairs and accounting of companies, merger and division of companies, dissolution and liquidation of companies, branches of foreign companies, legal responsibility, supplementary provisions.

It was actively discussed how the relations between companies and enterprise should be understood and what the company form should include in the course of enacting the Company Law. In the Company Law of 1993, unlimited liability companies and companies of both unlimited liability and limited liability were not covered but companies with limited liability and companies limited by shares were. It is said that behind the legislative movement is a clear intention to clarify that the State will no longer have unlimited liability for enterprises (Fei Li 1995). The Company Law of 1993, which initially specified the rules on preparation of articles of association, organization of shareholders (general) assembly, board of directors, board of supervisors, financial affairs and accounting of companies, made an important first step toward the systematical further development of enterprise law on the whole in China. The Company Law of 1993 has some features as indicated below.

Firstly, the Company Law of 1993 adopted a normative system in terms of incorporation of companies (Qinzhi Cui 1994). Before the enactment of the law, the concession system was adopted when enterprises were incorporated. The concession system got a lot of criticism for difficulty in the incorporation of enterprises, because of excess interference from the government in this regard and the complicated procedures of concession. The Company Law of 1993, which relaxed the standards for the incorporation of companies, in principle adopted a normative system and required a concession from the government only in some exceptional cases.

Secondly, the Company Law of 1993 stipulated the rules on the minimum amount respectively of a company with limited liability or a company limited by shares. For example, the former shall be RMB 100,000 yuan to RMB 500,000 yuan according to the scope of busi-

ness, while the latter RMB 10,000,000 yuan. Although the minimum amounts of the registered capital of these companies were reduced by the amendment of the Company Law in 2005, the minimum amounts of the registered capital remain intact for the purpose of protection of creditors.

Thirdly, the Company Law of 1993 stipulated strict rules on issue and transfer of shares of companies limited by shares. For example, as to the issue of shares, when the company issues new shares, after resolution by the shareholder general assembly, the board of directors shall apply for the approval of this matter by the department authorized by the State Council or the provincial people's government. Furthermore, the public issue of new shares shall be approved by the Securities Regulatory Authority under the State Council. As to the transfer of shares, shares held by the promoters of a company shall not be transferred within three years from the date the company is incorporated.

Fourthly, the Company Law of 1993 stipulated various kinds of rules to protect the interests of the staff and workers of the company. For example, the members of the board of directors of a wholly stated-owned company or a company with limited liability that is incorporated with the investment of two or more state-owned enterprises or two or more state-owned investment entities shall include representatives of the staff and workers of the company. A board of supervisors of a company with limited liability or a company limited by shares shall be composed of representatives of the shareholders and an appropriate proportion of representatives of the staff and workers of the company. When a company decides matters closely related with the interests of the staff and workers, such as the payment for work done, welfare, and insurance benefits. Furthermore, when a company decides major issues in business operation, or formulates important rules and regulations, it shall listen to the opinions and proposals of the staff and workers.

Fifthly, as mentioned above, wholly stated-owned companies shall take the form of a company with limited liability, because the Company Law of 1993 also intended to shift the state-owned enterprises to being companies whose modern enterprise systems were complete. Thus, the rules on companies with limited liability are applied to state-owned enterprises as a company with limited liability. However, because of the characteristics of wholly stated-owned companies as a state-owned enterprise, the Company Law of 1993

prescribed the various special provisions that applied only to wholly stated-owned companies. For example, no shareholders assembly shall be set up in a wholly Stated-owned company, and a state authorized investment entity or state authorized department may authorize the company's board of directors to exercise part of the functions and powers of the shareholders assembly. However, matters regarding merger, division and dissolution of the company, increases and reductions of the registered capital and the issue of corporate bonds shall be subject to decision by a state authorized investment entity or state authorized department.

The Company Law of 1993 also stipulated many rules which followed the models of advanced company laws of the world but were based on situations in China. It has played an important role in establishing the legal position of the company as an economic entity, regulating the company organization and its conduct, and developing modern enterprise systems. Afterward, the company law was slightly changed several times, such as the partial amendment of the rule on board of supervisors of wholly stated-owned company and the new creation of the rule on the high and new technology companies limited by shares in 1999, as well as the deletion of the rule on approval by the State Council in the issuance of new shares at prices above par value in 2004. However, the company law was dramatically amended, because the rapid economic development in China increasingly made it impossible for company law to keep up with it.

The Legislative Process of the Company Law of 2005

Shanghai stock exchange and Shenzhen stock exchange successively came into being in the early 1990's, and the trading of shares, national bonds, and corporate bonds officially started there. Since then, the economy in china has kept on further evolving. However, the Company Law of 1993 could not keep up with the economic development in China and many rules of this law became a barrier to company development. Some important issues were raised that the too strict requirements for establishment of a company made it difficult to found a company, that company scandals showed no sign of significant decline, because the company law fell short of the rules on responsibility for directors, supervisors and senior managers of companies, and that the company law was not sufficient to protect creditors and shareholders, especially minority shareholders. The company law was amended

in 2005 in order to deal with these issues.

First of all, the Standing Committee and the State Council tried to amend the company law and the State Council set out to prepare the drafts of amended company law. After the State Council thoroughly discussed the issues of company law with the interested departments as well as foreign experts in company law in United States of America, England, German, Japan and Korea, it summarized the final draft on December 28, 2004. The draft was submitted from the State council to the Standing Committee and put on the table at the 18th meeting of the 10th Standing Committee. Finally, through deliberation at the 18th meeting of the 10th Standing Committee on October 27, 2005, the new company law was enacted and promulgated (the Company Law of 2005). This law was put into effect on January 1, 2006.

The outline of the Company Law of 2005

The Company Law of 2005 consisted of 13 chapters and 219 sections, specifically including general provision, incorporation and organizational structure of companies with limited liability, equity transfer of companies with limited liability, incorporation and organizational structure of companies limited by shares, issue and transfer of shares of companies limited by shares, qualifications and obligations of directors, supervisors and senior managers of companies, corporate bonds, financial affairs and accounting of companies, merger and division of companies, dissolution and liquidation of companies, branches of foreign companies, legal responsibility, supplementary provisions. More than 90% of all of the provisions of the Company Law of 1993 were amended and 41 new provisions were created in the enactment of the Company Law of 2005. The main points of the Company Law of 2005 will be described below.

Firstly, the provisions for establishment of incorporation were amended and newly created. The Company Law of 1993 stipulated that the minimum amount of a company with limited liability shall be RMB 100,000 yuan to RMB 500,000 yuan according the scope of business, while, under the Company Law of 2005, it shall be RMB 30,000 yuan irrespective of the scope of business. The amount of the initial capital contributions made by all of the shareholders of the company shall be not less than 20 percent of the company's registered

capital and the remainder shall be paid for in full by the shareholders within two years from the date the company is established (in the case of an investment company, it may pay the remainder in full within five years). The minimum amount of a company limited by shares was reduced to RMB 5,000,000 yuan, which made it easier to incorporate. Furthermore, the Company Law of 2005 includes new rules on one-person companies with limited liability, which are stricter than the general rules on companies with limited liability in order to reduce the deal risk and protect the counterparty. For example, the minimum amount of registered capital for a one-person company with limited liability shall be RMB 100,000 yuan, and the shareholder shall make the capital contributions in one lump sum as stipulated by the articles of association of the company. A natural person may only make investment for the incorporation of one one-person company with limited liability. Moreover, where the shareholder of a one-person company with limited liability cannot prove that the property of the company is independent of his own property, he shall assume the joint and several liabilities for the debts of the company.

Secondly, the Company Law of 2005 includes a lot of rules to improve corporate governance systems and promote sound internal monitoring systems. It was pointed out that the authorities of the chairman of the board of directors were too strong and the methods of resolution by the board of directors were problematic under the Company Law of 1993. Therefore, the Company Law of 2005 enhanced the function of resolution by the board of directors and strengthened limitations on the authorities of chairman of the board of directors. As for the board of supervisors, it could not satisfactorily fulfill its audit function, because its authority was weak and the rules for them under the Company Law of 1993 were less effective. Thus, the Company Law of 2005 newly stipulates that the board of supervisors and the supervisor of a company without a board of supervisors may put forward proposals for removal of the directors or senior managers and may also inquire about or put forth proposals on matters on which resolutions have been or are to be adopted by the board of directors. Furthermore, the Company Law of 2005 specifies the duties of directors, supervisors and senior managers, such as a duty to observe laws, administrative regulations and the company's articles of association, a duty of loyalty and a duty of diligence.

Thirdly, the Company Law of 2005 enhanced the protection of interests of shareholders and adopted the doctrine of piercing the corporate veil. There has been an increased need

to improve the disclosure rules, because access to the information about a company required to exercise the shareholder's rights was not easy under the Company Law of 1993. Therefore, in order to make it easier for shareholders to gain access to information about a company, the Company Law of 2005 stipulates that a shareholder shall have the right to consult and duplicate the company's articles of association, the minutes of the meetings of the shareholders assembly, the resolutions of the board of directors, the resolutions of the board of supervisors, and the financial and accounting reports of the company. Moreover, because the exercise of shareholder's rights needs to be made easier and more effective for the protection of shareholder's interests, the calling procedures for shareholders (general) assemblies were relaxed, the rules on proposals by shareholder's and representative suits were specified. On the other hand, because the shareholder's rights can be abused, the Company Law of 2005 stipulates that where the shareholder of a company abuses the independent status of the company as a legal person, evades debts and thus seriously damages the interests of the creditors of the company, he or she shall assume joint and several liability for the debts of the company. Easier incorporation under the Company Law of 2005 might increase the number of shell companies, which could be dealt with by the doctrine of piercing the corporate veil.

Fourthly, the corporate governance systems of listed companies were enhanced and their duties and responsibilities became stricter under the Company Law of 2005. Recently, corporate scandals have often emerged in the securities market in China and continue to have a very negative impact on the development of the national economy. The regulatory authorities have dealt with corporate scandals caused by companies or their management through criminal charges, civil liabilities or administrative punishments. Nevertheless, there is no end to corporate scandals. Naturally, the regulatory authorities strengthened the penalties or liabilities in order to deal with corporate scandals. However, because the weak corporate governance of companies in China was thought to contribute to corporate scandals, it needed to be improved. Thus, the Company Law of 2005 newly established the rule on independent directors and secretaries to the board of directors. It also stipulates that, with regard to such matters as transfer and assignment of major assets of a company and provision of guarantee for another entity which are subject to resolution by the shareholders general assembly, as prescribed by the company law and the company's articles of association, the board of directors shall, in a timely manner, convene a meeting of the

shareholders general assembly, at which to hold a vote on the matters mentioned above. Moreover, considering that controlling shareholders, directors, supervisors, and senior managers often cause damage to their listed companies by the related party transaction, the Company Law of 2005 improved the rule thereof.

The other rules on external audit, merger and division of companies, dissolution and so on were amended and newly established, which meant that China had tried to address the various kinds of issues on companies caused by economic development.

Conclusion

Since the company law was enacted in China, 20 years have passed. Meanwhile, the company law, through the three amendments, evolved into a law which had systematical rules appropriate to modern society. With the development of company law, the securities law (which was amended in 2005) was initially enacted in China in 1999, and these two laws play an important role in providing the stable legal basis necessary for economic development in China. Until today, under company law, the state-owned enterprises have shifted to being companies which have modern corporate governance and finance systems, and many private companies have been incorporated in China. The active economic activities by the state-owned companies and private companies contribute to the economic development in China. In this situation, many companies have listed not only on the domestic securities market but also on the foreign securities market. Because these companies have to comply with the laws both in China and the other countries which are applied to them, they will have to further enhance the compliance systems or change the consciousness of compliance.

The laws in China have been considerably developed within a short period of 20 years but still have much room for improvement compared to those of developed countries, because the legislative activities in China prioritized the appearance of law, such as the number of provisions, to the quality of law. The company law also has many rules whose contents are insufficient or which stipulate only the principal matters. Furthermore, the enactment of rules which should be stipulated by the law is often delegated to the administrative agency. Therefore, how the law should be actually used or operated is very uncertain and might

involve significant confusion in practice. It should be further discussed in the future how these issues will be resolved, the conflicts of each rule of the law will be corrected, and the legal systems will be adapted to the society in China.

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3 Basis for Stability in Chinese Society. –Social Management System, created by Mao Tse-tung.

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Basis for Stability in Chinese Society

China has unique systems for ensuring social stability. Under the Marxist-Leninist constitution, the democratic governance concentration system of political power, along with a political system of single-party rule by the Communist Party, provide political stability while also functioning as a control system for social stability. Specifically, the members of the "leader system," selected mainly on the basis of academic achievement, manage and administer government, state-run companies, and other entities. They are also responsible for managing the rank and file employees, and running organizations. From the standpoint of society at large, this is a segment of society comprising bureaucrats, corporate executives, managers, engineers and other leaders, and society is effectively managed and controlled in a top-down manner by these leaders.

Each citizen belongs to a "work unit," such as a state-run company, non-profit business entity, school, administrative office, or other organization. The personnel departments for these units keep "personal archives" containing the personal history and other information on each individual in the organization throughout their entire lives, organized by leaders, ordinary workers, and retired staff. These archives are the basis for affirming that an individual belongs to a particular unit, and to receive social security, livelihood assistance and other benefits. The archives also record each individual's work performance and degree of sincerity, providing a psychological threat to the unit member that ensures individual loyalty to the unit, and functioning as a system to control and manage society.

Public security authorities also strictly maintain "household registry" records on all urban and rural residents, a system used to prevent adverse effects such as residents of rural

districts migrating to the cities in an unsystematic manner and creating slums in the cities.

This system of leaders, work units, archives, and household registries functioned as a system for social control in the reforms and systemic transformation of openness enacted since 1979. However, even though there has been no change in the system of single-party rule under the Communist party, the permeation of a market economy is leading to significant changes in this system. Based on the so-called “Deng Xiaoping Theory”, there is a movement to establish law-based social governance, aimed at eliminating the system’s harmful effects. The government has put forward a policy of actively reorganizing these systems.

Reforms are gradually moving forward, as “leaders” engaged in government duties are replaced by civil servants, leaders belonging to business entities are shifted to employment under contract, and the practice of inviting talented persons from outside the organization is established.

An increasing number of people are self-employed or work for foreign firms, and so do not belong to any work unit. The proportion of such “unit-less” residents is increasing among urban dwellers, and the unit system itself has lost one of its functions with the establishment of a social security system centered on regional pensions from local governments. Personal archives still have important implications for those in government or party administration, but the introduction of competitive personnel systems has made the archives less significant for employees of companies and non-profit business entities. Restrictions on residence under the household registry system have been relaxed with “temporary household permission” adopted to ease local imbalances in the labor supply as a result of economic growth.

This paper will present an overview of the Chinese constitution that is the key for political stability in China, followed by a summary of the historical context and functions of the “leader,” “work unit,” “personal archive”, and “household registry” systems, together with an examination of how they have changed. It will also consider the potential for these systems to continue to function as a structure for social control.

The Constitution of the People's Republic of China

The current constitution of the People's Republic of China begins with a preamble summarizing the history of the Chinese revolution since the Opium War, followed by 138 articles organized in the four chapters of "General Principles", "The Fundamental Rights and Duties of Citizens", "The Structure of the State", and "The National Flag, the National Anthem, the National Emblem and the Capital."

A provisional constitution was promulgated immediately following the establishment of the People's Republic of China, with four major revisions enacted to create the current version. The formal constitution was adopted by the First National People's Congress on September 20, 1954, and went into effect that same day. It comprised 106 articles in four chapters.

The constitution has been revised three times since its adoption, in January 1975 (second constitution), March 1978 (third constitution), and December 1982 (fourth constitution). Minor revisions to the current fourth constitution were made in 1988, 1993, 1999, and 2004.

Many national constitutions have been formed in the process of establishing a constitutional monarchy, utilizing the power of the state to protect citizens from autocracy. The Japanese constitution, for example, drawing on such documents as the 1215 Magna Carta and the 1628 petition of rights, guarantees fundamental human rights in Article 97, which states that "The fundamental human rights by this Constitution guaranteed to the people of Japan are fruits of the age-old struggle of man to be free; they have survived the many exacting tests for durability and are conferred upon this and future generations in trust, to be held for all time inviolate." The constitution further specifies the separation of legal, administrative, and judicial powers (Articles 41, 65, and 76) as a framework to guarantee human rights.

Amid such trends in constitutional history, the constitution of the People's Republic of China, on the presumption of social classes, asserts that state power is held by "the people," centered on workers, and so can be understood to mean that power is to be concentrated in the people. However, it does not recognize the separation of powers. The preamble includes such wording as "the system of exploitation of man by man [was] abolished and the socialist system established," "Marxism-Leninism, Mao Zedong Thought, Deng Xiaoping Theory and the Important Thought of the 'Three Represents,'" the "continued fight against

those forces and elements…hostile to China's socialist system," and "organization of the united front." The constitution also asserts in Article 1 that China "is a socialist state under the people's democratic dictatorship led by the working class and based on the alliance of workers and peasants. The socialist system is the basic system of the People's Republic of China. Disruption of the socialist system by any organization or individual is prohibited." At the same time, the constitution maintains the political principal of "people's democratic dictatorship," under which the people (the ruling working class) employ the principles of democracy to exercise dictatorial authority over the governed class (those forces and elements, both at home and abroad, that are hostile to the socialist system and try to undermine it, as well as the capitalists that comprise the exploiting class).

In China under this constitution, the role of the separation of power as we understand it does not function. That is to say, although the constitution guarantees individual freedom, in the context of the coexistence of the state with its monopoly on power, and the individual guaranteed freedom, the individual is powerless in comparison to the state. China needs a framework to prevent state abuse of authority. This is the separation of powers (legal, administrative, and judicial).

The propriety of this constitution is an issue to be decided by the Chinese people, but from the standpoint of political stability, the constitution does firmly secure the political stability of China.

Background, Functions, and Substance of the Leader System

Of the four systems for social control, the leader system has been reformed the most in the wake of the market-oriented economic reforms since 1979. Prior to China's 1979 economic reforms, nearly all organizational bodies in China, including political parties, government agencies, social organizations, and business entities, were administered and run by leaders selected by the Communist Party or government organizations. The leadership system was managed ostensibly to serve the ordinary employees and temporary workers. The system was reformed after 1979, and since 1996 has been replaced by civil servant or employment contract systems.

The Communist Party had emphasized the functions of the leader system since the founding of the country, and organizational divisions of party committees were directly involved in the leader appointments for nearly all organizations. At the time of the country's founding, appointments had strong military overtones, since the party was in the process of seizing power. Leader appointments came to be made with an emphasis on family status, individual belief, and social relations. For some time after the country's founding, with the exception of the Liberation Army, organizational divisions of the Communist Party at all levels handled the selection of leaders and other personnel appointments, without clear authority.

In 1953, the Communist Party Central Committee began formulating unified and clear regulations for leader appointments. The Committee established nine categories of leaders, and specified the organizations for which each is responsible. From the 1960s, following the rapid increase in the number of companies and business entities, along with the Communist Party Committee, administrative bodies also established personnel divisions, and began handling leader appointments in coordination with the Party. In principle, graduates of four-year universities were employed by units designated by the university, and become the leaders of those units. In the countryside, because of the shortage of regular university students, graduates of three-year universities were also employed as leaders.

However, with the introduction of the civil servant system and employment contract system in the 1990s, the leader system has gradually been reformed and abolished. Although the leader appointment system is being replaced by these other systems, the idea of the leader system, which has continued since the country's founding, remains deeply ingrained in Chinese society, albeit in a slightly different form. One aspect of this is the selection of top political and business officials by the Communist Party. The Party also intervenes in the appointments of civil servants, as part of a top-down chain of command based on the idea of leaders guiding society.

Even though China has adopted market principles, under its unique structure broad-based privatization is unthinkable, and as such there are many corporate and non-profit business units held by the state. So long as state-owned units retain a dominant position as a social force, some sort of method will be needed to select the leaders and administrators who manage them. Barring a change in the Communist Party's single-party rule, it is unlikely

that there will be any major shift in the management method that has been in place since the founding of the country, that of guidance from above by top officials and leaders selected by the Communist Party.

Currently, even in China purely private companies engage in economic activities, and play a major macroeconomic role. The founder or other individual concerned functions as the corporate manager, that is to say the leader, because the ownership rights of the company belong to the founder. In the case of county firms, the ownership rights belong to the collective, or the town or village government, so ordinarily a government representative serves as the corporate manager. Basically, since companies comprise people concentrated in a community, in some cases the county government representative is able to amass individual power and wealth. But since the ownership rights belong to the local citizens, individual abuse of power is limited. Listed companies with management control, as well as companies that are state owned but for which management has been entrusted to an individual, can be said to be similar to county firms. Because at many listed companies the state is the controlling shareholder, although structurally the corporate manager is selected at the general meeting of shareholders, in practice a strong influence is exerted by the government office with jurisdiction over the company, as well as the Communist Party, which directs the government office.

In Japan as well, there are many cases in which public officers meddle or interfere with the personnel appointments of purely private companies. This is particularly notable at licensed industries such as banks. There are cases of companies requesting that the supervisory authority dispatch a corporate manager, as well as government offices making implicit requests to companies to rehire officials who have reached mandatory retirement. Similarly, at Chinese state-owned companies, quasi-state-owned companies (such as listed companies), and purely private companies, there are many instances of corporate executives being dispatched from government agencies, including when a problem arises with the manager.

Background, Functions, and Substance of the Unit System

The traditional means of political control in past Chinese dynasties was to place a govern-

ment official at the provincial level to control and manage the region, without being directly involved in the towns and villages at the lowest rungs of the political framework. Village communities, linked through ties of blood or geography, were left to govern themselves. Accordingly, the government was able to rule with an exceptionally small number of bureaucrats. In the new China, unlike the dynasties of the feudal period, the government is involved in rule and administration down to the smallest political entities.

However, in this method of control and administration the smallest organizations are arranged into work units, and indirect rule is maintained through these units, rather than through direct rule by bureaucrats. Accordingly, the number of Chinese government officials (civil servants for the administration) is low compared to the population. Through the unit system, the Communist Party created a framework in which the smallest divisions of the party monitor and control the population. The units are the tools by which the government and the Communist Party directly rule the people.

The units have three main functions.

1. As independent organizations, they are the main providers of goods and services externally (broadly classified into government agency, non-profit business unit, and corporate unit, depending on the goods or services provided).
2. Units function as the smallest divisions of the administrative framework. Based on directives from their managing administrative agency, units provide administrative services to their members. (Units also provide members with such services as ideological education from the Communist Party, which directs the administrative agencies.)
3. Units are expected to provide members with public welfare and cultural services.

The function of the work units can be defined as the organization that acts as a go-between for citizens (the governed) and the government (the rulers).

Each unit is connected to a higher-ranked agency. The Cabinet departments give instructions and convey information to the local government departments they oversee, so no matter what the type of unit, following this trail upwards leads to the Cabinet, then to Parliament, and finally to the Communist Party Central Committee. As a result of this political

structure, the units perform administrative functions based on guidance from higher-ranking administrative agencies. Units are incorporated into the command line of administrative agencies (government), as illustrated by the fact that property rights of the units belong to the administrative units over them, and that the ranking given to units indicates its hierarchical relationship within the administrative agency. Considering that according to the ownership structure each company and non-profit business unit is obligated to pay surplus profit to the higher-ranking agency to which it belongs, and that control over personnel appointments is exercised by a higher-ranking agency, the units are effectively under administrative control from the agencies above them, and under the guidance of these agencies perform an administrative function for the unit members and the units themselves.

The Communist Party Central Committee decides on important matters of social development, and assumes a guidance role for policy. Under the direction of the Communist Party, administrative agencies formulate and implement specific plans. In such a political structure, political control naturally extends to the units incorporated into the administrative command line. However, at corporate and non-profit business units the principle of the inseparability of government and business has been discarded, and a policy of separating the two has become established. Communist party matters that cannot be integrated with government administration, such as preparation of materials for ideological education, have no impact on unit members unless they are conducted by the Communist Party branch or committee established in the unit.

Accordingly, the units that support the foundation of Chinese society are undergoing a certain transformation, and their functions are likely to be consolidated into their original function. However, under the current political structure, and in terms of public awareness, the units will continue to play an important role in society. In the process of transitioning to a market economy, whether units should continue to play this role is a major issue in China. Whether the work unit structure will continue to exist, and if it does, what changes will occur, and how this will affect the social behavior and relations of the people who comprise the units, are issues to be examined going forward.

Background, Functions, and Substance of the Archives System

China has since ancient times had a tradition of keeping records, and archives are one of the important matters managed by the state. In China today, the definition of archives, as prescribed by law, is "historical records in various forms, including writings in different languages, pictures, diagrams, audio-visual…, whose preservation is of value to the State and society and which have been or are being directly formed by State organs, public organizations and individuals in their political, military, economic, scientific, technological, cultural, religious and other activities." (Archives Law, Article 2, enacted 1988)

The Chinese term is usually translated as "archives," and typically refers to writings that are original sources, have a function of conveying information, contain knowledge, and have value. The archives kept in the national archives repositories are in principle made public after 30 years, though archives involving the security or vital interests of the state, and other archives which remain unsuitable for disclosure after their formation, may be open to the public after more than 30 years. Citizens and organizations possessing lawful identification may use archives which are open to the public. (Archives Law, Article 19) In China today, archives kept by the state are classified into three types according to when they were formulated—archives since the establishment of the People's Republic, archives on the history of the Revolution, from the May Fourth Movement in 1919 to the founding of the country in 1949, and historical archives on former regimes.

One type of archive is the personal archive, concerning the records of individuals. The origin of these personal archives is thought to be the archives on Communist Party leaders prior to the founding of modern China. Precise rules on leader archives were established during the first round-table discussion convened in 1956, when standing rules for the creation and management of leader archives were distributed.

Personal archives are categorized by type for leaders, workers, students (middle school and older), and military personnel. The type with the greatest significance is the leader archive. Large envelopes marked "Archive Packet" and containing documents are an everyday sight in China. Ordinary personal archives are stored in these envelopes, and kept in the records room of personnel departments. The leader personal archives on high-ranking officials, influential Communist Party members and other key persons, which are kept

by the administrative division of the Communist Party Central Committee, are digitized, stored, and effectively utilized for significant state appointments. In 1980, the administrative division of the Communist Party Central Committee formulated rules on handling the archives of leaders and company workers, specifying the materials considered necessary for creating and storing personal archives. Materials specified for archives included records of personal thoughts (self-written), materials for joining the Communist Party and relationship with politics (political history), and the presence of any major political issues in family or social relationships. Any history of anti-establishment conduct, either by the individual or a family member, would likely result in unfavorable treatment within the work unit based on the archive material.

It was widely reported in Japan that persons labeled as dissidents at the time of the Cultural Revolution were rehabilitated afterward, and in China, where the personal archive is institutionalized in society, it is easy to understand the necessity of correcting the archives to restore reputations. However, factors noted previously, such as the abolishment of the leader system and the waning influence of the work units with the development of the market economy, have led to the gradual breakdown of the original system to utilize the archives. As a result, with the exception of top personnel, the archives themselves function less effectively as a system for control.

Background, Functions, and Substance of the Household Registry System

Residence restrictions under family registers did not exist at the time of the founding of the country, but instead were part of the legislative process for the household registry system in the early 1950s, after the country's founding. Household registries were systematized to manage family registers, separating urban and rural areas, though peasants were able to emigrate freely to the cities. During the first five years or so from the founding of the country, population movements from the villages to the cities were not excessive, and did not exceed the labor demand.

However, under the first five-year plan through 1956, copied from the Soviet Union, agriculture was remodeled along socialist lines, with rapid collectivization. Agricultural production in some villages collapsed as a result, and many farmers from impoverished areas relocat-

ed to the cities. This mass exodus from the villages to the cities became a social problem. In December 1957, the Communist Party Central Committee and the Cabinet jointly issued a directive restricting movement of the rural population to the cities. This directive ordered public security agencies to strictly manage the household registry system, prohibited food distribution departments from providing rations to anyone other than those with an urban household registry, and ordered regional governments to send peasants who had migrated to the cities, or who worked in an industrial job, back to the area of their original registry. Such an administrative response did not exist at the time the country was founded.

In 1985, the Ministry of Public Security issued regulations for temporary urban residence, providing specific procedures for people to temporarily reside in cities for one year (currently three years), and officially allowing the migration of labor from villages to cities.

Unregulated population flow from the villages to existing large cities continues to be tightly restricted, but in small regional cities and areas designated for development, the government is allowing on a trial basis the lawful transfer of registries from villages to cities in certain situations and under certain preconditions.

Politics and Society in 2030

As this paper has shown, China's unique systems for social governance and control, with the exception of the household registry system, are being significantly transformed or abolished with the shift to a market economy. Reform of the political system can also be expected, and if this is realized the systems for social governance are also likely be reformed, particularly those systems that a market economy will expose as having only been superficially reformed. One example might be the selection of local government officials and other high-ranking leaders by election rather than de facto appointment by the Communist Party. Accordingly, the leader, work unit, archive, and household registry systems can be understood as products of the changes taking place in Chinese society.

Rational Chinese, taking a long-term perspective, and in the process of firmly implementing a market economy to create an economically strong country, enacting political reforms, and attaining power for China as an internationally influential state, will most likely replace the

systems for social governance and control in place up to now, and rebuild them with highly transparent, law-based systems. However, since the various government and social systems are currently in effect, the period when they will be reformed is in the distant future, far beyond 2030. Rather, if China is able to overcome the corruption that accompanies autocracy, one gets the sense that the systems of our democratic society might be absorbed by this Chinese model.

4 The internal problems of China: "All the Stock Circulation（股権分置）Reform"[11] and the "Ancient Regime"

Minoru Tada

Now, a relation between a state and state owned enterprises of economies in transition or a developing country is my primary concern. I am researching about it of such as China, South Korea, and Vietnam. This research is also the part.

Introduction

China has agreed to open an international securities business on the occasion of the WTO entry in December 2001.

However, various problems have arisen from inside and outside, especially regarding a stock system that includes peculiarities following the enforcement of the Reform and Opening Up policy. The problems include these:

1. The high circulation share ratio of the listed company, which makes the operativity in a stock market easier to set.
2. Existence of a kind of stock that infringes on the principle of "one-share monovalence," such as may be seen by circulation shares and non-circulating shares.
3. An irrational investor structure, which has a concrete, extremely high individual investor ratio and an extremely low institutional investor ratio. Based on these characteristics, it has high inducibility of short-term action, otherwise known as high speculativeness.
4. A structure in which the original useful functions of a stock system, such as the monitoring function by an investor, cannot operate effectively.
5. The problem of insider trading, including the role of a fund manager.

[11]" All the stock circulation 股权分置）" is a situation in which, notwithstanding shares issued by same company, two kinds of shares, a non-circulating share and a circulation share, exit. The differences of various rights for shareholders, including the price produced, create a situation in which "it was divided and placed" in Chinese notation.

A Stock System in China

From the 1980s to the second half of the 1990s, China was in the process of introducing policy to create a market economy system under the socialist system, which is said to be the essence of a policy of Reform and Opening Up. At the time, a very strong political requirement of maintaining a strong socialist system existed. As the mainstay of the socialist economy, the state-owned enterprise secured the predominance of a certain “omnidirection” to the national economy and guaranteed the existence of the supreme proposition. In all industrial domains, the state-owned economy secured the predominance and played a strong role in driving industry.

The state-owned enterprise’s loss-making-operation constitution serves a very critical role in the reform of state-owned enterprises. This constitution breaks from the deficit constitution and has been deemed one of the most important political themes since the Reform and Opening Up policy was enforced.

However, the result was poor and called for the next step, which involved pressing for requirements of an opposite system. As a result, it was necessary to maintain a socialist system and introduce a market economy simultaneously.

Under this situation, the establishment of the modern enterprise system, which has a main policy of introducing a stock system, attracted attention as a trump card in reforming state-owned enterprises. As a result, the stock system in China achieved a major development during the second half of the 1990s.

However, in the enforcement of this system, the problem of ideology emerged. Specifically, it is presupposed that “3 Large Worries (三大担心)” existed in the government when state-owned enterprises were reformed by the introduction of a stock system.[12] These worries were:

1. Does the issue of stocks induce a privatization problem?
2. Does the issue of stocks lead to the spill of national assets?

[12] Chuan Ziheng (2006):3

3. Does the leading status of the state-owned economy swing after stocks are issued?

Various original systems were incorporated to clear these problems in China and involved determining when a stock system would being carried out and how to succeed in efforts to maintain consistency while using a slogan called maintenance of a socialist system. In the process, the most serious problem produced was the existence of a circulation share and a non-circulating share. Although issued by the same company, these shares are exactly the same but involve “a different share, a different price, and a different shareholder’s right.” In China today, the various problems mentioned previously have resulted in generating a negative inheritance for maintaining a socialist system that is turning into an “Ancient Regime.”

In the enforcement of the stock system in China, a major policy conversion was put into action. The turning point was evident in the slogan “strategic adjustment in the distribution of the state-owned economy,” which was introduced in the third item of “the determination about the serious problems of the reform and development of state-owned enterprises” approved at the fourth general meeting of the central council held in the 15th gathering of the Chinese Communist Party in September 1999. The result of the implementation of several policies based on the slogan became the foundation of dramatic developments that have taken place in the Chinese economy in the 2000s. The main contents of the epoch-making change in policy reserved the predominance of the “omnidirectional” national economy and changed its enforcement to a form that specializes in a specific industrial domain. In other words, it carefully selected the industrial domain where the national economy should secure predominance.

Specifically, this domain is considered “the important company in connection with the key, high-tech industry of natural monopoly that provides important public products or services with which a state is safely concerned.

The policy of specification to the industrial domain that should be secured and maintained as the predominance of the state-owned economy got off the ground to some extent in 2003. The National Assets Administration Bureau, which until then was only part of the Ministry of Finance, was reproduced as the organization of the State-owned Assets Supervision and Administration Commission (of the State Council) as a stronghold to prevent

the spill of national assets. Making an effort to build the management system for full-scale, state-owned assets was started, and the greatest number of new directional properties in the history of Chinese economy appeared after the enforcement of the Reform and Opening Up policy.

Currently, a central (state-owned) company[13] is selected by the commission in the specific industrial domain to function as a powerful organization of the State Council under the direct control described as the “super shareholder” who enables unified management of the national assets of the leading state-owned enterprise in the domain. In this way, the reform of state-owned enterprises has rushed into a new stage.

The composition of shareholders before All the Stock Circulation Reform

These gross political changes have prompted growth in the securities market and stock system in China after the enforcement of the Reform and Opening Up policy.

Although various difficulties remain in the stock system in China, the fundamental problem is the existence of circulation shares and non-circulating shares.

The institutional measure ensures the existence of non-circulating shares represented by a national stock. This national corporation stock prevents the loss of state-owned assets on the occasion of demutualization by state-owned enterprises, maintains the right of control for the state-owned enterprise as the mainstay of the socialist economy, and prevents perfect privatization.

While non-circulating shares are necessary for the maintenance of socialist system, in the international economy they are recognized as a big problem. In the present stage, many of these shares have already been canceled and hardly exist in the securities market.

[13] Central companies are the most important state-owned enterprises that the central government controls directly. While State-owned Assets Supervision and the Administration Commission of each local government level is founded separately, district state-owned enterprises are selected. In this way, the system in which state-owned assets management is performed has already been established.

“All the stock circulation reform” is a policy aimed at abolishing the non-circulating share. The information that follows looks back upon the history of “all the stock circulation reform” and examines the actual condition of stocks issued in each listed company before and after implementation of this reform.

A ratio of 63.7% is given to all non-circulating shares issued in Shanghai Stock Exchange, and a ratio of 55.4% is given in Shenzhen Stock Exchange in January 2006.[14] Examples of central companies managed by the State-owned Assets Supervision and Administration Commission directly are outlined here:

Baoshan Iron & Steel Co., Ltd., is a subsidiary-listed company of Bao Steel Group Corporation, which is the steel interest’s major company. The largest shareholder at the end of 2006 was Bao Steel Group Corporation, a state-owned enterprise and parent company, which owns 78.3% of shares.[15]

Dongfeng Motor Group Co., Ltd., is a subsidiary-listed company of Dongfeng Motor Corporation, which is a major motor vehicle industry. The largest shareholder in January, 2007 was Dongfeng Motor Corporation, the state-owned enterprise and parent company, which owns 60.1% of shares.[16]

China CSSC Holdings Limited is a subsidiary-listed company of China State Shipbuilding Corporation, which is the major shipbuilding industry company. The largest shareholder at the end of 2007 was China State Shipbuilding Corporation, the state-owned enterprise and parent company, which owned 61.06% of shares.[17]

An example of an energy-related central company with a basis of public supply is PetroChina Company Limited, a major oil-related company and a subsidiary-listed of China National Petroleum Corporation. Its largest shareholder at the end of 2006 was China National Petroleum Corporation, the state-owned enterprise and parent company, which owns 88.21%

[14] SSE Monthly Market Statistics, January, 2006:18 and SZSE Monthly Report, January, 2006:18
[15] http://www.cninfo.com.cn/gszx/sdgd600019.html, accessed July 10, 2007
[16] http://www.cninfo.com.cn/gszx/sdgd600006.html, accessed July 10, 2007
[17] China CSSC Holdings Limited 2007 annual report:27

of shares.[18]

China Shenhua Energy Company Limited is a subsidiary- listed company of Shenhua Group Corporation Limited, a major company in the coal industry. The largest shareholder at the end of 2006 was Shenhua Group Corporation Limited, the state-owned enterprise and parent company, which owns 81.21% of shares.[19]

As shown above, the structure of Group Corporation, a central company (state-owned enterprise), holds more than the majority of issued stocks in the form of non-circulating shares by a subsidiary-listed company.

“All the stock circulation reform” was carried out for the purpose of canceling the existence of non-circulating shares to correct such abnormal circumstances. The history of this reform goes back to 2004.

The composition of shareholders after All the Stock Circulation Reform

First, in order to put “Some opinion about reform and opening of capital market and promotion in stable development” promulgated by the State Council in January 2004 into practice, “The notice about the problem in connection with experimental enforcement of all the stock circulation reform for a listed company” which noticed experimental enforcement of all the stock circulation reform, was promulgated by the China Securities Regulatory Commission in April 2005. It was notified of its related posts, such as a listed company, a shareholder, and a securities exchange.

Next, “The opinion about performing experimental enforcement of all the stock circulation reform on the success” and “The opinion about the instruction for listed companies which makes a national stock a control stock of all the stock circulation reform” by China Securities Regulatory Commission and State-owned Assets Supervision and Administration Commission were promulgated in March 2005.

[18] PetroChina Company Limited 2006 annual report:59
[19] China Shenhua Energy Company Limited 2006 annual report:82

Afterward, at the first term, four companies were selected, with Sany Heavy Industry Co., Ltd., a major machine development company for construction of Shanghai, in the lead.[20] At the second term, as the model case of a total of 42 companies, Shanghai International Port Group Co., Ltd., a major land and water container transportation company of Shanghai, was selected.[21] At that point, all the stock circulation reform was tentatively carried out.

These experimental enforcements received success, and in August 2005, "The opinion about the instruction of all the stock circulation reform for listed companies," a general plan about all the stock circulation reform, was released by the China Securities Regulatory Commission, State-owned Assets Supervision and Administration Commission, Ministry of Finance, People's Bank of China, and Ministry of Commerce in their joint signatures, and the basic policy was shown.

"The method of administration about all the stock circulation reform to a listed company" by China Securities Regulatory Commission and "The notice about the problem of the management to shareholder's right of the national stock in a listed company for putting all the stock circulation reform in practice" by the State-owned Assets Supervision and Administration Commission were promulgated in September 2005. "All the stock circulation reform" was enlarged to include all the listed companies that were issued an A share and had no specific range. At last, the policy of reform toward the pending problem of circulation of non-circulating share was completely implemented.

The concrete procedure used is shown in the third clause (4) of "The notice about the problem in connection with experimental enforcement of all the stock circulation reform for a listed company" This procedure was previously described this way:

"The formation of an extraordinary shareholders' meeting is accepted by 2/3 or more participation of the shareholders who have voting rights, and a bill of all the stock circulation reform for the board of directors is approved by 2/3 of the circulation shareholders who

[20] Shanghai Securities News (May 09, 2005): Coverage record of four listing companies selected as experimental enforcement of all the stock circulation reform and whose shareholder circulation share at the first term.

[21] Xinhua News Agency (June 09, 2005): Listing companies as models of the experimental enforcement of all the stock circulation reform at the second term.

have voting rights”

The fifth clause (1) states:

“Non-circulating shareholders of listed companies who enforce all the stock circulation reform experimentally shall consent that listed dealings or transfers will not be carried out within less than 12 months since their non-circulating shares have acquired the right of listed circulation.”

The fifth clause (2) also states:

“A shareholder who holds 5% or more of non-circulating shares in all issued shares of a listed company that is enforcing all the share circulation reform experimentally will deal in shares through a securities exchange after the matter of consent in the preceding clause. The shareholder shall agree not to exceed 5% of the all issued shares of the company within less than 12 months and will not exceed 10% within less than 24 months.”

Finally, the fifth clause (3) states:

“The listed companies enforcing all the stock circulation reform experimentally shall submit an advertisement to that effect within two business days and continue indicating their intent to stop dealing in shares from the day the fact was generated until the quantity of dealing in shares through a securities exchange reaches 1% of all issued shares of the company concerned.”

Moreover, the bill of all the stock circulation reform is shown in the above-mentioned notice as

“The listed companies that are enforcing all the stock circulation reform experimentally will determine the solution plan of all the stock circulation independently.”

In the solution plan of all the stock circulation, it is possible to incorporate the contents of consent that include the original rules with each company in addition to the fundamental

rules.

The contents of a bill of all the stock circulation reform adopted by several companies of a central company showed that the non-circulating share ratio was high.

A definite provision of a non-circulating shareholder who approved a bill of all the stock circulation reform for Baoshan Iron & Steel Co., Ltd., is as follows:

“The shares of Baoshan Iron & Steel Co., Ltd., owned by Bao Steel Group Corporation, will not be put in listed circulation or transferred from the day Baoshan Iron & Steel Co., Ltd., acquired the right of listed circulation to within less than 12 months and will not be put in listed circulation within less than 24 months.

It is possible for Bao Steel Group Corporation to transfer through a securities exchange in a range that does not exceed 5% of all issued shares of Baoshan Iron & Steel Co., Ltd., and with a selling price of not less than 5.63 yuan (元) per share within 12 months (the third year) after 24 months as mentioned above.

The shares of Baoshan Iron & Steel Co., Ltd., held by Bao Steel Group Corporation, from the day Baoshan Iron & Steel Co., Ltd., acquired the right of listed circulation to within three years afterward, maintained 67% or more of all issued shares of Baoshan Iron & Steel Co., Ltd.

However, after putting a bill of all the stock circulation reform into practice, Bao Steel Group Corporation did not receive additional shares of Baoshan Iron & Steel Co., and the restriction about listed circulation or transfer of shares did not apply.[22]

A definite provision of a non-circulating shareholder having already approved a bill of all the stock circulation reform of Dongfeng Motor Group Co., Ltd., is as follows:

“A non-circulating shareholder of this company consents to the minimum regulations de-

[22] Notice of resolution of the board of directors of Baoshan Iron & Steel Co., Ltd., at the first special shareholders meeting, 2005 (Description of a bill of all the stock circulation reform):14, translation by a writer

fined by law and recognizes the following specialties: From the day a bill of all the stock circulation reform was put into practice to within less than 36 months afterward, the non-circulating shareholder will not list or transfer shares through a securities exchange."[23]

A definite provision of a non-circulating shareholder having already approved a bill of all the stock circulation reform of China CSSC Holdings, Ltd., is as follows:

"1. All the non-circulating shareholders of China CSSC Holdings, Ltd., agree not to release those shares in listed circulation or transfer them within less than 18 months from the day the company acquired the right of listed circulation.

2. After the above provision is fulfilled, non-circulating shares of China CSSC Holdings Ltd., may be sold through a securities exchange, providing the dealing quantity of those sold within 12 months does not exceed 2.5% and those sold within 24 months does not exceed 5% of the all issued shares of China CSSC Holdings, Ltd.

3. Under the premise of observing the second point mentioned above, all non-circulating shareholders must prepare an advertisement to that effect within two business days from the day the fact was generated until the quantity of shares dealt through a securities exchange reaches 1% of all issued shares of China CSSC Holdings, Ltd."[24]

As mentioned above, the important portion of a bill of the all the stock circulation reform approved in each specific shareholders meeting was introduced by the three central companies. The main point is that the circulation shareholder consented "the right of circulation" of the old non-circulating share to the non-circulating shareholder. In other words, the non-circulating shareholder, namely the large state-owned group enterprises acting as an authorization company or the high-ranking State-owned Assets Supervision and Administration Commission, has the final judgment whether the shares concerned are actually or unlawfully released to a market.

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[23] Description of a bill of all the stock circulation reform of Dongfeng Motor Group Co., Ltd.(the full text):20, translation by a writer

[24] Description of a bill of all the stock circulation reform of China by CSSC Holdings Ltd. (a revised edition):15,translation by a writer

Because institutions can emit non-circulating shares, even with restrictions, all the stock circulation reform is epoch-making and deserving of esteem. However, the judgment to do so is left to each organization. State-owned enterprise or state organs clearly are unable to eliminate the influence of the state, so a major fundamental change in the old rule structure will not be seen.

How has the composition of shareholders been affected since the enforcement of the reform agenda was passed a little more than seven years ago? Details from the annual report of each company mentioned above provide insights.

Baoshan Iron & Steel Co., Ltd., issued all stocks of Baoshan Iron & Steel Co., Ltd., as a circulation stock. The largest shareholder is still Bao Steel Group Corporation, which holds 76.68% of shares and maintains an overwhelming majority.[25]

Dongfeng Motor Group Co., Ltd., issued all stocks of Dongfeng Motor Group Co., Ltd., as a circulation stock. The largest shareholder is still Dongfeng Motor Corporation, which holds 60.1% of shares.[26]

China CSSC Holdings Ltd., issued all stocks of China CSSC Holdings Ltd., circulation stocks. The largest shareholder is still China State Shipbuilding Corporation, which holds 60.06% of shares.[27]

In the case of PetroChina Company Limited, the infrastructure of the energy-related company has a basis of public supply. Non-circulating shares remain (0.22% of all the issued stocks), but most of the non-circulating shares serve as circulation stocks. The largest shareholder of PetroChina Company Limited is still China National Petroleum Corporation, which holds 86.35% of shares [28] and maintains an overwhelming majority.

Regarding Shenhua Energy Company Limited, non-circulating shares remain (0.9% of all the issued stocks), but most of the non-circulating shares serve as circulation stocks. The

[25] Baoshan Iron & Steel Co., Ltd., 2012 annual report:27,29, translation by a writer
[26] Dongfeng Motor Group Co., Ltd., 2012 annual report:28,29
[27] http://stockdata.stock.hexun.com/2009_sdgd_600150.shtml, accessed August 06, 2013
[28] http://stockdata.stock.hexun.com/2009_sdgd_601857.shtml, accessed August 06, 2013

largest shareholder of Shenhua Energy Company Limited is still Shenhua Group Corporation Limited, which holds 73.01% of stocks [29] and maintains an overwhelming majority.

Conclusion

The composition of shareholders before and after “all the stock circulation reform” has been examined, mainly by a central company in state-owned enterprises.

Using the stock system as a trump card policy of a reform of state-owned enterprises succeeded in demutualization by carrying out packaging of a state-owned enterprise’s prime assets. [30] In that sense, most of incorporated companies in China inevitably established state-owned enterprises as the central units at the time the stock system was enforced. Defined as maintenance of a socialist system, the existence of the state is necessary when a mechanism functions whereby a state-owned enterprise is main equity, plays a role of an authorization company, and uses its position as a means of holding extensive shares. As a result, the listed company is under the powerful rule of a state-owned enterprise as a parent company.

The listed company exists under composition of rule involving “the state (the State-owned Assets Supervision and Administration Commission in 2003 and afterwards), a large, state-owned group enterprise (a central company or a district state-owned enterprise), and a subsidiary-listed company of a large, state-owned group enterprise.” In the present condition, any change is essentially ignored.

Ultimately, the result of “all the stock circulation reform” is only a superficial abolition of a non-circulating share. Under the current conditions, any movement toward change has not been achieved.

However, calls for steadfast maintenance of a socialist system have been greatly reduced, and the focus on ensuring and maintaining the predominance of a state-owned economy in the specific industrial domain has been shifted to other areas.

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[29] http://stockdata.stock.hexun.com/2009_sdgd_601088.shtml, accessed August 06, 2013

[30] In case of China, the demutualization of a state-owned enterprise has been carried out by a mean called “packing” in the main.

In which direction did it shift? The state-owned enterprise as a main driving force in an important group of enterprises is expressed more concretely as an advance guard point that drives economic policies for development of the Chinese economy in an authoritarian development system.

Although more substantial changes in the composition of rule of the state as a large, state-owned group enterprise or a subsidiary-listed company of a large, state-owned group enterprise are not seen, the purpose is changing greatly. Economically, China is being largely released from the spell of the socialist system, but politically, it remains in the old system involving one-party rule by the Chinese Communist Party. Therefore, we can see signs of clear progress and development in China.

Although the significance of a state-owned enterprise in a specific industrial domain is transfiguring, the magnitude of the state's involvement is an undeniable fact.

In order to realize the goal of steadfastly maintaining a socialist system while enforcing the Reform and Opening Up policy, the Chinese government has carried out excessive participation and regulation not only to economic areas, such as reform of state-owned enterprises and a stock system, but also to various other fields and domains. However, those regulations have changed greatly and have loosened and become meaningless in the various situations over the course of time, expansion, and development of an economic scale. These changes have led to increased power of the people, social development, and weakening of the one-party rule of the Chinese Communist Party.

The necessity for "all the stock circulation reform" originates from an old structure called the socialist system, or "Ancient Regime," during the second half of the implementation of the Reform and Opening Up policy.

China faces a variety of problems that have resulted in various peculiar systems for correcting inconsistencies that have arisen from introducing a market economy system while trying to implement the Reform and Opening Up policy into the old economic structure. I have wanted to argue as a writer it is just as the symbolic problem that "all the stock circulation reform" for the abolition policy of non-circulating share.

Other economic issues are arising, including the social security system, a labor shortage caused by an aging population and a low birthrate, and a Rural Workers (農民工) . These urgent problems are critical to society in China and need to be addressed quickly.

In view of these issues, it is necessary to revamp the socialist system, which has turned into the “Ancient Regime” in new China, and various old systems used in the first half of the Reform and Opening Up policy. The conversion of the regime would make it possible to progress and put the “New Reform and Opening Up policy” into force. This process will involve finding a solution to the problem of democratic politicization for the Communist Party of China, which continues one-party rule.

The enforcement of “The New Reform and Opening Up policy” and its success or failure remains to be seen. China has the ability to become a “major nation” in the economic world, or it can remain buried in a mountain of serious political, economic and social problems for the foreseeable future.

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Ⅱ The geopolitical context

Throughout History, some States have been forced to rely on the economy to overcome their geopolitical weaknesses. In Asia, three countries illustrate this situation: Japan, South Korea and China. Japan in order to avoid Western colonization, South Korea to deal with the communist threat of North Korea, and China to break the capitalist encirclement. Increasing power based on economy is often a conspicuously absent parameter from the analytical frame traditionally used in International Relations, which tends to give much more prominence to political and military fields. This weakness can largely explain why many experts in the field have not been able to detect the magnitude of the rise of major Asian countries like Japan, China and South Korea in recent years.

In 1978, China is in a very complicated strategic context (height of the confrontation between the United States and the USSR). Given its military weakness and failure of the policy of non-alignment, Beijing had no other choice but to turn to the economic sphere in order to exist on the world stage. China opted for a pragmatic and non-ideological approach to get the necessary materials and knowledge required for the development of its power. To avoid being designated as an aggressive power, it is building from the mid-2000s the image of a stabilizing power.

1 China's relations with the other diplomatic heavyweights: the economics behind geopolitics

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For the first fifty years of the People's Republic, which anniversary nearly coincided with the return of Hong-Kong to the Mother-Nation, China's diplomacy was dominated by traditional geopolitical questions of military power and political influence.

At a time when the country's main exports were Mao Zedong's Little Red Book and reverse-engineered MiG jet fighters, relations with the other main powers of the Globe focused on military confrontation, for those who were neighbors (India in 1962 and Russia in 1969); and on support to revolutionary movements or hostile countries for others.

A change of perspective

Nevertheless, in 1997, the aforementioned takeover of Hong-Kong already showed that China's diplomacy wanted to take a new dimension in consideration.

At the end of the first experimental stage of its economic reforms, the country knew it was to take a new rank on the international economy – an international economy that had been transformed, itself by the end of the Cold War, and the new era of Globalization. Negotiations about Hong-Kong were thus heavily influenced by a will to preserve the financial and logistic platforms that the soon-to-be Special Administrative Region offered to Guangdong, China's uncontested economic powerhouse at that time.

Fifteen years on, this moderation of traditional geopolitics by new considerations linked to the economy, has spread to China's relations with all of the other "Heavyweights" on the international scene.

China's relations with the US and Japan, as well as with its fellow "BRIC"-Brazil, Russia and India – all remain strongly influenced by an heritage that goes back much farther than the People's Republic. But all now also take into account the economic interests of the country. Bilateral relations are thus the result of a balancing between competition for traditional geopolitical influence, and cooperation for preserving economic stakes.

Russia: oil in the mechanics of diplomacy

Russia may constitute the most blatant illustration of that evolution.

On the long term perspective, relations between these two giants that share 3.645 kilometers of frontiers, remain heavily uncertain and potentially conflictual. China has not forgotten that, during its XIXth Century spoliation, Russia was the main beneficiary in terms of territory - integrating 1 million square kilometers of formerly Chinese territory, through the Aigun Treaty of 1858 and the 1864 Convention on NorthWestern Borders. The conflict for leadership on the Socialist World between the People's Republic and the USSR, that culminated in the short 1969 border war.

Notwithstanding that historical context, reformed China's relations with post-USSR Russia have been strongly influenced by mutual economic interests.

From weapons to hydrocarbons

The process began on a quite traditional geopolitical frame, at the beginning of the 1990s. China then became one of the main buyers for weapons produced by a Russian defense industry that had just been deprived of its former captive markets of the Warsaw Pact. The Su27 fighter became a symbol of this new collaboration, permitting the People's Liberation Army Air Force to reach a new level of equipment, at the time it maintained activity at Sukhoi plants.

But the new course of China's economy in the 2000s was to give a much more important dimension to its relation with Russia. As China emerged as a new economic powerhouse, it appeared that its resources in a certain number of fields – beginning with hydrocarbons – would be insufficient to fulfill its needs.

In that new context, the fact that its Russian neighbor is the World's main producer of both crude oil and natural gas took a new significance. And the fact that this potential, relatively close, provider was short of cash, at a time when China piled money thanks to its trade surpluses with the West, was a happy coincidence.

Oil and banking giants take center stage

In the years 2000, the China Development Bank (CDB), China's policy "superbank", thus dethroned the weapons import agencies as China's most influent actor in Sino-Russian relations.

The importance of the negotiations in which it was involved appeared fully in 2009, in a four-party strategic agreement. Along with the CDB, it involved CNPC (China National Petroleum Company, the holding of PetroChina) on the Chinese side; and crude oil producer and transporter Rosneft and Transneft on the Russian side. The agreement stated yearly deliveries to CNPC, for 20 years, of crude oil produced on Rosneft's Siberian fields, through a pipe-line built and operated by Transneft. In exchange, the two Russian oil companies obtained huge credits from CDB, with a cumulated value of 25 billion dollars.

In March 2013, Xi Jinping's first foreign visit as President of the People's Republic confirmed the importance of this new Russian oil diplomacy. One of the main results of his stay in Moscow was the signing of new agreements between Rosneft and CNPC, for doubling deliveries from the Siberian oil fields, to 30 million Tons yearly. The CDB was still an important part to the deal, as at least 2 billion dollars of new credit were granted to Rosneft on that occasion. The visit also included signing of agreements between CNPC and Gazprom. The Russian gas giant agreed to deliveries to China that have to be specified, but that should be over 40 billion cubic meters per year. These giant hydrocarbon contracts were the most striking results of Xi's first presidential visit, illustrating the importance of economics in the new Sino-Russian relations.

On the long term, rivalry will remain between the two giants. But as long as China's industrial powerhouse needs fuel, the economic factor will deeply impact bilateral diplomacy.

India: from border confrontation to trade war threats

India is the other diplomatic heavyweight with long borders (3,380 kilometers), and lasting border problems (dating back to 1914 and the MacMahon Line) with China.

The tensions here, complicated by alliances with third parties (the US for India, and Pakistan for China), and by the question of Tibet, are more vivid. As late as April 2013, an incursion in disputed territory by a Chinese commando provoked an uproar in India, and reminded the World of this potential for conflict.

Intelligence targets economics

Nevertheless, this incident just preceded an official visit that was a proof of the importance China gives to that bilateral relation. In May 2013, New Delhi was the destination of the first foreign visit of Li Keqiang as Prime minister of the People's Republic.

On the other side of the border, the nature of the main reaction of India was also a sign of the new role of economics in the bilateral relation. India did not take any military action against the border incident that was decried as a Chinese provocation. But just one week before Li arrived in New Delhi, India's National Security Council (NSC) publicly issued a report that attacked Chinese telecom equipment providers Huawei and ZTE. Developing arguments similar to that of US Intelligence (see farther on that Chapter), it called for national alternatives to the imports of Chinese equipment, under the motive these could imply a threat for the functioning of national infrastructures.

Interlinked questions

Li Keqiang's visit to New Delhi had much less results than Xi Jinping's visit to Moscow some weeks earlier. But its main results were declarations of intention on two questions that were implicitly linked. One was on the will to resolve the border dispute between the two countries; and the other on developing trade, through more opening of both markets.

Although this may change depending on the evolution of China, economics today have come to the same level as traditional geopolitics when Beijing envisages its relation to India. The potential of the Indian market for Chinese exports is important enough to balance the border conflict.

Japan: one step farther – and back to traditional geopolitics?

Whereas economics have recently become at least as important as traditional geopolitics in China's relations with other diplomatic powers, its relation to Japan shows a quite different profile.

There, the preeminence of economics over traditional politics begun much earlier - as soon as the 1980s. But on the contrary, there seems to be a receding of their preeminence today, and a shift back toward more traditional geopolitics. The main reason is that economic relationship between both countries has radically changed on the course of the past 30 years.

Low profile for take-off

Although China's relation with Japan is undoubtedly the most sensitive and conflictual of all, because of the inheritance of the half century that ran from the Shimonoseki Treaty of 1895 to the end of Japanese occupation in 1945, it was also the earliest one to be moderated by Emerging China's new economic priorities.

Excluding Hong-Kong data, Japan was the most important foreign direct investor in reforming China, with 11.5% of FDI amounts cumulated from 1979 to 2011 (against 10% for the US, that rank number 2). And Japanese influence on the industrial take-off of China has been even more important than suggested by that figure. Several sectors that played a key role in the early stage of China's industrial emergence in the 1980s and 1990s – such as electronics and appliances – benefited from decisive (wanted or unwanted) technology transfers from Japanese firms.

In 1998, Jiang Zemin's visit to Japan, the first by a President of the People's Republic, showed that China was ready to make efforts toward easing of tensions. When pioneer

Japanese firms in electronics or appliances were joined, as investors in China, by others from the car, rail or chemical industries in the 2000s, the full benefits of a relatively low profile on confrontation with Japan appeared.

Inversions

Nevertheless, as mentioned above, a more recent evolution shows that economics, although they strongly influence the diplomacy of China, do not erase the old geopolitics.

In the wake of the World financial crisis, China has dethroned Japan from the 2nd rank in the World economy. And the dependency relation between both economies has tended to inverse. In 2012, whereas Japan accounted for 7.4% of China's exports, China, with 18.0%, accounted for a much larger share of Japan's exports. And even though Japanese investments still play an important role in China, Chinese investments have begun in Japan, in vulnerable sectors as electronics and appliances - that were the pioneers the other way thirty years earlier.

In that context, traditional geopolitics have resurfaced. Confrontation about the Diaoyu/Senkaku islands led to demonstrations directed against Japanese firms or their products in China in 2012.

The economic preoccupation of China is no more important enough to contain traditional politics. On the opposite, these seem to be usable as an economic weapon, to limit market share of Japanese products in certain sectors, such as the car industry, that was heavily impacted by the movement of 2012.

The USA: an in-between relationship

China's relation with the US, widely considered as the one between the world's actual and future superpowers, has fully integrated the new parameter of China's economic emergence. Nevertheless, there also, time has come for traditional geopolitics to regain ground. But, contrarily to the relation with Japan, initiative there has not come from the Chinese side but from the other party.

Complementary interests

For thirty years - from President Nixon's historical visit to the former enemy in 1973, to the buying of the PC branch of IBM by Lenovo in 2004, that was the first Chinese takeover of an important US firm —, complementary Chinese and US interests have paved the way for a spectacular bettering of relations.

Traditional geopolitics still resurfaced, sometimes strongly. The freezing of relations after the Tiananmen repression in 1989, the Taiwan Strait missile crisis of 1996, the Belgrade embassy bombing in 1999, or the Hainan incident in 2001, all showed that confrontation was still possible.

But the strong development of trans-Pacific commercial and industrial ties, clearly became decisive for both countries. In 2012, the US absorb, as China's second Overseas market (the first if the EU is not considered as one entity), over 17% of its exports. And US firms account for 10% of FDI cumulated in China from 1979 to 2012 (excluding Hong-Kong data). Although the trade relation is heavily unbalance, China is nonetheless the second Overseas market for the US (far behind the EU), with nearly 11% of US exports outside NAFTA. And FDI from China, even if it remains at a relatively low level (it has reached 6.5 billion dollars for the sole year 2012), has come to play a decisive role for some cash-strapped post-crisis US industrial firms.

Broader picture

Over the last ten years, nevertheless, this relation has seen a notable evolution, determined by a mix of elements, half-way between economics and traditional geopolitics. But the initiative has not come from China, but from the other party. As soon as 2005, the US showed that they considered their growing economic ties with China to be part of a broader geopolitical picture, which implied intervention of politics.

2005 saw the first important manifestation of that point of view, with the Unocal affair. Just as CNOOC (one of the three State-owned oil firms of China) intended to buy the California-based group, general uproar of US Representatives (Democrats and Republicans united), who said this may threaten the US energy independence, convinced it to retreat. On the following years, clear signs followed, that Washington considered a certain number of in-

dustrial domains outside China's reach, with telecom equipments taking center stage. Official or implicit vetoes against Huawei and ZTE, the two fast growing "champions" of China in that field, escalated into a report of the House of Representatives Intelligence Committee, describing the Chinese telecom giants as "threats against national security" in October 2012.

The last episode to date of that confrontation came with the accusations of Chinese cyber-spying in 2013. There again, the uncertain limit between economics and traditional geopolitics came to light. The White House first accused China of spying on US firms, before a Pentagon report affirmed that US government bodies were also targeted. And finally Chinese spying on US weapons systems was pointed.

Geopolitics and economics in a reciprocal influence

Notwithstanding this escalation, there is no "all out" commercial war between China and the US. At the same time Washington vetoed Chinese contracts in some fields identified as strategic, it did not oppose important Chinese acquisitions in other domains. Chinese firms have thus taken positions, implying technology transfers, in sectors as shale gas, electric vehicles batteries or non-Defense related aeronautics.

Traditional geopolitics and economics exert a reciprocal influence on the relationship between the Chinese and US superpowers. Common economic interests strongly moderate confrontation that would arise from a simple point of view of influence rivalries. But as soon as these same economics can be linked to traditional geopolitical considerations – such as oil providing or cyber security -, those take back center stage, reminding that the market in itself does not determine the way the global economy – and the World - works.

China-Brazil: the perfect partnership?

Among the emerging diplomatic powers of the Globe, Brazil is the one that presents the best potential for cooperation with China.

Both countries have a very limited common history, and thus no conflictual inheritance, as it is the case with the other "BRIC" (Russia and India). Both tend to focus on different re-

gional spheres of influence (South America and East Asia), avoiding the risk of a clash (as it is the case with Japan and the US). And their respective economic specialization profiles make them perfect partners in theory.

Complementarity

In 2012, China has become the number one supplier of Brazil, as of many countries, accounting for 15% of its imports. But what makes a big difference with many other countries is that on the same year Brazil had a comfortable trade surplus (of 7 billion dollars) with China, that has also become its first client, accounting for 17% of Brazilian exports in 2012.

Brazilian ores, agricultural products, and oil sold to China, more than compensate manufactured goods (led by electronics and industrial equipment) bought from China. Oil diplomacy, as applied to relations with Russia, is also at work there: in 2009, the China Development Bank (CDB) granted national oil company Petrobras 10 billion dollars of credits, in exchange for guaranteed deliveries to China.

Economic conflict potential

Nevertheless, on the long run, relations between the two countries may be a little more complicated than it appears at first sight.

The first problem appears on the Chinese side. It concerns the fact that Brazil takes center stage in a structuring of the international ores market, that is problematic for China. Vale, the firm controlling 85% of Brazil's iron ore production, is (with the anglo-australian groups BHP Billiton and Rio Tinto) one of the three giant firms exerting a de facto control over international ore prices. As Vale has been privatized in 1997, the problem is not directly diplomatic. But indirect control of the Brazilian State over the giant miner remains important. And conflict between it and the Sate-owned steel giants of China could lead to tensions between Brazilia and Beijing.

On the Brazilian side, the problem comes from the traditional risk of a resources-rich country, of being cornered on that specialization. Raw materials producers Vale or Petrobras fully benefit from China's demand. But Brazilian groups in manufacturing areas, such as Gerdau for steel or Embraer for aerospace, are, or will be, confronted to China's "champi-

ons" as competitors. On the long run, it seems probable that Brazil will not satisfy itself with a position of raw material provider for China. Tensions with China could there come from economics, where there was not any classical geopolitical motive for confrontation.

Wether you look at Russia, India, Japan, the US or Brazil, relations of China with the other heavyweights of the diplomatic scene are definitely strongly influenced by economics today. But this doesn't mean they will be quiet.

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2 The African policy of China

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François Gonnet is patented in higher military education (School of War), holds a Master of African Studies in Legal Anthropology (University of Paris I) and a Masters in Strategy & Competitive intelligence (EGE Paris).

If the reasons that lead China to invest in Africa and those who lead it to accept the Chinese penetration has already been extensively discussed and described, it is useful to focus on the strategy implemented by Beijing to conduct its African policy by identifying ways and means and by measuring the effects in order to check the validity of the concerns it raises. Indeed, the Chinese presence in Africa is sometimes presented as a threat, sometimes as a hope for the continent, whether by Westerners or Africans themselves.

An African policy which is part of an overall strategy

By throwing in a speech in Shanghai, in December 1978, its policy of reform and opening up, Deng Xiaoping adopted a new method compared to its predecessor and no longer relied on its own strength, as the Maoist slogan says “better use the outside world leverage to undertake the development and enter into modernity”. (de La Maisonneuve 2012).

He will specify the objectives in time, including the 20/20 goal: 20% of global GDP and 20% of the world population[31]. It was about moving in fifty years from 1% to 20% of global GDP and bringing the Chinese population from 25% to 20% of the world population. If the current economic strategy is the continuity of the one initiated by Deng and must be inter-

[31] The Chinese population currently represents not more than 19% of the world population and the Chinese GDP, second in the world since 2010, close to 10% of world GDP.

preted according to political imperatives (the security and development of the country), Beijing has used an unusual mix of practices to achieve this goal.

A global multifaceted strategy

The most visible expression of this strategy is to align its behavior with that of Western powers in a classic exercise of power. However, the exercise mode of the power is not the most common or the most effective in the eyes of the Chinese.

Their strategy usually plays on more nuanced registers inspired by tradition and prudence. It comes to "marry the spontaneous course of things that enables the design of strategic direction no longer in terms of action but reaction" (de La Maisonneuve 2012): Beijing also practices soft power to the Chinese (the rian shi li), where use of mental strength is much higher and more effective than physical force. It has three aspects: the oil stain that consists in going out of the borders, seduction through cultural influence and intrusion into the heart of partners or competitors systems, as evidenced by the recent case of penetration in U.S. confidential sites. China plays all these registers to implement, particularly in Africa, two types of strategies:

- An "octopus strategy" where it extends its tentacles across the continent to facilitate and boost its economic development[32], in order to supply materials opportunities to the 'factory of the world'. It relies on a diplomatic network which is constantly growing, a Chinese Diaspora of 60 million people of which about one million in Africa, Chinese companies setting up abroad or buying up rivals, and considerable financial reserves.
- A "strategy of seduction" which aims to promote speech and socialist culture with Chinese cultural characteristics, relying in particular on the New China News Agency (Xinhua), the State broadcaster CCTV and the Confucius Institutes. It is intended to raise the profile of the PRC which is conscious of being unloved or misunderstood by the western world and offer an alternative to the American way of life to which it is subjected.

Now Africa is one on which Beijing can deploy the most effectively and most easily this strategy, due on the one hand to the significant resources it contains and diplomatic sup-

[32] According to the International Energy Agency (IEA), China has become the first energy consumer in 2009 with 2,252 billion TOE.

port it can provide to the PRC, and on the other hand because of the old solidarity South/South, maintained today between emerging countries.

An evolutionary strategy adapted to the penetration of the African continent

This strategy applies in three key areas: diplomacy and support of Chinese policy in international affairs, the search for raw materials and the search for new markets for Chinese goods. The relative importance of each of these priorities has evolved over time. Still isolated on the international scene in the late 1950s, China has sought diplomatic support by building relationships with future African States and taking advantage of the development of South/South relations resulting from the Bandung Conference in April 1955. With the support of African States, the PRC has subsequently obtained a permanent seat in the Security Council of the United Nations in 1971[33] and the organization of the 2008 Olympic Games. Reciprocally, Africa is supported by China to try to get a permanent seat in the Security Council of the UN.

Today, Beijing seeks above all to ensure the supply of energy to meet its enormous needs and find opportunities to sell its manufactured goods. Its main objectives are the acquisition of oil (in 2006, 34% of oil used in China was imported from Africa) and the acquisition of minerals (25% of cobalt and steel produced in Africa go to China).

But since 2005, the PRC is also interested in wood and agricultural land in order to ensure the feeding of a billion and a half people, while its territory holds 12% of arable land[34]. Meanwhile, thanks to its admission to the World Trade Organization (WTO) in December 2001[35], where it has comparative advantages, China has seen its trade with Africa jumped from $10 billion to more than 200 billion between 2000 and 2012[36].

It is by using these comparative advantages and displaying its non-interference in the internal affairs of African States that has carved the lion's share with them.

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[33] In place of the Republic of China (Taiwan) which occupied the seat until then.

[34] The arable lands area is decreasing due to urbanization in the country.

[35] Yuan's real exchange rate undervalued. Non-convertible currency and fixed rate with the dollar. Low wages and low social taxes.

[36] According to He Wenping, head of the African office at the Institute of West-Asian and African Studies (part of Chinese Academy of Social Sciences).

The Forum on China-Africa Cooperation (FOCAC or FCCA), established in 2000, also gave a strong impetus to the development of Sino-African economic relations. It helped to institutionalize the African policy of China henceforth stamped by the seal of continuity and creativity. Every three years, the leaders of 49 African States and the Chinese authorities can launch new initiatives and new projects. This Forum, which facilitates bilateral cooperation between each African State and Beijing also allows to expand cooperation in the fields of national security, culture, education and training of human resources. Evolutionary, the Chinese penetration strategy in Africa is also implemented with pragmatism on all chessboards.

An African policy of soft power implemented with pragmatism

Officially proclaimed at the 17th CCP Congress in October 2007, soft power has been presented as “a fundamental tool to improve China’s image abroad and increase international competitiveness” (IRSEM 2012). Its implementation in Africa is characterized by the variety and complementarities of targets, actors and instruments they use.

Determinants of Chinese penetration in Africa

What determines the Chinese penetration of an African State is essentially a function of the relative interest it presents for Beijing which results from a combination of factors that can be represented as follows: (SI + PI + DI + TI)/WC, that is to say, the addition of strategic interest (SI) related to the existence of strategic resources for Beijing (Sudan, Angola, Nigeria), a political interest (PI) based on the relative political clout of the country in the comity of nations and its influence on other African countries (RSA), a demographic interest (DI) which takes into account the expected demographic changes (Nigeria, Ethiopia) and a territorial interest (TI) that combines the size, geographical position and available land of the considered country (Tanzania, DRC). Countries that combine many of these assets are those in which China is the most committed. China enters often into various sectors as oil & gas industry, infrastructure industry, finance & banking; which represent its largest projects in Africa (besides RSA, Nigeria, Angola, Algeria, DRC). The interest so accrued may be affected by the involvement or the implantation of Western countries (WC). This does not mean that China is not interested in African States in which Western countries have a strong presence, but it penetrates without restraint those in which they are absent

for various reasons (dictatorial regimes placed on the bench of the international community or country at risk where its competitors are reluctant to invest). In this fourth category of countries to which Beijing is interested primarily, Sudan and Zimbabwe are two emblematic cases.

The actors of Chinese penetration in Africa

The first actors whose involvement should be emphasized, are political leaders or precursors (Richer 2012). During his ten years in office, President Hu Jintao has made four State visits to Africa and visited 18 countries with an important visit in early 2007 (12 days, 7 countries visited and 38,000 km)[37]. Before being invested on the head of State, his successor, Mr. XI JINPING met February 17, 2013 at the Great Hall of the People in Beijing, Ms. NKOSAZANA Dlamini-Zuma, President of the Commission of the African Union then immediately invested, he went to Africa where he participated in the BRICS summit in RSA, and then moved to Tanzania and Congo. Similarly, for 20 years, first trip overseas of the Chinese Foreign Minister systematically includes Africa. These trips are an opportunity to provide new loans to launch large constructions or to open schools, hospitals and other structures built by China.

The entrepreneurs formed by the major Chinese State companies are the second vector of Chinese penetration in Africa. These are major oil companies associated with local companies and capable playing subcontractors for Western oil companies or large construction companies involved in the realization of economic and social infrastructure projects[38] or large banks. Many other Chinese companies are active in the areas of exploitation of minerals and agricultural land.

The men on the ground are the third type of player. It is characterized by its variety as it includes cooperating (managers and engineers skilled in the projects), Chinese workers employed by Chinese companies or joint ventures especially in public works projects, young volunteers to participate in micro projects, military more often involved in missions peace-

[37] Egypt, Gabon and Algeria in January 2004; Morocco, Nigeria and Kenya in April 2006; Cameroon, Liberia, Sudan, Zambia, Namibia, South Africa, Mozambique and the Seychelles in February 2007; Mali, Senegal, Tanzania and Mauritius in February 2009.

[38] According to the World Bank, China gets 31% market share for civil engineering contracts relating to tenders released by International organizations (World Bank, African Development Bank).

keeping (Liberia, Western Sahara, Côte d'Ivoire, Eritrea) or monitoring elections (Malawi, DRC), all present for a given period under contracts. Other Chinese nationals are present in a more sustainable way, these are either traders or off-the-law or traffickers who illegally exploit minerals or engage in poaching (ivory, in particular). All these non-State actors have an important role in the field of public diplomacy, instrument that can serve the image of China or penalize it, according to their behavior.

The instruments of Chinese penetration in Africa

Although she has not waived, the PRC is gradually replacing donations (especially military equipment) and debt write-offs, mostly used at the time she sought the political support of African States, by two types of loans. Subsidized loans at preferential rates, for which the difference between the agreed rate and the base rate is the responsibility of the Chinese government, are awarded after considering the profitability of the project. Concessional loans secured on natural resources (oil, minerals) whom repayment terms are set out in the agreement (in principle 20% of production) are generally related to the establishment of joint venture (JV), vectors of strategic alliances forming the basis of Chinese direct investments (FDI) (see Figure II-2-1)[39]. They put up with a remarkable pragmatism "hybrid operations such as strategic partnerships and alliances to reconcile their financial and technological resources with their international strategic goals while minimizing their risk." (Dzaka-Kikouta 2012). The multiplication of JV (see Table II-2-2) in Africa is a triple goal for China. First, market penetration and securing supplies of petroleum and mining products through what is known as the "Angola mode"[40]. These JV can also help to deploy a procurement strategy and vertical integration by exploiting crude oil[41] or conquer foreign markets and strategic assets by taking advantage of regional trade agreements such as the agreement of free trade ECCAS[42]. Chinese financial groups have also begun, via JV, the process of internationalization to acquire strategic assets in Africa at the example of ICBC (see Table II-2-3). Chinese firms prefer mergers-acquisitions (as opposed to ex nihilo creation), but this

[39] In 2009, percentage of FDI projects launched by Chinese state owned companies in Africa reached third world rank with 21.4% of total projects.

[40] It carries a "package deal" in a complex offset mechanism which allows the exchange between oil and mining contracts and infrastructure projects. JV example: Sonangol Sinopec International (SSI) between Sinopec (55%) and the Angolan state owned, Sonangol (45%).

[41] China National Petroleum Corporation has delivered to the Chad its first refinery with a capacity of 20,000 barrels /day in June 2011.

[42] A Chinese group, Fuzhou Huasheng Textile, was allowed to open business in the DRC in 2011 and supply the important mosquito nets domestic market and also the ECCAS neighboring countries.

situation could change in light of the government's strategy in China for the establishment of special economic zones (SEZs). Seven SEZ (five in sub-Saharan Africa and two in North Africa) are being developed and the long-term goal is to reach a total of fifty throughout sub-Saharan Africa (Nséké 2012) (see Table II-2-4). The development Fund China-Africa[43] supports the creation of these SEZs developed under the responsibility of official Chinese consortiums. They are an interesting example of concentration of FDI and are platforms for the export of manufactured products to third markets (Africa and China excluded). They have a positive impact in terms of development for Africa (investment, employment, social and environmental impact and transfer of skills). It is also a way to circumvent the implied restrictions imposed by EU and U.S. on Chinese products and enjoy the benefits of exports from Africa. This new cooperation model allows China to further strengthen its position in Africa.

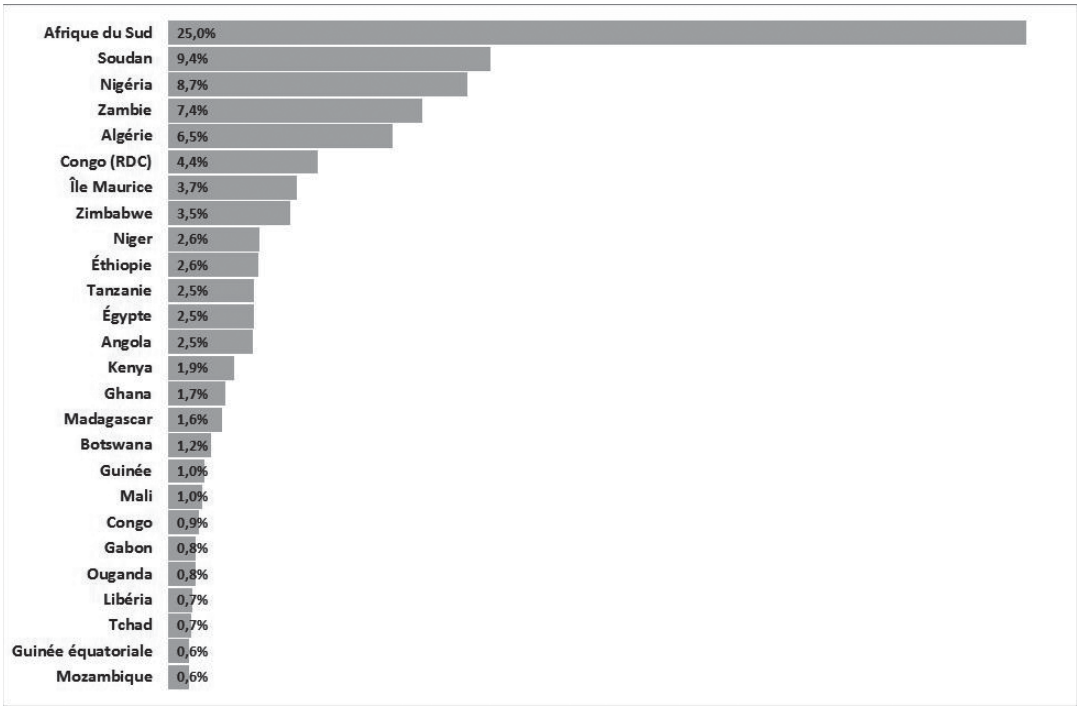

Figure II-2-1; Profitable African Countries of 95% of the flows of Chinese direct investment (the end of 2011) (Source:Chinese Ministry of Trades or MOFCOM)

[43] China-Africa Development Fund was established in June 2007 with an initial asset of a billion of dollars provided by the BDC. Close to $10 billion have been invested by Chinese companies in Africa through this fund.

COUNTRY	JOINT VENTURE	CHINESE COMPANY	AFRICAN COMPANY	SECTOR / INDUSTRY
SUDAN	KHARTOUM REFINERY COORPORATION (KRC)	CNPC détient 40% de KRC	Khartoum Refinery Coorporation	Oil Owned 40% of Khartoum Refinery Coorporation
CONGO	. SICOMINES.	China RAailway Group Ltd Sinohydro Corporation China Railway Sino-CongoMining Ltd (68%)	Gecamines (32%)	Mineral Resource Exploitation contract of 10 million tons of copper and 600 000 tons of cobalt
ANGOLA	Sonangol Sinopec International (SSI)	SINOPEC (55%)	SONANGOL (45%)	Exploitation of offshore oil blocks vs. concessional loans estimated between 5.5 and 8 billion $
CHAD	Société de raffinage de N'Djaména (SRN),	CNPC (60%)	Société des Hydrocarbures du Tchad (SHT).	Oil deliveries to refinery a 99-years JV

Table II-2-2; Chinese-African joint venture examples

(made by the author from various sources)

COMPANY	
Exim Bank	40% of the portfolio with credits in Africa Finance 259 projects in 36 countries Liabilities 2005 of 6,5 billions$
Industrial & Commercial Bank of China (ICBC)	Bought 20% of *Standard Bank Group of South Africa* (5,6 billion$) Offices in 18 african countries
China Development Bank (BDC)	Set up *China Africa Development Fund* (5 billion$) Liabilities 2005 of 1 billion$
Dayuan International Ltd China BeijaEscom International Ltd	Created a JV with *Espirito Santo Commerce*, subsidiary of *Espirito Santo Financial Group* in 2004. Office in Congo in 2011

Table II-2-3; Largest chinese banks in Africa

(made by the author from various sources)

COUNTRY	GROUP / FTZ	SHAREHOLDER AND ET SECTEUR D'ACTIVITE
ZAMBIA	Chambishi Non ferrous Metal Mining Group Industrial Park	China non ferrous mining Co. (>95%) and a zambian state owned mining company (<5%). Minerals non ferreux, services and industries (Lusaka area).
NIGERIA	Guangdong - Ogun Economic and Trade Cooperation Zone	Chinese companybased in Guangdong (82%), Ogun State Gouvernment in Nigeria (18%). Light industry, products For farming
MAURICE ISLAND	Tianli (désormais Jin Fei) Economic and Trade Cooperation Zone	Chinese companies (100%): Tianli and two majors companies. Manufacturing products and services.
NIGERIA	Lekki Free Trade Zone	Four chinese companies As CADF (60%) and Nigéria (40%). Automotive parts, products textile, light industry
ETHIOPIA	Eastern/Oriental Industrial Park, Jiangsu Qiyuan Investment Group	Chinese companies (100%) : Groupe Qiyuan and two small companies Building products and Iron products

Table II-2-4; Chinese areas of economic cooperation and foreign trade in Sub-Saharan Africa
(Source: les modèles africains – <www.afriqueexpansion.com/les-zones-economiques-speciales>)

Conscious of its perfectible image on the African continent, China is also based on the cultural instrument to expand its influence through scholarships (21,000 African students in 2007), vocational training and forums that intercultural[44] designed to enhance mutual understanding and friendship that Beijing wants to see deep in the heart of the two peoples. But the ultimate weapon in this area is the development of the Confucius Institutes Classrooms. End of 2012, there were on the entire African continent, in 26 countries and regions,

[44] Successful China-Africa Young Leaders Forum and China-Africa People's Forum which recently took place in Beijing, respectively before and during the fifth ministerial conference of the forum on china-africa cooperation (FOCAC).

31 institutes and 5 classes that are intended to showcase Chinese culture, develop learning of Mandarin and deliver specialized training.

A successful African politics but which reached its limits

The strengths and successes

The size, speed and diversity of Chinese penetration in Africa strike minds and are the hallmark of an unquestionable success of China in Africa. The figures speak for themselves: Africa's exports to China increased from $59 to 73 billion between 2010 and 2011 and in 2011, 18% of Africa's total trade is done with China, against 4.5% in 2002. In 2012, according to the Chinese Minister of Commerce, 2000 Chinese companies have made direct investments in Africa (Li 2012) as they were a thousand in 2009. Beyond the numbers, China has been particularly successful in securing its supplies of strategic energy sources and developing its political influence on the continent. The reasons for this success are based both on China's own strengths and the opportunities it has seized. Among the former, let's quote centralization at the highest level of the State that facilitates the definition and implementation of a public assistance and a structured and coherent political discourse, when a contrario the European Union, despite a strategic partnership signed with Africa, is still struggling to define an African policy. The march of China's success is based on three pillars: non-interference policy that meets the African heads of State, financial strength which allows an aggressive investment policy, and the priority given to infrastructures that meets the basic needs of African States. Among the opportunities that Beijing has seized it should be noted the withdrawal of Western companies in countries at risk or whose regime is considered wrong and the image, politically exploited, of a southern country that emerges when Western countries are in crisis. According to organizations such as the OECD and UNDP, China also contributes to African growth, since each percent increase in the rate of GDP growth in China has led to an increase of at least 0.3% GDP of sub-Saharan countries with low incomes and an increase of 0.4% of GDP in middle-income countries. Finally, China plays on two strengths: speed of execution (from decision to final realization) and technology transfers through the SEZ.

Limits and failures

Despite proven successes, China faces difficulties in the implementation of its African poli-

cy that contribute to mitigate its effects. They are due to the behavior of Chinese actors, the difficult development of Sino-African cultural exchanges and of a growing awareness by Africans of a new form of colonialism. Several cases of repatriation at the request of local authorities (Chad), aggression (Zambia) or removal (Sudan) of Chinese executives have been reported. They reflect the tensions that exist between Africans and Chinese whose modes and rhythms of work are very different and the discontent caused by the lack of local labor employed by Chinese companies, by working conditions of this local labor and the absence of environmental protection. Moreover, despite all efforts by Beijing to spread Confucianism, Chinese's influence in Africa is much lower than the one of the United States or than the former colonial powers, and the Chinese community remains grouped and isolated[45]. Finally, if Africa finds benefits to the growth of trade with China, they are profoundly unbalanced[46] and the role played by the latter in the global manufacturing is also likely to exclude the continent. This creates African reactions not only in words, as Mr. Lamido Samusi, Chairman of the Central Bank of Nigeria, recently did by urging Africans to revise their relations with China (Samusi 2013), but also in deed, as Lagos which applied a 3 years old law (Nigeria's local content), which imposes that a large majority of activities related to oil and gas be ensured by of local workforce. Other measures[47] are taken by other countries to limit Chinese influence on African economies, the ADB assists for its part States to renegotiate contracts with multinationals that exploit the wealth of the African basement. On the other hand, if China contributes to the development of Africa, she's not the only one and she must increasingly rely, in addition to the Western powers, on its partners/competitors from the BRICS (see Table II-2-5) and other new entrants are going to become serious competitors.

[45] For example, in Ethiopia where major infrastructure tasks were carried out by China, in particular the AU headquarter, Chinese workers did not mix with the local people and enjoying special flights booked for them for their holidays in China.

[46] In 2007, 86.7% of Chinese importations from Africa were energy products and 5.3% minerals.

[47] For example, Angola and its oil company Sonangol suspended negotiations in 2007 for the building of a refinery and decided, by "economic patriotism", to realize alone this project to reduce its dependence on oil importation.

COUNTRY	FDI	APD	OBS
BRAZIL	2000: 2,28 billion $ 2006: 28 billion $	500 millions $	Mainly in portugese-speaking countries
INDIA	2006: 9,7 billion $ 2011: 16 billions $	20 millions $ (2009)	FDI: 13 billions on average between 2007 and 2011
RUSSIA	No reliable data	Only in the case of humanitarian assistance	
SOUTH KOREA	249 millions $ (2005)	100 millions $ (2008)	
TURKEY	2,3 billions $ (2006)	25 millions $	

Table II-2-5; New comers in Africa
(made by the author from various sources)

Aware of the limitations of its current policy, China plans to expand its involvement in Africa in the field of peace and security on the continent by developing a strategic partnership with the AU that could compete with that of the EU and Africa.

Conclusion

By playing on the strengths and weaknesses of its competitors, China has succeeded over the last decade in its implantation in Africa with a strong desire to offer a credible alternative for Africans of the one proposed by Westerners and organizations such as the IMF and the World Bank considered to be in their hands. It is the success of the Beijing consensus versus the Washington consensus that promotes good governance as a prerequisite for development. However, this success seems to have reached its limits and Beijing, in addition to competition becoming stronger in the exploitation of resources and the development of trade with Africa, the PRC will have to be more concerned about the safety of its citizens, as showed in the Libyan crisis[48], and a certain unpredictability of its African partners. But China will continue to take an interest in Africa, of which she needs to defend its interests with the power that is henceforth its own. She still leads with pragmatism a policy that is part of an overall strategy to fill the “Mandate of Heaven”[49] and achieve the “Chinese

[48] China had use in an emergency various means to successfully evacuate close 20 to 30 thousands citizens.

[49] The “Mandate of Heaven” is, as the building of national unity and the establishment of a central government in charge of security, one of two majors’ objectives that China has set itself for centuries. It forces state leaders, under pain of being rejected, to supply the basic needs of the people (dressing, eating, housing, moving). These objectives are now completed by a third one, the Chinese dream, recently promoted by Mr XI JINPING. It consists to overtake Western countries without sacrificing its own way of development.

dream". However, its purpose seems neither world domination, nor its integration into the world system of which it has neither the culture nor the experience, but an alternative to it and the challenges that lie ahead, internal or external, by maintaining the power of the CCP.

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3 China in Brazil, an emergent empires partnership shaping new world order?

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Though the current relationship between Brazil and China is mainly economic, a political dimension has to be considered. Based on their specific geo-political situations, needs and specific orientations, these BRIC members share convergent interest in shaping a new world order in a way that doesn't match so well with the Western pattern. Increasing cooperations between these two powers appear as strategic to counter-balance historical and till now dominant international economic flows and political influence. For them both, the "concept of empire" sounds consubstantial within their history. The new "Middle Empire" that dominates the world sounds as an evidence for China while Brazilian soft influence and economic development is spreading fast not just in South America but worldwide too. A basic strong relationship between supplier and buyer has recently initiated business between China and Brazil. By now exchanges and cooperation are growing very quickly within brand new areas.

A so recent history

First official contacts between China and Brazil began in 1974 through a Joint Communication for the Establishment of Diplomatic Relations. But it remained incipient. For Brazil, which hosts a two millions nippo-descendent community, links and cooperation with Asia were basically focused on Japan. By the end of the nineties, China suffered the Asian crisis simultaneously with the Brazilian one, but things changed drastically by the beginning of Century Twenty First, which is the very start of an expansion that drove these countries to be recognized as emerging economies among the ten largest ones in the world.

All along years 2000's, Brazil and China adopted a bilateral model for cooperation based on economic complementarity from a main commodities supplier to a starving commodities buyer. To strengthen it, China's commitment with Brazil institutionalized gradually. Presidents Lula and Hu Jintao signed a Brazil-China Joint Action Plan for 2010 to 2014, an important milestone on the increase of relationship between the two countries. By the way, a Ten-Years Plan for Cooperation from 2012 to 2021 which pointed out priority areas and key projects in science & technology, innovation, economy and global exchanges, is in process.

Until recently, Brazil and China were pure strangers to each other, but over the past thirty years many things have changed within bilateral relations: type of agreements, objectives pursued and cooperation mechanisms on quantitative and qualitative levels. By now their partnership diversificates and grows simultaneously of the main commodities flows. One might identificate kind of implicit complicity between these "emerging new comers" within the international political scope, which claim for own and independent views and values, sometimes that contradict traditional Western ones.

Trade and Investments: High speed economic development on an unbalanced basis

In 2009, China became the main trading partner of Brazil, bigger than the U.S. or the European Union. Between 2007 and 2011, Brazilian exportations to China increased by 312% (from $23 to 77 billion), while exportations from China grows about plus 160% (MRE 2012). Brazilian sold to China mostly commodities (85% in 2011), especially iron ore, soybeans, crude oil, wood, and sugar. Brazil bought mainly manufactured products from China, quite 50% were IT, but significant also came from organic chemicals, cars, iron and steel (MRE 2012). By their nature these exchanges might be read as the one between an industrial country (China) that transforms and sell, with an under-developped one (Brazil) which provides rough materials. The huge potential and realities of the emerging Austral giant, made a major partner for the starving commodities emergent Asian giant.

From 2010, Chinese FDI (Foreign Direct Investment) intensified and diversified in Brazil, becoming significant in mineral, oil, gas and coal fields. Before 1990, Brazil accounted for only 3.5% of Chinese investment in Latin America, but reached 62.7% of the total in 2010 (CEPAL 2011). This year, 93% of this capital came from Chinese Central State-Owned En-

terprises. This stressed the strategic dimension of the partnership for China. The Brazilian Ministry of Development, Industry and Foreign Trade pointed out that since 2003 Chinese investments reached approximately 41 million dollars. Although the electronics and two wheels sectors include the highest number of projects, metal, oil, gas and coal sectors hold approximately 77% of the advertised features, respectively, 21 and 10 million.

To supply its demanding domestic industry, China is beginning to invest by creating infrastructures for production in Brazil. By now China does not limit itself in joint ventures or acquisition of national companies, but may act as a competitor within domestic Brazilian markets. Such a step means a significant change compared to before 2011. 10 of the 16 investment projects announced same year refer to construction of factory plants or research center (CEBC 2011). In addition, cooperation is going beyond bilateral trade and investment, including science & technology.

Agreements in Science, Technology & Education

For both countries, science, technology and education represent strategic issues for economic development and competitiveness. Therefore, several important actions have been implemented on a bilateral basis. First cooperations began in 1988. The CBERS Program (China-Brazil Earth Resources Satellite) resulted from a partnership between the Brazilian National Institute for Space Research (INPE) and the Chinese Academy of Space Technology (CAST). Launched satellites monitor climate, but also provide information to improve the management of water resources for farming, and to better efficiency of agricultural machinery. Tax collection, licensing and images for environment monitoring of environment are also included within the set of applications in Brazil. It is easy to grasp the reasons of these agreements between the “Farm of the Word” (Brazil) and the main economy in need of agricultural products.

Another partnership links the Chinese Academy of Agricultural Sciences (CAAS) with EMBRAPA (Brazilian Agricultural Research Corporation) to increase knowledge on the local sanitary and phytosanitary systems control to better and adapt Brazilian products to the needs of Chinese markets. This program includes creation of joint laboratories in China and Brazil to foster research in biotechnology, plant genetics and biofuels. In 2009, the

Federal University of Rio de Janeiro (UFRJ), through its Coordination of Graduate Programs in Engineering (COPPE), opened a research center in Beijing in partnership with Tsinghua University to develop technological cooperation in biotechnology, climate change and offshore oil exploration. This agreement is, supported by BNDES (National Bank on the Social and Economic Development), Ministries of Foreign Affairs, Science and Technology and the China-Brazil Business Council. For China, the objective is to ensure a stable and long term suppliers agriculture products in addition to other commodities. S & T cooperations are not limited to agriculture and space. A Brazil-China center in research and innovation in nanotechnology is currently considered as a project to be set up.

In 2012, Ministries of Education signed a memorandum linked to the Brazilian program Science Without Boundaries (Ciencia sem Fronteiras) which offers 5,000 scholarships for Chinese and Brazilian students in undergraduate, graduate courses and as visitor researchers. The number of Brazilian students in China is very small in comparison with other countries. Within this program, they reach around 5,000 studying in the United States, and France hosts 2,700 academic program beneficiaries. However, the memorandum signed by the Ministries of Education in 2012 aims China being soon one of the main destinations for Brazilian students, even within famous French or German schools of engineering localized in China! In early 2013, China and Brazil announced investments for joint researches on clean energy. The Brazilian participation in the project is linked to the China-Brazil Center for Climate Change and Innovative Energy Technologies. The model is based on the creation of partnerships between companies and universities.

Economy and Finance: diversification, expansion and independance

Besides the increase in trade and the direct investment in strategic sectors, China shows interest in cooperation in financial sectors. The scope is quite wide: actions to strengthen macroeconomic policy dialogue, to reinforce cooperation in multilateral financial forum, to expand bilateral financial exchanges and facilitate trade financing, to promote the use of national currencies in bilateral trade are part of this cooperation between countries. In 2012, the CEO of Bank of China (BOC) in Brazil gave an interview to the Brazil-China Commerce Department where he pointed out that the Bank of China has been operating in the host country since 2008, providing short-term loans as well as financial support

for projects. Primarily, it elected sectors related to commodities that represent most of the trade, but the CEO declared they wished to include telecommunications, car industries and improvements of infrastructures.

The Bank of China has doubled its balance sheet in just one year operating in Brazil. Most customers are Brazilian companies such as the majors Vale do Rio Doce, Petrobras, Braskem and CSN (National Steel Producing Company). In April 2013, Brazil and China, through their Central Banks, signed a local currency swap agreement with the amount of 60 billion of Brazilian Reais (190 billion Yuan, or about U$30 billion). The goal was to protect the trade and investment between the two countries from dollar variations. In order to boost and facilitate business opportunities, the Brazil-China Business Council (CEBC) provides relevant information for the Sino-Brazilian economic actors. Publications of CBEC are available both in Portuguese and English.

New areas for cooperation: Language, Culture, Sports…

Until now, language and culture do not represent a strong issue within the China-Brazilian cooperation. For their direct exchanges, both countries want to promote the use of Mandarin and Portuguese rather than the English as far as possible. They support the project of compiling and editing a Portuguese-Chinese dictionary using the database “Le Grand Ricci”, the famous Chinese-French dictionary. São Paulo State University (UNESP) and the Institute of Latin American Studies of the Chinese Academy of Social Sciences (CASS) are linked by a Cooperation Agreement to provide texts in Mandarin and English. It was signed during the 5th Conference of Confucius Institutes, which occurred in Beijing, December, 2010. By now, UNESP is the only higher education institution to host a Confucius Institute. Founded by Chinese Government Agency, Confucius Institutes spread Chinese culture and language in foreign universities.

In 2010 Brazil and China decided to cooperate and to gather experience by organizing large-scale sporting events. China welcomed the Olympic Games in 2008 and Youth Olympic Games in 2014, while Brazil is organizing the World Cup in 2014 and the Olympics in 2016. Doing so, both countries want to capitalize positive worldwide image, spreading soft power. To facilitate business, scientific and cultural exchanges, China granted Brazil the

status of “authorized destination” which avoids prejudice through Chinese immigration services. Currently, the number of Chinese descendants in Brazil is estimated at 190,000, of which 120,000 live in the State of São Paulo. Local media in São Paulo in 2012 celebrated the 200th anniversary of Chinese immigration in Brazil, and highlighted that the Chinese community in São Paulo have brought numerous contributions, including: typical restaurants, technique of acupuncture, martial arts, Chinese horoscope as well as contributions in the medical field.

Fifteen brotherhood agreements between Brazilian and Chinese cities facilitate exchange between the two cultures. The latest one involves the state capital of Rio Grande do Sul, Porto Alegre, becoming sister city of Suzhou in China. Porto Alegre is interested about fishing industry experience from Suzhou, and the Suzhou Government is wishing to learn about public transportation and solid waste treatment from Porto Alegre (CBEC 2013). One of the largest Chinese bank, ICBC (Industrial and Commercial Bank of China), is willing to sponsor a soccer team in Porto Alegre, Grêmio Futebol. But, it is not only in terms of sponsorships that Chinese banks are operating in Brazil. Some important initiatives promoting the use of local currencies are also being implemented to strengthen and facilitate exchanges between these countries.

Convergence in strategic issues

In addition to the bilateral cooperation agenda, it occurs that Brazil and China share similar, though sometimes surprising, commitments as regard as broad multilateral issues such as climate change or guns control. They act in favor of inter-regional cooperation between Asia, Latin America and the Caribbean (MRE 2010), but also with Africa. Their representations often converge at United Nations, World Trade Organization or G20, claiming independent positions in differentiation to main stream Western positions. Both countries support cooperation programs for developing countries. They advocate for the safeguard of their rights, interests and independence, and refuse foreign interventionism even in case of hot crises, including civil wars. Within the international political area, they constantly emphasize the necessity of dialogue and mutual trust in order to give greater contribution to stability, development and peace within the world.

It is obvious that the strategic economic relationship between Brazil and China aims to position them both as independent actors within a new economic and political order. For China, the partnership with a stable Brazil sounds as a vital issue to secure the supply of natural resources in volume and diversity which are required to maintain its growth rates. Among the main characteristics and motivation of the expansion of Chinese direct investment, is the need to secure access to abundant commodities. But this was just an initial step. The art of war is like water, wrote famous Chinese strategist Sun Tzu, once a breach opened, water might spread everywhere, and especially where topography calls for it. On a voluntary basis, China seeks systematically to better competitiveness and technology for its companies through acquisition of foreign ones. Simultaneously it does increase political influence, and secures own interests through mutual agreements.

Thus, the involvement of a growing number of Central State-Owned Enterprises (SOEs) within the productive Brazilian sectors reveals an obvious coordinated plan inspired by the Chinese Government itself. This orientation that diversifies access to natural resources does not appear as temporary but a long term economic policy. With the logic of a “game of Go player”, Chinese investments in Brazil are overtaking former limits and specific areas and forms, including operating subsidiaries to compete on domestic markets. The Austral emergent expects from Chinese Foreign Direct Investments to provide higher value in various productive sectors of the country. Yet in the segments of agribusiness, mining, steel and oil, Chinese FDI strengthen the supply chain for exportation within the model of developed country that buys to a commodities supplier. Brazilian Government would also expect that Chinese companies operating in domestic agribusiness, not only export soybeans, but also manufactured goods from this production chain (MDIC-RENAI 2011). A nationalistic Brazilian tradition of protection of the inner markets might represent a limit, or at least a constraint as regard as the economic expansion of the “Middle Empire” within the Austral one. Brazilian worldwide companies may also enter in competition with the aggressive expansion of China at home and abroad.

Since the 2000’s, the scope of Brazil – China trade and partnerships is growing and diversifying fast spreading, from agriculture and mining (commodities) to finance, space, science and technology, innovation and education. For them both, this means developing independent partnership abroad from the West, aiming to shape new world order where they would

play more important role than a historical one. The old, yet renewed, “Middle Empire” and the emerging Austral Giant share a tacit alliance to counter-balance Western powers’ views and supremacy. Doing so, they rely on, and sustain, regional alliances and South to South cooperation providing alternatives for economic development. Apart language and culture, which do not represent yet a strong cooperation field until now, this partnership is to last and expand. On an economic level, China needs Brazilian natural resources and agriculture potential, and Brazil considers China as a major market for exportation. One issue for Brazil is whether it would go on selling raw or transformed value-added products? For China, next steps in Brazil would be to deepen presence through diversificated companies that become part of the domestic landscape. Partnership between China and Brazil still has a lot of potential and future.

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Ⅲ The Chinese hard and soft power

China became aware of the importance of military by been soundly defeated by the British empire during the Opium Wars at mid-19th. Since that time, China understood that a great power could not exist without a strong military basis. Nevertheless China is not the US. As the American country chose to build its power upon a gigantic military base, China tried to avoid conflicts during the second half of the 20th century. With a few exceptions (India during the 60s and Vietnam during the 70s), China remained an inoffensive country with an out-to-date army. However if China's current power is based on economics, the country cannot neglect the military sector as there is always a risk that geoeconomical struggles could turn into traditional military confronts. The transformation of Chinese economy, leading to a new international role for Beijing, imposed the country to be a credible global power, including in the military field.

The transformation of war and its corollary, the transformation of the military, are the subject of an intense and deep strategic thought. Talented authors such as Colin S. Gray are currently interrogating the future of war. The development of the cyberspace as a conflict area, the importance of irregular warfare since the end of the Cold War and the persistent terrorist threat are some of the strategic issues an important country like China is facing.

The main challenge in the transformation of Chinese military tool is to become a 21st century high technology army without forgetting its strategic legacy. As fluidity or indirectness have been drivers of the Chinese strategic thought along centuries, the development of a cyberoffensive capacity and the reform of the military model have to be coherent with the legacy of Mao as of Sun Zi.

1 The Chinese Military Power: Its Real Situation & the Influence

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Although China has a long history for more than three thousand years, The PRC is a newly built communism country on the basis of the traditional thought and strategy of the Chinese. The PRC is now attracting the eyes of the world because of her amazing economic growth. At the same time, the more countries have become pay more attention for the negative influences on the international society.

This paper tries to make the analysis on the reality of the Chinese military power and its influence on the surrounding countries form the viewpoint of Japan. Japan, as one of the surrounding countries of China, has not only imported many various cultures from China and also waged the wars with her. Japanese viewpoint would be beneficial for other countries because of the lessons learned through the long history of the communication with China.

Traditional Power of China

GDP & Population

In the history of China, many dynasties got appeared, rising and experienced the height of its power for about fifty years, then became falling, and finally disappeared from the history. The Chinese history has experienced this type of cycles at the interval of several hundred years. In those cycles, the prosperity and the population on the continent of China changed dramatically. Over most of the past two thousand years China has accounted for between 22 and 33 percent of world GDP. But the economic power of China sharply fell down according to the collapse of the social order. For example, in 1950, the next year of the end

of the Civil War, China's share of the global GDP fell, reaching 4-5 percent, where it stayed until 1973 (Maddison 2001, Appendix B, p. 263) .

The population has also been changing dramatically. In the Warring States period (403 -221 B. C.), the total population of China had already reached to about twenty millions. In Han Dynasty, the population reached about sixty millions in 2 A. D. After that, the population fell down dramatically to twenty millions in the one generation, because of the population collapse caused by the civil war and the famine. The population of China increased in the stable and prosperous society in Han, Tang, Song, Qing Dynasties, reaching about sixty millions. In the 17th Century, the population of Qing Dynasty reached one hundred million, in the 19th Century, reached about four hundred millions. And China also experienced dramatic decrease of the population, reaching less than twenty millions several times (Kato).

The most militarized civilization and formidable than the Soviets

China has been very militarized from the ancient times, because of the frequently happening civil wars, the rebellions and the invasions by the surrounding tribes, which resulted in the population collapse. In China, there had been more than 6,000 battles in 4,000 plus years from the twenty-sixth century B. C. to the end of Qing Dynasty. This figure was more than one-third of the total numbers that had happened around the world during the same period (Guangqing & Youzhi 2005, p. 3).

China has had a huge amount of force. For example, Shihuangdi (259-210 B.C.), Initial Emperor, in Qin Dynasty, commanded about one million personnel. The total force of China, including all of the warring states in those days, is estimated about 5,300,000. This huge amount of the force is far outnumbered the force commanded by Caesar, reaching twenty to thirty thousands. China also invented and developed the revolutionary armaments like the gunpowder, the advanced crossbows and the rockets propelled by the gunpowder; and besides, they deployed and used them in a huge amount in the battle fields. Although China was almost colonized by the lack of the military power coping with the modernized western countries after the eighteenth century, it would be better not to forget the fact that China has historically been seriously militarized civilization.

The U. S. confronted with the Soviet Union in the Cold War Era. Which nation does have

the greater power, the PRC or the Soviet Union? The PRC has the almost similar amount of the territory to that of the U. S. The Soviet Union had the 2.3 times more of that of the U. S. But the most important factor deciding the national strength is GDP. Because it is not only the most useful indication of the economic power of the nation, but also decides the capability to invest the construction of the military power. In terms of GDP, the Soviet Union could not succeed to overwhelm the U. S. The best record of the Soviet Union's economy was nearly a half of the GDP of the U. S.

According to the IMF, in 1990 China's GDP share of global economy was at 5.61 percent, increasing to 11.02 percent in 2000, 14.39 percent in 2005, and an estimated 15.83 percent in 2007 (International Monetary Fund 2007). In 2020's, the China's GDP would become larger than that of the U. S., if the annual economic growth of China maintain more than 7 to 9 percent. The population of China is about five times larger than that of the U. S. The Soviet Union had almost the similar amount of the population to that of the U. S.

In total, the Soviet Union had almost the same power as the U. S., on the assumption of its vast territory has the same importance as GDP in the national power. Considering the importance of the GDP and the population, China would become about five times more powerful than the U. S., because China will have almost the same GDP in the 2020's, on the other side, she has the five times larger population and the same size of the territory. China should become more formidable than the Soviet Union for the U. S. in neat future, and especially for the adjacent countries of China like Japan, Korea and Taiwan.

Until when will China be formidable and what should we do?

The average duration of the most powerful and prosperous period of the dynasties is about fifty years according to the Chinese history. The pressure on the surrounding countries caused by the growing China would be kept for more than ten to twenty years, because the economic growth began in the late 1970's under Deng Xiaoping's leadership.

After 2030, China will become a society occupied by more than two hundred million aged people and the population of China will begin to decrease (Ooizumi 2011, pp. 3-10). China will surely lose the momentum of the economic growth and the military expansion. According to the lessons from the Chinese history, the PRC will be suffering from the civil war or

the rebellions after 2030. The most important issue on the national security of the neighboring countries should be how to endure the increasing pressure of the Chinese military challenge until 2030.

Mao's Strategy

Active Defense Strategy

The rise and fall of the dynasties on the continent of China brought the Chinese philosophers some unique view on the history. They considered the human history as the cyclic change in the mixture of the positive aspect of all events within the universe, Yang, and the negative one, Yin. The Chinese people would never give up in the worst situation, because they believe Yang will surely come back again in some day. They would always be cautious not become arrogant about the height of the best situation, because Yin has certainly already stolen up behind them.

Such a view on the history based upon the dualism has prevailed among all factions of the Chinese philosophers, including the most famous ancient military strategist, Sunzi. Mao Zedong was also influenced by this view in his strategy. Mao viewed a war as the highest form of struggle for resolving contradictions, when they have developed to a certain stage (Zedong December 1965b, p. 180). He also said that "A war is the continuation of politics by other … means. When politics develops to a certain stage beyond which it cannot proceed by the usual means, war breaks out to sweep the obstacles from the way" (Zedong 1967, p. 152).

He asserted that the seizure of power by armed forces, the settlement of the issue by war, is the central task and the highest form of revolution (Zedong May 1967, p. 219), and only with guns can the whole world be transformed (Zedong November 1965a, p. 225). Thus, Mao seemed the military force as the only decisive means to resolve the political contradictions between the imperialism states.

However, he also put the great importance on the politics and other non-military factors. This shows the dualism. The PRC leaders and the strategists emphasize the importance called Sanzhan, including phycological warfare, propaganda campaign to the masses and

the legal warfare, those are very effective to collapse the adversary metal strength.

As the other side of the dualism, Mao formalized the Active Defense Strategy. This strategy contains three stages; the first stage is our strategic defensive; the second one is our preparation for the offensive confronting the enemy's defensive posture; and the final one is our strategic offensive and enemy strategic withdrawal (Zedong May 1967, p. 472). On the defensive stage, Mao asserted; we sometimes have to retreat to avoid our casualties caused by waging war with the overwhelming enemy. If possible, we should disturb the enemy in order to wear down the enemy strength. The preparation stage is the hardest period for China during the long protracted war. During this stage, we should alter the balance of power, by wearing down the enemy enough to launch the offensive with the advantageous power. On the offensive stage, we should pursue the annihilation of the enemy (Li 2004, pp. 98-130).

This Active Defense Strategy is in effective under the modernized local conflicts, such as those concerning the sovereignty of the disputed territories. This strategy adapting to the conflicts over the sovereignty of the territories puts more emphasis on the offensive than the Mao's Active Defense Strategy for the reunification of the mainland China. The People's Liberation Army would not give up their assertion to the sovereignty for the disputed territories, including Senkaku (Diaoyu in Chinese) Islands. Senkaku Islands were incorporated into Japan's territory according to the International Law with the legal procedures in 1895 by the Japanese government. At that time, Qing did not declare any protests to the incorporation. The PRC abruptly began to assert their sovereignty to Senkaku Islands in 1971, only after the discovery of the submarine oil field by ECAFE (Economic Commission for Asia and the Far East) in 1968.

The similar situation has already observed in the South China Sea. The PRC is disputing the islands with Vietnam and the Philippines, both waged the battle, and other neighboring countries. The PRC would not give up their illegal request for the sovereignty to the islands, and if the balance of power is seemed to become overwhelming to the adversary, they will not hesitate to occupy the disputed area with their force by surprise. Once succeeding in the occupation, they would by no means bring back the territory. This shows the inherent endurance of the Chinese leaders to accomplish their aim in the long run, and their will to

use force to do it without any hesitation if there is an opportunity.

Nuclear Forces Combined with People's War

Another principle of Mao's Strategy is "Liang-Dan Yi-Xing." This means the Ballistic Missiles with Nuclear Warheads and the Artificial Satellites. Peng Dehuai, Commander of the Chinese Volunteer Force dispatched to Korea during the Korean War, opposed to Mao's People's War Concept, because of the severe experience of waging war with the modernized U. S. Forces. Peng asserted the need to modernize the PLA conventional forces by learning from the Soviet Forces. On the other hand, Peng would accept the extended nuclear deterrence of the Soviet Union.

However, Mao rejected the Peng's request for the modernization. Mao, as the leader of newly built the PRC, would not accept the reliance of the nuclear deterrence on the Soviet forces. Mao decided to develop the nuclear bombs and the ballistic missiles under the support of the Soviets. All supports provided by the Soviet side were withdrawn, as the result of the confrontation between the PRC and the Soviet Union in 1960. In spite of it, the PRC independently succeeded to develop the nuclear bombs and various kinds of the ballistic missiles by the early 80's (Xueyuan 1991, pp. 136-138). Mao established the foundation of the sovereignty and the independence of the PRC from the U. S. and Russia by attaining her own nuclear deterrence power.

On the other hand, Mao would defend China from the invasion especially by the Soviet Army along the long border with the Soviet Union by the People's War Strategy. On People's War Strategy, Mao said "What is a true bastion of iron? It is the masses, the millions upon millions of people who genuinely and sincerely support the revolution." (Zedong 1966, p. 150) and he also said, "The operations of the people's guerrillas and those of the main forces of the Red Army complement each other like a man's right arm and left arm." (Zedong 1967, p. 238). However, People's War Strategy should impose the burden of the guerrilla warfare and the casualties on the civilians; and besides the enemy should be allowed the invasion in the depth of the Chinese territory to wear down their strength (Li 2004, pp. 103-107).

People's War Strategy has a great influence on the PLA military strategy today. For ex-

ample, the Chinese strategists now consider the information warfare as a new type of People's War. And they put the emphasis on the mobilization of the cyber militias from the IT specialists in the civilian sectors. They also assert that information warfare is not only a war using the computers but also a new special war mobilizing radio communication and Internet technology (Military Science Institute 2005, pp. 339-340). The PLA strategists put the emphasis on the creation and the development of People's War Theory under the current national defense circumstances. In order to match the request for war with the advanced technology, to accomplish the ideal and perfect mobilization system and the intimate corporation between the PLA and the civilian sectors is indispensable (Military Science Institute 2005, pp. 498-501). China is also emphasizing integration of defense and civilian sectors to leverage output from China's expanding science and technology base (US Office of Secretary of Defense 2013, p. 47). This reflects the traditional total mobilization system of People's War Strategy.

Another example of People's War Strategy is "Ciaoxian Zhan", which means war without any limitations. This strategy is based on the idea that every useful measure in the civilized society should be utilized as weapons (Liang & Xiansui 1999, Chapter 7).

Deng Xiaoping's Modernization of the PLA

The PLA modernization

Deng Xiaoping got the supreme power after the catastrophic Great Cultural Revolution led by Mao. Under Deng 's leadership, the "Four Modernizations," consisting of agriculture, industry, science and technology, and national defense, were promulgated in 1973. Since 1978, China embarked on a fundamental process of reform and modernization that has resulted in an unprecedented rate of economic development. China has been successful in attracting vast amounts of foreign direct investment (Khalilzad et al. 1999, p. 1).

Revamping the military was, however, seen as "a long-term strategic program, and put the fourth priority of the "Four Modernizations." No dramatic upsurge in the level of Chinese defense spending or effort occurred in the late 1970s and early 1980s. Instead, attention centered on redesigning the armed forces so that they would be capable of absorbing and effectively using more advanced weapons and equipment (Khalilzad et al. 1999, p. 37).

In 1975 the CMC (Central Military Commission) concluded that a massive Soviet invasion was more of a myth than reality. With Mao's support and Deng's guidance, the CMC implemented a three-year plan of force reduction, cutting the overall forces level of the PLA from 6.1 to 4.5 million. The army was reduced by 32 per cent, strategic missile force by 27.2 per cent, and the air force by 13.4 per cent. Only the navy increased its number of sailors (Ji 1999, pp. 32-33).

In 1983, Deng proposed that the PLA's war strategy be altered from preparation for an early all-out war with the USSR to one of 'steady development' in a changed international environment. The Soviets were mainly focusing on the European theatre and preoccupied by the threat posed to it by hardline US policy. Thus the PLA enjoyed historic opportunity of development and reform: the PLA was no longer forced to keep a giant army (Ji 1999, p. 4).

In July 1975, when Deng Xiaoping surveyed the PRC military, he summarized the problems of the PLA in five words: "bloating, laxity, conceit, extravagance and inertia." (Xiaoping 1984, p. 27). The PLA did not perform well against the Vietnamese in 1979. Thereafter, first Deng and then his successors Jiang Zemin and Hu Jintao continually sought to shrink the total number of PLA personnel; reestablish and then upgrade the military education system; build a noncommissioned officer corps; gradually create a more secure nuclear deterrent; reduce the dominance of ground units in the force structure and decision-making system; elevate the positions and capabilities of the strategic and missile forces (second artillery), navy, and air force; revolutionize the technological level of all services and functions such as logistics, intelligence, command, control, and communications; and increase mobility and joint operational capabilities (Lampton 2008, p. 39).

The Rising of the Resources after the Tiananmen Incident

The resources devoted to military modernization rose in the 1990s as China's economy gained strength, as communist regimes in Eastern Europe and the Soviet Union collapsed, and as mutual strategic suspicion between Beijing and Washington increased following the June 4, 1989, violence in the PRC, the Tiananmen incident, in which the PLA had played a decisive role. Officially announced military budgets from 1990 largely rose by double digits (Lampton 2008, p. 40).

Beijing fears that the United States would intervene to protect Taiwan if the PRC used force against the island. However, a lack of response by the PRC would undermine the regime's legitimacy with its own people. Given this dilemma, Beijing's chosen course has been to increase its military strength in hopes of deterring a Taiwan declaration of its independence and, failing that, deterring a U.S intervention (Lewis & Litai 2006, especially ch. 8).

Moreover, the 1991 display of U. S. military superiority in the gulf War, the 1996 dispatch of two U.S. carrier groups to the waters off Taiwan, a move that Beijing found it difficult to respond to, and the 1999 Kosovo War also created a rationale for increased military spending. Finally, a major contributor to rising military spending has been the need to keep military pay somewhat competitive with compensation in the civilian sector. Beijing's 2006 defense white paper acknowledged the protracted nature of the military modernization task by saying that the goal was "building informationized armed forces and being capable of winning informationized wars by the mid-21st century (Lampton 2008, pp. 39-40).

US Office of the Secretary of Defense describes in Annual Report to Congress in March 2013 that, "Beijing announced a 10.7 percent increase in its annual military budget to $114 billion, continuing more than two decades of sustained annual defense spending increases. Analysis of data from 2003 through 2012 indicates China's officially disclosed military budget grew at an average of 9.7 percent per year in inflation-adjusted terms over the period. China has the fiscal strength and political will to support defense spending growth at comparable levels, despite lowering its economic growth forecast in 2012 to 7.5 percent from 8 percent in 2011. Continued increases will support PLA modernization efforts and facilitate China's move toward a more professional force. Using 2012 prices and exchange rates, the U.S Department of Defense estimates that China's total actual military-related expenditure for 2012 falls between $135 billion and $215 billion." (US Office of Secretary of Defense 2013, p. 45).

As long as the strong political power of the PLA will be kept, the trend of the military budget increase will be maintained, even if the economic growth becomes lower.

The Maritime Strategy Development from the Coastal Navy to the Offshore Navy

Deng Xiaoping made an on-the-spot inspection on the sea to a state-of-the-art destroyer equipped with missiles in 1979. He declared that we had the right to assert our interests in the issues in the Pacific Ocean. Then he wrote down a slogan appealing to construct a strong navy with the capabilities of conducting modern operations (Changxue 2013, p. 125). Deng appointed Liu Huaqing as Supreme Commander of the PLA Navy, and ordered him to construct such a modernized navy in 1982 (Changxue 2013, pp. 33-35).

Liu showed the strategic guidance which the reform of the PLA navy should base on. Active Defense and Offshore Operation (Jinhai Zuozhan) were the guidance shown by Liu (Changxue 2013, p. 86). There are several reasons in addition to the threat by the U. S. intervention, why the PLA has to construct a strong navy and why Liu showed such guidance.

The presence of a large and growing percentage of China's GDP in coastal areas vulnerable to air and sea threats is a concern Beijing is addressing (Ruozhou 1998, pp. 1-2). From 1978 to 1980, 32.7 percent of China's GDP was located in coastal areas; by 1995-97, that percentage had risen to 41.7. Doctrinally, therefore, Beijing wants to push the space for potential conflict offshore. This requires enhanced naval and air capabilities, as well as the means to command, control, and coordinate fast-moving and far-flung forces (Lampton 2008, p. 41).

Another reason is the nation's increasing dependence on important imported strategic resources, notably oil, that are concentrated in volatile areas, especially the Middle East. It is an increasing concern in Beijing. The U.S. Department of Energy estimates that by 2025 the PRC will be 73 percent dependent on oil imports (Lampton 2008, p. 41).

Liu indicated the six principles in the PLA navy strategy, as follows: The first principle is to match the multilayered system of the theoretical principles; The second one is to materialize the strategy given by the CMC; The third is to reflect the inherent requests of navy construction and future operations; The fourth is to base upon the objective needs brought by the development of the naval circumstances; The fifth is to respond to the requests from

the circumstances of the strategic status and the posture of the maritime battle field in the Chinese defense districts on the sea; The final one is to meet with the increasing demand brought by the improvement of the China's status in the international society (Changxue 2013, pp. 118-119).

Liu said: Comrade Deng Xiaoping clearly indicated the orientation on the two fundamental issues, the strategic characteristic and the basic area of the naval operations. The characteristic is defensive, and the area is the offshore sea. According to this orientation, we have to make sure that our naval strategy is to defend the offshore area, and it belongs to one type of the area defense strategies (Changxue 2013, p. 125).

Liu also said: It is needless for China to pursue the blue water navy to attain the hegemony. Our objective is to maintain the unification of our nation, and to defend our territory and sovereignty, to cope with the local conflicts on the sea, and to deter and defend the possible invasion from the sea by the imperialism and the hegemonism. The primary operational area for the PLA navy of the hour is the offshore sea which is encircled by the first island chain, including Yellow Sea, East China Sea, and South China Sea. All of this area is under the administration of China according to the international maritime laws, and including the inherent territories of China like the islands in South China Sea.

According to advancing the level of the economic power and the science and technology, the naval power should become much stronger. The operational area of the PLA navy should be gradually extended to the northern part of the Pacific Ocean and the second island chain. Our navy will conduct the operational phase in which both we and enemy launch the offensive, according to the doctrine of the Active Defense campaign (Changxue 2013, p. 126).

This Offshore Active Defense strategy is the basic theory leading the construction and the operational concept of the PLA navy today. The U. S. analysts fear the appearing strategy of the PLA, called the Anti-Access/Area Denial (A2/AD) Strategy. Although this strategy is the concept estimated by the U. S. side, it has clearly been resulted from the Offshore Active Defense declared by Deng and executed by Liu.

The threat of the A2/AD in the western Pacific Ocean

China's leadership has supported former paramount leader Deng Xiaoping's dictum from the early 1990s that China should, "observe calmly; secure our position; cope with affairs calmly; hide our capabilities and bide our time; be good at maintaining a low profile; and never claim leadership." This guidance reflected Deng's belief that Chinese interests are best served by focusing on internal development and stability while steering clear of challenging or confronting major powers.

Rising of Power and Change of the Strategy

However, some Chinese scholars question whether Deng's policy approach will continue to win support as China's interests increase abroad and its power expands. China's perceived security interests have changed considerably since Deng's era to include a heavy reliance on maritime commerce. China's improving naval capabilities enable roles and missions that would have been impossible for the PLA to pursue just a decade ago (US Office of Secretary of Defense 2013, p. 20).

Today the PRC became the country having the largest GDP except the U. S. Some analysts estimate that the GDP of China will surpass that of the U. S. by 2030. Analysis of 2000-2009 data indicates China's officially disclosed military budget grew at an average of 11.8 percent in inflation-adjusted terms over the period, while gross domestic product (GDP) grew at 9.6 percent (US Office of Secretary of Defense 2010, p. 41). If this trend is kept, the resources allotted to the military will become larger than that of the U. S in ten years, because the U. S., now suffering from the huge amount of the budget deficits, is obliged to cut the defense budget for five hundred billion dollars in ten years.

In August 2011, President Obama and Congress struck a grand bargain to raise the U. S. debt limit known as the Budget Control Act of 2011 (Public Law 123-25). This law immediately placed ceilings on discretionary "security" spending. In implementing the Budget Control Act' s spending ceilings, the White House's Office of Management and Budget is reportedly looking to trim as much as $489 billion more from the Pentagon's budget over the next decade (Foreign Policy Initiative 2011).

Earlier this decade, China began a new phase of military development by articulating roles

and missions for the People's Liberation Army (PLA) that go beyond China's immediate territorial interests. Some of these missions and associated capabilities have allowed the PLA to contribute to international peacekeeping efforts, humanitarian assistance and disaster relief, and counter piracy operations. Other investments have allowed the PLA to pursue anti-access and area-denial strategies. Still others appear designed to improve the PLA's ability for extended-range power projection, although China's ability to sustain military power at a distance, today, remains limited (US Office of Secretary of Defense 2010, p. I).

The Background of the Anti-Access/Area Denial Strategy

The PLA strategists conceive that the U. S. Forces are strengthening their envelopment around the PRC, especially in the north-eastern Asia-Pacific area, as Hilary Clinton declared in Guam on January 8, 2011. The PLA strategists assert: In order to accomplish their aim, the U. S. Forces are taking several measures as follows;

The first measure is to construct the so-called "three island chains," the chains for the military envelopment zones. The first island chain starts from Kyushu, Japan in the north, to Malaysia in the south, including Republic of Korea, Japan, one of the PRC provinces, Taiwan, the Philippines, Indonesia, Brunei and Singapore. The core of the second island chain is Guam where the largest U. S. Air and Navy bases in the western Asia-Pacific are stationed. The core of the third islands is Hawaii;

The second is to strengthen the military alignment in the Asia-Pacific. "Tianan Incident," the incident where the ROK navy vessel was sunk, and the sovereignty issue of the Diaoyu Islands between China and Japan are especially utilized for strengthening the Japan-U. S. military alignment and the ROK-U. S. one. By the exchange of the information, the corporation in the logistics, and the bilateral military exercises, the de facto military alignments among the U. S., Japan and ROK is constructed. Its aim is not only to threaten the North Korea but also to defend and deter our intention;

The third is by conducting the bilateral and multilateral exercises surrounding China, to threaten the safety of our country. The objectives of the offensives in those exercises were clearly China. And besides, during the U. S. exercise with the ROK and Japan in 2010, the U. S. Navy aircraft carrier group entered into the Yellow Sea area. They became the real

threat against the safety of our country, although they did not commit the violation of the territorial waters of China (National Security Policy Committee 2011, pp. 118-119).

The PLA is preparing for the new types of war and operation in the current local wars; joint operation, non-contact and asymmetric operation, firepower war, information war, quick maneuver operation, command-and-control war, special operation, aerospace war, amphibious operation, air-raid, air defense, biological war, psychological war, ecological war, and chemical war (Military Science Institute 2005, pp. 186-206).

The Threat of the Medium-Range Missile Forces

On firepower war, as the 2010 Quadrennial Defense Review Report notes, “China is developing and fielding large numbers of advanced medium-range ballistic and cruise missiles, new attack submarines equipped with advanced weapons, increasingly capable long-range air defense systems, electronic warfare and computer network attack capabilities, advanced fighter aircraft, and counter-space systems” (US Department of Defense 2010, p. 31).

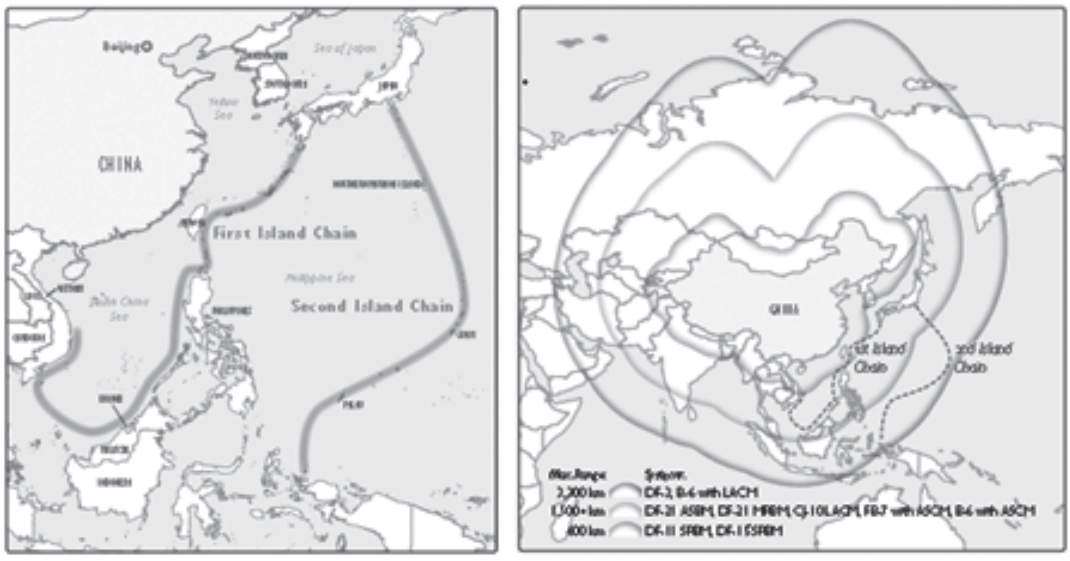

Figure III-1-1 & 2; (US Office of Secretary of Defense, 2012, p. 40, 42.)

Among them, the missile forces have shown the most dramatic increase in the quantity and the quality. According to the US DOD report, the Chinese missile force in 2012 is as follows:

System	Missiles	Launchers	Estimated Range
ICBM	50-75	50-75	5,500+ km
IRBM	5-20	5-20	3,000-5,500 km
MRBM	75-100	75-100	1,000-3,000 km
SRBM	1,000-1,200	200-250	< 1,000 km
GLCM	200-500	40-55	1,500+ km

Table III-1-3; (US Office of Secretary of Defense, 2012, p. 29.)

The Second Artillery has deployed more than 1,100 SRBM s (Short Range Ballistic Missiles) to garrisons across from Taiwan and is fielding cruise missiles, including the ground-launched CJ-10 land-attack cruise missile (US Office of Secretary of Defense 2013, p. 38). Cross-Strait economic and cultural ties continued to make important progress in 2009. Despite these positive trends, China's military build-up opposite the island continued unabated. The PLA is developing the capability to deter Taiwan independence or influence Taiwan to settle the dispute on Beijing's terms while simultaneously attempting to deter, delay, or deny any possible U.S. support for the island in case of conflict. The balance of cross-Strait military forces continues to shift in the mainland's favor (US Office of Secretary of Defense 2010, p. I).

Concerning the number deployed China's missiles in the range of within 3,000 km, including the GLCM (Ground-Launched Cruise Missile), it reached about 280-620 based on the above assessment in 2012. On the other hand, the United States will retire the nuclear-equipped sea-launched cruise missile (TLAM-N). The reasons why the United States decided to do so is explained as follows:

This system serves a redundant purpose in the U. S. nuclear stockpile. It has been one of a number of means to forward-deploy nuclear weapons in time of crisis. Other means include forward-deployment of bombers with either bombs or cruise missiles, as well as forward-deployment of dual-capable fighters. U. S. ICBMs and SLBMs are capable of striking any potential adversary. The deterrence and assurance rolls of TLAM-N can be adequately substituted by these other means, and the United States remains committed to providing a credible extended deterrence posture and capabilities (US Department of Defense April 2010, p. 28).

The retirement of the U. S. TLAM-N will bring the limitation in the number of the U. S. Forces missiles ranging within 3,000km with the nuclear or conventional warheads deployed

in the western Pacific. The deployed warheads will be limited to the ALCM (Air-Launched Cruise Missile) s, and bombs equipped with the bombers deployed in Guam and the fighter/bombers of the aircraft carriers. It will lead the inferiority in the numbers of the warheads deployed in the Asia-Pacific to those of the PLA.

On the aircraft carriers, the most serious concern for the U. S. Forces deployed in the region within 3,000km are the MRBM (Medium-Range Ballistic Missile) called DF-21D. China continues to field an ASBM (Anti-Ship Ballistic Missile) based on a variant of the DF-21 (CSS-5) MRBM that it began deploying in 2010. Known as the DF-21D, this missile provides the PLA the capability to attack large ships, including aircraft carriers, in the western Pacific. The DF-21D has a range exceeding 1,500 km and is armed with a maneuverable warhead (US Office of Secretary of Defense, 2013, p. 38).

As the result from the retirement of the TLAM-N and the threat of the DF-21D, the credibility of the U. S. extended deterrence for Japan and the ROK, would be decreased in near future, in spite of the reassurance of the credibility by the U. S. side. In that situation, the order and stability in the Asia-Pacific might become unstable.

The Threat of the Asymmetric Wars

The strategists of the PLA put the great emphasis on the asymmetric wars. They assert that: In such a war, the inferior side finally got the victory for about 30 percent of the wars. There are many aspects of the non-symmetries; power, operation domain, period, equipment and technologies, and methods of the operations. In the Post-Cold War era, the asymmetric warfare represents the new characteristics of information war. We should analyze and research the asymmetric wars. Today by using the missiles, the inferior side can defend directly against the superior side indirect attacks like the strategic bombings (Military Science Institute 2005, pp. 229-234, 261-267).

According to this thinking, despite the decrease of the effective attacks caused by the deployment of the MD (Missile Defense) systems in the U. S. and its allies, for the PLA, the missiles should be kept as one of the most reliable asymmetric direct attack measures against the superior forces like the U. S. Forces.

The PLA has made a great effort to win the local conflicts under the circumstances of the military information operations, especially after the Iraq War in 2003. The PLA strategists recognize that information war is the most important aspect of the new types of wars, and the operation domain should include the aerospace and the cyber space Military Science Institute 2005, pp. 469-480).

For attacks on U. S. C4ISR (Command, Control, Communication, Computer, Intelligence, Surveillance and Reconnaissance) Systems and to defend their C4ISR Systems, they have developed and conducted the clandestine cyber operations in the peacetime, as one of the operation domains and the methods supported by the advanced IT technologies in the new asymmetric war (National Security Policy Committee of China 2010-2011, pp. 58-79). China is executing the vigorous activities to increase their space capabilities, especially for the military purposes like the anti-satellite attacks. They are also developing other soft-kill measures, including covert operative, jammer and EMP (electromagnetic pulse) (Cliff et al. 2007, p. 111).

The hard-kill capabilities for the amphibious assault operation, the special operation and the submarine attacks, under the support of the modernized joint forces, are put a great emphasis, judging from the trend of their military force construction (US Office of Secretary of Defense 2013, pp. 6-11). Although the elements of the hard-kill methods and the soft-kill ones mentioned above should be effectively combined each other, the total effects brought by these war capabilities could increase the probability of the success of the A2/AD strategy in the western Pacific.

And besides, the U. S. forces rely on the vast transportation networks for the logistic support spread among the allied countries in the western Pacific. This reliance brings the serious vulnerability to the U. S. Forces. If the allied countries reject the use of the U. S. bases in their countries, the U. S. Forces will not support the forward deployed forces. Because Japan, South Korea and Taiwan located within 1,500 km from the coast of China are in the range of the Chinese MRBMs and cruise missiles, those countries might reject the use of the U. S. bases when threatened by China with their missile forces, additional to the special force attacks and the cyber-attacks, without any engagements of the military forces.

The U. S. Estimate of the Anti-Access/Area Denial Strategy & its Counter Measures

The U. S. Estimate of the Anti-Access/Area Denial Strategy

The U. S. government estimates that states are developing anti-access and area-denial capabilities and strategies to constrain U. S. and international freedom of action. These states are rapidly acquiring technologies, such as missiles and autonomous and remotely-piloted platforms that challenge our ability to project power from the global commons and increase our operational risk (US Department of Defense February 8, 2011, p. 3). China is clearly involved in those challenging states. This shows that the China's ability to defend the offshore sea of China encircled by the three island chains, has been estimated to be effective by the U. S. side.

A combination of ballistic, cruise missiles, aircraft, and covert operative attacks on runways, aircraft, shelters, and other critical facilities could render U. S. airfields in Okinawa, South Korea, and the main islands of Japan unusable, particularly in the days of a conflict. In addition, ballistic missile, cruise missile, aircraft, covert operative, jammer, antisatellite, EMP, and computer network attacks could degrade command-and-control or early warning capabilities for forward-deployed forces, particularly air forces operating from bases within about 1,500 km of China, to the point that the theater commander would choose to move them farther away (Cliff et al. 2007, p. 111).

Even if Chinese anti-access measures did not result in the outright defeat of the United States, they would likely make it significantly more costly for the United States to operate in the region. Moreover, it is possible that these costs could rise enough that, even if U. S. decision-makers were confident that the Unites States would eventually prevail in a conflict with China, they might be unwilling to pay those costs.

The United States, however, can take a number of actions to counter Chinese anti-access threats. Strengthening passive defenses at air bases, deploying air and missile defense systems, strengthening defenses against covert operatives, and bolstering allied air-defense capabilities will reduce the vulnerability of air bases to anti-access attacks. Diversifying basing options for aircraft will diminish the effects of such attacks. Air and missile defense systems, strengthened defenses against covert operatives, improved allied defen-

sive capabilities, improved information-security practices, and efforts both to deter and to mitigate the potential effects of high-altitude nuclear detonations can reduce the vulnerability of C4ISR systems (Cliff et al. 2007, pp. 113-114).

The U. S. Counter Measures against A2/AD

The US Air Force and Navy together are developing a new joint air-sea battle concept for defeating adversaries across the range of military capabilities. The concept will address how air and naval forces will integrate capabilities across all operational domains to counter growing challenges to U. S. freedom of action. As it matures, the concept will also help guide the development of future capabilities needed for effective power projection operations (US Department of Defense February 2010, p. 32). This new concept known as “Joint Air-Sea Battle Concept,” is, however, the only a concept. It is not guaranteed by the budget. Offshore balancing is control.

The shortage of the budget influences most seriously on the R & D (research and development). As global R & D investment increases, it is proving increasingly difficult for the United States to maintain a competitive advantage across the entire spectrum of defense technologies. We cannot afford everything we might desire: therefore, in the future, the Department must balance capability portfolios to better align with budget constraints and operational needs, based on priorities assigned to warfighter capabilities (US Department of Defense February 2010, pp. 76, 94).

U. S. President Obama made remarks to the Australian Parliament on November 17, 2011. He said in the remarks that: Reduction in U. S. defense spending will not come at the expense of the Asia Pacific. We will keep our commitments, including our treaty obligations to allies. And we will constantly strengthen our capabilities to meet the needs of the 21st century. Indeed, we are already modernizing America’s defense posture across the Asia Pacific. It will be more broadly distributed – maintaining our strong presence in Japan and the Korean Peninsula, while enhancing our presence in Southeast Asia. Our posture will be more flexible – with new capabilities to ensure that our forces can operate freely. And our posture will be more sustainable, by helping allies and partners build their capacity, with more training and exercises. The closer relationship between U. S. and Australia will be brought and it will allow us to respond faster to the full range of challenges. Meanwhile, the

United States will continue our effort to build a cooperative relationship with China. And we will seek more opportunities for cooperation with Beijing, including greater communication between our militaries (Office of the Press Secretary November 17, 2011).

In the remarks, the U. S. efforts to rebalance the military resources to cope with the new situation in the western Pacific, in other words, the rising threat of the A2/AD are appeared. The gravity of the U. S. Forces deployment will be getting back to the safer rear area like Australia and the Southeast Asia from Japan and South Korea. On the other hand, in order to save the resources, the more contributions by the allies are requested in the exchange for the transfer of the U. S. military experience through bilateral trainings.

Hilary Clinton published her opinion in November 2011. She said that: We are modernizing our basing arrangements with traditional allies in Northeast Asia - and our commitment on this is rock solid – while enhancing our presence in Southeast Asia and into the Indian Ocean. For example, the United States will be deploying littoral combat ships to Singapore, and we are examining other ways to increase opportunities for our two militaries to train and operate together. And the United States and Australia agreed this year to explore a greater American military presence in Australia to enhance opportunities for more joint training and exercises (Clinton 2011).

Clinton's statement declared the strong will of the U. S. to keep its forces in Asia-Pacific. Responding to the political decision and Joint Air-Sea Battle Concept, the strategists in the U. S. are proposing the concept of Offshore Balancing and Offshore Control. Both concepts take the limitation of the resources and the new military situation in the western Pacific into consideration. The possibilities of how much and when these concepts are realized are uncertain. Representatives of the three military services indicated that they would be struggling in 2014 to restore readiness. For example, the Air Force for the first time in its history is implementing a "tiered" approach to unit preparedness. About one-third of the service's forces that are not deployed or preparing to deploy will be "standing down" and rated unready. The move will affect a number of nuclear-capable forces, with some B-2 bombers (Everstine & Weisgerber 2013).

Will these measures really not affect the credibility of the U. S. extended deterrence? If the

U. S. extended deterrence becomes less credible, the U. S. allies will have to construct their own military forces to deter the threat of China and to defense against the invasion of the PLA.

Conclusion

New Secretary-General Xi Jinping stated on November 15, 2012, that he would make every effort to realize a great revival of the China race. Socialism looks like one of the tools for realizing such a nationalistic aim. He declared that the objective for the modernization of the PLA is the construction of firm defense and strong military forces adapted to the national security and interest. He also said that we should fundamentally realize the mechanization and make a great advance in the construction of the information-oriented military by 2020. That the security of ocean, aerospace and cyber-space should be paid attention continuously is pointed out. The PLA will continue to pursue the construction of the capabilities enough to win the local wars under the information-oriented condition. The missile forces will be put the emphasis.

Consistency of the military strategy and the firm will among the leaders to make the endurable effort to realize it is the marvelous characteristic of the PLA. The PLA is trying to seize the exclusive control in the South and East China Sea. The PLA will accomplish its objective to control the sea encircled by the three island chains in a long-term. U. S. Forces are suffering from the defense budget cut, and the forward deployed forces might gradually decrease, in spite of the statement to keep the American commitments to the allies in western Pacific.

If the U. S. does not accept the challenge by the PLA pursuing the control of the larger area, spread beyond the first or second islands chain, some conflicts, including use of military forces will happen in the future. At that time, the allies will be urged to defend by themselves for some period or eternally.

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2 Chinese Cyber strategy: from control to expansion

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The activities of Chinese cyber espionage or cyber conflict are more and more on media. In the United States, two reports of an American company (Mandiant) and a Pentagon report in spring 2013 have designated China as the author of a considerable number of cyber attacks against the United States. American politicians, including President Obama, have directly accused China after those reports have been released. Earlier, in the summer of 2012, the report by French Senator JM Bockel said that in France risks associated with the use of network equipments (eg, servers, wireless relay) made in China should not be acquired for French and European infrastructure. In addition, several Asian countries have recurring disputes with China (including Japan and Taiwan) because their companies and official websites are frequently the target of Chinese cyber attacks. These attacks attributed to China are both acts of espionage (theft of data) and offensive acts to disrupt the operation of information systems (especially those of government, business or groups from countries having disputes with China).

Through these numerous cases of cyber attack, China would implement a coherent and coordinated cyber strategy. However, it is necessary to emphasize that it is currently impossible, if not impossible, to determine the origin of a cyber attack if it is sufficiently sophisticated[50]. This difficulty is at the origin of the cardinal principle of cyber strategy: non-attribution. Being unable to identify the perpetrator of an act, if it takes some precautions,

[50] In this regard we note the existing porous border between cyber terrorism and cyber crime conducted by "patriots" independent groups.

fundamentally changes the rules of strategic calculations. Moreover, China is far from being the only country engaged in so-called computer offensive operations. All the world's major military powers (United States, Israel, Russia, France ...) have an cyber strategy including, formally or classified, this type of operations.

The attacks in cyberspace are conventionally divided into three categories: the war for information (espionage), the war against information (sabotage) and the information war (subversion). China has implemented successively these three tools. Essentially from military origin in western countries, China cyber strategy follows a very specific development cycle that we will present. In fact, the cyber strategy follows the changing needs of the Chinese leaders. Thus, the Chinese cyber strategy was originally based on an internal problem of cyber controlling population, before moving towards an approach of economic cyber espionage to support the development of the country, and finally lead to more capacity and acts in military cyber conflict to sit the emergence of China as a major military power. It should be noted that these tools do not replace each other, but are the successive layers of Chinese cyber strategy.

Cyber control of population

The Internet was introduced in China under the auspices of Deng Xiaoping. Nevertheless, it was well aware that the Internet was a factor that accelerates the development of China as well as a political risk factor that would encourage the dissemination of diverse ideas as well. Deng Xiaoping also said here that "if you open the window for fresh air, you have to expect some flies to blow in."

Cyber strategy of China had a very specific evolution because it was initially centred on what we describe as cyber control: this includes domestic censorship and surveillance of dissidents. During the development of the Internet in the early 2000s, China had two fundamental characteristics that distinguish the major Western powers: the lack of a military operation outside the borders and freedom of expression very controlled. The potential of cyber space has first been used for internal purposes of censorship and control of ideas. But this control has also led to the emergence of giant online corporations in China.

Cyber control as part of the protection scheme.

Chinese political control within cyberspace is to protect the system by eliminating the presence on the Internet as well as opponents of hostile ideas regime. Here we must understand the concept of regime in the broad sense which includes institutions, politicians and political action, as well as the events that could raise public outrage and lead to social unrest (e.g. bribery of a local police chief, the ostentatious wealth of elites, pollution ...). The term therefore covers more “China” as a whole, as a political and social entity, than the organization of political power. In this respect it is interesting to note that in China, the term “censorship” has been replaced by the word “harmonization”.

To address this problem, the government has developed in the 1990s (and published in 2000) under the Ministry of Public Security, a program called “Golden Shield” (Golden Shield Project) on domestic surveillance under wide scope (Internet monitoring and surveillance of public spaces). This program was subsequently dubbed Great Firewall with reference to the Great Wall of China, which remains a powerful geopolitical representation of China.

This program includes two types of censorship. The first is a priori censorship, based primarily on a technical network filtering (URL/DNS, keywords address). Thus, a number of keywords are subject to an automatic censorship in social networks, forums, search engines, websites, connections ... This censorship can be total (blocking access to content, the entire site or specific pages) or partial (filter results[51]). Some sites try to identify the “sensitive” words (e.g. China Digital Times) despite the changing nature of a part of the list by the news. There are two types of sensitive words. First those who are a permanent sensitive issue for the government (e.g. falun gong, pornography, names of dissidents, issues related to Tibet, Xinjiang or Taiwan ...) and those corresponding essentially to issues of news (e.g. a contentious court case, a temporary pollution, a localized strike ...) which are temporary threats that the state is trying to curb to prevent their dissemination in the public opinion.

There is a second type of censorship: censorship afterwards. This is done primarily on

[51] It is possible for example to compare the results of research 六四 天安门 事件 (Tiananmen June 6) on google.com and baidu.com, the difference is striking.

the content (forums, social networks, and Internet websites) and is usually simply deleting the targeted content. The targets here are mostly criticism of the government and calls for disturbing public order (protests, strikes ...). To cope with inflation publication of content on social networks, China has 20 to 50,000 police experts (in addition to teams of censors employed by the sites themselves). Beyond the number of contributors, the number of social networking sites makes them complicated control. If other countries are only seen a handful of sites, China has a very large number (should be made to non-exhaustive overview in Annex 1): China now has over 500 million users, when U.S. not count only 250 millions! However, according Jed Crandall (2013) (professor at the University of New Mexico specializing in Chinese Internet censorship), facing the sharp increase in the number of Internet users, it seems that censors are moving more towards a strategy for controlling the spread of certain topics blocking.

In addition, content managers are fully involved in censorship. Indeed, the government makes companies legally responsible for posted on their sites and services contained. They are therefore forced to collaborate with the authorities is to exercise in China. Thus, Yahoo has already provided information on dissidents, Google filters the results of queries made on its website, Skype has built a device for censorship in its program for China, Weibo regularly censor posts and profiles on government orders (Xuecun 2013). Companies therefore employ censors, whose numbers can go up to a thousand people.

Finally, China also has at its disposal an invisible army whose numbers would be close to 300,000 people. These people are officially called “Internet commentators” (网络 评论员 / 网络 评论员) but are known as Wu Mao (five mao, referring to parts 0.5 yuan) because they would be paid 0.5 yuan per message posted. Their task is to control the content and publish oriented content. They are used especially for sensitive issues likely to evolve in protest of the government (eg Taiwanese democratic character of the regime) or to stream pro government content on Internet. In 2011, Amnesty International said through its Secretary-General that the China and Iran were investing “considerable resources into pro-government blogs and content.”

Cyber control as part of digital sovereignty

Many foreign sites are unavailable in China (Google services, Facebook, blogging plat-

forms, information sites, adult ...)[52]. This answered the needs for authorities to filter contents. It is simpler to block a handful of large sites that control all pages, especially when it comes to blogging platform or sharing sites content. However, there is a desire to emerge major players in the Chinese Internet and in this way strengthen the Chinese digital sovereignty.

The table below shows the Chinese Internet giants by industry. While most of these companies are unknown outside experts, it should be noted that in spring 2013 QQ had 798 million of active accounts with a peak connection 176 million simultaneous users, and Weibo (micro blogging platform) has 503 million users with 46.2 million daily users.

figure III-2-1; Giants of Chinese Internet

China's restrictive policy provide results with the emergence of the Internet giants. However, these giants don't get out of their borders at the moment. Although it has some surprising similarities with graphics foreign counterparts (e.g. Google and Baidu, Renren and Facebook), it would be dishonest to attribute the success of these sites only to digital protectionism. Chinese sites have for the most adapted their functions to suit the Chinese surf-

[52] Non-exhaustive list available https://en.greatfire.org/search/blocked

ing habits and improved users features, which explains the relatively low success of sites like Facebook in China despite the possibilities to circumvent the “Great Digital Wall” (use of VPN or proxy).

Economic approach

We have seen that the Chinese cyber strategy was initially developed according to the first priority of government: control of public opinion. But in the 1990s, China also aims to develop its economy and to push its industry to produce higher value added products. This process can only be achieved through innovation and research and development (R & D). Given the disappointing results of R & D in the 1980s, China has decided to launch a broad policy of industrial espionage. It is therefore natural that the country added a layer to its cyber strategy as a component to capture the economic data that we can call more directly espionage. However, China has also developed a Technological and Industrial Base specializing in cyber technologies (hardware and software).

Cyber espionnage

China is endowed with offensive cyber capabilities for economic espionage. In this regard, the Mandiant report[53] largely presented espionage that targeted the United States. The main sectors are high-tech industries and those of defense (which often belong to the category of high technology). The priorities in these areas follow general priorities of five-year plans[54]. In the attacks presented by the Mandiant report, at least four of the seven strategic areas have been targeted. In May 2013, the Pentagon has for example revealed (Nakashima 2013, US Department of defense 2013a & b), that hackers operating from China have managed to penetrate the government agencies and companies in the defense sector systems that stored information about weapons programs (Patriot missiles, Aegis radar, Black Hawk helicopter, F-35 ...).

These actions have two interests for China. First, they can save a significant R & D budget.

[53] The company Mandiant published on February 16, 2013, a report (APT1: Exposing one of China's Cyber Espionnage Units) identifying a unit of the Chinese army would engage in extensive espionage operation, mainly against companies and Anglo-Saxon organizations.

[54] Every five years China will publish a development plan including among others a list of some sectors prioritized by the state.

Second, China can incorporate information collected in its own programs directly. For example there is strong suspicion that China is inspired by information on the F-35 to design faster its own stealth fighter.

These actions are generally made by two types of actors: the units of the Chinese army (the Mandiant report and refers to the 61398 unit based in Shanghai), and groups of “patriotic” hackers generally very close to the authorities (even if they are not military, and if their incomes are not directly or mainly provided by the State). Units of the Chinese army use processes similar to conventional hackers (eg. social-engineering social engineering-end phishing-phishing). However they differ in two points: the human and material resources are without common measure with independent groups, and a strategy clearly directly related to the interests of the Chinese government and industry. In addition, to the knowledge of Western countries, there has been no destruction of data for extortion or financial scams. These elements tend to direct suspicion toward government structure. Through these units, China is therefore ensures that technology transfer voluntarily or involuntarily will...

Nevertheless, as pointed out by the Chinese authorities, it is extremely complicated to determine with certainty the origin of a cyber attack and the greatest caution is required before laying charges in the matter. The non attribution is indeed the basic principle of the cyber strategy, as we have already reported.

The support of a Cyber Technology and Industrial Base

One of the characteristics of the economics of China is the strong relationship between the central authorities and firms, including those that are not public companies. The latter benefit greatly from information obtained by the intelligence services on technologies and their competitors. In return, they also work with the intelligence services and are involved in the process of gathering information.

The Chinese economic espionage process has two parts. First, Chinese companies providing terminals and network components (routers, modems, cables ...). These can have a control on data passing through their products[55]. But we also found a large number of subcontractors in China which may include programs in components and products manu-

[55] Security issues will be addressed in the next section on cyber defense.

factured (not assembled) in China. Microsoft, for example, revealed in September 2012 (infoDSI 2012) that computers assembled in China were infected by viruses from their factory. These viruses were found in particular programs to access computers and key loggers (software that tracks everything typed on the keyboard).

It is mainly because of these problems that the report of Senator Bockel appeared in France in the summer of 2012, called not to buy some Chinese equipment for telecom infrastructure and networks, citing the companies ZTE and Huawei: they are involved in the provision of network routers heart. Huawei and ZTE have been “banned” from equipment markets in the United States. Both companies have also been targeted by a report of the Committee on Intelligence Congress (October 8, 2012). England has also taken measures such as the United States, Canada, Australia. There has been, since the spring of 2013, a series of investigations conducted by the European and Indian authorities to these two companies accused of dumping or espionage.

In recent years, a trend observed in China to develop its cyber espionage to expand trade issues (pricing, marketing plans ...) and political (documents prepared by the delegations of various countries for some international summits). Acts of cyber espionage had been carried out for example in 2011 by China against France to obtain data relating to the G20 France presided.

Nevertheless, China, because of its domestic market and its business model, has managed to build an industrial sector of information technology: China has become the largest exporter in 2004 of information technology in up to $180 billion. In 2012, there were more Chinese than American publications on information technology. Finally, in 2010, China has developed the most powerful supercomputer in the world (with a power of 2.5 petaflops) Tianhe-1A, built by the Changsa National University of technical defence (even if it was since passed). From this point of view, it has built its independence from Western suppliers, mainly Anglo-Saxon. Thus, it has established sovereignty in cyberspace.

Geopolitics and defense in cyberspace

Become a leading economic power, China is now seeking to sit its global power by

strengthening its military capabilities. The Chinese authorities have therefore developed military capabilities of computer control. This does not mean that these abilities are mainly directed against the United States.

Overall power and informational strategy

The rise took place in the 2000s. If there is much talk in the West about the book of colonels Liang Qiao and Xiangsui Wang “Unrestricted Warfare”, it is first of all because it is one of the few texts translated. It focuses mainly on the results of the first Gulf War in 1991, and shows that the Chinese are aware of the superiority of Americans on information technology. They believe that the war can not be confined to only military. More importantly, the authors develop their approach by the informational war. For China, the meaning is more important that the pipes that convey.

The book was published in 1999, the year of the bombing “by mistake” of the Chinese embassy in Belgrade. We can see there the announcement of a rivalry between China and the United States. But while they “build the Chinese enemy” (Conesa 2011), it must be noted that Beijing refuses to enter into this dialectic and practice the art of evasion, which reflects its overall strategy.

Mention may also studies reporting the National Defence University, the Academy of Military Sciences and the number of research centers. Also, note “The science of military campaigns - ZhanYixue - 役 学 -”. The latter stated that “control of the information flow of the opponent and the conquest of superiority in this area is the strategic and tactical priorities of the Chinese People’s Army” (Danjou 2012, Zang 2001).

From this point of view, the informational strategy is serving a comprehensive strategy (Poirier). This informational strategy therefore includes elements of cyber war and information. The war against the information finally arrives. It distinguishes two aspects, which are central in the West when they appear second in Chinese: technical mastery, and military development.

The shield and the sword

Beyond the support to a policy of developing a defence industry (via cyber espionage), the

development of cyber capabilities of China also improves defence as the offensive capabilities of Chinese power.

First, cyber espionage government defence and its partners (public and private) can know the military doctrines that may apply its enemies. This allows both to benefit from the research on teaching others to improve their own teaching, but also how could be carried out military offensives against him and thus be better prepared. In addition, the flight technical data on military equipment potentially hostile major military powers like the United States, allows knowing more precisely the capabilities of the enemy which is crucial to prepare cons technical and technological, tactical, operative or strategic.

But China's actions in the cyber sphere against other countries also have much more aggressive than the theft of data. Indeed, China is also conducting operations to destabilize systems of foreign countries. Thus, the smart grid and U.S. power plants were attacked in 2013. After several months of investigation the Pentagon attributed the attacks to the Chinese army. Actions committed so far allow China to test both its offensive capabilities and send a signal to potential attackers. First, it conducts trainings to check and improve its ability to cause damage in the territory "enemy" through cyberspace, as well as to test response procedures that have targets against attacks. But it also helps to show his abilities, to make a show of force to try to deter the ambitions of aggression against China.

It is thus a strategic rhetoric that addresses the challenger. It is not yet entering an escalation of violence just to show the capabilities, real or imagined. Indeed, no major cyber operation sabotage was so far attributed to China: hacking of Estonia in 2007, the Stuxnet operation in 2010 or Shamoon attack in 2012 are attributed respectively to Russia the United States and Iran. However, it should be noted the operation Aurora, which was updated in January 2010 and has been attributed to China using a spy software to steal source code of products from targeted companies.

This option can be interpreted in two ways: a strategic restraint a result appeasement, or, for now, an inability to develop such a scale actions or technologically developed. Indeed, despite the rise in quantitative power of China, we can still wonder about the real Chinese military capabilities. Certainly, they will say otherwise (aircraft carrier, nuclear submarine

launcher vehicle, a new generation fighter), but they have never been observed in a situation or actually tested. Efforts are obvious, but we are not sure now the actual technology equivalence with Western equipment. By analogy, it is assumed that what is true for conventional weapons is perhaps for advanced cyber weapons. This hypothesis refers to the situation in the summer of 2013, and does not prejudice the possibility of development and technological upgrading by Beijing.

Organisation

It is extremely difficult, from open sources, to describe the Chinese cyber defence organization: unlike the West, we do not have an organizational GCHQ (UK), a ANSSI (France) or describing the joint between a cyber command and NSA (United States).

It seems that the Chinese system (Danjou 2012, Stokes, Lin & Russell Hsiao 2011) has incorporated all aspects of electronic warfare in the forth third And fourth Offices of General Staff of the PLA, the first being to simplify, specializes in the collection of electronic information and the second in countermeasures or attack. These offices enable operational research units and countermeasures in five Chinese Military Regions (Jinan, Lanzhou, Chengdu, Guangzhou and Beijing).

In 2010, the PLA created what could be a centralized command operations “cyber war” (zhongguo renminjiefangjun xinxi baozhang jidi) that can be translated as “the basis for the information security of the PLA” (BSIAPL). But the PLA remains quiet on the subject. However, we can report the incorporation in 2011 of the Communications Department of the PLA in this organism can hypothesize that the Xinxi Baozhang Jidi is a new command and coordination specially dedicated to “cyber-war”. Finally, a cyber defence force, called “blue team”, has been officialised in May 2012. It would count thirty people under the military command of the Canton area.

According to a March 2012 report (Krekel, Adams & Bakos 2012), the third department of the General Staff of the Chinese army count up to 130,000 people (the highest rating). The 61398 unit, also called the second office is responsible for intelligence operations on North America, when the 61046 unit (called the eighth office) would focus on Europe. According to the report Mandiant, twenty groups of hackers would operate from the Chinese territory.

The document has particular focus on one of them, which it called “APT1” and that is precisely located in a building in Shanghai. According to the report, APT1 would be the 61398 unit, since only one state would be able to mobilize long-term (traces observed for seven years) as many people located in the same place and having such activity.

Here we see two points that appear to suggest that the Chinese have much greater capacity (beyond the fact that there is uncertainty about the proportion of detected attacks). First, there are at least two economic and military units specialized in geographic areas of interest to China to collect political intelligence, but there are probably other for technological powers such as Japan, Korea, Russia, India ... In addition, companies are increasingly multinational and therefore use English in more of their documents, it facilitates the actions of the Chinese (especially since there are more Chinese Speaking fluent English, especially among computer science graduates, the French or German).

Sino American Confrontation

Superpower feeling threatened by the emergence of a second giant, the United States came increasingly into opposition on issues of cyberspace with China. Regularly accusing of espionage and publishing reports in charge, they believe that China is a major threat. It would be unfair to ignore all the major Western powers have instituted similar devices that is China. NSA, U.S. agency in charge of cyber spying and telecom directly employs over 38,000 staff (which must be added the many sub-contractors), and the 14 U.S. intelligence agencies 14 have prerogatives in economic espionage. Finally, Verizon Business and PRISM, made public in May and June 2013, shown that the U.S. NSA had secrets and legal agreements with major telecommunications operators and social networks (Facebook, Apple, Google, Amazon, Skype...) to monitor communications within the Patriot Act, the fight against terrorism. However, this does not absolve the Chinese jurisdiction since Beijing organized, as we have seen, methodical cyber espionage.

Facing U.S. accusations, China says it is regularly the victim of cyber attacks, and it relies on this to prove his need to defend himself and his inability to attack others. There is certainly some truth in this speech, but also a part of subterfuge.

To counter the American discourse, China did not remain inactive. Thus, against the U.S.

Internet regulation by organizations highly dependent on U.S. authorities (ICANN), China and Russia offered to cooperate in the development of international rules. In proposing a treaty regulating the Internet under the guise of an international organization such as ITU, China aims to reduce U.S. capacity for.

Conclusion

Thus, China is a real cyber power. It might once have been emerging; realism led it to assert that it has now emerged. Its cyber strategy firstly focused on the control of internal information. This strategic line used censorship, but also the establishment of national platforms, thereby excluding large foreign and especially U.S. carriers. This is an information strategy which first insisted on top of cyber spectrum (cognitive layer).

This strategy was then focused on the economic aspects, first developing means of massive economic espionage and, for China, economic warfare and cyber conflict have large intersections. This economic cyber espionage is deployed worldwide. Simultaneously, cyberspace has been an industrial strategy to implement a technology industry including manufacturers (drivers, routers, and infrastructure) but also assembly (mobile devices, PCs, servers). Thus, China has managed to conquer its independence from the dominant industrial cyberspace that were the U.S. actors.

The last phase appears under development: it is the cybernetics tool traditional defence. If the media were very interested in the 61398 unit, it is likely that the internal challenge is not there, but in the development of products involving cyber to develop major weapons programs.

Chinese cyber capabilities are distinguished from resources available to other major cyber powers by significant experience in combating cyber by content (producing positive content, discredit opponents...). As such, we can emphasize the attempt to influence international opinion on the Internet through the website anti-cnn.com, famous 4th-media. This site was created in 2008 to present the initial errors of the Western media regarding the treatment of disorders of the events in Tibet. Initially focused on the Chinese and Tibet, this site is subsequently developed in English and has expanded its products to all the subjects

on which China is challenged (conflict in South China Sea presence in Africa…). The site also publishes a large number of articles attacking image of great power rivals China to show again the difference between the attitude of these countries and the one of China. The English version of the site hosts articles mainly from foreign journalists, but is mostly administered and hosted by the Faculty of Journalism at the University of Beijing. It will be interesting to see if and how China will develop its capacity to fight the online contents when linking skills in internal affairs with those related to the development of international power.

The Chinese strategy of positioning the content can be explained by two reasons. First, we find in Chinese strategic culture a tropism for the content rather than the container, the long term over the short-term and the fluid on the solid. On the other hand, this strategy is for China a virtual obligation as at the international level the country has little influence on the layer 1 (main infrastructure, the role of ICANN) and a fairly limited decision the (U.S. origin international protocols (ISA)) layer 2.

However, one should not misunderstand. While the United States are building a “China threat”, it also gives the impression to replicate the geopolitical scheme of the Cold War with the Soviets. However, the Chinese do not pay this mimetic dialectic. First, they probably do not have ambitions as a global power could have the Soviet Union. Their geopolitical goals “classic” seem pretty close to their borders. It should not be forgotten that China is the Middle Kingdom, and sees the world as “barbarians” it did not really need to dominate. It is much more concerned with its padding. From this point of view, the maritime borders are much more concern for her around the two seas Chinas, one of the East (between Korea, Japan and Taiwan) and the South (Philippines, Vietnam, Indonesia). Here, a cyber conflict is going on, even if it is barely perceived in Western countries, and cyber fighting held regularly between the powers in the region. The real cyber aggressive posture of China is probably there, much more than in the Sino-US confrontation.

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Appendix 1

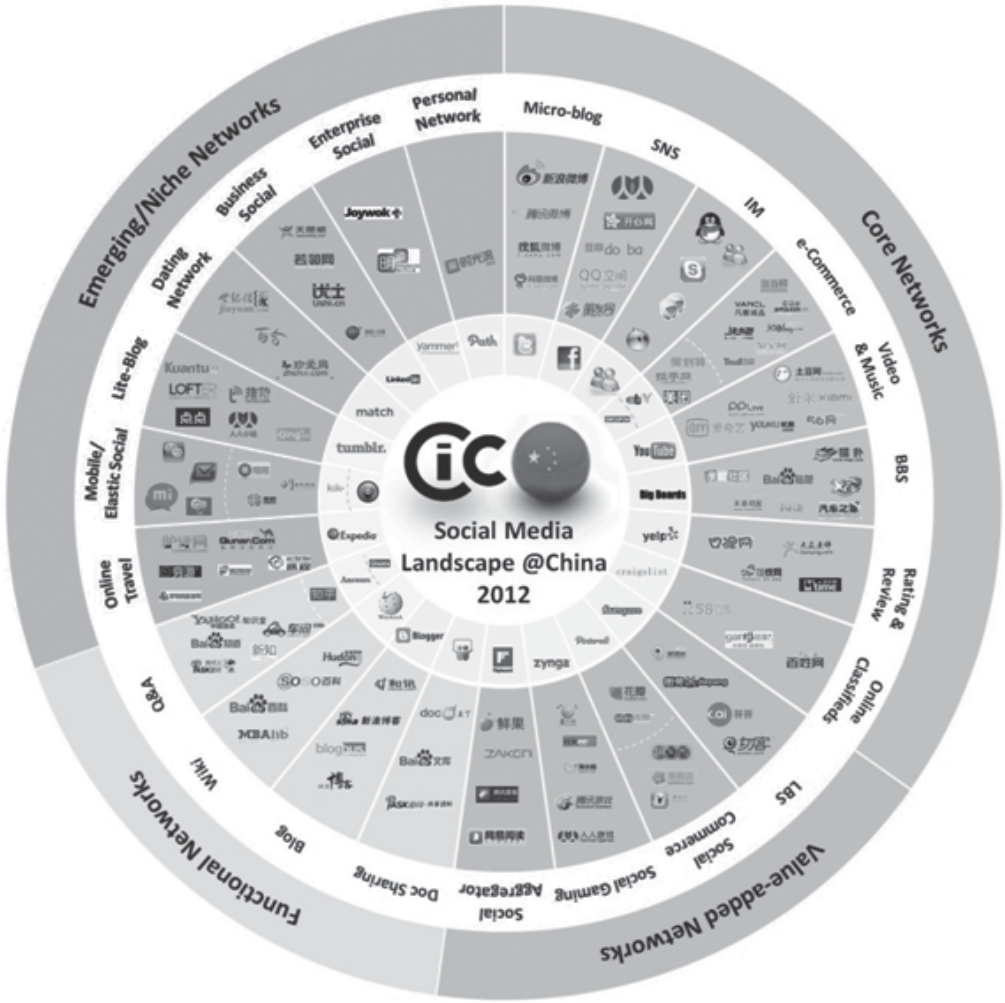

Figure III-2-2; Overview of Chinese websites (source: Resonance)

Ⅳ The China soft power

After the Sino-Soviet schism, Communist China tried to compete with the Soviet sphere of influence in the world by recognizing communist dissident movements. This attempt was a failure because the influence of the pro-Chinese groups was limited. However, the promotion of non-alignment after the Bandung Conference in 1955 allowed it to build relationships with Third World countries and benefit from decolonization to forge ties with African nations.

The demise of the communist bloc forced China to rethink its strategy of international influence. In the new geopolitical context of the early 90s, China had a number of disadvantages: the image of a totalitarian country inherited from the Cold War, the need to leave a certain isolationism, the decline of Maoism as a vector of ideological thinking, language barriers, a relationship with overseas Chinese politically based.

Incidents that marred the route of the Olympic flame in 2008, especially in Greece and France have raised awareness to the Chinese authorities that soft power was a weapon that went beyond the framework of diplomacy.

1 China Cultural Influence

Jean-françois Susbielle

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The “West” never fails to remind that China’s image is irredeemably damaged.

One, it is not a “democracy” but a communist dictatorship, two it has no respect for human rights, there is censorship and freedom of speech is repressed.

With such “values” and political system, China is anything but an attractive model.

However in the emerging world, this rhetoric has little if no impact at all thanks to China’s economic might. The last twenty years, China’s robust economy has lifted entire continents out of poverty and on the road to prosperity. In Africa, Central and South-East Asia, Australia or Latin America, in Brasilia, Manila or Caracas, all echo “China, I love you” or rather “China te amo”. Beijing’s strict compliance with UNO charter of non-intervention in internal affairs, contrasts favourably with the “Western values” enforcement scheme of the US. In emerging countries, a win-win all-in-one economic partnership is what makes China popular and attractive, not classical opera or Du Fu’s poetry.

While in the “West”, where China is still perceived a totalitarian and predatory regime with mercantilist goals, Beijing will bet on its cultural influence to turn reluctant partners into willing “panda huggers”.

But the ultimate cultural battle takes place in China’s own backyard, around the China Sea, a region of 2.2 Bn people stretching from Japan to Indonesia and from Vietnam to the Philippines.

A spontaneous cultural integration is at work, based on sharing rather than hegemony. And while China threatens its neighbours with its maritime claims, an Asian cultural community

is in the making, competing with America's influence, and indirectly benefitting to China.

Unique cultural assets

China can count on its heritage and History to promote an image of harmony-seeking and benevolent nation. But in the West, China produces antagonistic feelings. As much as it fascinates, it also induces fear. And fascination and fear are never far apart.

Uninterrupted History and culture

What we call the "West" is the result of a succession of civilisations that each had to die so the next could arise. Chinese History is cyclical and resilient, made of chaos and renaissance as the Mandate from Heaven (Tianmin) is passed from a dynasty to the next.

The "Spring and Autumn" period (-722 to -476) is contemporaneous to Homer and Pythagoras in Greece. The "100 schools of thoughts" produces Confucius (Kong Fuzi or master Kong from -551 à -479), Lao Zi (Taoism). As far back as antiquity, the corner stones of Chinese culture are already in place.

Between fascination and fear

Italian traveller Marco Polo's silk road to Beijing in 1275 is the first to translate the fascination that China has on a "Westerner". Later, Jesuit Matteo Ricci introduces Confucianism and Taoism to Europe. During the Enlightenment, European philosophers, Leibniz, Voltaire or Kant, are highly impressed by the Confucian model of social organisation and meritocracy.

The real culture shock comes with the Opium wars (from 1839 to 1860) and the partial colonisation of China by Western powers. China's porcelain, pagodas and other "Chinoiseries" become a hot favourite in European palaces.

But this positive image can turn negative, and fascination flip to fear.

China's "anthill" never fails to scare. After the Boxer war (around 1900) and the defeat of Russian navy by the Japanese (1905), the "yellow peril" narrative develops. China's multi-

tudes are presented as hostile, wanting to destroy the West – like in Sax Rohmer's Dr Fu Man Chu novels. Postcards with "slow slicing" (lingchi) and other Chinese tortures circulated around Europe as proof that behind the inscrutable mask, Chinese were deceptive and cruel.

This Western dual attitude of fascination and fear is at work to this day. The best example being Michael Pillsburry, a mandarin scholar who led a passionate romance with China in the wake of the 1972's Nixon-Kissinger visit to Beijing, before turning a major hawk in Donald Rumsfeld's team. Why such a dramatic about turn? With 1989 Tiananmen events, Pillsburry said he had suddenly discover the Chinese true colour…

Chinese cultural sphere

Chinese culture and its Confucian – Taoist model of harmony is naturally present in what is called Greater China, Hongkong, Taiwan or Singapore, but also in Japan, Korea or Vietnam.

From 1949 to this day, Hongkong and Taiwan have become a rich repository of Chinese culture. Though Japan was never attacked by China, the latter gave Japan its culture, writing, bureaucracy, urbanism or architecture. Nara or Kyoto are patterned after China's northern capitals. Korea was heavily influenced as early as the Han period, while Vietnam spent the first millennium under China's rule.

In South East Asia, Cambodia, Burma have been at times under Chinese domination.

These ancient cultural links play an important role in community-building around the China Sea.

Promoting Chinese "cultural values"

China will use the fascination of its cultural assets to try to win Western public opinions, combat the effects of "China bashing" and extend its influence. Because when it comes to investing in Greek ports, buying European technology companies or American utility groups, one had better look like a benevolent harmless power, rather than a deceptive

predator.

Chinese influence is often government-backed, but it is also spontaneous, the latter being the most efficient.

Chinese traditions in world culture

Derived from Taoism, many Chinese traditions have made their way into world culture and contribute to the peaceful image of the Middle Empire. A country that promotes spirituality, harmony with nature and society, and cures patients with soft medicine techniques cannot be aggressive. At least that is the plan.

Tai-Chi-Chuan, a slow relaxation technique, Traditional Chinese Medicine (acupuncture, herbs or massage) are popular with Western urban professionals. Feng Shui (literally wind and water) is fashionable with Western architects and home designers. Chinese horoscope and its 12 animal signs makes a nice complement to traditional horoscope.

Chinese martial arts (wushu) - Kung-fu and its Shaolin temple mythology – are now an Olympic discipline.

Harmony is key. Harmony with nature (Taoism), harmony with the flows of energy (chi), harmony in the family and social order (Confucianism). And therefore harmony between a rising China and the rest of the world. Unlike 20th century's new industrial powers Japan and Germany, China's rise will not generate conflicts because China's ultimate goal is harmony.

Chinese popular culture

Hongkong cinema contributed much to China's international image. It started in the 70's with what can be considered the first global universal hero, Bruce Lee. His successor Jackie Chan tried (with mixed results) to put his international fame at the service of China's poor image during the Beijing Olympics.

Hongkong Martial arts movies, Wuxia, started in China in the 30s and gained fame in Asia in the 60s. Thanks to Ang Lee's 2000 blockbuster Crouching Tiger, Hidden Dragon, the

Wuxia genre reached international appeal.

Hongkong choreographer Yuen Woo-ping became hot favourite of Western films like The Matrix, Mission Impossible and Kill Bill.

In China, 5th generation directors Zhang Yimou or Chen Kaige popularised ancient History and traditions to international audiences with stunning costume period movies.

Government backed policies

In 2002, at the 16th CPC Congress, - reinforced in 2007 at the 17th Congress -, culture is identified as a major component for both national unity and international strategy of influence. From this day, China encourages cultural exchanges of arts, movies, music or sports and the “Year of Chinese Culture” are held around the world. Unesco has granted China 33 World Heritage sites, the third highest figure. Abroad, the Cultural Departments in Chinese embassies are busy signing cooperation agreements

But Beijing, acting like a corporate brand name, also sponsors events that will benefit its image, like the Buddhism International Forum since 2006. An easy way to associate its image with Buddhist values of peace, non-violence and harmony.

Chinese New Year celebrations, also sponsored by China with undisputed success, are now part of festive calendars of many Western countries like London, New York and Paris.

But the most visible arm of Beijing’s “cultural diplomacy” is a network of some 400 Confucius Institutes, whose mission is to “promote Chinese language and culture” around the world. They are obviously patterned after the Alliance Française, British Council, or Goethe-Institut with an important difference. Unlike their foreign counterparts, Confucius Institutes are hosted - and some times co-financed - by local universities, which has raised concerns of possible industrial espionage and other intelligence gathering activities.

Limits of Chinese cultural diplomacy

For more than a decade, China has massively exploited its heritage and History in the hope to build a positive image that would win over other countries. But this strategy is a double-

edged sword as it contrasts with the actual situation of culture in modern China. When “dissident” writers, painters and artists like Ai Weiwei are jailed, when freedom of expression is muted, China’s insistence on focussing on old assets becomes more than suspicious.

Why trust a country that keeps referring to its antiquity and doesn’t allow a vibrant cultural scene at home? This is casting a shadow on the “peace and harmony” rhetoric based solely on legacy History.

On October 2, 2010 in Athens, Chinese PM Wen Jiabao was congratulated by European countries for his support to ailing Greek economy. But a week later, human rights activist Liu Xiaobo was awarded the Nobel Peace Prize in Oslo...

Cultural integration in the China Sea

The China Sea - East and South - is the mare nostrum (common sea) of many countries: the Asean+3 group (Asean + China, Japan and South Korea) as well as Taiwan or North Korea.

It is the home of 2.2 Bn people producing a combined GDP of USD 16.5 Trillion, on par with the United States and the European Union. The region is on track to economic and cultural integration, which presents the biggest challenge of all for America. China is now each and every country’s largest trading partner in the group, and currency agreements to use the Yuan for bilateral trade poses a lethal threat to the US dollar. Traditionally, all three currencies, Yuan, Yen and Won have their origin in the same Chinese character.

In the China Sea, cultural integration is a spontaneous and uncontrolled aggregator. China is not the organiser of this phenomenon. It is not even an important player compared to the major powerhouses of Japan, South Korea, Taiwan and Hongkong. But on the sideline, China is comfortably collecting the dividends of 3000 years of cultural influence.

A culture of sharing

China Sea’s cultural integration plays a great role in creating a feeling of community that European Union will never achieve. In fact, there is no trace of European-style rivalry, but

rather a natural propensity to share, exchange and pool cultural resources, in a region that was for centuries under Chinese influence.

Cross cultural sharing covers TV series and games, music, movies and actors: K-pop, J-pop, Japanese cosplay, Taiwanese TV games, Hongkong dramas, and of course anything Korean, like pop band Girls Generation or TV series. A mainland program like “I’m a singer” was passionately followed by Taiwanese audiences, helping to mend cross-strait relations.

America’s main challenge

Post war America made extensive use of its entertainment industry to impose its cultural model to Europe as a means to counter the attraction of communist USSR model. Today, Chinese consumers long for the American way of life and cultural codes. Though Beijing protectionist laws limit the number of foreign movies, Hollywood with half a dozen block-busters manages to rack up half of the revenues.

But this time, America faces a greater challenge. A culturally integrated China-centric Asia – recouping the Co-Prosperity Sphere of Japan’s Shōwa legacy – would put an end to US world dominance and send the US dollar into the doldrums. It would also severely undermine Washington’s efforts to keep its 50 000 strong military forces in the region.

While China’s claims over the South China Sea and the Senkaku islands justify the American presence, the battle for cultural dominance might eventually decide its long term fate.

Conclusion

Inside China, Beijing is struggling to contain America’s influence as the US has become the desired model of prosperity. But in Asia, Beijing can count on unexpected allies in the form of its former cultural sphere to eventually sack America out of the region.

As for the rest of the world, China has yet to convince of its peaceful intention by allowing its culture scene to bloom freely. Otherwise, its charm strategy will be mistaken for another attempt to “win without fighting”, as Sun Zi recommends.

2 Soft power “with Chinese characteristics”

Pierre GUEYDIER

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“The natural effect of commerce is to bring peace. Two nations that trade together become mutually dependent [...] and all unions are based on mutual needs.” Montesquieu, De l’esprit des lois, 1748

In an article of Foreign Policy in May 2013, the famous Joseph S. Nye, Professor Emeritus of Harvard and the father of the concept of “soft power”, welcomed, with justifiable pride, the fact that his theory published in 1990 had passed into the common language of international relations. Even Vladimir Putin and Hu Jintao are no longer reluctant to officially use it during meetings at the highest level. What a long way indeed in the minds by these two simple words in more than twenty years. We will focus here on receipt of this concept by China since the 2000s and see that Chinese strategists, by adopting this term, have significantly changed its original meaning. The singular episode of relations between China and the Vatican on the eve of the Beijing Olympics, will illustrate this chinese doctrine of “the use of soft power.”

The global success of the concept of soft power

This is an essential feature of American intellectuals specialized in international relations, than to be able to build concepts and powerful intellectual standards which can summarize situations of rare historical, geopolitical and social complexity. “End of story”, “Clash of Civilizations”, “war against terror”, “Cold War”, “Axis of Evil”, “Soft power”, then ... “Smart power” often appear as much part of the diplomatic and academic marketing as fiction or self-fulfilling prophecy.

But in the area of simplification, nothing really goes as planned and the empirical reality never matches the slogans. It is precisely what Jospeh Nye regrets in his recent article:

China and Russia excessively use the term soft power but - needless to say - with bad understanding and without, he says, hope of success. Perhaps to reassure himself, Jospeh S. Nye does not hesitate to call Russia “declining power” and deny that chinese “civil society” has any effective role in soft power. Finally, according to Nye, the American soft power finds its strength in the fact that it comes from the civil society and not from a state initiative. In contrast, the “authoritarian states” are not credible because of their tendency to propaganda. For Nye, indeed, “the best propaganda is not propaganda,” but the decentralized action of civil society, the private sector and individuals.

Globalization easily allows the deterritorialization of ideas. The original definition of soft power, despite its universal allure remains very ethnocentric. What is the soft power of the 1990s such as Joseph Nye expresses it? In line with the historical trend of realism, for which social facts are determined by the balance of power and are the result of a combination of these on the international scene, Joseph S. Nye offers at the outlet of the cold war, a theory of the paradoxical power: the exercise of power on the international scene by attraction with the use of non-coercive means to achieve its goals in particular by culture, political values and diplomacy. Joseph S. Nye was blamed by many for his naivety and misleading idea that only the soft power could determine an effective foreign policy. Indeed, the shock of September 11 will have to bring some revision of the theory of “the end of history,” Hegelian idea awkwardly became popular because of Francis Fukuyama in which the concept of soft power has emerged. The military enterprises of American power in the 2000s contradict in facts the soft approach of Nye but nevertheless underline its relevance. This outburst of hard power will encourage Nye to revise his theory to evolve to the concept, no less obscure, of smart power which involves the full range of soft and strong means to maintain American power at its level. On January 13, 2009, Hillary Clinton, during her hearing before the Committee on Foreign Affairs of the U.S. Senate, will use this “inclusive” theory as the doctrine of U.S. foreign policy on Obama’s first term: “we must use the so-called smart power, that is to say, the full range of tools at our disposal (diplomacy, economy, military, politics, law, culture) using each of them or a combination of all these tools. With smart power, diplomacy will be the vanguard of foreign policy”.

In 2004, Jospeh S. Nye begins to look at what he perceives in Chinese foreign policy as the soft power (Nye 2004). But do we speak to each side of the Pacific of the same thing?

The characteristics of the Chinese foreign policy are they a translation of the concept of soft power or did they exist before them? Are they a bad copy of the idea of American strategist or a historical habit of the Middle Kingdom?

A chinese style soft power

As already stated Montesquieu: The natural effect of commerce is to bring peace. We will not dwell here on the superlatives that characterize the last fifteen years of Chinese economic development. But a key question that the theory of soft power does not explicitly address remains: trade is the spring of soft power or hard power? Military and war metaphors are plentiful when we talk about the “China threat.” It must also be noted that historically China is a little belligerent power in the military sense of the term, or even colonial. At least, in contrast with the Western powers. Among the myths of the chinese “friendly power”, the figure of the browser and explorer Zheng He (1371-1433), whose 600th anniversary was celebrated by China in 2005, is the model of “largely peaceful” nature of China. As claimed by Wu Jianmin, president of the Institute of Diplomacy and former Chinese ambassador to France, “600 years ago, at the time of Zheng He, China was the world power in military terms, scientific, cultural, and finally economic. However, the Chinese have not used their military superiority to conquer other countries, to reduce them to the status of a colony. This shows that good agreement is part of Chinese culture and the rise of China has essentially a peaceful nature”.

Unlike Western thinkers who like to invent new words to describe the reality of international relations, such as the soft power, the chinese ancient tradition has extreme attention to words, the richness of their calligraphic representation, their depth and their stability over time. “Agreement”, “Harmony”, “Sweetness”, “Friendship”, “Agreement”, “Mutual Respect” are terms which seem outdated and naïve to Westerners but are on the contrary, by their semantic authority, cardinal values for Chinese thinkers and society as a whole.

This is so the vast movement of “re-confucianisation” the inseparable Chinese society of the most dramatic economic consequences and the image projected by this Nation. The intensification of the academic research on Confucius wanted by the National Popular Assembly and the dazzling swarming of Confucius Institutes around the world are the most

visible fruits.

For this “essentially peaceful” nature of Chinese history and the central figure of Confucius, what Chinese authorities now call soft power is actually quite far from the concept of Jospeh S. Nye 90s. It seems, rather than a slavish adaptation of the idea of Nye, that Chinese authorities have found a flexible term that can formalize a set of directions of foreign policy that refer to both the long history of China, its willingness to support its influence on the world stage primarily through trade and affirm peaceful dimension of its intentions. This is the seventeenth Party Congress in 2007, which will enroll in the official terminology the term soft power, already present implicitly in 2002. In 2009, Hu Jintao in front his ambassadors has formalized this “soft power” of China by the discourse of the “four forces” valid for both domestic and foreign policy: the political influence (yingxiangli) economic competitiveness (jingzhengli), affinity for China (qingheli) and moral virtue (ganzhaoli).

The definition of soft power by the Chinese is much broader and holistic than Nye. This term, as seen from China, means any power beyond the strict military and security sphere. Means considered by Nye as coercive will be integrated into the Chinese doctrine of soft power. Development aid, investment, participation in multilateral organizations will be an opportunity for a “soft use of power” (Li 2009), more accurate definition of soft power “with Chinese characteristics”. The holistic approach (Bashan 2012) is characterized by the continuum between domestic and foreign policy which aims at the establishment of a harmonious society as the refusal of outside interference with symmetrical principle of non-interference and respect mutual towards third countries.

Another specificity, the Chinese soft power is focused on a primarily cultural soft power (Wenhua ruanshili) integrated in the official language of the CCP by Hu Jintao in 2007 term. Traditional cultural values of China are the spiritual foundation, philosophical and ethnic regarded as the most valuable asset and source of Chinese soft power: “The competition of cultural power is the heart of the competition of soft power” (Li Haijuan 2004). While American entertainment industries are a vector of American soft power, the Chinese put at the center of Chinese characteristics tri-millennial values of their culture to make the matrix of harmony among nations. Finally, the idea that hard and soft power must unite to produce a smart power appears to be a very old doctrine in China. it seems possible to trace in the

famous strategist Sunzi and his Art of War, the idea that military action is not only a component of this art (Hunter 2009), but not the most important part. The extended soft power "Chinese" also fills gaps in the field of hard power, such as deficiencies in military high-tech equipment.

Did China practice soft power for decades without knowing it? The widespread adoption of the term by political elites during the 2000s remains paradoxical. The use of the concept can stop on a wide range of internal and external policies and action at the same time the loan to the Western sphere forced the Chinese authorities to constantly position in reference to the U.S. definition returns through a mirror, the idea of "China threat." This complex posture and probably inherited from the colonial period forces the Chinese analysts "to minimize or ignore the function of soft power to influence others aggressively" (Li 2009), "as they are busy using it to oppose the theory of the "China threat'" (Bashan 2012).

The case of China-Holy See Relations

After these general remarks, we would like to mention the example of relations between China and the Holy See. This case seems interesting because it is not a question of trade relations, the powerful economic incentive component that serves as a vehicle "off-road" on Chinese power does not apply in this case. Beijing, until the early 2000s was definitely not requesting the establishment of reconciliation with Rome.

In line with the Chinese political tradition, internal religious matters can not suffer any interference, the CCP controls the patriotic religious associations representing each religion. Contrary to common belief, there is indeed a genuine Chinese Christianity, albeit very small, but since the seventh century introduced by Nestorianism in 635. An Italian Jesuit Matteo Ricci (1552-1610), who reached the status of a "scholar" at the imperial court, is even one of the few foreigners to be officially considered one of the fathers of Chinese history. But Christianity, acclimatized long and becoming Chinese, will see its image tarnished by the colonial wars by the Western powers in the nineteenth century picture. The profound trauma suffered by imperial China will inevitably part of national historiography Christianity and Catholicism in particular as having been "introduced by the guns." Based on this colonial memories, Maoism and the Cultural Revolution are going to brutally suppress all reli-

gions for a forced march toward secularization which, however, will fail to eradicate three thousand years of profound religious and spiritual feelings of the Chinese culture. Since the 50s, the increase of the Christian population, mostly Protestant, is spectacular (8000% from 1949 to 2007).

Concerning Catholicism, almost all of whom were Western ecclesiastical structure - the first six Chinese Catholic bishops were ordained in 1926 - the coming to power of Mao in 1949, leads the exile of European clergy and many faithful in Taiwan and the severance of diplomatic relations. The Catholic Church in China is characterized by two entities with more or less porous borders: a patriotic church as an association whose executives - including bishops - are appointed by the CCP and a church called “underground”, which denies membership to the Patriotic Association, recognizes the Pope as the supreme authority and survives in an almost underground. For the Chinese political authorities, the interference due to external power to China, especially in the appointment of bishops, is strictly inconceivable to the values of government supported by the concept of patriotism, loyalty to the nation and harmony of society. For his part, the Holy See, which measures the size of the issue of Christianity in China is sparing no efforts to try to find a compromise on the appointment of bishops. John Paul II will not stop to try and find an entrance door to China, particularly through the French Cardinal Roger Etchegaray, tireless personal ambassador, who will manage to establish deep relationships with friends Chinese interlocutors in line with the Jesuit Matteo Ricci. But the leading role of John Paul II in the anti-communist struggle in Europe will not be able to blink the Chinese authorities also engaged in counter diffuse interference of Evangelical Churches in American patronage.

The lack of interest of China to step toward the Holy See will evolve from July 31, 2001, when the Olympic Games are awarded to the city of Beijing. Messages sent to China on this occasion are very clear: this award is in the nature of a final exam to fully integrate Chinese power in the international arena and give it the title of “great power.” Among the criteria for election are those of human rights, including religious freedom which is an important symbol in particular the United States. Strength of this observation and the simultaneous theory of soft power “with Chinese characteristics”, the strategists will identify the Roman authorities as a prime target: if the Pope himself recognizes that religious freedom in China is progressing and he wishes good luck - he blessed? - The Olympics, no one can

deny that China has met the political criteria set by the final exam of the Olympic Games of 2008.

The election of a new pope in the person of Benedict XVI in April 2005 will be an opportunity for the Chinese authorities to deploy their soft power, but this time without the use of trade. First, the CCP will release its requirements on the appointment of bishops which is of crucial importance to Rome on the theological and political level. From the accession of Benedict XVI to the Pontifical charge no Chinese bishop will be ordained without the prior consent of the Holy See. The balance is extremely subtle: a discrete channel is opened between the two partners. Beijing and Rome agree unofficially on a list of three names that the Chinese authorities submit to the Vatican for the appointment of a bishop. Among the three names appears the one that makes the consensus. Rome confirme secrètement son choix et Pékin fait l'annonce officielle, puis Rome ratifie le choix du public. This meticulous mechanique gives gradually its fruits and Rome favorably welcomes the bureaucratic progress, despite being strongly warned by of the Cardinal Zen of Hong Kong, veteran of relationships between Chinese political and ecclesiastical authorities.

In 2007, Benedict XVI sent a public letter to the members "of the Catholic Church in China", which reaffirms the unity of the Catholic Church in China, implying that the old division between church and patriotic underground will eventually fade based on a new generation of believers and clergy who have not experienced the persecution of the Cultural Revolution. Publicly, the spokesman of the Supreme Pontiff, recognizes that there is no more religious "persecution" in China within the meaning of deportations and mass arrests, although some cases of imprisonment raise questions.

The highlight of the merger between China and the Holy See will manifest on May 7, 2008 during a concert at the Vatican by the China National Symphony Orchestra and chorus of the opera concert in Shanghai. Without diplomatic relations, the two countries can not publicly organize official meetings, but in this case, the cultural exchange will symbolically seal the friendship. The subtlety and genuine "soft power" of music - the Chinese orchestra played Mozart's Requiem, favorite composer of the Pope - and the high position of the head of the delegation, the daughter of Deng Xiaoping, in person, will encourage the pontiff to give what the Chinese authorities hope. His speech resumed the next day in the Os-

servatore Romano and all the Chinese media salute “the” great cultural tradition “of China which reflects” the history of a people with values and noble aspirations “and especially address” greetings to all the people of China who are going to live with the next Olympic Games an event of great value to humanity”. A few weeks of the opening of the Olympic Games, the Pope’s words validate the objectives of religious freedom progress in China by one of the world’s largest religious authorities who “reign” on a spiritual “empire” as important quantitatively as China. But as warned by Cardinal Zen, the improvement was short-lived, anytime soon Games and Shanghai World Expo were completed, the takeover of the CCP on the appointment of bishops was very brutal from 2010. In this situation, feeling betrayed, Rome responded vigorously by excommunicating the bishops ordained without his consent. Not since 1949 and despite many controversial cases, a Chinese bishop had been excommunicated.

This episode is symptomatic of the evolution of the Chinese strategy of soft power that is able without the use of trade and economic levers “to get what she wants through its power of attraction and without using coercive means”, according to the original definition of soft power by Joseph S. Nye. By adopting the American term, China could have been be locked in a legal trap and could have tried to imitate, and finally submit to the theories of North American international relations. But by acclimatizing the concept to the Chinese mentality, enlarging, by linking to old practices and associating immediately to domestic politics and hard power, the student may have exceeded the master Joseph S. Nye.

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V The geo-economic issues

For a country, the strategic orientation towards geo-economics must not be a choice but an obligation. The structure of international relations with the existence of one or more superpowers, a hazardous geopolitical context or the need to change the paradigm of power could lead to the creation of a strategy based on economics rather than on military. Middle ages merchant republics, 16th century Britain or 19th century Japan are good examples of a successful geo-economical strategy aiming to the development of a country's power.

If such a strategy could appear less harmful and offensive than a military-based one, it imposes the creation of strong ties with suppliers and clients as they became substitutes for allies. For 35 years, China creates a bunch of relations with a large panel of other countries in order to sustain the development of its economy. With a production-driven economy during the 80s and the 90s, an efficiency-driven one during the 2000s and now an innovation-driven economy, China jumped in the ranking of GDP from the 8th rank to the 2nd and is now aiming for the 1st.

With a near 1.5 billion inhabitants, China needs food, energy and a whole range of primary goods to feed a still growing population and to fuel its economy. China is obligated to strengthen and to diversify the relations with its partners and suppliers with the risk of a geo-economical confrontation with other emerging or Western countries, themselves relying on a large bunch of suppliers.

1 Feeding the Ogre: China's Access to Resources

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The rise of China since the 80s has been conditioned by the country's ability to secure natural resources supplies. As China wanted, during the 80s and the 90s, to become the "world's factory", the resources needed to fuel its economy were quite easy to find. But as the country is becoming a great power since the 2000s, the diversification of China's economy has changed the demand in both a qualitative and quantitative way. In order to fill its needs, China is obligated to plan a global strategy to gain access to resources and to secure supplies. With a specific geoeconomical approach in terms of targeted countries and resources, using the close ties state-companies, China is developing a "chess and go" strategy, mostly oriented against US influence.

The need of metal and energy resources

The transformation of China's economy

For the last twenty years, China's economy has changed from a planned communist economy inherited from Mao Zedong to a fully integrated market economy. This change mostly occurred during the 90s when China chose to join several international economic organizations. At the end of 2001, a few months after the 9/11 events, China made the choice of integration to the global market by joining the WTO and further developing what is today known as "socialism of market" (Sanjuan 2011, pp. 175-182). This new economic doctrine is the combination of traditional Chinese political and economic thought and the compul-

sory adaptation to world's economic reality and the needs of a globalized market (Sanjuan & Trolliet 2010).

However this evolution is not simply inherited from the fall of USSR. After Mao's death in 1976 and the ousting of the Gang of Four in 1978, Deng Xiaoping became the new ruler of China. Under Deng's rule, China transformed itself in order to become a more open country, at least in an economic perspective. Contrarily to Mao's opinion, Deng believed that China needed to insert itself in the market economy without forbidding its particular political and social orientations. During the 80s and the 90s, Deng reforms led to the creation of national companies, economic structures and helped to transform China into an exporting country (Bergere 2012, pp. 82-88).

Nevertheless, during Deng's rule – from 1978 to 1992 – China remained an agrarian and heavy industry oriented economy. Mao's economic legacy has transformed into a burden during the 90s as China was very much like the former USSR: a primary goods and simple manufactured goods economy. Chinese products had a very low added value and China was simply a giant factory for the most advanced countries.

As China's GDP grew in an exponential manner from 1978 to present day, from less than 1000 billion RMB to near 20 000 billions RMB, China's economy started a deep transformation during the 2000s. Nowadays Chinese political leaders, viewing their country becoming the 2nd global economic power and aiming to the first place, are wishing to make China a technologically advanced country and to change from a factory to a high-technology production and development center (de la Maisonneuve 2012). This strategy is benefiting from the very high revenues of Chinese companies as well as from the global economic growth of China with a two digits number of year-on-year growth (+11% in 2012). The Chinese leaders are now encouraging the development of the highest technological sectors such as aeronautics, defense, telecommunications, biotechnologies, space or renewable energies.

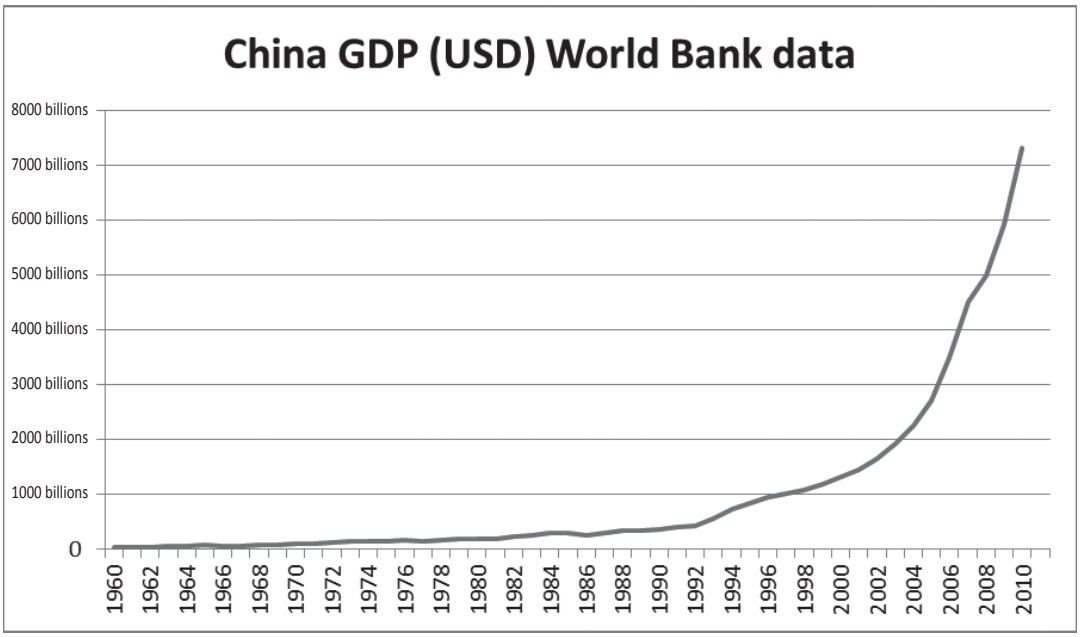

Figure V-1-1; China's GDP evolution

Qualitative and quantitative needs

As China wants to transform the core of its economy, the country is facing a new dilemma. Until the mid-2000s, the specialization of economies from innovation based European, American and Japanese economies to production based emerging economies ensured a difference regarding resources demand. Nevertheless, the transformation of emerging countries' economies, especially the BRIC, is now leading to a global competition for the same resources.

In the Chinese view there is a double problem as the increase of the demand is made in both a quantitative and qualitative way. For the 50 last years, the country experiments a spectacular population growth leading China to become the world's most populated country with near 1.5 billion inhabitants. With 15% of the world's population, China is more a continent than a country and has a demographic weight that could only be challenged by India. China's demography, which is the basis of China's actual economic power, is also its most important burden. As the resources needs became critical, the government issued at the end of the 70s the One-child policy to slow down the population growth (Bosquet 2009).

This policy, often enforced with resolution, succeeded in the limitation of the population.

Nevertheless, China's population continued to grow, even if it grows slower than during the 60-70s. With an increase of 500 million inhabitants between 1980 and 2010 without any territorial modification, except Hong-Kong, China is facing a resources problem.

Moreover, for the last 10 years, thanks to its economic rise, China has also experimented a qualitative transformation of its needs. The two-digits continuous economic growth led to the creation of new wealthy classes regrouping several millions of "red millionaires" and bourgeois. In proportion those new classes remain very few but there is a global movement of enrichment leading to the emergence of a consuming middle-class. The development of a national individual car market, of houses equipment and of an electronic market with companies like Lenovo or Haier, is a natural consequence of this social modification of Chinese population (OECD 2009, pp. 93-124).

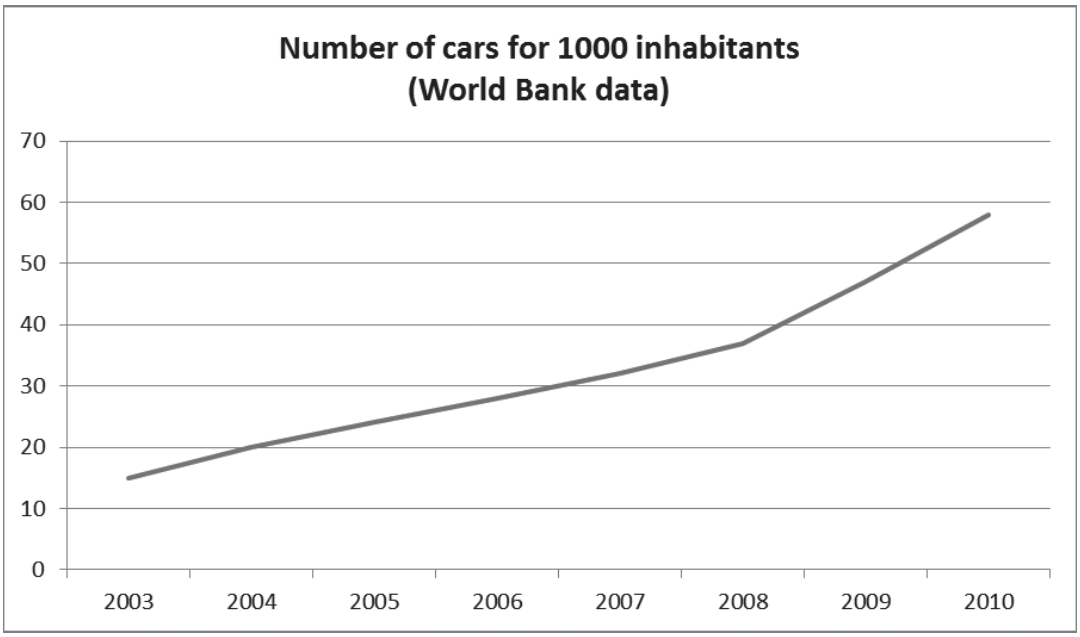

Figure V-1-2; Evolution of Chinese population's cars

China: an endless hunger?

If the One-child policy seems to have some positive results regarding the limitation of the population's growth, it has merely no impact on the qualitative needs. The non-stop growth of the population, combined with the qualitative evolution, is today leading to a syndrome of "endless hunger" (L'huillier 2007, pp. 37-50.).

The evolution of China's resources demand is not only a matter of private consumption. The modification of the country's economic structure and the emergence of high tech companies is leading to a change in the resources demand structure. During the 80s and the 90s, China kept its role as "the world's factory" with technology-limited production units and simple-material-consuming heavy industries. This very polluting economic structure is slowly transforming for 6-7 years into a light industrial high-tech based model. The development of high technology companies in China is a natural consequence of the country's economic emergence. If China is believed to reach the 1st global economic rank by 2020, it would be with an important transformation of its economic structure. Defense (Norinco), transportation (CASC, CSR Corp., Geely), IT (Huawei, ZTE), computers (Lenovo), space (CASC), energy (CNNC, several wind and solar companies) … are the new flagships of China's economy. Yet those companies, regarding their development, are becoming global consumers of a large number of primary goods, from oil to rare metals like rhodium, titanium, indium or palladium. Those resources, unequally distributed through the planet, are the stake of a global competition between high-technology companies. China is now joining this geoeconomical battle likewise other emerging countries while it was originally a battle fought between Western countries.

China's resources geopolitics and geoeconomics

Oil & gas: from Central Asia to Middle East

As China became in 2011 the world's first oil importer (de la Maisonneuve 2012, pp. 159-173), the country became in the same time one of the most important actors in the energy sector. Chinese thirst for oil forces the country to deploy a global and complex geoeconomical strategy to secure its supplies. Yet, China has important oil and gas resources. For example in 2011, China was the world's 4th oil producer after Russia, Saudi Arabia and the United States; the very same year, China produced more oil than Iran with 4289 thousands of barrels per day (Iran: 4234 tbpd). But if China is an important producer it also is a very important consumer. As Chinese economy is developing, and as China's population's needs are transforming with the economic boom, the country has become a net importer since the middle of the 1990s and will be the world's first importer – and consumer – at the eve of the 2010s.

To fill its needs, China has to develop a comprehensive energy strategy, using political influence, national oil companies and economic attractiveness. China's oil companies' international deployment reveals a global strategy dedicated to ensure the country's supplies (Lewis 2007). The three national oil companies: CNPC, Sinopec and CNOOC are today trying to compete with the traditional majors such as Exxon-Mobil, Shell or Total for the possession of exploration-production concessions all over the world. First of all in Asia, those companies are deploying both in a maritime and a terrestrial perspective (Mitchell 2010). Backed by the Chinese State which uses its sovereign instruments of influence and diplomacy as well as the wealth of its development banks (CNDB) and sovereign funds (CIC) (Salidjanova 2011), those companies have become global oil & gas players for the last five years. Today CNPC, Sinopec and CNOOC, are present at all the stages of the oil & gas value chain, from upstream to downstream, including on high technology areas such as deep-water exploration, biofuels, LNG or petro-chemistry.

As global players, Chinese oil companies are present all over the world with a particular presence in the South countries. As their needs became more and more important, Chinese national oil companies signed agreements with national oil companies from the Gulf countries such as Saudi Aramco (Saudi Arabia) or NIOC (Iran).

The diversification of sources is one of the main strategies used by Chinese companies to ensure a satisfactory level of supplies. Since the mid-1990s Chinese national oil companies extend their global position from Asia (Myanmar, Iran) to Africa and eventually Latin America and Central Asia. The development of China-Angola and China-Nigeria relations ensured the country a leading position in the most important oil producing countries of Africa (Vines, Wong, Weimer & Campos 2009). At the same time the implementation of diplomatic and economic relations between China and Central Asian countries (especially Kazakhstan), through the Shanghai Cooperation Organization, led to the creation at the end of the 2000s of a Kazakhstan-China pipeline network, soon connected to several countries of Central Asia (Li & Wang 2009).

This global strategy of developing terrestrial routes from Central Asia and maritime routes, mostly from the Persian Gulf and Africa's Indian coast, aims to create a global and diversified supplies network to China in order to secure the country's supplies.

China and “rogue States”: opposing the West in geoeconomics

In order to avoid a direct geoeconomical conflict with the West powers during the 90s and the 2000s, China first chose for its supplies to create close ties, political as well as economical, with States often considered as “rogue”. This idea here was that China will not suffer any concurrency with Western countries if it tried to implant in these market areas. This indirect strategy led China to create partnership with countries such as Angola, Libya, Iran, Myanmar or Sudan. This very particular behavior in international relations has been China’s trademark since Mao’s era. The support of dictatorial regimes in Asia (Myanmar) or Africa (Zimbabwe, Sudan), originated from a near non-aligned position for the last 30 years, is now becoming counterproductive for China. As today’s China is the 2nd most important economy and aiming to the first position, it cannot continue to support countries continuously violating Human rights if it wants to appear as a contributor to the world’s stability and balance of power.

As a consequence the country is now changing its orientation to a more consensual behavior. China’s position towards Iran reveals a global change in the country’s geopolitics. During the 1980s-2000s Iran remained China’s first oil supplier in an oil-for-protection deal (Downs 2012b, pp. 26-27). As Beijing ensured Teheran to remain untouched from the United Nations Security Council sanctions, Teheran supplied Beijing with oil and gas. Nevertheless as Chinese needs in oil became more and more important, Beijing chose to get closer to more producing countries such as Saudi Arabia or Nigeria.

As the global role of China is changing alongside its weight in the global economy, this “rogue states” strategy is no more an option. Nevertheless China is facing a dilemma as the country needs to maintain good relations with its most ancient partners in order to avoid them to go to another emerging country like Russia, and, at the same time, is obligated to develop relations with other important primary goods producers. The best example is the position of China between Iran and Saudi Arabia. As the need for oil is developing, Beijing is becoming more and more closer to Riyadh as Saudi Arabia became in 2011 China’s first oil supplier. Nevertheless China needs to maintain a good relation with Iran (Dorraj & Currier 2008, pp. 66-80.), especially with the Chinese strategy to connect Iran to its Central Asian pipelines network. As Iran and Saudi Arabia are deadly enemies, China’s position is more and more complicated as each of the supplying country is influencing Beijing to

cease the relations with the other.

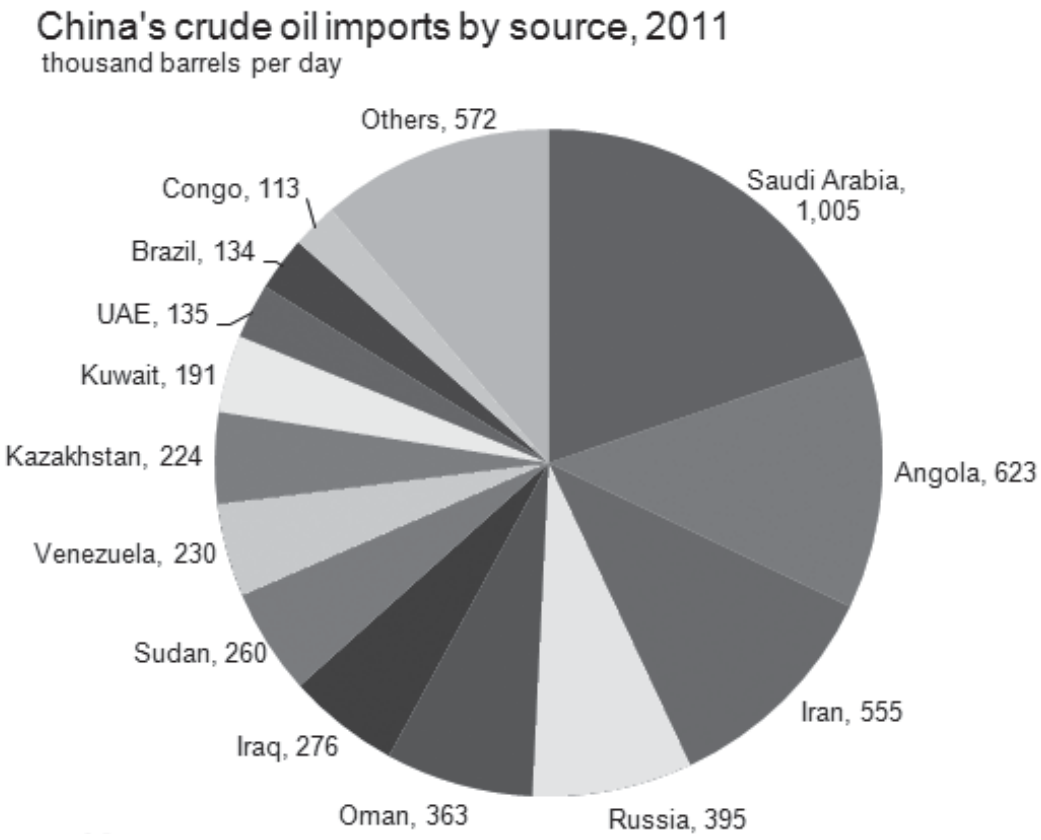

Figure V-1-3: China's Oil imports; source: Energy Information Administration

From Africa to Latin America: Chinese mining companies and the South

China's position in mineral industry is the same as in oil & gas industry. The country being one of the first base[56] and some rare[57] metals producer is now obligated to import ever more rare metals and to extend the international deployment of its mining companies in order to secure its supplies. Helping the development of great international mining operators, whether directly state-owned (Baosteel, Chinalco) or not (Jinchuan Group), the political leaders of China are trying to secure the supplies of the compulsory industrial and rare metals for the Chinese industry. Those industrial companies absolutely need a large number of metals such as Titanium (aeronautics), Nickel (IT), Copper (IT), Lithium (IT, automobile, energy), Niobium (energy) or Rhodium (energy, automobile) in order to continue their

[56] China is the world's 1st crude steel, coal, aluminium, tin, zinc and tungsten producer.
[57] China is also one of the first world producers of germanium, gallium, indium and molybdenum.

economic and technological development. As most of those metals could only be found in satisfactory quantities outside China, Chinese mining companies, although originally created in a regional basis to extract the minerals of the country, are now deploying all over the world.

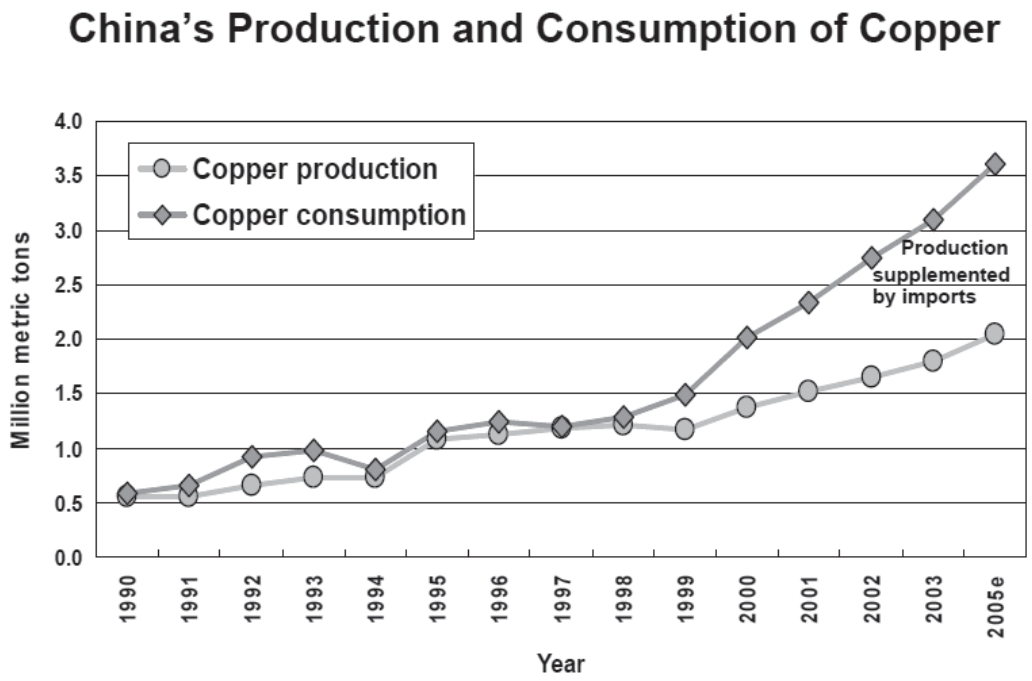

Figure V-1-4: China's copper production and consumption; source: USGS.

Moreover, today's China is still using a "South-South cooperation" rhetoric in order to create and maintain ties with Southern countries, often very rich in primary goods such as Bolivia, South Africa or Nigeria. This new global strategy, also employed by Brazil in Africa and South America, aims to create an artificial bound between countries that were out of the globalization fluxes during the end of the 20th century. As Western countries are still seen in a great number of countries as the former colonizer, the emerging countries are now trying to use this reference to a painful past to attract the countries to them. By creating an artificial empathy and solidarity – in combination with a large panel of development funds used to develop the countries' infrastructures[58] – Chinese authorities are gaining the sympathy of a great number of African and South American countries.

[58] Chinese companies also use their financial power to create non-economic infrastructures such as the Abu Ushar (Sudan) hospital financed by the CNPC oil company.

Chinese companies, backed by the Chinese State, managed to develop their positions in primary goods producing countries all over the world, African and Latin American countries appear to be their primary targets (Peru, Bolivia, Chile, Sierra Leone, Zambia, Zimbabwe…). Peru for example, one of the most important copper producers, signed an agreement in 2008 with the Chinese national company Chinalco to develop the Toromocho mine. This copper mine, with 7.3 million tons of estimated copper reserves, is expected to start producing in 2013. The project, financed by China's state-owned China Development Bank (CDB) and Export-Import Bank of China (Eximbank), will cost near 4 billion USD. China Minmetals, the country's first metal trading group, created a joint-venture with Chile's national copper company Codelco to extract copper from Northern Chile.

Developing the Chinese companies' position in producing countries isn't the sole strategy of China's government. Using the tight link between state-owned companies and financial institutions, Chinese government aims to control a large part of international operators. In 2009 China Minmetals acquired the Australian group OZ minerals and in 2011 the Canadian company Anvil Mining, making the Chinese group one of the most important metals trading group in the world. This group, which is now present in 44 countries, is operating all along the metal value chain as for ferrous than for non-ferrous metals (copper, tungsten, rare earth, tantalum). In 2009, Chinalco tried to invest near 20 billion USD in the Australian company Rio Tinto, one of the major metal producers in the world, in order to gain control over the company but the deal was finally rejected as Chinalco appeared to the Australian government and Rio Tinto's executives too much interventionist.

A global view

The development of Chinese economy absolutely needs a constant supply of primary goods at the best price. As their value is continuously increasing with the maintain of Western countries demand and the increase of emerging countries one, China needs to use a large panel of instruments. Assessing that most of China's great companies belong to the state, a global strategy has been developed by the political leaders of the country. The management of those companies being over the rule of the SASAC (State-owned Assets Supervision and Administration Commission) they could interact more completely sector-to-sector. At the same time, most of the State-Owned Enterprises (SOE) CEOs are having a political responsibility such as Jiang Jiemin (Downs & Meidan 2011, pp. 3-21), CNPC's

CEO, holding the rank of Vice-minister and being a member of Central Committee of China's Communist Party 18th congress, the executive organ of the Party. The interaction between the politics and companies is total as each one could participate to the definition of the country's strategy. For example there is no Energy or Oil Ministry, China's oil & gas strategy being the resultant of each Chinese oil company's own strategy (Downs 2008, p. 134).

This "controlled chaos" behavior has been created by the Communist Party Rulers during the 90s to ensure that no company director or minister could become too much powerful by supervising entirely such a critical sector. As the Chinese national oil companies and mining companies were created competitors with each other, only the cooperation of all actors, political as well as economical, could ensure success. If the State isn't directly piloting the companies, their position under the SASAC, the need of funding issued by State-controlled banks and funds (CDB, CIC, Eximbank…) and the compulsory support of the diplomatic network in foreign countries, ensure the government to keep a central position (Lieberthal & Lampton 1992). This arbitration position is the most interesting particularity of the Chinese central State in China's geoeconomical strategy.

An improving global strategy

Sea, land, routes and tubes

Finding the resources and securing their possessions is just the first part of securing the country's supplies. In order to maintain a continuous flux of resources to the Chinese territory, national authorities need to control all the logistic side of the value chain whether terrestrial or maritime. Traditionally, China is more a terrestrial country than a maritime one. Except from the era of Admiral Zheng He (14th century), China never had a powerful navy and tried to extend its territory southward towards Vietnam, India and Myanmar and westward towards Central Asia following Genghis Khan's paces. Nevertheless, with the development of its industry with its integration to the world market, China has to develop a powerful maritime sector since the 90s. This sector became so important that China can today be considered as the first commercial maritime power in the world; half of the first 10 world's harbors in terms of capacity are in China[59] and the country possesses the most im-

[59] Shanghai, Hong-Kong, Shenzhen, Ningbo, Canton and Qingdao.

portant commercial fleet in the world[60] and is the world's first shipbuilder.

With the increase of oil & gas needs, China also has to develop further the oil maritime logistics. Saudi Arabia, Persian Gulf countries and Africa being the most important oil suppliers for China, Chinese national oil companies (CNPC, CNOOC, Sinopec) in collaboration with national shipping companies (COSCO, China Merchants Energy Shipping) are creating a logistical system to bring raw or refined products to China. This oil shipping global system has developed during the 90s and the 2000s. With the increase of natural gas demand, China is today developing a similar system for LNG from Australia and Qatar (Locatelli 2004, pp. 119-130).

Yet China has to face an important problematic: securing the shipping lines. Importing oil & gas, mostly from Persian Gulf and Africa leaves China with two strategic dilemmas: the Hormuz Strait dilemma and the Malacca Strait dilemma. The development of a more and more maritime approach to supply security is forcing the country to be more and more involved with maritime security in the Indian Ocean and in South China Sea. The creation of a powerful navy for the People's Liberation Army, with aircraft carriers and nuclear submarines, along with the "string-of-pearls" harbors, is mostly intended in a geoeconomical perspective as some kind of Chinese local adaptation of Alfred T. Mahan's theories (Mazzucchi 2013, pp. 78-84).

But China is at the same time creating a complete network of terrestrial pipelines for oil & gas in order to decrease and limit the impact of the Malacca and Hormuz straits dilemmas. As the western provinces of China such as Xinjiang could still be considered as a frontier land (Pannell 2011, pp. 105–118), China is developing relations with Central Asian countries since the end of the Cold War. Those relations are today the basis of a global energy network. Kazakhstan, Turkmenistan and Uzbekistan are already part of the Chinese supplies system. The oil and gas pipelines, created and operated by CNPC, help maintaining a continuous hydrocarbon flux to China and are the basis of a more important network in the whole Central Asia that could become China's master move in the next years.

[60] More than 2000 ships are flying the Chinese flag and contrarily to Panama and Liberia, those two countries having more ships under their flag, Chinese ships are mostly possessed by national interests.

Securing the supplies: chess or go?

The problem of securing China's supplies remains open. China is today at the crossroads and has to choose between a chess approach, direct and aggressive, and a go approach, indirect and smooth. In reality as no exclusive approach could be possible, China has to mix both of them into an adaptive strategy.

Contrarily to the United States, China is not today a very impressive military power, especially in the naval domain. If the United States can secure their supplies using the menace-in-being constituted by their military capacity, China, for the moment, doesn't have this option. Nevertheless military power is compulsory for China in order to secure its supplies, fight against piracy and defend its economic interests in South China Sea and Indian Ocean (Komiss & Huntzinger 2011, p. 12). The transformation of the Navy of People's Liberation Army into an oceanic force seems to be China's new military top priority. The construction of nuclear submarines (SSN and SSBN) and the creation of an air-sea capacity with the country's first aircraft carrier, are the milestones of this new navy. As it's intended to protect the maritime supply lines, whether hydrocarbons or minerals, this developing navy will use the 'string-of-pearls' (Zajec 2009, pp. 59-67) system to remain close to the country's strategic nexuses: Hormuz and Malacca straits. Nevertheless China could not for the moment be considered as having an oceanic capacity. Building a ship is just the first part of this development and China has to develop doctrines, to create a complete air-sea integrated system, to conduct exercises and to train its men. So China could only be seen as a naval power in a long term perspective.

Diversification seems to be one of the keys to securing the supplies of China. As the country is looking away from Iran, the mining and oil companies are securing positions in all the continents. In the same time, the development of new technologies at a large scale such as LNG for the importation of natural gas allows China to diversify the routes and sources of supply. Those routes being the very first problem for China, the country's officials are also trying for a few years to put in place a "go strategy" based on the development of a new network of pipelines.

The existing pipelines running from Kazakhstan, Uzbekistan and Turkmenistan could only be seen as a first step in the Chinese planned network as the country is having great

projects in this area. The development of commercial and diplomatic relationships with Afghanistan are creating an important influence of China inside Afghanistan as Beijing managed to seize all the contracts for the exploitation of copper mines and gas resources (Downs 2012a, pp. 65-84). This new relation between the two countries was sealed by the admission of Afghanistan as observer in the Shanghai Cooperation Organization (Rousselot 2011, pp. 117-132.) in 2012 at the Beijing summit[61]. Added with the close ties between China and Pakistan, developed since the withdrawal of US influence in the country (Kabraji 2012), we can see the development of a global Central Asia strategy extending from Iran to Pakistan, and from Kazakhstan to China. One of the main projects is the creation of a pipeline running from the Bandar Abas harbor in Iran to China, built by the Chinese National Petroleum Company to secure the country's supplies. Another Chinese project could follow the way intended for the US project TAPI; an important pipeline running from Tajikistan to Afghanistan, Pakistan and India, linked with the Iran-China pipeline. This pipeline, planned by Unocal in the 90s, the creation of this new network could lead to a complex system intending to secure China's oil and gas supplies and to gain control over Indian supplies. This "go strategy" with its two goals of securing Chinese supplies and giving the country the control over Indian and Pakistanis supplies could lead to a turmoil in the global oil & gas geoeconomics by diverting Central Asia from Russian influence, creating China an important power in the Indian Ocean and reducing US influence in the region (Henry, Osowski, Chalk & Bartis 2012).

[61] Iran and Pakistan are also observers at the SCO whereas Kazakhstan, Uzbekistan are full members.

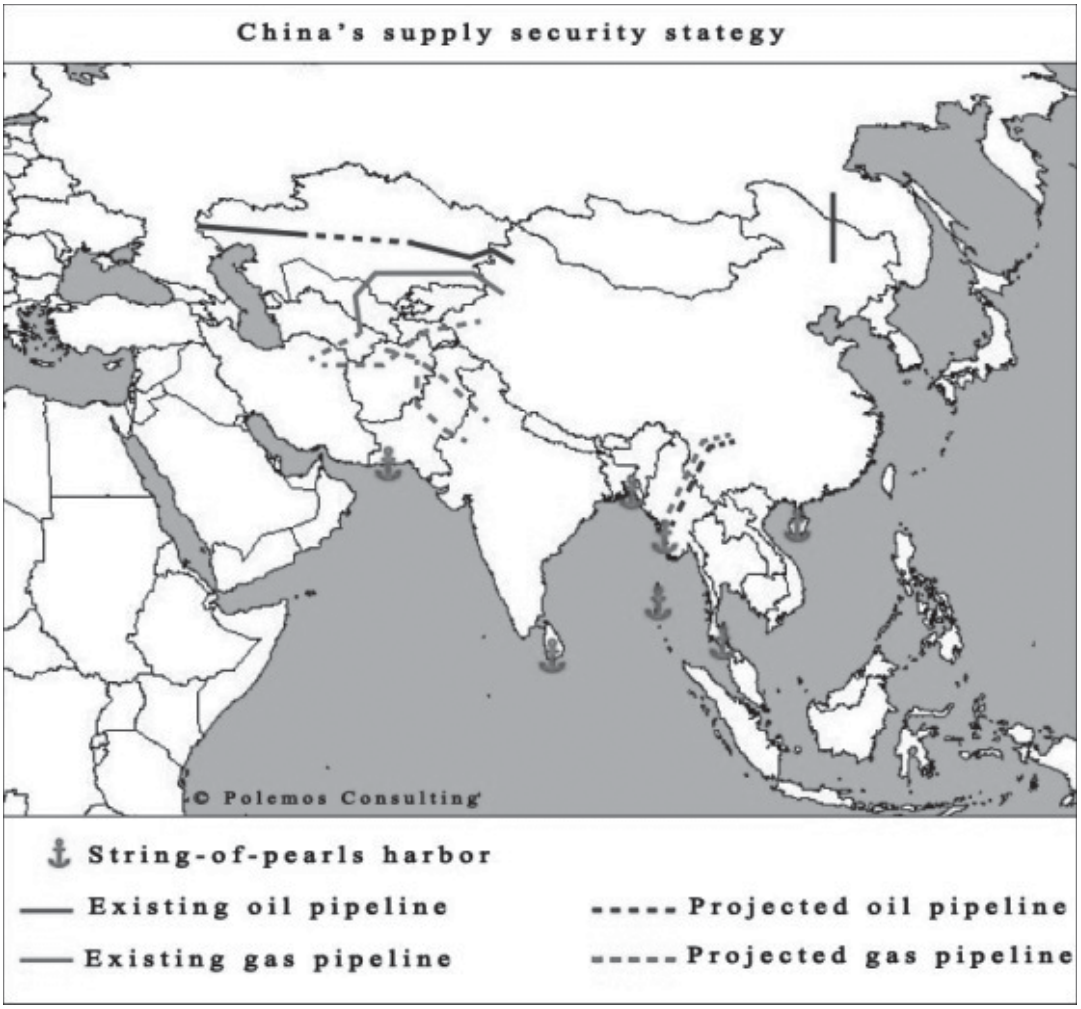

Figure V-1-5; China's supply security strategy map

Conclusion

The Chinese military concept of "unrestricted warfare", originating from a 1999 book, has been discussed in the West since its publication. In this book, economic warfare is included among the soft conflict forms and this very particular way of war seems to be adapted to China's supply security strategy. As the world has entered an economic conflict era where companies are becoming the spearheads of states' power increase strategy, China, with its particular way of new State capitalism, is among the most aggressive countries. The fight for the resources is becoming tougher as emerging countries try to develop high-technology companies. Following the "going-out policy" defined during the 2000s to encourage the internationalization of Chinese companies (Yueh 2012), CNPC, CNOOC, Sinopec, Chinal-

co or China Minmetals are becoming more and more global players.

As a geoeconomical confrontation between China and other powers, first of all the United States of course but also the other emerging countries in their influence area[62], is more and more likely to occur, China has to develop a strong supplies security strategy in order to continue its development. This strategy, part of chess and part of go, is intended as a global strategy. Using companies, banks, development funds but also diplomatic ways and the development of an oceanic navy, to compete over the US. It would take years to completely put in place such a strategy, especially the military part, nevertheless the speed of Chinese development binds the country to become more and more aggressive in a geoeconomical way.

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2 Rare Earths Elements Anticipation Strategy

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China and rare earths elements (REE) are a relevant example of an anticipation strategy to use the resource as a trigger for technological and industrial – and thus political – development. Moreover, we can analyze consequences and challenges of this for industrialized consumer countries.

Limits of a productivist strategy

Over the past three decades, China has developed its mining industry to feed the country's development. Thus, the exploitation of REE large reserves was part of the need to provide hundreds of thousands of jobs for its people. Also, technological advances allowed by REE are fully revealed along with the development of Information and Communications Technologies (ICT) and new forms of alloys, in the 1990s. In the same way, during the decades 1980-1990, domestic production is mainly export-oriented.

Thus, China gradually gets a near monopoly of the REE gross production (95 to 97% of world production) due to its important and valuable geological resources, unbeatable production costs (low labor costs and authorities "tolerance" about highly polluting extraction methods) and a strong political will (planning). This "productivist" strategy allows China to flood the world market, forcing competitors (United States, Australia...) to close their mines in the 2000s.

However, many limits appear, prompting the state to redefine its strategy in 2009. Indeed, REE exploitation generates fast geological depletion and pollution, less and less accepted

by locals. The alarming increase in illegal mining[63] is associated with security problems. In the same way, overcapacities and REE prices drastic fall over the last two years undermine the profitability of Chinese mines. Also, at the international level, China is now confronted with consumers awareness (governments and companies) about their dependence vis-à-vis Chinese REE, encouraging them to implement corrective action.

Thus, China's new strategy is the result of a pragmatic analysis of the 1980-2000 development model and its consequences, also taking into account the industrial and political challenges of the first half of the 21st century. Indeed, China is seeking to build its competitive advantages in "industrializing industries" the next two decades (metallurgy, automobile, IT, renewable energy, aerospace, defense...), depending in part on the rare earth industry. More specifically, China redefined its goals, building on its role as the dominant producer to structure nationally and internationally throughout the rare earths value chain. Accelerating its move upmarket – no longer a mere exporter of raw resources but through the value of manufactured products – China is developing its national technological and industrial capabilities, strengthening the value-added content of its exports.

The need to think in terms of value chain to understand the new Chinese strategy

Reflect on the entire value chain[64] helps to catch the relevance of the new Chinese strategy but also – and especially – to understand deadlocks and problems faced by Western consumers.

Indeed, most observers unduly focus on the Chinese REE gross production, and thus the country's reserves (over a third of identified reserves in the world), arguing that they are the main Chinese assets. Therefore, boosting exploration and production in areas of the world that have recoverable reserves (former Soviet Union countries hold 20% of the reserves, the United States 14% and Australia 6%) allows reducing the Chinese near monopoly. However, the current development of various exploration and production projects (Austra-

[63] According to Chinese authorities, illegal mining represents around 10,000-20,000 tons per year.

[64] The supply chain for rare earth elements generally consists of mining, separation, refining oxides into metal, fabrication of alloys and the manufacturing of magnets and other components, industrial consumers, end users.

lia, United States, Gabon, Madagascar, Malaysia...) would only shift the pressure on other links in the value chain.

Indeed, taking into account the entire REE sector, showing its complexity and segmentation, other points of weaknesses for industrial consumers may be highlighted. Thus, China is the only country to locate the entire value chain on its territory and currently holds the majority of technologies and patents dedicated to the separation/metallurgy of rare earths[65]. In contrast, other countries (Japan, USA, France, Germany...) have skills and abilities in certain segments, usually those for finished and semi-finished products such as magnets, alloys...

Thus, industrialized countries are not only weakened by a lack of production on the national territory but also by the inadequacy or absence of links related to refining and the manufacture of alloys, critical capabilities for the development of ore production. If it is possible locally (economically recoverable resources), but the next steps are not present/available, then production is impracticable or transformed into the country with this kind of capacity, that is to say China.

A polymorphic strategy to make China the center of everything

China currently focuses on strengthening its grip on the various links of the value chain, cross-industry and international. The long-term objectives pursued by the Chinese state and state entities are economic and political[66], inevitably combined: strengthening the role of Chinese actors in the sector, at the national level but also internationally; ensuring long-term high prices and controlling price volatility; structuring REE consuming industries and encouraging resource users to relocate their processing/industrial production, or research and development (R & D), on Chinese soil.

[65] About 90% of the metal alloys are produced in China and China manufactures 75% of the neodymium magnets and 60% of the samarium magnets.

[66] Beyond those commonly advanced: fight against pollution, safeguarding jobs...

At the national level

Structuring national production and the supply chain

According to the National Development Plan of the rare earth industry, established by the Ministry of Industry and Information Technology, covering the period 2009-2015, China wants to limit domestic production to 120,000-130,000 tons and greatly reduce REE exports[67] in order to secure national industrial consumers' supply. While China was exporting to 75% of its production in the early 2000s, quotas for exports now account for a maximum of 24,000 tons/year[68]. As a reminder, world production has been falling over the past two decades to about 3,000-4,000 tons.

Similarly, the government directly manages 19 REE production areas. Since 2009, it seeks to organize regionally the production, made by state-owned companies, and rationalize the industry by encouraging dozens of producers to merge while limiting development projects (production, refining...). Although there are a dozen of companies[69], mostly state actors, Baotou Steel Rare Earth High-Tech is the main company. Listed on the Shanghai stock exchange but controlled by the state, it holds rare earth reserves in Inner Mongolia (about 75% of all Chinese reserves) as well as technological know-how in metal separation. Moreover, the Baotou Research Institute, with 300 scientists, combines civilian and military research programs.

Finally, China has developed a REE strategic reserve in 2010, with a capacity of 100,000 tons[70], under the joint leadership of the Ministry of Land and Resources and the Ministry of Finance. This decision is unique from the world's leading producer[71]. Indeed, the estimated cost is US$3 billion and is to report to the low REE market, by value[72], thus raising the issue of economic and political goals of such a project. Nevertheless, goals are clear: secure the resource for its industrial companies, orientate/make the price of the resource and grip consumers.

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[67] China did the same strategy for tungsten, antimony and magnesium, in the last decade.
[68] Only twenty producers or trading companies have a license to export.
[69] Minmetals and Chinalco hold reserves in Jiangxi; Jiangxi Copper and China Nonferrous Metal Industry's Foreign Engineers & Construction Co. hold Sichuan and Guangdong reserves.
[70] Some people say capacity could reach 200,000 tons.
[71] It's not a surprise either because the State Council proposed the creation in 2003.
[72] Estimated at US$1.5 billion in 2010, analysts predict the REE market value could reach 3 billion in 2015.

Avoid unwanted foreign intrusion

Along with the gradual opening of the domestic economy, China would like to establish a mergers and acquisitions control body, under the authority of the National Commission for Development and Reform Commission and the Ministry of Trade[73]. The goal is to "ensure national security", that is to say, to control all foreign investment in strategic sectors, including resources. According to the Government, the evaluation criteria of investment would be related to the impact of these on the economic and social stability of China and the country's ability to continue R & D on technologies related to national security.

The creation of such a body would strengthen anti-monopoly law, adopted in August 2008, supervising more strongly opportunities for foreign investment in Chinese companies[74], particularly in the mining sector, which already has a restrictive legislation. Indeed, investments in REE exploration and production are prohibited[75]. In contrast, the "encouragement" to joint ventures with Western firms exists – and tends to be promoted – in the treatment of ores, for appropriate products/high-tech processes.

Thus, in 1990s, Rhone-Poulenc, now Rhodia (Rhodia Silcea, dedicated to REE), has partnered with producer Baotou Luxi, and holds 41%. The French gradually expanded production facilities and R & D centers in the chemical application, electrical and electronic components... Similarly, in October 2009, OSRAM, a Siemens subsidiary specialized in lighting, and China Rare Earth Holdings Ltd. created a joint venture in China, managed by the German, in order to produce and sell products made with phosphorus for the industry.

Thus, alliances between Chinese producers and Western consumers could intensify in the future, in a win-win relationship: security of supply and demand, cooperation in mining to improve efficiency, significant financial contributions in a capital-intensive industry... However, the Chinese want to increase the added value of their manufactured products. So, there is an indirect pressure to encourage Western industries to develop their activities on site, including high-tech sectors, especially R & D functions.

[73] Announcement in February 2011.

[74] The Ministry of Trade has not the exclusive investigation of cartels or monopolies. Other ministries are also involved, thereby strengthening the law.

[75] In China, exploration and production licenses are delivered by the Ministry of Land and Resources.

At the international level

Knowing that consumers' willingness is to diversify their raw resources supplies, China seeks to strengthen its monopoly in this segment – or at least become vital – and thus to control foreign deposits. For example, China Non-Ferrous Metal Mining, in September 2009, has attempted to acquire Lynas, specializing in REE extraction, but this attempt was rejected by the Australian authorities because of a potential monopoly over global production.

However, these efforts are likely to increase in the coming years, the Chinese basing on the weaknesses of Western businesses: small, undercapitalized after years of disinvestment in the sector but with significant proven and probable reserves. Indeed, China does not want to make the same mistake that OPEC (Organization of the Petroleum Exporting Countries) following the two oil shocks, in the 1970s. The surge in oil prices helped capitalize on the rent but also triggered an increase in investment in exploration and production, made by firms and Western countries. Subsequently, the development of the deposits in the North Sea and the Gulf of Mexico offset the OPEC influence.

Consumers seeking solutions: heterogeneous actions for random results and inevitably rooted in the long term

Security of supply for industrialized countries is a key strategic requirement for the future of their national technological and industrial base. Beyond actions commonly undertaken (investments in exploration and production on the national territory or abroad, R & D in order to reduce or fully replace the amount of REE used, recycling...)[76], it turns out that industrialized countries have different acuity of Chinese strategy and its impact on a particular segment of the value chain where they have interests. This disparate acuity shapes actions to get back leeway[77].

Thus, the United States have boosted the development of domestic rare earth industry

[76] The complaint by the United States, Japan and the European Union to the World Trade Organization against China's export quotas for rare earths could also be cited. It's still ongoing and has not led China to ease its strategy for the moment.

[77] In France, rooms for manoeuvre need to be imagined. But, first, private and public actors must have an awareness of that kind of issue. And, then, a common willingness to avoid waste of means.

through new legislations[78] supporting the strategy of vertical integration of the private company Molycorp, one of the few producers in the country: from mine (Mountain Pass, closed in 2002) to the alloys manufacturing, through partnerships or acquisitions of players in Japan and Europe (Silmet)... Strengthening metallurgists on the national territory (Electron Energy Corporation producing magnets based on samarium and gadolinium) is also a priority and, more generally, a weaknesses inventory is made. The issue of (re)creation of strategic reserves is also in progress.

In Japan, keeping some advantages in the processing of rare earths, it favors access to the raw resource. In fact, the state and companies cooperate on REE exploration programs on the national maritime domain or the creation of a strategic reserve of rare earths, representing six months of consumption. At international level, partnerships are forged like that between Toshiba and Kazatomprom. Already involved in the supply of uranium, the two companies want to continue this relationship in the operation of certain rare earths (dysprosium and neodymium) in Kazakhstan[79]. In such agreements, the state support is not only diplomatic but also financial, through the agency Japan Oil, Gas and Metals National Corporation[80]. Similarly, the Japanese trading companies are involved in the process of securing. In November 2010, the Australian rare earth producer Lynas has signed an agreement with Sojitz (major importer of rare earths) to provide 8,500 tons over ten years[81].

Finally, Germany also has a policy of partnerships, especially with Russia and Kazakhstan. In exchange for better access to the resources of this country, German companies deploy technologies and know-how to improve the country's infrastructures. Germany has also established an "agency for raw materials"[82], in 2010, to inform national companies about the location and availability of resources (including a rare earths production project in

[78] After the U.S. Department of Defense and industrial interests were the first to highlight the dependence on Chinese REE, the General Accountability Office estimated that it took 15 years to rebuild the domestic industry, by changing legislation on mining, giving financial aid, setting up measures in the training of geologists, skilled workers... and by purchasing of patents and licenses held by Chinese companies.

[79] Similarly, in 2010, Japan and Vietnam have completed the agreement for the construction of two nuclear reactors with cooperation in the exploration and production of rare earths on Vietnamese soil.

[80] Although part of the Government, the JOGMEC keeps its autonomy (own budget and administration).

[81] Lynas, with the agreement, secures the long-term demand and a source of funding, estimated at US$300 million.

[82] The Rohstoffagentur is part of the Federal Institute for Geosciences and Natural Resources, who reports to the Ministry of Economy.

Madagascar), while supporting politically and economically in their industrial projects in the producing countries. This initiative was completed in 2011 by creating a shopping resource company[83], whose shareholders are twelve major industrial companies and smaller businesses from the Mittelstand (small and medium enterprises, export-oriented).

Conclusion

The analysis of the REE Chinese strategy, over the last three decades, reveals the country's ability to think the issues of wealth and power over the long term, in their globality and over whole value chain, i.e. reasoning and applying an effective strategic planning. In contrast, the heterogeneity of solutions implemented by consumer countries is striking. Mostly because awareness of their weaknesses, and thus the consequences of China's strategy on the national technology and industrial base, is not complete, for some in particular (for example: France). In addition, actions, requiring continued engagement, inevitably have random effects. However, vulnerabilities of REE-dependent Western industries induce that the obligation of result is real and urgent. Otherwise, economic decline (but also, political, social or societal) will continue and relegate countries concerned in the background of those who make history.

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[83] This "Alliance for Securing Raw Materials" has various shareholders (BASF, Bayer, Daimler, BMW, Bosch, Evonik, ThyssenKrupp...) from various sectors (energy, chemistry, automobile, steel industry…). Coordinated by the Federation of German Industry, the Alliance targets various strategic resources, by identifying very early exploration projects in the world, evaluating deposits, participating in the production through financial support, taking a share in the capital of the operator…

3 Electricity and nuclear issues in China

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"Energy is not only [an] economic resource, but [a] strategic and political resource as well." The Chinese academy of sciences couldn't have made clearer the energetic issues for the country than with this formula from its roadmap to 2050.

With a population in demand of improved living conditions, the Chinese State is forced to economic growth as a way to ensure social stability. Energy represents a key element for the development of the country, and at the same time a critical issue in the international competition for primary resources.

Challenges are even more obvious regarding electricity, symbol if any of man's power over energy, allowing a wide range of use and an unmatched flexibility. This versatility, however, requires a commitment over the long, and even the very long term due both to the huge investments required and to the longstanding environmental consequences tied to each of its production modes. Thermal production, from coal, oil or natural gas releases massive amounts of carbon into the atmosphere with practical consequences of a global scale; hydroelectric dams impair entire valleys, and China with nearly 2 million people relocated due to the Three Gorges Dam has established new references in these views; nuclear energy rises specific safety issues and produces wastes, radioactive for very long duration… As for renewable energies, which can have their own environmental repercussions, they are, yet and for the foreseeable future, unable to reliably match the required levels of production.

The scale of the efforts exhibited by China into nuclear energy is characteristic of its long-term vision on issues considered as strategic. Over the past two decades, China has developed with strong determination its research and development skills and its industrial

capabilities in the nuclear area. These efforts clearly denote the ambitions of the country toward atomic energy, intended to meet its domestic demand as well as to conquer new international markets.

Electrical energy in China

Electricity consumption

China has become in 2009 the first worldwide energy user and ranked second in 2011 behind the United States for its electricity consumption with 4700 billion of kilowatt-hour[84], 5 times more than Japan and 10 times more than France. Divided by the population, the per capita electricity consumption has increased in China by 25% since 2001[85], catching up on world average in 2009. However it is still four to five times lower than United States', and two to three times lower than the French or Japanese consumption. Notably while this per capita consumption continuously increases in China, it has stalled, or even receded, in OECD countries due to the economic crisis and energetic efficiency measures.

Electricity usage is also very different: in OECD countries, industry represents less than one third of the average electricity consumption, whereas it amounts to two third of China's use of electricity; therefore its critical part in the economy of the country. In the same time, residential consumption represents 32% of electricity in OECD countries, versus less than 16% in China. However these raw figures mask profound disparities as, according to the Chinese government, one third of the electricity is considered to be used by only the wealthiest 10% of the population.

Even without considering that Chinese electricity consumption might rise up to the level of the most electro-intensive States, all aspects of China's electricity market offer a huge growth potential, from electricity production to transmission and distribution, and through all ways of consumption, first and foremost domestic use.

For instance, the potential opened by electric mobility in China is huge: development of public transportation, subway within the cities and high speed train between them, is boom-

[84] source: CIA, The world factbook 2012
[85] source: World bank 2010

ing. Prospects are not so clear regarding individual mobility, electrical car still being held by many technological uncertainties, but China is already the first worldwide market for electrical bicycles.

Production

Chinese electricity production is mostly dominated by fossil energies which represent 80% of the installed capacity, almost entirely coal power plants, oil and natural gas being allocated to more strategic use. Hydroelectricity amounts to 16% of the total electricity produced, nuclear to 1 to 2%, and the remaining part of the electricity mix is provided by renewable energies: wind, marine energies, biomass and photovoltaic. China imports a minor part of its electricity, around 0.1%.

To face its internal demand, China has no other choice than developing in parallel and massively all possible electricity generation modes, first and foremost coal, meant to remain the main power source for many more decades, despite its heavy toll on air quality in the country. Last years have seen concentrations in power plants, with the shutting of older and more polluting units in favor of more modern and powerful ones. Development of natural gas plants is anticipated to limit greenhouse gas emissions.

With the potential of the Yangtse hydrographic basin and of the Tibetan rivers, China's hydroelectric capabilities are still far from being fully developed, but times appears to be to a rethinking of the impact of oversized plants built during the past decades. China has massively developed the other renewable energies over recent years, especially wind power which installed capacity has doubled each year since 2005. It should be reminded however that these energies are intermittent by nature, putting in perspective their effective contribution to the Chinese production.

Atomic energy bears the promise of huge amounts of electricity – 1 kilogram of uranium provides more power than 10 tons of coal – as long as safety conditions are thoroughly ensured and as its particularly noxious wastes are properly taken care of. At present, China counts 17 nuclear reactors on 5 different sites, about thirty are being built and twenty more are projected. Most operational reactors have been connected to the electric grid after year 2000, and most projected ones will be before 2020. This is more than 70 million kilowatts

of installed capacity ensured to the country until over the middle of the century, and more units are considered.

All Chinese electronuclear sites are located on the borders of China's sea, close both to the reliable cooling supply of the ocean and to the large centers of population of the east of the country, huge consumers of electricity. Before 2011, about ten reactors were considered to be installed inland, riverside, but the accident of Fukushima lead to postpone all projects not already under construction. Chinese authorities have since confirmed that the projects planned far from the coasts would not resume before the end of the twelfth five-year plan, which means not before 2016.

Failures into the energetic system

China experiences chronic electricity shortages during peak periods, particularly in winter in the northern regions and summer in the south and east. Insufficiency or even failure of production capacities doubles with inefficiencies in the electric distribution network leading to cutouts.

During the first decade of the century, China has tripled its power production capacities to reach 988 million kilowatts in 2010, without however being able to satisfy its internal demand. Each year, production is a few tens of million kilowatts short to answer the needs the country; the amount of seventy million kilowatts have been mentioned for 2013, almost the total annual increase in capacity for the last past years.

Government-set price for electricity is amongst the first parameters invoked to explain the persistent gap between demand and offer: prices are kept low to sustain the manufacturing sector, not really encouraging energy efficiency. Since upstream, prices for primary energies are less regulated, profitability for new means of production is not guaranteed, discouraging investments especially from foreign origins. To counterbalance these effects, Chinese government has decided in 2012 to implement a progressive pricing system for electricity, intending to discourage high residential use.

Meanwhile, Chinese power production units happen to suffer from coal shortages, due to insufficient transportation capacities in some regions, whether it be by road or by train. In-

deed, coal mines are located mostly in the north of the country whereas main load centers are located in the large cities of the east, and in a country as wide as China it is not easy to bring power plants closer to the mines. High voltage transportation lines are expensive and lengthy to install, above all very tricky to deploy on such long distances, typically over 1000 km. Incidentally, hydroelectric plants face the same problem to deliver their power to the users, the large dams being mostly located in the south western part of the country.

To this intrinsic distance problem adds a structural weakness from the organization of the distribution sector. The system relies on six local companies whose interconnecting capacities are insufficient to allow an overloaded area to get help from its neighbors to support its demand. China has assessed this weakness and has engaged a large program of development with the goal to double its high voltage interconnecting capacities.

Environmental concerns

The tremendous economic growth of China has not left natural environment unharmed: international press periodically recounts of massive industrial pollutions of the rivers, the real time measurement system maintained by the American embassy in in Beijing often reaches levels of air quality[86] qualified of unhealthy, the scandal of melamine infected milk in 2008 has touched thousands of children and probably caused many deaths…

This general deterioration of the environment with insufficient regulation and sanitary controls in China often lead to public protestations or internet campaigns. With the rise in the large eastern cities of the country of a middle class craving for better life standards, the Chinese government will have to take into account growing environmental concerns.

Production of greenhouse gases represents another major concern for the Chinese authorities, for the sustainability of the country's economic growth as well as for its international public image. Along with disturbances in the energetic system, global warming could bring water flooding in large areas of its coastal territory, drought in other parts, changes in ecological systems… Since 2006 China has become the world largest producer of carbon dioxide and nuclear energy appears as a solution to contain the rise of these emissions.

[86] http://beijing.usembassy-china.org.cn/aqirecent3.html

In this context, the reaction of Chinese government after the accident at the Fukushima nuclear plant in 2011 has been both firm and prompt. Less than a week after the tsunami lead to the loss of cooling in the Japanese reactors, Chinese authorities froze all authorization for new projects of nuclear plants and launched a massive plan of control and reinforcement of all the units, whether in operation or under construction. Even more noticeable, the first Chinese “nuclear safety plan” was in 2012 proposed to public approbation before getting into effect, a very rare procedure in the country.

This rapid reaction suggests an extreme attention from the Chinese state to avoid the development of a movement of public defiance towards nuclear energy. The twelfth five-year plan reaffirms a “more efficient development of nuclear power under the precondition of ensured safety”.

The Chinese nuclear program

Origins

The origins of the Chinese nuclear program tracks back to the middle of the 1950’s, intended for military goals. By a nuclear cooperation agreement with the Soviet Union, China benefited from knowledge and technology transfers leading to engage the construction of an experimental heavy water nuclear reactor in 1956. In the same time, China launched itself into a uranium prospection program, and started research projects for nuclear enrichment and fuel conversion process.

Despite in 1958 the cooling-off of the relations with USSR, China carried on its military program, succeeding in 1964 its first test of an atomic weapon based on uranium, and therefore asserting its mastery of isotopic enrichment process. In parallel, collaborations between the two countries had kept going regarding the civil use of the atom and lead to the construction of several research reactors. China signs the Nuclear Non-Proliferation Treaty in 1968.

If the decision to engage into a civil electronuclear program originates in 1974, the choice for the first reactor of the site of Qinshan in the coastal province of the Zhejiang was only settled in 1982. Construction really started in 1985 under the impulse of Deng Xiaoping’s

reforms, leading in 1991 to the operational start-up of a 300 thousand kilowatts reactor.

In the meantime, political and logistical infrastructures required for a nuclear sector are getting in place, and many state departments or companies (NNSA, CNNC… see below) get their origins in this period. China rejoins the International Atomic Energy Agency (IAEA) in 1984, thereby allowing an international monitoring of its civilian nuclear installations.

Present situation

Different technological solutions are available to produce electricity from nuclear reactions: for convenience they are commonly grouped under the expression of “generations” tracing the evolution of the nuclear reactors both in terms of power and safety. Let’s recall that present reactors are designed for a 50 to 60 years lifetime.

Most reactors currently in operation, in China as in the rest of the world, are second generation units, mostly based on an enriched uranium and pressurized water technology. Actual Chinese nuclear plants owe much to a cooperation with France engaged during the years 1980: reactors derive extensively from the “Réacteurs à Eau Pressurisée” (REP) in operation on the French territory since the 70’s, in a China localized version, modernized in particular regarding to the command system. In addition China operates a few units issued from collaborations with Russia or Canada, related to the will of Chines state to keep active cooperation with these countries and benefit from technology and knowledge transfers.

Concepts for third generation reactors have been defined by the international community since the 90’s. Delivery to China of such units led to a strong competition between the French Areva, the American Westinghouse and the Russian Atomstroïexport. Westinghouse benefited from the first contract to build four nuclear reactors, having accepted to transfer the technology of its AP1000 before even building a single unit in the United States. At the same time, two EPR from Areva are under construction and should too begin their operation by 2014.

A great deal of research work worldwide concurs – and competes, on an industrial point of view – to define the fourth generation of nuclear reactors, and different designs are still under study to achieve a better fuel efficiency, generate fewer wastes and guaranty an even

better operational safety. China contributes to this global effort to identify the best solutions, which could lead to operational industrial plant by the years 2030.

Chines nuclear industry

An independent civilian nuclear program relies on several elements, each equally necessary:

- A stable institutional structure which sets the strategic goals, defines safety regulations relevant to the whole nuclear sector and appoints – and support – the control bodies,
- Un industry proficient in the different technological fields required to build, maintain and operate nuclear installations,
- Industrial production capacities to manufacture nuclear fuel and dispose properly of the wastes,
- A research and development environment able to support all sectors of the nuclear power industry.

Institutional bodies

In the middle of the 90's, the ninth Chinese five-year plan engaged the conversion of the nuclear defense industry into a civilian electronuclear program. The state remains the ever present actor, in all the aspects and at all the levels of the sector.

At the top of the state system, the National Energy Administration (NEA) defines the goals for China's energy policy. Directly related to the National Development and Reform Commission, heir of the former Planning Commission, the NEA controls all the investments related to the power sector. All companies involved in nuclear electricity are owned by the Chinese state through the State-owned Assets Supervision and Administration Commission (SASAC), but industrials in the area, nuclear operators, research and development centers… are all directed by the NEA. Last but not least and a critical function for the nuclear sector, the NEA delivers the "road ticket" which is the official approbation required to engage any new project of nuclear plant.

The policy for civilian nuclear power is defined by the China Atomic Energy Authority (CAEA) which depends from the industry and information technologies ministry. The CAEA is also in charge of representing China to international bodies regulating the nuclear field, and particularly to IAEA.

Responsibility for nuclear safety control bears on the National Nuclear Safety Administration (NNSA) which depends, significant fact, from the environment protection ministry. After the road ticket delivered by the NEA, it's the NNSA which grants the building license, controls the construction process and finally delivers the commercial license for any new nuclear power plant.

Let's stress out in this context, the peculiar position of the China National Nuclear Corporation (CNNC, which multiple assignments will be detailed below), heir of the former nuclear industry ministry which provided China with the military nuclear capacity. By its history and influence, its size and involvement in multiple civilian and military programs, and by the influence it maintains in the state system, CNNC's action extends way beyond the part of a "simple" electricity operator, even if it administers the majority of Chinese nuclear power plants.

Industry and operators

Main players

Over the more than thirty electricity operators of China, only five hold 10% or more of the national market. However these five "Gencos", for generation companies, play a minor part in the nuclear sector.

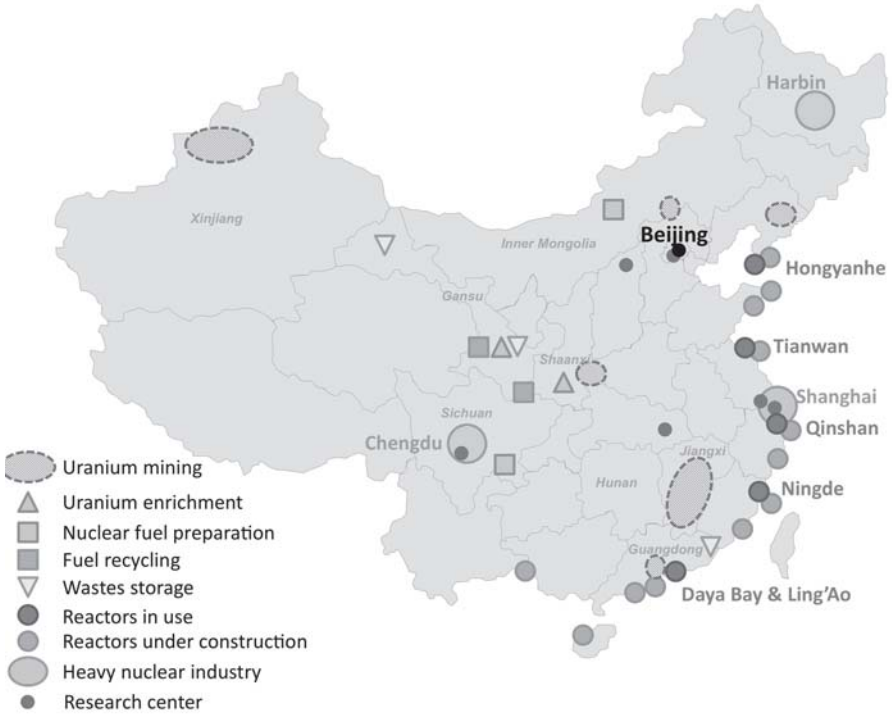

Figure V-3-1;

The historic heavy player in nuclear energy is the aforementioned CNNC. Created in 1988 and under direct control from the CAEA, the China National Nuclear Corporation is a holding based in Beijing, which numbers a staff of more than 100 000 peoples and gathers 186 industrial companies and societies in the nuclear field, as well as 18 research and engineering institutes. CNNC manages ten operational power reactor and about fifteen others are under construction or projected.

The other large nuclear power company has in April 2013 changed its name to China General Nuclear Power Corporation (CGNPC) to reflect is national ambitions, the “G” formerly refereeing to the Guangdong province where it originated from. CGNPC had been created in 1994 originally to handle the nuclear program of its home province, which stays a 45% shareholder of the company, at equal shares with CNNC. Established in Shenzhen, CGNPC numbers 17 000 employees and more than twenty subsidiaries, amongst which research and engineering laboratories and a mining company for uranium exploration.

CGNPC exploits eight nuclear reactors and is involved in the building of more than fifteen others, among which two EPR at Taishan, third generation units design by the French

Areva. This project, departing from the nation's official choice of the American AP1000 as a reference base for its third generation reactors, demonstrates CGNPC's strategy to place itself as an independent actor from CNNC in the development of nuclear power in China. Taishan's units are the purpose of a unique partnership in the Chinese nuclear sector as they will be operated by a joint venture with the French Électricité de France (EDF) as a 30% stakeholder.

Along with these two companies which operate all of the actual Chinese nuclear power plants, several other new entrants intend to place themselves in the atom sector beginning with joint project with CNNC or CGNPC before engaging into independent ventures. All of them are major players in the Chinese power sector, amongst the five cinq Gencos: China Datang Corporation, China Power Investment Corporation (CPI), China Huadian Group and China Huaneng Group all number more than 100,000 employees and are historically placed in the building and operation of thermal or hydraulic power plants.

The whole the power industry in the nuclear field in China is organized through holdings, each big power company controlling his own subsidiaries covering all of the critical industrial competencies and the necessary research centers. Industrial strength for nuclear sector, heavy industry, mechanical and nuclear construction… are mainly concentrated around the cities of Harbin, Chengdu and Shanghai, giving China the ability to master most of the production process of reactors, at least for second generation units.

International ambitions

China's international ambitions into the nuclear field are not recent since a power reactor based on the design of the Qinshan unit has already been sold – and built –to Pakistan in the 90's. The extension of this program by two more units, currently under construction, has raised political issues, since China joined in 2004 the Nuclear Suppliers Group (NSG[87]) and is not supposed to sell nuclear equipment to countries which have not signed the Nuclear Non-Proliferation Treaty.

[87] The NSG is a group of nuclear supplier countries that seeks to contribute to the non-proliferation of nuclear weapons through the implementation of guidelines for nuclear-related exports.

Since this first export experience, Chinese industry has acquired the design, construction and operation knowledge for bigger second generation power plants. China now possesses all rights and licenses over these reactors and may offer to export units from 600 to 1,400 thousand kilowatts of power. Programs under course over the third generation aim the same goal with modern and more competitive reactors, but which will not be available to export until a demonstration unit has been built on the Chinese soil, leaving at least a 5 years delay to the competition.

Confided by its large number of nuclear units in operation, which might rank world second before the end of the decade, China is already ready for the nuclear international market and should be expected to figure in good position in future international calls for propositions. No doubt China will put together all its strengths to gain contracts, at least for the international status to be present amongst the very private club of the worldwide suppliers of civilian atom.

Nuclear fuel

The only fissile element naturally available on Earth is the 235 isotope of uranium, only present in quantities of the order of 0.71% in the uranium ore extracted from the mines. Most power reactors worldwide operate with enriched uranium, a fuel containing a 3 to 5% proportion of uranium 235. The development of an independent nuclear power program thus requires an access to uranium ore and enrichment facilities to produce the nuclear fuel, but also capacities to treat or at least safely dispose of used materials at the output of reactors.

Prospecting

If Jiangxi seems to have provided raw material for the Chinese military nuclear program in the years 1950-60, half a dozen mines are now in operation throughout the country. China has announced by the end of 2012 the discovery in Inner Mongolia of the largest uranium field on its soil, and other large deposits are still expected to be found especially in Xinjiang.

Before these announcements, China’s uranium reserves, on which official sources are very

scarce, were estimated in 2009 at 3% of the world stock and the country ranked amongst the first ten worldwide producers. Over and above these significant resources, China is involved in prospecting operations outside its borders, especially in Mongolia and in Africa, and ties partnerships with main producing countries such as Australia which is believed to detain nearly the third of the world reserves.

Enrichment and preparation

Enrichment is the most sensitive operation in the fuel preparation process: if a level of 3 to 5% is enough for power generation, mastering these technologies empowers to reach higher enrichment rates and opens military applications of the atom. All the technologies related to uranium enrichment are therefore the object of an attentive control by the international community under the supervision of IAEA.

Built with the help of USSR in the 60's, the first uranium enrichment plant in China relied on the state of the art technology available at that time of gaseous diffusion. Russia again provided the two main plants now in operation, opened in the years 90's and 2000's in Shaanxi and Gansu provinces and based this time on centrifugation technology. Lately in February 2013, China inaugurated its first centrifuge entirely conceived and built in the country, asserting its independence on these strategic technologies.

The different plants for uranium enrichment all depend from CNNC, as well as the processing units China Jianzhong Nuclear Fuel (CJNF) and China North Nuclear Fuel (CNNF) for preparation of the nuclear fuel.

Isotope separation and recycling

Out of the reactor, used nuclear fuel is mainly composed of non-fissile uranium but also contains a small part of new elements, produced by the fission of uranium nuclei or resulting from transmutation after absorbing neutrons generated by the nuclear reactions. As France and Japan, and contrary to the United States, China has chosen a closed fuel cycle, considering the used nuclear fuel as a valuable product and not only as a waste.

Fuel recycling consists in isolating fissile atoms still present, that may be reused to produce

energy again, and separating radioactive materials with short, medium or long lives (from a few tens to a few million years) to optimize their consecutive treatment or storage. It is a complex and heavy chemistry due to the high level of radioactivity and chemical toxicity of the elements dealt with. It is also a very sensitive process in the way that it leads to isolate significant quantities of highly concentrated fissile elements.

Once again CNNC bears the Chinese efforts in that field. In April 2013, the company signed a letter of intent[88] with the French Areva, representing an important milestone toward the supplying of a recycling plant similar in concept to those already in operation at la Hague in France and at Rokkasho in Japan.

CNNC through its subsidiary Everclean Environmental Engineering is also involved into conditioning and storage activities of radioactive wastes. Already equipped with several disposal centers for its short and medium life wastes, China still need to set up by 2030 an underground disposal repository for its high activity wastes. A geological granitic site in the north-west of the Gansu province seems actually to be favored.

Research

Inherited from its military program, China benefits from significant capacities in research and development in the nuclear sector, now devoted to sustain its nuclear industry. Efforts aim first and foremost at ensuring a lasting development of the nuclear industry by mastering each and every technology necessary in the three strategic fields of the sector: fuel, reactors and recycling. The policy for atomic research is defined, and to some extent financed, by the ministry of science and technology (MOST) which also sets the country's international policy for cooperation in science and technology.

But China also sets itself more distant goals toward fourth generation nuclear power, unrecyclable wastes transmutation and even mastery of controlled thermonuclear fusion. The scientific roadmap to 2050 regarding research for energy aims to the development of commercial units by 2035 for fourth generation and 2050 for fusion.

[88] See for e.g. http://www.world-nuclear-news.org/WR_China_approaches_reprocessing_commitment_2604131.html

If these goals may be seen as ambitious, not to say more considering fusion, it is worth be noted that China has the ability to marshal huge financial and human strengths to advance rapidly. Researchers in the nuclear field can be counted by tens of thousands, exploring virtually all possible paths to future reactors. China already operates one sodium cooled fast breeder reactor built with a strong hand from Russia and operated by scientist trained on a similar – now shut – installation in France, one high temperature helium cooled pebble bed reactor from a German technology, and some other experimental reactors are projected or under construction.

Last of all China runs a tokamak, an investigative reactor for fusion energy designed with a technological support from Russia. After joining in 2003 the international ITER consortium, Chinese scientists have been contributing to the construction of the experimental reactor being built at Cadarache in France, with a particular involvement in the engineering matters.

Afterword

The Chinese nuclear sector is out of standards on the international scale, whether it be by its amazingly rapid growth during the last two decades or by the amplitude of the financial and human means involved.

While countries with a long history in nuclear power face doubts from their population toward the civil use of atom, China is engaged into an intensive development program of its industrial capacities to answer its urgent actual and future needs.

The big question for tomorrow will be the reaction from the Chinese population: already facing an out of range pollution of its air and soils, will it see in nuclear power a solution to purify its atmosphere or a new factor of environmental threat? And in that later case, what would be the reaction of Chinese authorities?

Whatever situation, it would only have a slight incidence on the nuclear companies all over the world: they already know that they will be facing a terrible competitor in the sector, and that China has strong assets to gain markets.

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4 Food supply: a largely unrecognized burden on the economic strategy of China

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If China arouses a certain fascination, this is due to the fact that its economical development occurred whilst sheltered, as it were, from the ups and downs of the world economy. China's economy is best known for its GDP growth rate, industrial performance, improved living standards for large numbers of the population as well as its dazzling rise in power rather than for uncertainties relating to food and agricultural product supply since the late 1990s. The hypothesis of China reaching its goal to establish world leadership is increasingly studied, leading a substantial number of economists to consider China as key in shifting the world economy's centre of gravity (Boillot & Dembinski 2013) (Aglietta & Baï 2012). This prospect raises the following question: is the superpower status to which China aspires compatible and tenable with a higher level of food dependency? This brings up the whole set of problems relating to the industrialization of a country and the repercussions on the agricultural sector.

This constitutes the main theme of this chapter which will initially discuss the present state of Chinese agriculture and the evolution of its main sectors of production, which appear unable to respond satisfactorily to the dynamics of the interior consumption of food and agricultural products. This causes agri-food imports to increase, contrasting with the global foreign trade surplus. The evolution of the Chinese agricultural policy will be dealt with in the second part of the chapter. In addition to the central issue of food self-sufficiency, this

second part will examine the potential repercussions of political decisions on farming populations.

China's food supply dilemma

Up to the present time China has had two big agri-food related ambitions. The first was to ensure a self-sufficiency rate of approximately 95% in cereal crops (essentially wheat, corn and rice), in oilseeds (particularly soy) and in tubers. The second goal has been to achieve the status of a great exporting nation in agri-food products. Looking at the demography, the rise in living standards and agri-food foreign trade, it seems that the Chinese economy is moving further away from achieving these objectives. Where is China at today?

The dynamics of grain production in China justifies an examination over time and can be linked to the development of Chinese agricultural policy, particularly the area directly concerning grain production[89] . We will select 1978 as our starting point, the year the economy's structural reforms began, using the China Statistical Yearbook as a resource. Grain production during the period from 1978 to 1996 can be broken down into three phases: from 1978 to 1984 growth was at a rate of 4.9% per year, then only 1.2% per year from 1985 to 1992/93, following a strong decrease between 1985 and 1989. In total, the production growth rate between 1978 and 1996 amounted to 65.5%. Chinese production experienced another decline after the year 2000 with 462 million tons, falling as far as 430 million in 2003, matching the production level of 1991. Some observers of this evolution saw it as the start of a weakening in China's food supply performances. According to these observers, the decline in grain production did indeed open the way to an increase in Chinese food dependency on the outside world. Furthermore, the stagnation in yields expressed in tons per hectare provides an explanation for the slump in grain production after 2000.

In fact, grain production increased again from 2004, from 469 to 517 million tons in 2011, an increase of almost 22%. Does this represent a trend reversal implying a decrease in China's food dependency rate? An answer to this question requires a slight detour into an analysis of the evolution and composition of Chinese consumers' food rations. The steady economic growth that distinguishes China has brought change in the lifestyle of many Chi-

[89] According to Chinese nomenclature, "grains" corresponds to cereals, soy, tubers and legumes.

nese households. Poverty has greatly decreased and standards of living have improved. The proportion of the population disposing of a daily income between $6 and 10 has thus grown from 4.8 to 25.5% between 1995 and 2007, and the same for the higher category of $10 to 20 per day from barely 1% to 19%. The birth of a middle class in China has come hand-in-hand with an accelerating urbanization rate since the 1990s with more than 50% of the population living in towns, i.e. close to 700 million inhabitants. These socio-economic dynamics have many repercussions on consumption patterns.

Indeed, China has undergone a process of nutrition transition. During the 1960s, the annual food availabilities per inhabitant were of approximately 1500 kcal, composed essentially of plant products, particularly cereals (wheat, rice), manioc, potato or legumes (beans, peas). The beginning of China's economic structural reform kickstarted a process of nutrition transition which has continued to this day. Formerly centered on plant products, food consumption of Chinese households has diversified, with an increase in the consumption of meat products (cattle, pig and poultry meat) and dairy products. By around 2010, total food availabilities measured close to 3000 kcal per day per inhabitant, which includes a high proportion of animal calories. In addition to the demography and urbanization of China, the opening of trade and the arrival of big retail companies have played a decisive part in this process of nutrition transition (Chaumet & Pouch 2012).

The increase in the consumption of animal products – specifically poultry and pig – leads to an accompanying increase in the consumption of crop production. In order to increase production volumes, demand for cereals and soy for animal feed rises. For example, China now accesses more than 55% of the world trade in soy, particularly in the form of beans originating from Argentina or Brazil (figure V-4-1). The structure of Chinese agri-food imports also shows a large increase in the purchase of wine and alcoholic beverages after 2000.

This produces two major consequences for the stability of global agricultural markets. By occupying a leading position in imports, China is single-handedly able to force agricultural prices up, exposing the poorest importing countries more and more to higher import costs. The first consequence involves China's level of dependency in the main agricultural products. Presently, the highest rate in dependency is found in soy products, alongside

oils. Chinese agricultural production is clearly struggling to satisfy the increase in demand, whether it emanates from consumers or livestock farmers. Moreover, the impact of public health crises amplifies the recourse to imports, as illustrated by the case of melamine milk contamination. Consequently, between 1990 and 2010, dairy imports increased by around 4,000%.

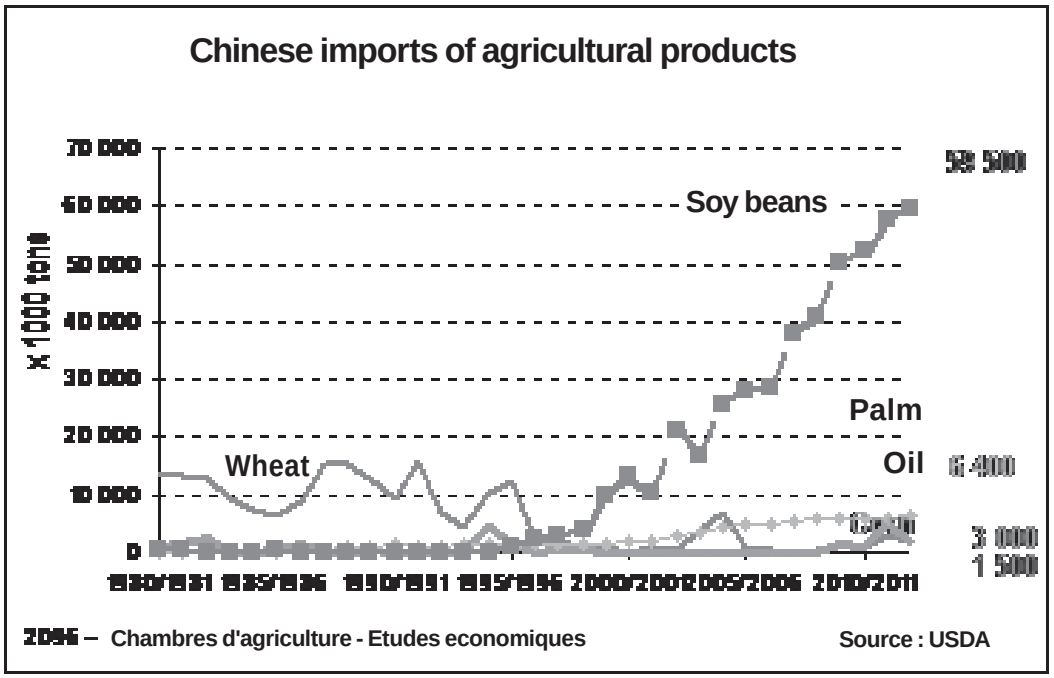

Figure V-4-1;

The second consequence concerns the evolution of China's agri-food trading with the rest of the world. Again, after the year 2000, the trade balance tipped into long-term deficit, in contrast with the high surpluses achieved in manufactured goods trading[90]. Only processed products show some resistance to the decline in trade, whereas primary agricultural products have settled into a state of chronic deficit (figure V-4-2). Between 2010 and 2011, the trade deficit in agricultural products deteriorated by 20 billion dollars. The share of agri-food products within the total of Chinese exports collapsed between 1990 (approximately 13%) and 2011 (less than 3%). However, the proportion of agri-food imports remained stable over the same period, around 7% of total imports. This highlights the fact that the Chinese

[90] In the manufactured goods sector, China is now the leading exporter in the world, having overtaken Germany.

economy cover ratio indicator (import/export percentage) has deteriorated, from 250% in 1993 to 46% in 2011.

This general picture suggests that close attention be paid to the agri-food foreign trade situation of China in the years to come. The indicators presented above demonstrate how this country's ambitions for power could be thwarted by the level of food supply dependency in relation to the rest of the world. Indeed, besides soy and beef, recent increases in rice and corn imports give rise to some concerns regarding on the one hand China's capacity to sustainably feed its population, and on the other hand the repercussions that Chinese purchasing could have on global agricultural price levels in the long run. China has become an overall importer of rice since 2010 and corn imports tripled in 2012. Chinese authorities are consequently at risk not only of food dependency but also of destabilization among the small farming population, whose income could suffer greatly if the rate of imports continues at the same level (Aubert 2005, pp. 69-83) (Morton 2012). Therefore what role will agricultural policy have to play?

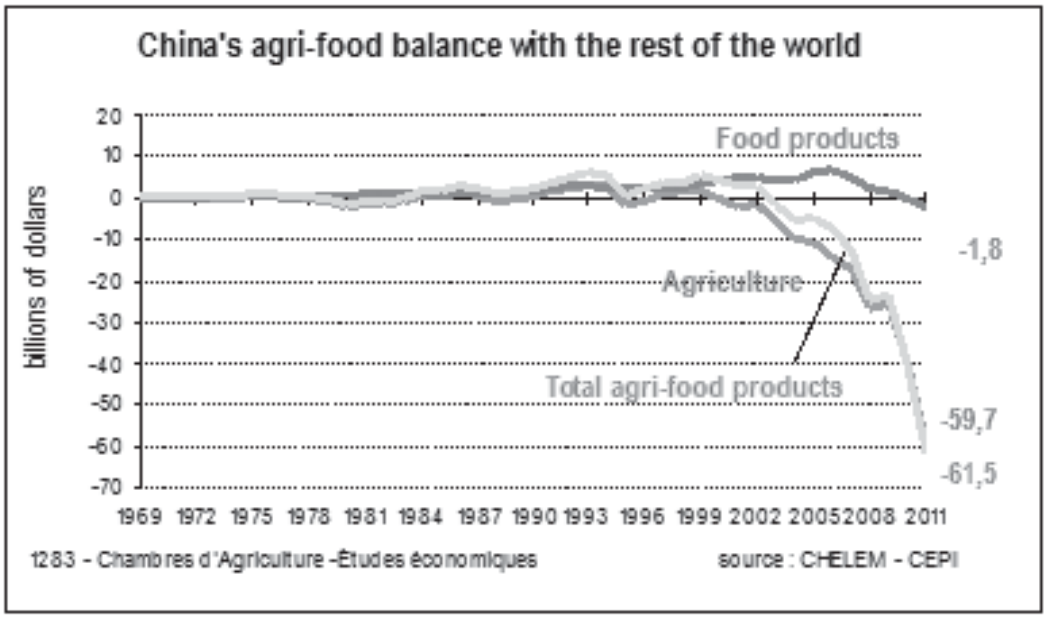

Figure V-4-2;

Role and evolution of agricultural policy and China's food self-sufficiency level

Agriculture's role and place within the Chinese economy has developed greatly since the end of the Second World War and serves partly to explain China's capacity to feed itself, even though the farming sector began its liberalization thirty-five years ago.

Agricultural policy: inexistant before 1978

From Mao Ze Dong's arrival in power to the start of reform in 1978, the main role of agriculture was to provide resources for the country's industrialization, by transferring surpluses to the towns and industry. The roles traditionally given to agriculture within developing countries were hardly fulfilled at all (Johnston & Mellor 1961). While agriculture enabled an increase in calorie availability per inhabitant, the Chinese diet evolved little, remaining centered on grain consumption. In addition, cereal imports were stable between 1973 and 1980. Supply of materials for industry also increased slightly, but industry labour supply could not be put to use in the agricultural sector during this period, mainly because of the Hukou system, which limited rural migration. Raising rural incomes became impossible due to the low prices fixed by the authorities and the lack of incentives to increase production. Furthermore, the in-flow of foreign currency by exporting agricultural products was never a goal for the authorities, international trade serving only to acquire those goods that could not be produced in the country (self-sufficiency policy). Also the structure of Chinese agriculture evolved very little, the proportion of grains decreasing from 88% to 80% of agricultural area between 1957 and 1978, and from 83% to 73% of added value in agriculture.

Chinese agricultural policy reached a turning point in 1978, with reform focusing on agriculture before other sectors. The first reform phase dealt with institutions and prices, in order to provide incentives for farmers, something which had been previously lacking. The People's communes were gradually dismantled and the household responsibility system spread throughout the country, theoretically leaving the choice of production to the farmers themselves. Land, being collective property, was assigned to households for a period of 15 years, later extended to 30 years. At the same time, the authorities increased the prices paid to producers with the intention of inciting them to further develop their farms and also to boost their incomes. From 1984, the aim of the second reform phase was to liberalize the trade of agricultural produce. Second category products (fruit, vegetables, animal

products…) could be sold freely in the markets and corresponding quotas were abolished. Only grains, constituting the first product category alongside cotton, remained within State control until 2004. Moreover, grain policy was chaotic, revising the quota system and modifying price levels for farmers on several occasions, liberalizing trade before reversing the decision (1993-1994) and at every change provoking major variations in production, until actual liberalization occurred. As a whole, these reforms enabled not only the successes described above in terms of production and food supply but also in terms of reducing rural poverty, with the number of people in rural areas below the poverty line decreasing from 260 million in 1978 to 89 million in 1984 (Fan et al. 2000).

A major change of direction after 2000

From 2000 onwards Chinese agricultural policy changed direction once again. Whereas farming and rural areas were largely ignored in the 90s, they were given top priority in Chinese policies after two specific events: firstly China's entrance into the WTO in December 2001 that opened borders and put local and imported products in competition with each other, and secondly the change in leadership within the Chinese communist party in 2002, who decided to move away from the previous leaders' policy with its sole focus on increasing GDP. The main priority of the 11th five-year plan (2006-2010) was to build "a new socialist countryside", to serve as a starting point for the new policy regarding rural areas as a whole. In addition, since 2004, all the "n°1 documents" (jointly published at the end of January every year by the Communist Party and the Chinese government) as well as every annual policy orientation statement, have been entirely focused on rural issues, highlighting the importance given to this sector by the Chinese authorities. The big objectives of Chinese agricultural policy are: securing food supply for the country, which in China means self-sufficiency for certain strategical products, improving income and living standards for the rural population, crucial in maintaining social and political stability while the income ratio between rural and urban people is still from 1 to 3 (figure V-4-3), and the longer term objectives that are to provide healthy high quality food, to protect agricultural resources and to promote sustainable development (see Referencies).

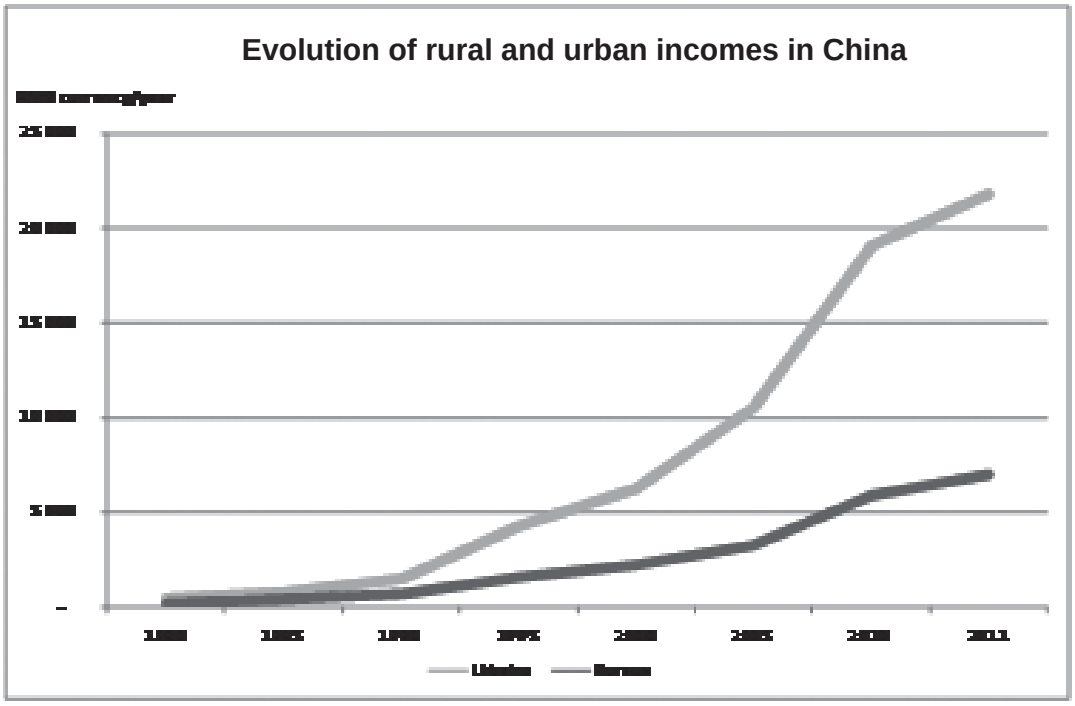

Figure V-4-3; Source: GEB-Institut de l'Elevage according to China Statistical Yearbook

These objectives coincide with a central issue in China, that of the "san nong" (the 3 nong) upon which rural policies are focused: agriculture (nongye), where the goal is to increase production, farmers (nonmin) whose incomes the authorities are working to increase, and the rural environment (nongcun) for which the main priority remains infrastructure modernization. The budgets allocated to these three areas have multiplied by 8 in 10 years, exceeding 1,000 billion RMB in 2011 (figure V-4-4).

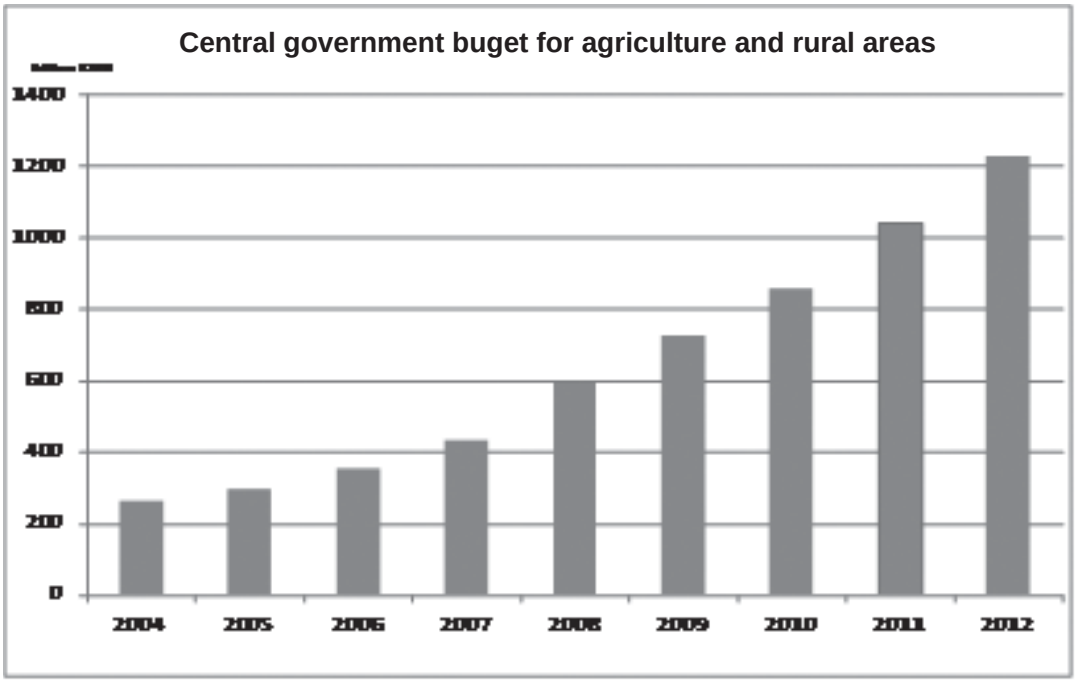

figure V-4-4; (in billions of Yuan)

Source: GEB-Institut de l'Elevage according to Chinese Ministry of Finance

It is unlikely that the new political leaders, who took up office at the end of 2012, will rapidly undertake another major directional change as the 12th five-year plan (2011-2015) is already underway. This latest orientation of Chinese agricultural policy can be broken down into several sections. When entering the WTO, China's agricultural trade strategy consisted of authorizing import increases only on certain "non-strategical" products (soy, meat), by imposing tariff rate quotas on cereals. In this way agricultural production can focus on strategical products, like grains, in order to maintain self-sufficiency in this sector. In addition, at the time of entering the WTO, China negotiated the right to subsidise up to 8.5% of the agricultural production value. Progress was thereby achieved in both integration into international trade and improvement of farmers' incomes.

Chinese authorities proceeded with the liberalization of cereal trade in 2004 by abolishing price controls and allowing companies to buy and sell on the free market. However, trade in cereals was not completely left to the mercy of the world market. The Chinese authorities kept several means of intervention such as minimum purchase prices in conjunction with a system of national reserves, tariff rate quotas, and ways to limit exports (export taxes and

VAT refunds on cereal exports). Numerous budget measures were taken to support agricultural producers. Rural taxes that were “the peasant’s burden” were unified and gradually abolished. Direct payments to cereal producers were established in 2004, after trials from 2002 onwards. If the declared goals were to support cereal production and increase farmers’ incomes, it would appear that only the latter has been effective (Huang and al. 2001). Subsidies for inputs and improved seeds as well as the purchase of agricultural machinery were also implemented during the years after 2000. The authorities’ concerted efforts to maintain self-sufficiency in grains, while liberalizing trade, limited the effects of the natural tendency for agriculture to move towards productions that are comparatively advantageous on an international level.

These supportive measures as a whole have enabled a steady progression in grain production. However, the evolution of Chinese agriculture towards higher productivity and lower production costs is faced with two challenges, which are both sides of the same coin. The first challenge is to modernize and increase the size of farms, in order to help farmers out of poverty and establish a modern agricultural system. Due to concessions made to the WTO, China cannot protect and maintain small farming structures as Japan and Korea have been able to do. However, enlargement is hindered by the present property law status which makes it difficult to establish large farms and also by the fact that land remains a safety net for migrants (mingong). Rural exodus, although necessary to provide manpower for the industry and service sectors, represents the second challenge. This movement is dependent not only on economic growth to guarantee opportunities in secondary and tertiary sectors but also on land rights currently in force in China. Land policy is therefore more than ever a key feature for the development of Chinese agriculture.

A deficit that will inevitably grow

In spite of all the authorities’ efforts, the agricultural and agri-food deficit will probably continue to worsen as demand progresses and supply is hindered by constraints. China’s macroeconomic evolution has a role to play in the growing agricultural deficit. According to the OECD and the FAO, the growth in GDP should be maintained above 6% over the next ten years, doubling the income per head, and thereby leading to a sharp increase in consumer product demand, particularly in those of high income elasticity (OECD-FAO 2012). Moreover, growing urbanization (more than 50% of the Chinese population was urban in 2011

and the UN projects 70% in 2030) will cause change in dietary habits and will increase the pressure on animal production. Finally, the evolution of agricultural production methods, with the decline of farmyard pig and poultry operations alongside the development of large farm units (mostly based on intensive indoor production), increases the proportion of cereals required for animal feed and intensifies the pressure on agricultural land.

Agricultural production therefore faces many challenges. Land that is suitable for cultivation is dwindling because of urbanization, land requisitioning by local authorities and infrastructures due to the explosive development of car ownership in China. China lost 8.2 million hectares of land since 1997 out of a total area of 120 million hectares in 2010 (de Schutter 2010). The 11th five-year plan drew a limit at 120 million hectares and this figure was maintained in the 12th five-year plan. A large portion of the remaining agricultural land is damaged by the excessive use of fertilizers, polluted (heavy metals…) or affected by erosion (almost 40% of land), despite protective measures that are increasingly coming into force. Water reserves are rapidly dwindling, particularly in the north of the country, threatening irrigation that is required by almost 50% of cultivated areas. Indeed, agriculture accounts for 60% of China's water consumption. Water availability varies greatly from one year to the next (a difference of 33% between 2010 and 2011), and the effects of climate change could be severe in the northern and north-eastern areas of the country (Wang and al. 2009). Two economical factors will also contribute to an increase in imports by lowering the price-competitivity of Chinese products:

- The demographical issue will push up the cost of labour across all sectors as the working age population numbers drop, and will raise the price of Chinese products.
- At the same time, the increase of the Yuan exchange rate, inevitable over the medium to long term, will lead to cheaper imports.

The constraints that burden China's food supply are therefore set to become more pronounced and could constitute an Achille's heel in the winning strategy of this economy.

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5 Beyond geo-economics: not all eggs in one basket

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Return of Geo-economics: for how long?

Geo-economics: cyclical concept and realities

In its most general meaning, the concept of geo-economics is generally used when attempting to capture the linkage between economics, geopolitics and national security. The word emerged in 1990 at the end of the Cold War when the importance of military power relative to economic power was fading in the immediate aftermath of the fierce competition between the US and Japan in the 80'.

Its first use is attributed to Edward Luttwak in whom views GDP, trade surpluses, currency reserves… are key factors to assess the balance of power. In the wake of Luttwak's definition, some authors (Pascal Lorot…) suggest in their definition that a difference in nature between geopolitics and geo-economics would separate them and that economic matters would be the new drivers of world order, while the traditional strategic component of power would decline fading gradually. Other authors highlight "the renewed centrality of economics to political power" or "conversion of economic assets into political influence" (Grevi 2012).

For the purpose of this article, a broad definition will be used, pragmatic enough to describe real world phenomena in the view that geo-economics is not different from geopolitics. It should be seen as a complement, a widening of the prism that enhances its analytic power, giving more focus on economic phenomenon relatively to traditional power components.

The point defended here is that there are rises and falls in the use of the concept linked to the cyclical evolution of the phenomena described, but that, ultimately, economics cannot be really converted and replace politics (domestically and in the relations between states), even if in a short to middle term perspective it may be used as a powerful proxy in the real world. Looking at recent history, a surge in geo-economics (as analytic angle and phenomena) can be seen at the beginning of the 90', followed by a weakening of interest during the internet and new economy bubble. With the rise of the BRICs and specifically since the GFC and its long tail, geo-economic concerns are again at the front of the stage. The question is: for how long?

Geo-economics features and pressures

Several phenomena can be considered linked or particularly characteristic of the return of geo-economic approach:

- Shift to a multipolar world (rise of China),
- Global financial unbalances (reserves and surpluses vs deficits/debts),
- Scarcity and aggressive resources policies,
- Rise of state capitalism.

They last three illustrate well the economic side of power and the macro-shift in its balance. This article will focus specifically on state capitalism.

State capitalism and the example of Chinese SOEs

Success of an alternative model of governance

The surge of the BRICs and other emerging markets, going with a subsequent diversification of economic and political power across the world, have led to a large debate about the advantages of authoritarian capitalism ("Beijing Consensus") in a post-Washington Consensus world. Authoritarian capitalism is not limited to China and includes Russia as well as many central Asian countries and energy-rich countries of the Middle-East. Moreover, the economic success of East-Asian countries (Singapore, Taiwan, Kore…) can also historically be related to this model. Though the political purpose being different, a clear distinction should be made between authoritarian and state capitalism, the apparent relationship

gives arguments to those claiming its superiority in a context of crisis-stuck West.

The central question relates to the role of the state in the economy leading to a significant change in attitudes across the world with regards to its advantages and disadvantages. Following the GFC, the role of the state has increased in every part of the world with a noticeable expansion of TNC having a variable degree of state's stake in their ownership, even in countries with old tradition of liberal capitalism (UNCTAD 2011). A serious debate is taking place in the West to assess this new form of hybrid 21st century capitalism and its potential adoption reactively or proactively, given the success of China (The Rise of State capitalism 2012).

In the countries where it is prevalent, state capitalism is usually associated with state-owned enterprises (SOE) including state-owned banks (SOB), sovereign wealth funds (SWF), parastatal agencies, industrial policies and national champions, protectionism, capital control, currency interventions… Taken one by one, all these elements do not sound astonishingly new but it is rather their combination, their size and the intent behind their use that could be considered specific.

According to Ian Bremmer (2010), state capitalism is not the re-emergence of the failed planned economy neither is it a take-off stage or a temporary support aiming at the reconstruction of an economy. It is rather a long term and strategic policy instrument where the state dominates markets primarily for political gains, that is to say the holding of power by elite (Russian FSB, Communist Party, ruling families in the Gulf…). In those countries, leaders know better than elsewhere the merits of markets and only want to marshal its use to serve their own purpose of political domination on their own people. Even if international expansion is pursued through acquisition of various assets abroad, the main focus remains internal rather than external. Russia and China no longer seek to dominate the world militarily: war is bad for business. Therefore, the main threat would not be military but on free markets with enormous risk of distortions and economic dependence in open economies like the US or the EU. During the cold war the impact of soviet decisions on western economies was limited; now a political decision taken in Moscow, Beijing or Abu Dhabi could have an impact on the whole planet.

The major question: the sustainability of state capitalism

Consequently, the advantages of authoritarian and state capitalism could be summarized by the efficiency of state-led development in the take-off period as the state can take rapid decisions, show clear strategic directions and concentrate its resources on focused investments. That is the reason why state capitalism remains popular.

However, once the take-off stage is over the long-term economic efficiency is a clear challenge. The point is that resources distribution and allocation are inefficient, particularly when a certain level of development is achieved. Waste can be colossal. When the technological frontier is approaching, the role of private sector becomes critical. Innovation, considered as a process of trial and error cannot be achieved only through top-down directives.

Another shortcoming is the over-reliance on big SOEs and all the issues that follow: directors not chosen for their managerial skills but for their political links, market distortions with diverse kind of advantages and dominant positions, precedence given by the financial system and eviction of SME for access to credit… (see below the Chinese SOEs case).

Room is here insufficient to discuss in details those questions; the future will tell whether state capitalism will last in its current form and maybe spread to the West, evolve in an East-Asian form of development or collapse.

Beside the economic arguments, another resilience factor that could mitigate the natural evolution toward a private-sector led economy should be considered: the constitution of a strong politico-financial elite linking government, state enterprises and banks. As often seen in history, these elites will try to patrimonialize the state to ensure a grip on it and an outlet for their children.

Nevertheless, what can be said at this step is that political survival of these systems is conditioned by the continuous delivery of growth and this is the reason why the long-term sustainability of state capitalism in its current form does not seem very likely.

Still, in a short-term perspective, it is difficult to deny its pressure; a good illustration will be

provided by the example of one of its main tools, the SOEs in the Chinese case.

Overview of Chinese SOEs and implications from a geo-economic point of view

Macro background

According to a World Bank's report (2012), significant enterprise sector reforms have underpinned China's growth performance during the last decade leading to a reduction of the state sector. The state sector's share in the number of industrial enterprises (annual sales>5mRMB) fell from 39.2% in 1998 to 4.5% in 2010. In terms of industrial assets the respective numbers are 68.8% and 42.4% while for employment they are 60.5%% and 19.4%. Their share in export decreased to 15% in 2010 from 57% in 1997. As a result, the share of SOEs in industrial output amounts to 27% in 2010 and is expected to decline further to 10% by 2030. This shift to the private sector was centered on small and medium-sized companies while the flagships of the economy (about 120 large SOEs) were organized under the authority of the SASAC in the highly strategic (and officially designated as such) sectors of defense, electricity, petroleum, aviation, banking, telecom…

Weight

Beyond the foregoing numbers, it is necessary to assess more in-depth the real weight and power of SOEs and state control.

A first observation is that China is climbing rapidly the levels of ranking and has now the second largest concentration of Global 500 companies after the US and before Japan, 2/3 of them being SOEs and often very inward oriented instead of being multinational corporations. It is difficult to give a straight-forward answer to the question of the state's control scope in the economy because one of the main SOEs' features is that they constitute large networks extending from the 100% pure state-owned enterprise to cooperatives, local companies, joint-operation enterprises, mixed private-public companies, affiliates not registered as SOE… In statistics, only wholly state-funded firms are recorded as such and that is why it is necessary to broaden the scope to get a full picture of real state influence. They also often have for example links with state-controlled universities without having any equities links. In manufacturing the direct role of SOEs has been diluted but is still prominent in ser-

vice sector for example. In conclusion, some researches (Milhaupt 2012) show that if one makes reasonable assumptions regarding the service and construction sector and takes into account other forms of public controlled enterprises not registered as SOEs, the level of about 50% of state controlled GDP seems a good approximation.

Structure

The SOEs are vertically integrated groups, with a hierarchical shareholding structure (few cross-ownership), a focus on one business or sector and few diversifications. This is the main point of contrast with the Japanese keiretsu which are diversified and have horizontal links. They are typically organized around a core company, a listed company, a finance company, and a research institute. The core company, often the results of corporatization of former ministry departments, is itself 100% owned by the SASAC and acts as a holding with a coordination role between the different entities and the state. The listed company is the external face of the group, often a single firm with only a minority of share traded on stock exchanges. It is the focus of the public and the media but represent only a part of a broader ensemble. The finance company is a non-bank institution that provides a wide range of financial services to the group members (deposits, loans, payments, insurance, foreign exchange, underwriting of securities…). Finally the research institutes are the place where R & D, particularly applied researches related to the group activities are conducted. There are often collaborations with universities on specific projects.

State goals and consideration of market conditions

Beside these complex aspects of extensive network, key in understanding Chinese capitalism, the diverse kind of subsidies and advantages they receive, are other important and well-known features of the SOEs. The main categories are direct subsidies (capital injection), preferential loans (favorable interest rates, concessionary funding for foreign acquisitions…), tax reductions/exemptions, preferential access to raw material and other inputs (below market prices, export restrictions on steel-making raw materials, rare earth…), preferential regulatory treatments (disclosure regulation, preference in government procurement…).

Another key question is the goals and the management of the SOEs. In theory the SASAC

judges management performance on the basis of financial performances, and thus, there are incentives for market-oriented and commercial behavior. However, the Communist Party through its "Central Organizations Department" (COD) chose the top management and influences the choice of directors so that top corporate managers of SOEs simultaneously hold important positions in the government and/or in the Party. Therefore, managers are also judged by the COD including an assessment of the achievement of state plans, which means that, even if profit is not unimportant, profit maximization is not the primary motivation. SOEs are pursuing both market oriented and state goals. The "go global" policy reflects this global strategy with its goals of securing natural resources, promoting capital accumulation, accelerating technological innovation, improving international competitiveness by promoting Chinese brands… These strategies can be pursued at the expense of profitability as SOEs have no real requirement for dividend or return and can engage in exclusionary pricing or market share maximization strategies.

Indeed, the profitability of Chinese SOEs remains well below non-state firms. The ROE of SOEs (The World Bank 2012) increased during 1998-2007 but fell sharply more in 2009 than the non-states firms whose average ROE stands 9.9 percentage points above that of SOEs. Relative to the private sector, SOEs consume a large proportion of capital, raw materials and intermediary inputs to produce relatively small share of gross output and value added. In addition, a large share of SOEs profits comes from a few where profitability is often related to limits on competition, access to cheaper capital, land and natural resources

The Chinese risk in a changing world

Black Swans

The 12th FYP proposes an ambitious rebalancing of Chinese economy between growth and sustainability, production and consumption, infrastructures and innovation… After 30 years of catching-up, China has an urgent need to change its growth model as it has exhausted the gains of first-generation policy reforms. From a political and economic point of view it is estimated than the country needs to continue to deliver a 7% growth to keep under control the social contract and push up the necessary reform allowing China to jump to the next step and join the team of high-income countries.

Nevertheless, even if one can reasonably estimate that China has the potential to achieve this challenge, nothing is less sure beside the fact that the world is entering a dangerous zone in the next five years for the global economy and order.

Referring to the prospective study “Global trends 2030” (National Intelligence Council 2012), several potential Black Swans -discrete events causing large-scale disruptions- are identified, among which Euro/EU and China collapse. As Black Swans they are only risks among others (pandemic, cyber/WMD attacks…) and not forecasts. However, in a geopolitical and geo-economic perspective, they have such a major impact while their likeliness being far from science-fiction, that a focus on them can help to better figure out the future challenges to be overcome.

Chinese key challenges

There is a large consensus on the fact that the Chinese economy will decelerate due to a shrinking of the labor force, a lesser contribution of accumulation of capital and a decline of total factor productivity as absorption of imported technologies has reduced the distance to the technological frontier. Therefore, the second generation policy reforms are likely to have a smaller impact on growth.

The question is to what extent and above all, how suddenly? The World Bank is forecasting a gradual decline of GDP growth rate from an average of 7% for 2016-2020 to 5% by 2026-2030. However, several private institutes see growth decelerate around 5% as soon as this decade. A sudden slowdown could stress inefficiencies and unmask liabilities in banks and enterprises, precipitating a fiscal and financial crisis not to mention social unrest due to the fading prospect of income increase. China has the brighter prospect among the BRICs but also the biggest hurdles. One key structural problem is the risk of staying stuck in the middle-income trap. Historically, many countries entered the middle-income range but few achieved the further leap to high-income as advantages like low-cost labor and easy technology adaptation fade. The condition is to find new growth drivers and succeed in the transition to an innovation based economic model through reforms. If China fails, it will remain a major player in Asia but with influence dissipating and its weakness being the biggest uncertainty.

Major areas of reforms are well identified: rethinking the role of the state in the economy, extending social security and reversing the rising income/asset inequality less and less bearable with low growth, strengthening the social system with better fiscal resources… As for the role of the state, it covers a wide range of issues extending from restructuring state enterprises and banks, developing the private sector, promoting competition, reforming land use, labor market and financial markets. For enterprises, the focus is on limitations of use of public resources, introduction of modern corporate governance, separation of ownership and management and increased completion. As for the financial sector reforms would require commercializing the banking system, allowing interest rates to be set by market forces, deepening the capital market and developing the supervisory infrastructures.

How likely China will success or fail?

One the biggest challenge: reform of SOEs

Among other concerns related to China's ability to succeed in its transition, the reform of SOEs is considered key but difficult to achieve according to many observers and this for several reasons. On this point, few analysts are optimistic.

First, the cost of reforms is an important obstacle. Reforms of the late 1990s that have targeted many small state companies finally closed are estimated to a cost of more than 20% (The World Bank 2012) of GDP at the time. It shows how costly and difficult restructuration of state enterprises can be. One major concern is the lack of transparency and opaque accounting practices that can hide huge hidden liabilities. Another key element is the low profitability or some SOEs that have benefited of preferential financing condition but could face insolvency if exposed to normal market conditions

Furthermore, as already mentioned, the weight of SOEs with their networks and the entrenchment of state capitalism have created a powerful elite class and stakeholders that are not eager to let their interest weakening. SOEs are dominating the country's key sectors and have no incentives to accept a transfer of wealth and power to the private sector. Those interest groups have a lot to lose, particularly in the financial sector, in change in capital allocation and investment decisions. Implementation of reforms would suppose leadership, determined will, and coordination across ministries but it is unlikely in the cur-

rent Chinese political environment that a strongman or a group of leaders would be able to overcome these interest groups.

The financial system is another major concern about the scope and pace of reforms. The system was used for many years to pursue state economic strategy and as such, highly politicized, but in return of high economic growth, the sector is now plagued by inefficiencies, distorted funding cost and eviction of entrepreneurship. The state has directed lending for infrastructure and corporate investments at the expense of consumers and depositors and with the need to finance the spending of the 12e FYP, the government is not likely to loosen its grip on the system in coming years. Moreover, since the GFC and the credit-financed plans to boost growth, non-performing loans and assets are likely to have become a sizeable problem, rendering financial reforms more difficult.

All these elements are not very positive from the reforms point of view. Even if changes are going to be implemented, it will be as usual with China at a very gradual pace and a strengthening of government control over the financial system is more likely than the contrary

Does china have enough time?

The continuous delivery of sufficient growth to smoothly implement the reforms needed and the increase of living standards are the conditions for the PCC's legitimacy to remain in power. Indeed, without growth the Chinese model has little to offer to its people. Another indicator of the dangerous nature of the zone China in entering, is that it is approaching the threshold of $15,000 of GDP per capita (PPP) which is often a trigger for demand of democratization.

A unique weakness can be stressed here: the low level of consumption in the GDP. This factor is well known and has historical roots entrenched in the country development strategy. Nevertheless, compared to most countries and even in a historical perspective, Chinese evolution is a special case with consumption to GDP rate under 50% during the 1995-2010 period. The rebalancing of the economy is aiming to correct this structure but how long time will it take? Beside increase of income, the critical factor is of course the building

of a sufficient social security system but the problem is exacerbated in the cultural context of China where spending beyond one's mean is simply not natural. Therefore those kinds of evolutions need a generation rather than a few years to yield effects. The same can be said about China's attempt to build a more balanced power not over-reliant over economics: even if the country is increasing its military spending at a pace that its neighbors judge threatening, how long time will it take to catch-up the US, say in number of aircraft carriers: at least one generation?

Political and historical reasons of likely weakening

The advantages of authoritarian regimes and state capitalism have been discussed above from the point of view of effectiveness in economic development; they are mainly due to the fact that economics is serving a clear political strategy with a rapid decision process compared to democracy. Here, a look at Chinese political history with the help of Francis Fukuyama (2012) seems interesting.

In its book, Fukuyama analyses the essence of political development of the major world regions around the 3 axis of state building, rule of law and accountability, the balance and historical evolution of the three depending on each country. In the case of China, he argues that state building was effective at a very early stage, that rule of law was/is not absent but just "good enough" for business purpose for example. As for accountability, he explains that in dynastic China, it was flowing upward rather than downward as local officials were only looking toward the emperor for recognition of their performances without caring downward about ordinary people lacking judicial or electoral power. On the other side, the emperor, surrounded by its courtiers and mandarins, had to use eunuch as a network of spies to be kept informed of the real state of this huge country. Therefore the main problem of this system is that ordinary people with bad officials at the local level had to appeal directly to the emperor in case of abuse, which was of course not easy but possible.

Fukuyama points out that contemporary China is not so different from dynastic times. At the top, excellent leaders and the PCC watching a high quality bureaucracy especially in the upper reaches, but in between a wide intermediate body not always the same quality. In modern China also, the majority of problems does not come from a tyrannical cen-

tral government but from local government with abuses on peasant lands, safety rules in school construction, environmental damages…

This sheds light on one major problem of authoritarianism and state capitalism: the quality of leaders. In Chinese history this is called “the bad emperor” question. It means that the shape of the country depends on the constant supply of good leaders, which is of course not always possible and lead to disasters as Chinese experience teaches us with the empress Wu for example. And this is the reason why Fukuyama thinks that political accountability would prevail over authoritarianism.

Beyond geo-economics: weakening of China and changing nature of power

Limits of geo-economic approach

This article began with some definitions of geo-economics in order to analyze the phenomenon of state capitalism which is a good illustration of the concept. The limitations of geo-economics as a concept and as a strategy will now be examined followed by a broadening of the scope toward the future

The first point could be that geo-economics tends to focus too much on economic factors and neglects other factors of power. As said above, this tendency often reflects the perceptions of the time and can be very relevant for certain periods like the beginning of the 90’ or the current period in the long tail of the GFC and the rise of BRICs powers. However, on a longer term it can underestimates other factors, especially when they are changing in nature.

The second limitation is the focus on a logic of conflict and zero sum game thinking (“what I win is what you lose”) which implies beggar-thy-neighbor behaviors. These strategies and policies have existed and are of courses still existing but the economic development of the world since 15th century simply cannot be explained this way. Economists and strategists may focus more on one approach than the other, but is seems obvious that positive-sum outcomes also exists and are driving trade, investment and growth in a win-win manner.

Firms and particularly multinational corporations are the main actors of globalization and

are driven by individual rationality and profit seeking. Even if it is known that they are not completely rational, limited in their information and also sensitive to power issues and the interest of their different stakeholders, the main drivers for their trade and investment decisions remain wage differential, rising productivity, move of clients and competitors, consumer demand, access to technology and resources… All these factors have contributed to create a world-wide, extremely complex and entangled network of supply-chains that forms the backbones of modern production systems and cannot be easily removed or overpassed for strategic reasons. In this sense the “pull” market factors does not necessarily converge with “push” strategic interest.

What is meant here is only that there are several logics to be watched. Interdependence is a reality that mitigates strategic pressure and the strength of geo-economic approach or state capitalism. It does not mean that the mitigating forces will always win.

Europe and China weakening scenario: all eggs in one basket

Some major challenges for China were stressed above with the risk that it will not necessarily be able to sustain its economic growth through its state capitalism model, and thus take the place it could deserve as a great power.

Here a parallel could be drawn with Europe. At the beginning the European project was political: a union that would end the century long wars on the continent. However, the peoples of European countries not being ready for the fusion of their sovereignty and for a common defense, it was decided that economics would come first and that once interdependencies are deeply entrenched, political union would be more easily accepted with time. This model has worked well, with more or less success across time and severe delay, but is now coming to an end with the crisis hitting Europe. This is not any longer a problem of debt but of massive unemployment and therefore a political crisis undermining the institutions. Europe is now economically ill and politically divided more than ever. It is returning to its traditional situation of fragmentation and competing nation-states. This is why the likelihood of the European Black Swan is rising and, should the EU survive, it might end being only an empty shell like the League of Nations in other times.

The point related to the Chinese situation is the over-focus on economics. Now that Chi-

nese miracle has passed its peak, Europe and China have to rediscover that geopolitical questions and domestic politics cannot be ignored. As long as the economy is prosperous and keeps its promises, weaknesses can be set aside. When the tide goes out, the rocks begin to show. Japan also experienced a similar path throwing all its forces in (geo)-economics while leaving nearly unaddressed the other aspects of power. And Japan did not have the multiple challenges China has.

A better balanced power, the (relative) re-emergence of the US

One of the major questions in future thinking is the role of the US by 2030 and further. Everybody acknowledges that the weight of the US will decrease relatively to the rise of other powers and the formation of a multipolar world. The problem is to which extent?

Continuing with the scenario of a weakening China in a world where neither Japan nor the EU could counterbalance the US, then, this world could offer the picture of a much better position of the US than generally assumed because power is only relative.

Usually the shift to the East and Asia is taken for granted in discussions but several elements advocate for a greater resilience than anticipated of the West, at least in its US version:

- The shale gas and energy revolution in the US with its great impact on production cost.
- The US-Latin America-EU energy triangle concept that could marginalize other region (yet to be materialized).
- The rapid increase of wages in Asia relatively to productivity and the lack of skilled workforce (Asia no longer cheap nor available).
- Constraint on supply chains (distance, hidden costs, natural disaster and other risks) and rise of robotics reducing the needs for outsourcing in developing countries.

All these factors have already begun to yield effect with some industries reshoring in the US or simply shoring like some EU energy-intensive companies.

However, the most important aspect seems to be the balanced and the changing nature of power where it is difficult to deny to the US the preeminence compared to other “economics-mainly” powers.

A good illustration of this could be the image of a future balance of powers found in the publication “Global Trends 2030” prepared by the National Intelligence Council (figure V-5-1).

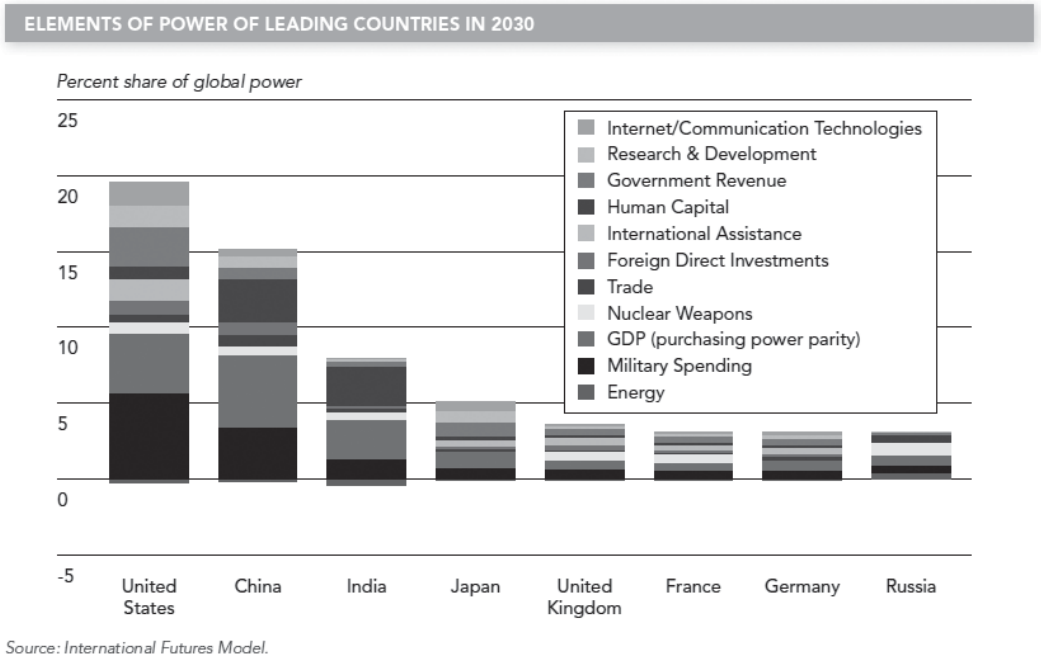

Figure V-5-1; Components of power in 2030 (National Intelligence Council 2012)

Of course, it is only anticipation while several scenarios are possible and one could argue that this is a US view, which nobody denies. Nevertheless, it illustrates well the specific advantages of the US, what makes it unique among the great power: the variety, this combination of hard and soft power that lacks to other powers. Even if the absolute figures of this representation are only assumptions with different outcomes possible, it is unlikely that China catch up the US in military power. As for the soft power, what has China has to offer particularly if the economy weakens, compared to the power of the US to attract talents and ensure leadership in science and technology? The traditional fundamentals of power

(GDP, population, size…) are no longer sufficient in a world of multifaceted and amorphous networks.

Conclusion

This article is an attempt of future thinking where a scenario has been chosen among others, highlighting the challenge to overcome for China, the symbol of geo-economic thinking and strategy, and the possibility of its weakening. This scenario seems to have reasonable probabilities to occur but one should acknowledge that it is only a scenario.

If the Chinese economy really weakens to a political crisis level, the country could become unpredictable and aggressive. There is not sufficient room here to develop other scenarios but the purpose was to show the interest and limits of geo-economics and the necessity of diversifying the sources of power, particularly in the 21st century.

Whatever the future, what can be said for sure at this turning point of history, is that politics is back in all parts of the world.

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VI Technological challenges

China understands that science and technology is a key competence for future economic growth. In this chapter state-of-arts of science and technology and science and technology policy in China are overviewed. Chinese challenge to create innovation for future is also investigated. The chapter describes 6 features for this purpose.

From the point of the view of geopolitical changes in science and technology NIS (National Innovation System) is important. Especially in China science and technology policy is dominant among NIS toward future. China's NIS appears to be shifting from the "statist" model to the "laissez-faire" model led by companies, but in reality, NIS is still dependent on the government's science and technology policies. Moreover, China is a totalitarian, state capitalist country, and there is danger that techno-nationalism may easily link with other types of nationalism to sustain the government's control. The fact that China aspires to become a leader in innovations that are backed by new science and technology, means that China tacitly approving the dissemination of new innovations. While it is possible to manage innovations within NIS at the time of their creation, it is impossible to manage their consequences. Furthermore, innovations are not necessarily created within the country. Associated with the geopolitics of science and technology, we must not only pay special attention to the innovation system of each country, as represented by NIS, but also carefully monitor the social and political impact of new innovations. In response to the advent of the Internet, which was developed in the U.S., China maintains the status quo and filter dissident voices at the brink of its borders. Although it has had to pay the price, China has succumbed to the Internet. If China were to become a leader in science and technology and a giant in innovations backed by the fruits of such accomplishments, it must take sound steps to accept the terms of technological globalization and identify its own characteristics in science and technology—in other words, devise a method to localize technology.

Among the influstructures which are indispensable for future growth electric power system is investigated. Chinese power grid development is not enough and is poor comparing to the economic growth. China is challenging influstructure development in three fields such as strong grid, smart grid, and super grid. In their development of power grid they are aim-

ing strong grid at first to achieve power transmission from generation ares to comsumption ares. By applying UHV AC transmission technologies, high voltage DC system and system control technologies which are maily developped in other countries. They applied these technology in their wide country. Smart grid is also under development with other countries to realize future frexible grid. China is conducting many smart grid pilot projects in distributed ares. They are developping smart meter, telecommunication technologies for domestin and global application in future. China can realize these grid concepts in near future. China is also aiming export their electric power to Europe especially Germany where no nuclear power is developped. They plans to develop super grid tu Europe with UHV technologies. Their challenge is at first domestic but global in future.

Chinese government is keen to develop not only nuclear energy and big size natural gas thermal generation but also renewable energy, such as wind, solar, bio-fuel, and small hydro for their future energy development. In terms of renewable energy issues, there are two perspectives: application as energy supply market to Chinese society and manufacturing business of Chinese industry. The main possibility among several renewables in China is solar or photovoltaic (PV) energy. These years big market of solar energy was Europe including Germany and Belgium. But the price of electricity was appreciated by renewable energy application and then Europ is now reluctant to develop much renewables. Now Japan and China are the biggest market for them. In terms of solar cell business Germany manufacturers including Q Cells enjoyed the top share. But because of the market shrink their business is getting worse. Japanese manufactures including Sharp are not competitive in solar cell business. And now Chinese companies such as Yingli Green become top blue chips. However they have several issues such as trade dispute, price and cost, high efficiency product needs… Chinese government supports their industry so far. For these years China will keep their position in PV industry.

As for the fourth area the future of China manufacturing is investigated. The estimate of the competitive strength in manufacturing of the 2030s in China is difficult. Therefore the following items based on the plant survey and the interviews to the president of China manufacturing are discussed:

1. The foreign manufacturers and the china manufacturers.

2. The national strength enhancement and the China manufacturing industry.
3. The real ability as the world factory
4. Would the china manufacturing industry be able to dominate the world?

As a result, China will support the world economy to exert great influence in the world politics. Therefore, it's going to be China's leading manufacturing industry in the world. There are, however, there are two issues in China's manufacturing industry. The first issue is the impact of the one-child policy, which began 35 years ago. Young people are no working in the manufacturing industry. The second issue is the multi-ethnic country that has lived for thousands of years. When China's economic growth makes progress, these two issues will be the Achilles heel in the future. China will perform one of two choices. Two choices are the over-concentration management and the distributed management. The good scenario, China becomes the nation such as the United States, there will be possible to be in manufacturing industry to lead the world. On the other hand, such as when the Soviet Union became Russia, the pessimistic scenario would secession. At that time, manufacturing is subject to considerable damage. That direction is going to be speculatively in within the next five years.

Next feature is pharmaceutical industry in China. The Chinese government currently invests heavily to promote health care reform, and one third of the investment is said to be spent on improvement of its medical infrastructure. And the council proposes to speed up the establishment of pharmaceutical and public health systems. The plan aims to raise industrial concentration by improving national policies and promoting integration and reorganization within the pharmaceutical industry, and to hone competitiveness in the global market by supporting companies'R & D capabilities. The sales of these companies, however, range from 1.6 to 3.2 billion dollars. This is far from the global top-tier benchmark of 10 billion dollars in sales. So far, the management strategies of major companies have emphasized the domestic market with a focus on cooperation with domestic medical institutions. These strategies include scale merit-derived mass production for the domestic market, and product differentiation through a form of exclusivity given to research results obtained at universities and government institutions. Chinese companies will aim at expanding shares

in the growing domestic market. Chinese firms could gain a toehold in the global market by doing so. It is difficult to predict what the Chinese pharmaceutical industry will look like in Year 2030. Assuming the current economic growth will continue at the current pace, Chinese pharmaceutical companies may make it into the world's top pharmaceutical companies. For that, China not only needs to achieve its economic growth but also needs to establish a new business model in the increasingly severe pharmaceutical industry.

The 6th feature of science and technology challenge is influence of Chinese Information and Communications Technology (ICT) on the world. ICT in China is currently a prominent representative of high-tech industries, and plays a very important role in the promotion of social employment and economic growth, adjusting industrial structure and changing the mode of development and maintenance of national security. A broad overview of the influence on the world is analysed with detailed drill-down of ICT market, ICT Industry, and ICT Technology in China. The insights are broken down into the following four general categories: Government policy and promotion, patents and Chinese standardization, cyber-attacks and state intervention, and Chinese global ICT companies. Chinese government is promoting the integration of "Informatization" and "Industrialization" in order to open a path of new industrialization with Chinese characteristics. The integration of the two is a process whereby information equipment, products and technology are widely applied in industrial R & D, production, circulation and management in order to promote the development of digital design, intelligent manufacture, production automation, marketing network and management information. The next challenge in the economic battlefield is the globalization of Chinese enterprises. Many Chinese companies have gone global through mergers and acquisitions, establishing capabilities beyond cost leadership, and other measures. There is no doubt that the next generation of ICT standards, in accordance with evolving standards, will bring new birth of Chinese ICT giant companies. Chinese ICT will certainly have an increasingly significant influence on both economic and social development both within China and worldwide.

1 Science and Technology in China: A Study from a Geopolitical Perspective

Hirokazu ISHIMATSU

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Introduction

Science and technology impact the power balance among states, or geopolitics. Here, this phenomenon is referred to as the "geopolitics of science and technology". This paper first surveys the international changes in today's geopolitics of science and technology. Next, the national innovation systems possessed by each country are positioned at the core in an analysis of the geopolitics of science and technology. Finally, the case of China is taken up from the standpoint of policies on science and technology, which play an important role in national innovation systems.

The Geopolitics of Science and Technology

Geopolitics is an academic discipline that seeks to understand the sustainable development of a country on the basis of its geographical relationship with other countries. The geopolitical spaces studied in geopolitics are areas in which disputes among states might occur. Over the years, geopolitics has expanded its focus from land to sea, air, and outer space. One driving force behind this expansion is clearly the development of science and technology[91]. Moreover, the rapid development of information and telecommunications

[91] In the present manuscript, "science" refers to the discovery, systematization, and explanation of objective rules and principles among matters, "technology" refers to means for the actual application of theories, and "science and technology" refers to the overall entity of science and technology.

technology since the 1990s, as represented by the Internet, has introduced cyberspace as a new subject of study in the field. At the same time, the advent of the Internet has transformed the essential meaning of national boundaries, which were heretofore understood to be drawn based on the geological concepts of distance and time. Consequently, space in geopolitics has dramatically evolved from physical to virtual.

Military and economic power also shapes today's geopolitics. At the same time, current initiatives in science and technology offer a basis for understanding geopolitics a decade or two into the future. The distribution of knowledge of science and technology provides extremely important intelligence in thinking about the future of geopolitics. Therefore, the geopolitics of science and technology are important in offering a fundamental perspective that impacts the future of existing geopolitical spaces, including land, sea, air, outer space, and cyberspace.

Previous studies in geopolitics have focused on science and technology that has a direct connection with military or "hard" power, such as rocket and nuclear engineering. This has limited the discussion of comprehensive knowledge of science and technology—which integrates perspectives from other fields—as merely "soft" power (Nye 2004). Indeed, science and technology constitute a part of "soft" power, and they can be discussed within such a framework. However, as stated above, their significance greatly differs from other kinds of "soft" power in terms of their ability to catalyze geopolitical changes. As pointed out by Ferguson and Mansbah, it is appropriate to treat science and technology as independent factors that influence international politics (Ferguson & Mansbach 1999).

Geopolitical Changes in Science and Technology

As discussed thus far, science and technology are geopolitical. Heretofore, developed countries, such as the U.S., European countries, and Japan, have acted as leaders in science and technology. Today, these two fields are undergoing major geopolitical changes.

The first change is the multi-polarization of the locations at which science and technology knowledge is produced. Until the 1980s, the triad of the U.S., Europe, and Japan was the primary producer of scientific and technological knowledge. Subsequently, countries like

Taiwan and Korea industrialized in the 1990s, and by the 2000s, Asian countries such as China and India began to focus on the education, research, and development of science and technology as they too made economic progress. As a result, the producers of science and technology knowledge have become multi-polarized. China, the main subject of this paper, has come to rank among the top three countries in the world when considering just the quantity of knowledge it produces; China's share of the volume of academic papers in science and technology in 2010 (the percentage of academic papers against the total number published worldwide) ranked second, following the U.S. China also ranked third in the world in the number of patent applications, following Japan and the U.S. (White Paper on Science and Technology 2012). Dr. Rita Colwell, the former director of the National Science Foundation (NSF) in the U.S., described this geopolitical change in science and technology as a "silent Sputnik" (Colwell 2008). Sputnik, an artificial satellite that was successfully launched by the former Soviet Union in 1957, demonstrated that the Soviet Union had the capacity to launch ballistic missiles and that it occupied a superior geopolitical position encompassing outer space. The launch incited "Sputnik shock" throughout the western world. The U.S. has acknowledged that a geopolitical change that could match the impact of this "Sputnik shock" is silently progressing in the field of scientific and technological knowledge ("silent Sputnik"), and has taken measures accordingly.

The second change is "brain circulation," referring to the phenomenon in which people from countries that are still developing in terms of academic research study abroad at the top universities in the U.S. and then return to their home countries. This "brain circulation" is vigorous, especially between the U.S. and China. In fact, of the approximately 50,000 students who earned a doctorate in the U.S. in 2007, the two largest groups were from Chinese universities—571 from Tsinghua University and 507 from Peking University. In response, China has implemented the hangui policy, which encourages Chinese researchers outside the country to return home. Even if they do not return, knowledge transfers take place across the borders through networks with the home country (Saxenian 2007).

The third change is the perspective from which phenomena such as the aforementioned multi-polarization of the production of scientific and technological knowledge and "brain circulation" are understood in the context of relationships among states. This involves the simultaneous globalization and localization of technology. Globalization of technology is a

phenomenon in which technology spreads by transcending national borders and, as a result, the use of technology, as well as research and development, become integrated on a global scale. At the same time, localization of technology refers to the concentration of research and development activities of a particular technology in a specific region. These two phenomena are progressing simultaneously around the world. For example, globalization of technology includes the international spread of the Internet and mobile phones. Meanwhile, localization of technology is ongoing in cases such as the concentration of world-class information and telecommunications companies in Silicon Valley in the U.S. and biotechnological companies near San Francisco and Boston. According to Yamada, although economic activities continue to globalize, technology will not cease to localize due to three factors: (1) geographical proximity is important in the tacit transfer of scientific and technological knowledge; (2) synergy effects (Porter's cluster theory) are created through the concentration of companies in a particular region (Porter 1990); and (3) at the state level, each country has its own National Innovation System (hereafter "NIS") (Yamada 2001). NIS is "the set of institutions that (jointly and individually) contribute to the development and diffusion of new technologies" (Sharif 2006) and encompasses various systems, both official and unofficial, including government policies on science and technology, industry, and trade, relationships among companies, relationships among industry, academia, and the government, as well as finances, taxes, intellectual property rights, and education. This paper will focus on the third factor, or NIS.

Techno-nationalism and Techno-globalism

The above section discussed geopolitical changes in science and technology. Among the transformations taking place, in the field of international relations, previous studies used the polarizing views of techno-nationalism and techno-globalism in understanding the simultaneous development of globalization and localization of technology (Ostry & Nelson 1995).

In general, scientific and technological policies of techno-nationalism refer to a body of policies aiming to protect and foster technologies that are implemented preferentially in strategic fields selected by the government in order to secure a superior position for the country in science and technology. The case of Japan in the 1960s and 1970s is often cited as an

example of successful techno-nationalism.

On the other hand, techno-globalism not only acknowledges the development of technology beyond national borders and the exchange, integration, and interdependence of actors in research and development as irreversible, but also values these as a process that benefits all states, companies, and citizens. As such, this approach upholds their further development.

Since the 1990s, the world economy has rapidly globalized. However, not all countries' scientific and technological policies have turned to techno-globalism. In fact, the science and technology policies actually implemented by a country usually reflect various components of techno-nationalism and techno-globalism rather than a dichotomy between the two approaches. A country must demonstrate unrivaled uniqueness to be invited into the global network of science and technology; in other words, the country must "glocalize."

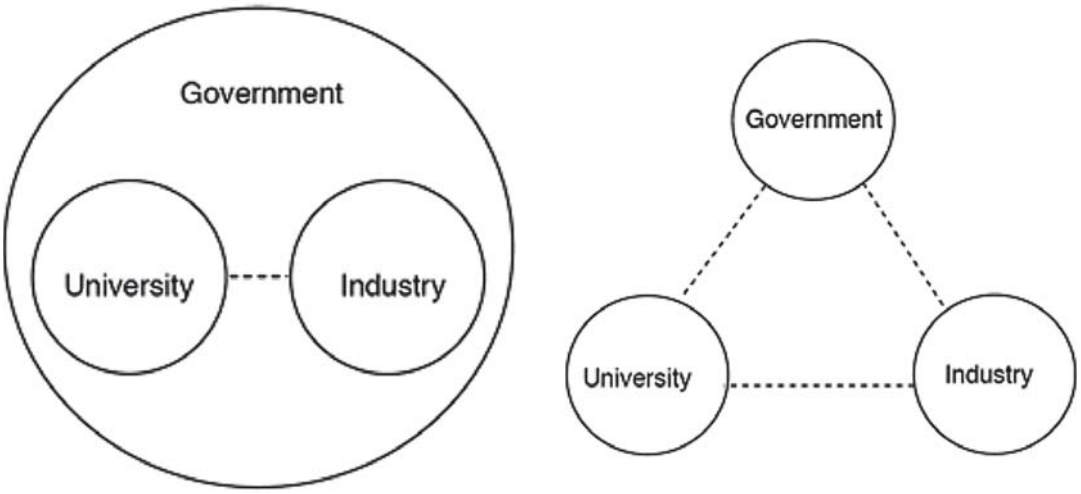
Analysis of a country's NIS will aid in understanding how these two approaches are integrated in the country's science and technology policies. As discussed earlier, NIS is a factor in technological localization when a country seeks to demonstrate the uniqueness of its technology. Moreover, Ostry and Nelson (1995) have pointed out that "national innovation still differ in many aspects, reflecting differences in history, the relative importance of national security and other objectives in guiding a nation's policy, and other variables" In this regard, too, we can judge that an analysis of NIS is geopolitically effective. In the next section, we will discuss China's NIS, the main subject of this paper, and describe the characteristics of Chinese policies on science and technology.

Characteristics of China's NIS

One way to understand NIS is to use the triple helix model (Etzkowitz 2008), which focuses on actors that play a main role in NIS. Three main actors comprise NIS in this model: universities, industry, and the government.

This triple helix model is composed of two opposite models that describe the relationship among the three actors. One is the "statist" model, in which the government controls the

universities and industry. The other is the free “laissez-faire” model, in which industry, universities, and the government are independent of one another, and collaboration among them is weak. Figure VI-1-1 & VI-1-2 shows these two models.



Figures VI-1-1 & 2: S & T in China : The statist model & The laissez-faire model

The Republic of China was established in 1949 under the one-party rule of the Communist Party; at that time, just like its fellow communist country Soviet Union, China’s NIS fit the “statist” model. Subsequently, along with economic development, China’s NIS underwent transformations in stages. As a result, universities and industry, led by private companies, have come to play a major role in innovation in lieu of the government (Xiwei & Xiangdong 2007).

However, this view must be questioned, as universities and industry remain under the control of the government. In the Chinese education system, private universities were accredited from 2003. To this day, the majority of universities are national and public and are under the control of the government. Moreover, it has been frequently pointed out that Chinese companies that lead research and development activities in the industry, such as Huawei and Lenovo, have a strong connection with the government, evidenced by the relationships between company executives and top-level Communist Party officials. Huawei,

for example, has recently experienced trouble with the U.S. in the wake of allegations that its telecommunications devices sold overseas are sending various types of information to the Chinese government.

China is a totalitarian state led by the Communist Party. Moreover, its economy is based on state capitalism, meaning the state intervenes in and manages capitalism. As pointed out by Bremmer, the surest path for state capitalist governments toward politically sustainable economic development is to continue to micromanage entire sectors of their economies to promote national interests and to protect their domestic political standing (Bremmer 2010). Therefore, the government plays an extremely important role in NIS under state capitalism. Sun and Liu have stated that China's NIS is characterized by the fact that "[it serves as] an innovation model and tool that was established and led by the government" (Sun & Liu 2010). Therefore, China's NIS appears to be shifting to the "laissez-faire" model on the surface, but in reality it continues to embody the "statist" model. Moreover, as a result, the degree of techno-nationalism in China is stronger than that in advanced "laissez-faire" countries. Hereafter, we discuss the policies of science and technology, which the government unilaterally controls as an actor in NIS.

The above section discussed geopolitical changes in science and technology. Among the transformations taking place, in the field of international relations, previous studies used the polarizing views of techno-nationalism and techno-globalism in understanding the simultaneous development of globalization and localization of technology (Ostry & Nelson 1995).

China's Policies on Science and Technology Today

The government's policies on science and technology are important determinants of the future of China's science and technology, as the government continues to play a leading role in its NIS.

Today, China is in the middle of implementing a fifteen-year medium- to long-term plan as its policy on science and technology, beginning in 2006. The plan was announced by then-Premier Wen Jiabao at the Fourth National Conference on Science and Technology, which

began on January 9, 2006. The plan calls for the fulfillment of the following goals by 2020:

- Development of technologies for energy and water resources, and for environmental protection.
- Acquisition of core information and production technologies.
- Catching up with the most cutting-edge technology in the field of biotechnology.
- Acceleration of the development of space technology, aeronautical technology, and marine technology.
- Reinforcement of both fundamental and strategic research.

In the field of science and technology, the plan positions the following eleven areas as core fields:

- Energy and resources.
- IT and services.
- Water and mineral resources.
- Healthcare.
- Environment.
- Urban development.
- Farming.
- Public safety.
- Production technology.
- National security.
- Transport.

Among these goals and core fields, particularly characteristic in terms of geopolitics are the inclusion of items that could directly trigger resource and military nationalism—resource and military technologies, respectively. Because China's political system is ruled by a single party, there is inherent danger that techno-nationalism could easily link with other types of nationalism. For example, since 2005, China has imposed regulations on the export of rare

earth on the grounds of resource protection. However, time and again, it has been pointed out that this reflects resource nationalism. Moreover, if Huawei were indeed intercepting information, as discussed earlier, it would constitute a case in which techno-nationalism has linked with military nationalism in cyberspace. In these ways, we cannot forget the possibility that the Chinese Communist Party could manipulate techno-nationalism, led by policies on science and technology, and link it with other types of nationalism to maintain the regime. We must take proactive steps to increase participation in international research collaborations to prevent the easy formation of such links (Serger & Breidne 2007), and the international society must carefully monitor such developments.

The Future of China's Science and Technology

As discussed above, China is taking big strides forward to become a leading country in science and technology as a national policy. Most likely, China will continue to post a higher volume of activities in the development of science and technology, as gauged in the number of academic papers and patent applications. However, we must question the quality of this output, as revealed by the fact that China has yet to receive a Nobel Prize in the sciences at the time of this writing.

This is because China is a totalitarian state and its society tends to show strong signs of authoritarianism. Major scientific discoveries are made by challenging and shifting existing paradigms (Kuhn 1962). Therefore, it is necessary to challenge existing authority. Regarding this matter, the British magazine The Economist has pointed out the qualitative drawback of the system in the book "Megachange: The World in 2050": "China's authoritarian regime will stunt the development of creative research, which requires thinking revolutionary enough to undermine the authority inside out" (The Economist 2013).

Moreover, the future of China's science and technology can be speculated from civilization theory. Historian Niall Ferguson states that western civilization succeeded in dominating the world due to the interplay of the following six elements: (1) competition, (2) science, (3) property, (4) medicine, (5) consumer society, and (6) work ethic (Ferguson 2011). Most likely, the only element that has taken root in China is the fifth, or consumer society. As for the second element, science, China has been making efforts for its development, as already

discussed. In terms of the first element, competition, there remain transparency issues by which businesses can benefit from their connections with the government; as for the third, property, awareness is still low, as reflected in copyright issues. Moreover, medicine, the fourth element, has yet to become fully available to the general public in local regions. Finally, there is still room for development for work ethic, the sixth element. Unless policies are promoted to mutually develop these six elements, China cannot become a leader in science and technology in the true sense of the word, meaning excellent in quality and quantity.

Conclusions

This paper attempted to study geopolitical changes in science and technology by focusing on NIS as a unit of a country. The study is valid in making speculations about the future of science and technology. In conclusion, China's NIS appears to be shifting from the "statist" model to the "laissez-faire" model led by companies, but in reality, the government's influence remains strong, and NIS is still dependent on the government's science and technology policies. Moreover, China is a totalitarian, state capitalist country, and there is danger that techno-nationalism may easily link with other types of nationalism to sustain the government's control.

There are issues that must be considered in using the analytical unit of NIS itself. NIS is an approach to foster innovation within an institutional framework. In this context, NIS is the cause and innovation is the result. However, NIS, which involves policymaking in science and technology, cannot remain static. Once an innovation created somewhere is spread on a worldwide scale, it will impact NIS itself, and also the government. In this context, innovation is the cause and NIS and changes in the state are the result. Therefore, NIS and innovation are in a dynamic relationship in which they impact one another. In thinking about the geopolitics of science and technology, we must of course analyze NIS. However, in addition, we must identify the types of innovation that are projected to become widespread in the future and analyze how they would impact NIS and the state.

The fact that China aspires to become a leader in science and technology, and a giant in innovations that are backed by new science and technology, means that China is tacitly

approving the diffusion of new innovations. It is impossible to project in advance the social and political implications of the diffusion of innovations. Therefore, while it is possible to manage innovations within NIS at the time of their creation, it is impossible to manage their consequences once they are diffused. Furthermore, innovations are not necessarily created within the country in which they are ultimately diffused.

In considering the geopolitics of science and technology, we must not only pay special attention to the innovation system of each country, as represented by NIS, but also carefully monitor the social and political impact of new innovations. Both tasks are required in studying the geopolitics over the medium- and long-term.

In response to the advent of the Internet, which was developed in the U.S., China has introduced the Great Firewall to maintain the status quo and filter dissident voices at the brink of its borders. Nevertheless, despite the inconveniences that it poses to the Chinese government, China has succumbed to the Internet. No country can escape the wave of new technologies that are sweeping throughout the entire world.

In order for China to become a leader in science and technology and a giant in innovations, it must take sound steps to accept the terms of technological globalization and identify its own characteristics in science and technology—in other words, devise a method to localize technology.

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2 Strong, Smart, and Super Grids

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The Chinese power grid is still not sufficient compared to the rapid growth of electric energy suppy. In their development of the power grid they are aiming for a strong grid at first and a smart grid in future. At the same time they are keen to develop international transmission highway (Liu, Zhenya 2012) as a super grid.

Strong Grid

A power grid combines the functions of electricity transmission, trade, and optimized allocation all in itself, therefore plays an increasing role in energy safety, efficiency and energy conservation… In recent years, State Grid Corporation of China (SGCC) has quickened its step in building an open, synergized, and highly efficient technical innovation system, and made overall breakthroughs in key energy and electricity technologies with focus in UHV (Ultra-High Voltage transmission, 1000kV) technology.

The first overall breakthrough for strong grid is in UHV techologies and application. China has built four test bases (namely UHV AC(alternative current), DC(direct current), High Altitude, Engineering Mechanics) and two R & D centers (namely Large Grid Simulation,

DC System Design). Compliance with high standards and large-grid test and research system for UHV have been formulated. China has mastered the core technologies of UHV AC and DC transmission as well as whole set of equipment manufacturing, with leading results achieved globally. Before 2012, three UHV DC projects, including Sichuan-Jiangsu, Sichuan-Zhejiang and Xinjiang-Henan lines, as well as Anhui-Shanghai UHV AC lines were under rapid construction. By 2015, China will complete the UHV AC backbone network that connects China's large generation areas and main load centers. China will complete 15 trans-regional DC transmission projects with 260 GW capacity per year. With these, they can transmit 1200 TWh power per year and accommodate 145 GW more power into the power grid.

Smart Grids

The second breakthrough is in smart grid construction. Smart grid is a sophistically integrated grid within power network and information network. China has completed the wind/ solar/ power storage and transmission pilot project complex in Hebei province; China has advanced technology for combined control of new energy. Before 2012, the wind and solar installed capacity had exceeded 50,000 MW and 2,500 MW respectively. In Bohai Rim and Yangtze River Delta, China built an intercity service network for charging and battery swap, including 243 stations, 13,000 charging poles, which can serve 80,000 cars. China has installed 92.6 million smart meters, which can collect data from 10 million customers, and it is expected to install 20,000 ~ 30,000 more every year ahead. In cities like Beijing, Tianjin and Shanghai, many smart grid pilot projects are built, including smart substations, storage systems, network convergenceof power and information, smart distribution, smart building, and smart home appliances. China has also built a smart power dispatch system with grid panoramic monitoring, and dynamic analysis, which are applied to 220kV and above grids to realize integrated dispatch.

Smart Grid Technologies

Smart Meters

The power grid in China is undergoing a fundamental upgrade, focusing on the development of a smart grid. A primary element of this transformation is the deployment of inter-

active technologies, including smart meters for residences and businesses. The installed base of smart meters in China will reach 377 million by 2020, growing from 92.6 million in 2012. The penetration rate for smart meters will reach 74 percent in 2020.

The State Grid Corporation of China (SGCC), the government-owned electric utility that leads the market by a large margin, is the main force behind efforts to construct the country's smart grid. Moreover, building a smart grid is a key goal for many provinces and cities under the country's recent Five-Year Plan, which continues through 2015.

The greatest smart grid growth in China will occur in transmission system upgrades, with transmission investment reaching a cumulative total of more than $72 billion by 2020. The Chinese government and SGCC have emphasized their intention to invest in high-voltage DC and transmission upgrades in order to solve the country's power imbalance issues. China aims to provide electricity to urban and rural areas by delivering generated power sources from developable hydropower located in the mountainous southwestern region, as well as wind and solar resources concentrated in the northwest.

In China there started many industrial restructuring in smart meters business. One of the many collaborations among companies is Atmel® Corporation, a leader in microcontroller and touch solutions, and Wasion Group, a leading supplier of advanced energy metering products and solutions. They announced the two companies have signed a memorandum of understanding (MoU) to develop smart electricity meters and data concentrators utilizing highly integrated power line communication (PLC) solutions developed by Atmel.

According to market research firm Pike Research (Pike Research in 2013), 17.9 million smart meters have been deployed since Q2 2012 in China as the largest driver. The joint development between Atmel and Wasion helps drive adoption of standards-compliant smart metering solutions in worldwide markets based on field-proven and cost-effective narrowband PLC technology. Atmel and Wasion Group collaborate on product developments based on the Atmel ATPL210, ATPL220 and SAM4SP32A, the world's first single-chip compliant system-on-chip solution based on an ARM® Cortex™-M4 processor-based microcontroller (MCU) core with 2MB of Flash memory, supported by Atmel Studio 6 integrated development platform (IDP).

Energy storage

A partnership between the Snohomish PUD in Washington State and 1 Energy Systems developed and deployed an approach to energy storage aimed at helping electric utilities increase their use of renewable energy and improve overall reliability. Under the partnership, 1 Energy Systems will provide a one-megawatt battery energy storage system, built on a Modular Energy Storage Architecture (MESA). The system, based on commercially-available, advanced technology batteries, will be housed in a standard shipping container, which is installed at a PUD substation. Alstom Grid and faculty at the University of Washington are also collaborating on the project.

The project brings major equipment and software companies together to establish the appropriate industry standards and interfaces to make storage more economically and operationally viable. This approach is much different than other energy storage projects in the past and should result in the expanded application of plug-n-play type energy storage systems to help solve the expanding needs of today's electric grid that depends more and more on intermittent resources such as wind and solar (Memoori 2011).

PON technology in China

China's big utility is testing passive optical networking technology with a nod to capabilities that extend beyond grid reliability. It's one of five intriguing smart grid projects in China.

An interesting piece in the MIT Technology Review highlights a smart grid pilot that State Grid Corporation of China is rolling out to test passive optical networking (PON) technology, described as high-bandwidth data wiring that can be run inside electric power cables without interference. The thinking is that the technology can not only make the electric grid more efficient and reliable, but could also be a conduit for delivering high-speed Internet, TV and telephony. As the article points out, there's difference of opinion on whether it's something U.S. utilities would or should consider.

SCADA System

China's smart grid development drives massive revenue growth in the power Transmission

and Distribution (T & D) Supervisory Control and Data Acquisition (SCADA) systems market in the coming years, according to research and consulting firm GlobalData (GlobalData July 2013).

SCADA industrial control systems gather data from sensors and instruments located at remote sites and transmit and display the data at a central site for control or monitoring. The systems also collect and analyze data in real time, which is integral to smart grid networks.

GlobalData predicts the Chinese SCADA market value to soar from $3 billion in 2012 to $20 billion by 2020, at a compound annual growth rate (CAGR) of 27 percent, resulting in Asia increasing its share of the global market from 45 percent in 2012 to 61 percent by the end of the decade.

China's aim to become the world leader in smart grid technology will prove the key driving force in SCADA revenue growth, with the country's T & D infrastructure investments unmatched globally, according to GlobalData.

However, as the reliance upon smart grid systems grows, the threat of cyber-attacks becomes ever more significant. Developing effective security against threats such as the Stuxnet and Night Dragon attacks is the greatest challenge facing the global SCADA industry today, according to the firm, as the use of malware and viruses is becoming increasingly common, raising the future risk of attacks on SCADA control centers.

China's drive to develop its smart grid expansion will result in China increasing its share of the global market from 45 per cent in 2012 to 61 per cent by the end of the decade, say analysts at consulting firm GlobalData.smart grid

Smart grid investment to double by 2018

China's need to address its imbalanced energy supply is making it the world leader in smart grid development. Coal remains China's primary source of power generation and 76 per cent of the country's coal resources are located in Shanxi, Inner Mongolia, Shaanxi, Xinjiang, and other northern and western regions. However, the country's energy consumption needs are mainly concentrated in the more industrialized economies in the eastern

and southern regions. Navigant Research in the US estimates that smart grid development in China will generate $127bn in cumulative revenue from 2013 to 2020.

The Chinese government's current energy strategy calls for "strengthening the construction of the smart grid" and this is resulting in considerable investment and development in the country's power infrastructure. "The area of strongest smart grid growth in China will be transmission upgrades, anticipated to reach more than $72 billion in revenue by 2020 on a cumulative basis," said Bob Lockhart, senior research analyst at Navigant.

Global smart grid investment grew 7% in 2012 to US$13.9 billion according to figures from Bloomberg New Energy Finance. In terms of geographic spread, the sector mirrors photovoltaics with the U.S. clinging to top spot but due to be replaced by China in 2013, in large part thanks to a willingness to invest in smart grid technology by the Chinese government.

Some $4.3bn was invested in smart grid technology in the U.S. (down from $5.1bn in 2011). On the otherhand a big smart metering procurement program from the Chinese national State Grid company was the main driver behind $3.2bn of investment in the People's Republic, up from $2.8bn in 2011.

Investments in smart-grid technologies that boost efficiency and curb energy waste rose 7 percent last year to $13.9 billion, driven by spending in China, according to Bloomberg New Energy Finance. China raised investments by 14 percent to $3.2 billion, largely because of a smart-metering program, according to the London-based research company. It forecasts Chinese spending on smart grids will outstrip the U.S. in 2013, where it fell 16 percent to $4.3 billion.

Smart Communities Projects

China is enhancing the smart grid concept to smart cities and communities. There exist many smart grid and smart communities projects going in 2013 in China such as:

- Tanghai, Tangshan, Hebei is one of the biggest urban development under the concept of smart city.
- Tianjin.

- Huainan, Anhui.
- Chongqing.
- Changsha, Hunan
- …

International Transmission Highway

From a global perspective in some countries and regions, the energy resources and demands are unevenly distributed and far away from each other, thus requiring large-scale and remote transmission of electricity. Based on the above recognition and the practice in China, building an intercontinental transmission highway and electricity trade market with advanced UHV AC and DC transmission technology is a strategic move to push forward the optimized allocation of global energy resources and sustainable energy development as well as energy security.

As for the perspective of energy demand, Europe is among the world's largest energy consumers. Its energy consumption in 2011 takes up 23% of the world's total, second only to Asia Pacific (39%). In recent years, Europe has been devoted to green and low-carbon development. Europe is taking proactive measures to optimize energy structure with a bias to renewable energies. Its target is to bring renewable resources in 2020 to 20% of total energy consumption mix. Meanwhile, under the impact of Fukushima nuclear disaster, Germany, Switzerland and Italy have renounced their own nuclear programs. Germany even decided to close all nuclear reactors within 10 years. Given these situations, Europe faces new challenges of energy supply. There will be huge energy shortages waiting for new energy replacement. It is estimated that Europe's dependency on imported primary resources will reach 65% by 2020, and up to 70% by 2030. UHV transmission, as a safe, economic, efficient and mature transmission technology, will make optimization of global resources possible. For ±800 kV DC projects, transmission power is 8000 MW, and economic transmission distance could reach 2500 km. For ±1100 kV DC projects, transmission power is 11,000 MW, and economic transmission distance could reach 5000 km.

Looking around regions nearby Europe, China's Xinjiang autonomous region, Russia's Siberia, CIS countries and Mongolia are very rich in wind, solar and hydro power, with big

potential for development, yet relatively low local demands and costs. These regions are generally 4000~8000km away from European countries. They are well suited to become the future large power source bases, with clear advantages in applying long-distance power delivery all the way to the load center in Europe by UHV DC transmission technology. Given the transmission distance and factors such as the transmission loss and capacity, direct transmission and relayed transmission are considered as two possible transmission patterns, and there are three options of transmission plan when it comes to realizing this intercontinental highway.

The first option is to bundle up new energy and local gas power in Xinjiang of China. Then this huge amount of electricity will be transmitted 5600km to Germany by ±1100 kV UHV DC lines, with a transmission capacity of 11,000 MW (or even 22,000MW with double-circuits on the same tower).

Option two is to bundle up gas power in Kazakhstan with new energy in Xinjiang, and deliver this power 4700km to Germany by ±1100 kV UHV DC lines, with a transmission capacity of 11,000 MW (or even 22,000MW with double-circuits on the same tower).

The third option is to bundle the hydro, wind and gas power in Siberia, then deliver it by ±1100kV UHV DC transmission lines to west Russia, and from there on, relay this power to Germany by ±800kV UHV DC lines. The transmission distance is about 6400 km, and transmission capacity is 11,000 MW (or even 22,000MW with double-circuits on the same tower).

Compared with the cost of directly connecting offshore wind power of North Sea to Germany, all the above mentioned three options have competitive advantages.

In the future as the European super grid progress, China will deliver power to this super grid through UHV grid, and then though this super grid to every nation in Europe. For this intercontinental transmission line, the annual transmitted power total could reach 66 TWh, a huge relief and compensation for the electricity gap incurred by the denuclearization of Europe, and a push for the European target of low carbon development. In the first phase, China can deliver renewable power bundled up with conventional power. Then, with future

progress and breakthroughs in energy efficiency, new materials, and energy storage technology, China could anticipate that renewable power can be transmitted from central Asia, Middle East and North Africa to Europe on a massive scale. Meanwhile, UHV technology can also be applied in the America, Europe and Africa intra- or inter-continentally for resource optimization.

Building intercontinental transmission highways is feasible in technology and good for safety and efficiency. In recent years, UHV transmission technologies have undergone rapid development and are now turning mature. Our well-operated UHV AC and UHV DC projects have withstood harsh tests of frost, lighting, rainstorm and high wind since 2009 and 2010, which is a strong proof for the reliability and safety of the UHV technology. China has built a world-class large power grid simulation analysis system and launched simulation calculations for large hydro, thermal, wind, nuclear, and UHV transmission, including 11500 nodal points, 2260 generators and 35,900 lines. China has mastered advanced large power grid control and system protection technology. Along with the application of smart grid control technology and improvement of equipment reliability and management level in the future, UHV large grids will be safer and more reliable. The future power grid upgrade and structure optimization in Europe will enhance the accommodation capacity and security level of the grids so as to satisfy the needs of multi-infeed DC system with large capacity.

Building intercontinental transmission highway has significant economic, social and environmental advantages. First, it can effectively boost economic growth. Nowadays, the world economic recovery is still weak. Building intercontinental UHV project will boost investment, innovation and development in electrical equipment, metallurgy, building materials, new energy and new material industries. Second, it can promote energy saving and emission reduction. A transmission line with transmission capacity of 11GW could provide 66TWh clean energy to Europe each year. In other words, every year, China could save 21 million tons of standard coals, reduce 60 million tons of CO2 emission and 360,000 tons of SO2 emission so as to change the development mode to a low-carbon and greener way. Third, it helps realize energy complementation. Due to vast geographical size, time difference and large diversity of load centers as well as power resource structure, intercontinental transmission highways could realize cross region capacity compensation, load shedding and mutual back-up. Fourth, it also works for promoting common development. The inter-

continental transmission highway will leverage resource advantages in Asia and Africa as well as the economic advantages in Europe, increase employment opportunities, narrow the North-South Gap and promote common development of world economy.

Conclusions

Chinese power grid is under construction in terms of strong and smart grid. Their network will be sufficiently supplied in these years. It makes China competent in industrial circumstances. At the same time using their technologies developped through such innovations they can provide an inter-continental transmission highway to Europe via super grid.

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3 The positioning strategies on renewable energy - Solar Energy

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Introduction

Chinese government is keen to apply renewable energy, such as wind, solar, bio-fuel, and small hydro for their future energy development. In terms of renewable energy issues, there are two perspectives: application as energy supply market to Chinese society and manufacturing business of Chinese industry. The main possibility among several renewables in China is solar or photovoltaic (PV) energy.

In this paper the state-of-the-art of PV market in China and business of Chinese manufacturing are described and future strategy perspectives are estimated.

In the coming years it is necessary to deal with these three major trends in the solar industry:

- In 2008, the global solar market was for 80% in Germany, Italy and Spain. In coming years 80% would not be in those countries but in East Asia.

- Energy utilities are starting to worry about the challenges of integrating increasing amounts of distributed energy resources.
- It is moving from being policy driven to being a competitive energy source with new business models based on self-consumption and electricity storage integration.

These trends call for action and through the challenges China needs to optimize the business development and strategy for these new realities.

International Renewable Energy Agency (IRENA) has announced China has decided to join. China is the world's largest producer of power generation capacity to reach 1140 GW. It is also the world's top level in the production of facilities and use of wind, solar, and hydro. Taking IRENA to advance the international efforts for the dissemination of renewable energy, China's accession is an important step.

Renewable Energy Market

Renewable Energy Fund

To the Ministry of Finance of China, in order to pay the appropriate subsidies to companies that are doing renewable energy, the State Council seems to have prompted the establishment as soon as possible of a renewable energy development fund. National Development and Reform Commission official said it expected to be able to solve the problem can be achieved by the end of 2013.

Recently, for the healthy development of promising industry, the State Council Executive Committee has submitted a request for six items. In which, by expanding the scale of renewable energy, the fund has been set up that spread to ensure grants. Currently, officials of various fields have continued with consultation under the surface of these issues, and officials of Development and Reform Commission, predicted that resolution is to be achieved by the end of 2013.

Feed In Tariff Scheme

Bloomberg New Energy Finance (BNEF) prospected the solar market in the world after China to Japan. This occurs by Feed-in Tariff (FIT) of power paid off in these countries.

According to the investigation report of BNEF, solar power in 2013 is at 6.1 – 9.4 million kilowatts, and expected to exceed 3.2 – 4.0 million kilowatts original in China. BNEF described as “revised upward because of development plan and was stronger than the initial forecast, solar cell shipments of October-December period in 2012 soared”.

Acceleration of market development is based on increasing facilities of 10-1000 kW using idle land or roof of a building. Solar power market of 6.1 – 9.4 million kilowatts in China in 2013 is compared to 3.3 – 3.9 million kilowatts in the United States forecast. In the case the order would be no. 1 China, two Japan, three Germany based upon amount introduced.

In solar cell market size based upon amount of money, US based IHS has announced the prospect that Japan could become the top spot in 2013. Germany, which was the first place in the 2009-2012 year, dropped to third place. Second place is China.

China aims to have 35 GW by 2015 in installed capacity of solar power. This means it is raising to four times the 2012 year-end strength of 8 GW. In the statement of (equivalent to the Cabinet) State Council, it expressed intent to raise by 10 GW per year in the power generation capacity in 2013 ─ 15.

Renewable Energy Manufacturing Business

2012 Rank	Module Supplier	Countries	Change from 2011
1	Yingli Green Energy	China	+1
2	First Solar	US	+2
3	Suntech	China	-2
4	Trina Solar	China	-1
5	Canadian Solar	Canada	-
6	Sharp Solar	Japan	-
7	Jinko Solar	China	+2
8	JA Solar	China	+7
9	SunPower	US	-1
10	Hanwha SolarOne	China	-3

Table VI-3-1; Top 10 PV Module Suppliers in 2012 (NPD SolarBuzz, January, 2013)

As for the world solar panel business, Chinese companies have shown the presence with overwhelming amount of production (Table VI-3-1). In various statistics, Chinese companies such as JA Solar, Suntech Power, and Yingli Green Energy which occupies the top of the production volume ranking.

On the other hand, demand was concentrated in the developed countries such as Europe and Japan. This was because policies forced reductions of emissions of greenhouse gases, and therefore the spread of renewable energy is essential. Governments have been urged to stimulate demand and purchase power generation systems, such as purchase subsidy of the solar panel.

Faced with aggressive Chinese bias Q-Cells, Germany's largest and the best in the world for the production of key components of the panel bankrupted in 2011. Displeasure with China bias is increasing in Europe and the United States.

Production of thin film solar cells with crystalline silicon

Solar cell world production volume had reached 30GW units in 2011, but it was 28.6GW in 2012. In 2012, it dropped 11 percent from 2011 and showed negative growth for the first time. It happened by the influence of the amount of stock in early 2012. In terms of the regional production volume, it was China and Taiwan 19.2GW, Japan 2.6GW, Europe 1.4GW, America 0.9GW, and 4.6GW of other regions.

Production volume in China and Taiwan was world leading for the sixth consecutive year, as a global solar cell supply base; China is driving to continue the world production of solar cells. Global market share in China and Taiwan was 67.1% in 2012 up from 65.6% in 2011. The top 20 solar photovoltaic (PV) module suppliers accounted for almost 70% of global PV shipments in Q1'13(NPD, SolarBuzz, January 2013). The continued consolidation of solar PV manufacturers is creating opportunities for the leading tier 1 module suppliers. The market share of the top 20 module suppliers increased significantly in Q1'13 to 70%, up from 58% in Q1'12.

As the solar PV industry continues to show increasing globalization of end-market demand, tier 1 solar PV module suppliers are implementing aggressive overseas marketing strategies to increase market share. This is most evident among the top 10 Chinese tier 1 PV module suppliers such as Yingli Green Energy, Trina Solar, Jinko Solar, and Renesola.

The top 10 Chinese suppliers have been less successful in countries where there is strong competition from domestic module suppliers or attractive solar PV policy incentives. In the US and Japanese solar PV markets, for example, local manufacturers still rank at the top for domestic PV module shipments. Over the last four quarters, US based manufacturers First Solar and SunPower were the leaders in module shipments to the US market. In Japan, leading domestic PV module suppliers Sharp, Kyocera, Panasonic, and Solar Frontier also outperformed Chinese competitors during the same time period.

Solar PV module supply to the US and Japan is contrasted with the dominance of tier 1 Chinese module suppliers in European countries, emerging solar PV regions, and in China and Australia. Over the four quarters in 2012, for example, almost 50% of modules shipped to the Australian PV market have been supplied by a small group of tier 1 Chinese manu-

facturers led by Trina Solar, followed by Renesola, Suntech, China Sunergy, and Canadian Solar.

Leading European tier 1 PV module suppliers, such as Conergy and SolarWorld, continue to target European and North American PV markets that are characterized by brand recognition and higher pricing levels. However, this strategy comes at the expense of global penetration, as their market share within the top 20 module suppliers declined from 10% in Q1'12 to 7.5% in Q1'13.

Price and Cost of PV cells (HIS Report 2013)

While solar PV module pricing levels continue to vary across the key solar PV end-markets, the average sales price for the top 20 tier 1 suppliers showed signs that of stabilizing at $0.76/Watt in Q1'13. This compares to $1.03/Watt in Q1'12.

Chinese panels are increasing in price due to the EU's anti-dumping tariffs. As a result, high-quality modules from South Korean and Western suppliers are becoming more competitive. The stabilization of module prices during Q1'13 was driven mainly by a geographic shift in demand from end markets during the quarter, with strong demand from higher price countries such as Japan preventing further global declines. However, pricing continues to vary considerably among different countries and for the various module technology types being supplied. The European Union's anti-dumping tariffs are driving up prices for Chinese solar modules, marking the end of a fast growth period made possible by inexpensive photovoltaic products.

Average pricing for Chinese crystal polysilicon modules in Europe rose by 4% in June 2013 to €0.54, up from €0.52 in May (NPD SolarBuzz, April 2013). The increase follows a steady price decline since the first quarter of 2009 (aside from a seasonal uptick in February 2013). With the plan to reduce government subsidies in Germany starting in April 2012, low-cost PV modules from China took over as the engine of growth in the European solar market, enabling the continued expansion of installation. The end of the era of low-cost Chinese modules is likely to cause many companies engaged in the engineering, procurement and construction of solar systems to go out of business in 2013. The EU Commission imposed tariffs on June 2013 5 of 11.8%, which correspond to a net value of €0.05 to

€0.055 per watt. The additional cost has translated directly into an increase in prices for buyers.

Prices are now rising due partly to the closing of a loophole that allowed them to bypass the tariff. Some Chinese suppliers in May 2013 and early June used Croatia's transition from a non-EU to an EU member state, declaring modules shipped to Croatia before July 1 as duty-cleared goods. The circumvention, however, is no longer available.

As a result, average tariffs on imported Chinese solar modules could rise on average by 47.6% between Aug. 5 and Dec. 31 in 2013. If the 47.6% tariff goes into effect, global supply lines and pricing for solar modules will be shaken up dramatically. Chinese suppliers initially would suspend almost all shipments to Europe. In order to continue serving the European market, they then will try to shift production capacity to locations outside of China by using overseas branches or via agreements with non-Chinese module makers. But even if they succeed in this, the supply disruption is likely to cause module prices to increase by 12 to 20% during the following months.

High-end pricing for modules have already cleared European customs to amount to €0.60 to €0.65 per watt. These are modules that would normally be subjected to the 11.8% duty but came through duty free due to their clearance before June 6, 2013. Such a level of pricing makes high-quality modules from South Korean and Western suppliers more competitive with Chinese-made products. Because of this, European module buyers are likely to switch to these alternative sources.

On the global scale, the price increase in Europe has been compensated by declining prices in Japan. Chinese modules sold to Japan dropped below $0.70 per watt on average in June 2013, the first time in history they have been at such low levels. Chinese suppliers are competing furiously and driving prices down in Japan, despite restrictive regulations on imports and quality. Chinese solar manufacturers that are still trying to sell the cheapest panels have failed to adapt to an industry seeking more efficient products. Panel prices have plunged, and now make up less than half the cost of a system. Customers are no longer seeking the cheapest solar panels; they want the cheapest solar energy. Most solar companies compete on price. SunPower has transitioned to selling energy. Chinese pro-

ducers have been accused of selling panels in Europe and the U.S. below cost. Offering ever-lower prices has become a money-losing strategy for most solar companies, Werner said. All of the China-based manufacturers in the 17-member Bloomberg Industries Global Large Solar Energy Index are expected to report losses in 2013.

Other Costs: expenses including labor and customer acquisition make up a greater portion of the cost of solar systems. Spending less on photovoltaic components won't have much effect on the bottom line. SunPower's panels use cells that convert as much as 24 percent of the energy in sunlight into electricity. The company expects to reach 25 percent in a few years. Yingli Green Energy Holding Co. sells panels with efficiency rates as high as 15.4 percent. Higher efficiency "allows you to produce more energy over time. SunPower typically charges more for its panels and the higher efficiency justifies the price tag. Panel prices make up about 20 percent to 25 percent of the cost of a solar system, compared with as much as 70 percent in 2010 and 2011.

Failure of PV companies

BEIJING Suntech, one of the world's biggest solar panel manufacturers has defaulted in March 2013 on a $541 million bond payment in the latest sign of the financial squeeze on the struggling global solar industry. Suntech Power Holdings' announcement was a severe setback for a company lauded by China's Communist government as a leader of efforts to make the country a center of the renewable energy industry. The company is exploring strategic alternatives with lenders and potential investors. A sharp drop in solar panel prices over the last several years has erased the profits of solar panel makers around the world.

Other major Chinese producers including Yingli Green Energy, LDK Solar and Trina Solar have reported heavy losses. That has prompted expectations that the government will intervene and force companies to merge or shut down. Prices of polysilicon wafers used to make solar cells plunged by 73 percent from 2010 to 2012. The price of cells fell by 68 percent and that of modules by 57 percent. Major manufacturers amassed debts of $17.5 billion, according to Maxim Group, a research firm in New York City.

Deep-pocketed Korean conglomerates are moving into the solar industry, adding still more

competition. Chinese producers also have been hit with U.S. anti-dumping tariffs imposed to offset what Washington says are improper subsidies from Beijing. European solar producers also have filed anti-dumping complaints, with the European Union asking for higher tariffs on Chinese imports. In July 2013 Suntech announced the closure of its U.S. factory in Goodyear, Arizona, and the elimination of 43 jobs.

Disputes and Issues of Chinese PV companies

While the trade friction with Europe is intensifying, solar panel industry in China is rushing to markets in the U.S. and European markets other than those with the trade friction, such as Southeast Asia and Japan. It's going to be a key to whether they can establish a model for service in high value-added areas in the future.

Solar panels made in China are exported at a price cheap unfairly; EU (European Union) decided a temporary injunction to impose sanctions tariffs on anti-dumping interim. The EU decided as a result of the investigation, that solar panels made in China are sold at a price about 88% cheaper than the market price, and therefore suspicion of dumping is strong. Regarding the sanctions tariff, caution was voiced from the UK and Germany, but since Chinese-made panels accounted for 80% of the market share in the EU, employment and industry would be hit hard by the decision.

Chinese trade officials met with the European Commission to discuss ways in which the two trading partners can avoid a worsening anti-dumping dispute regarding Made in China solar panels. A provisional tax on Chinese-made panels is expected to be applied in early June 2013 as long as the European Commission does not change the policy. The European Commission has opened an anti-dumping probe against Chinese solar glass makers following a request by European manufacturers, in the latest row between China and its Western economic trading partners, the EC said.

Strategies of China

Chinese solar PV manufacturers are eyeing a possible move to Greece in an effort to mitigate the impact of EU anti-dumping tariffs. Chinese operations at the Port of Piraeus in Athens could help. They are considering transferring part of their production lines to Greece in an attempt to circumvent EU anti-dumping duties on their products. Representatives of

Canadian Solar, Yingli Solar and Huawei recently travelled to Athens, Greece, in order to have direct talks with local PV manufacturers over the prospect of setting up manufacturing collaborations in the country. Such collaborations could take the forms of manufacturing their products in Greece, renting existing Greek industrial premises and acquiring shares in Greek industries. The dominant scenario is for Chinese manufacturers to transfer assembly of their products in Greek territories. To that end, they could rent existing Greek PV industrial bases or build new ones in collaboration with Greek manufacturers.

The aims of Chinese manufacturers are as follows: Firstly, assembly lines do not require a lot of staff, thus Chinese PV modules can remain substantially cheap and competitive. Secondly, Chinese manufacturers have access to the Piraeus Port, the biggest port in Greece located next to the capital city Athens. China's state-owned global shipping giant China Ocean Shipping Co. (Cosco) runs half of the port. Initially, Cosco launched operations in Greece the Piraeus Port's Pier II in 2009, signing a deal which put Eur500 million into the coffers of the cash-starved Greek government. Since then, Cosco has converted the Piraeus port into a successful business and has posted remarkable results.

Developments regarding the ongoing trade dispute between the EU and China will show if China needs to map a new 'silk road' for its photovoltaic products to Europe.

Conclusions

China is enjoying the top share of PV cells business and promoting PV application in their market. However they have several issues such as trade disputes, price and cost, high efficiency product needs… The Chinese government has supported their industry so far. For the next few years China will keep their position in PV industry.

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4 Competitive Strength in Manufacturing - The Future of Chinese Manufacturing

Keizo Sakurai

Keizo Sakurai received his Ph.D. in "the Management to Technology" from Yokohama National University. He has been a full professor with the Graduate School of Management of Japan University of Economics since 2012. 30 years, He has been doing the product development and production management in Japan manufacturing company. He also has done research on China manufacturing company. He interviewed to the president of the 20 companies of China manufacturing company in the three years from 2010.He analyzed the work time of assembly industries in China in 2011.

Overview

I think that estimating of the competitive strength in manufacturing for the 2030s in China is difficult. The competitive strength in manufacturing of the 1970s in Japan was great. However, I was not able to predict the decline in competitiveness of today. One of the reasons for the decline is the rapid changes due to globalization that began with the 1990s . Therefore, I think prediction of the future is very difficult. However, I would assess for the following items based on the plant survey and interviews with the president of China manufacturing (Sakurai 2011, Sakurai 2012).

1. Foreign manufacturers and Chinese manufacturers
2. National strength enhancement and the Chinese manufacturing industry
3. The real ability as the world factory
4. Would Chinese manufacturing industry be able to dominate the world?

Foreign manufacturers and Chinese manufacturers

China has carried out the policy of market economy, the inspection of Deng Xiaoping and the policy of special economic zones since 1986. Foreign manufacturing companies have made inroads into the Chinese market as a result. The companies from the three Scandinavian countries and Eastern Europe had made inroads into the Chinese market before

1986. And the companies in Western Europe, the U.S. and Japan have made inroads into Chinese market since 1986. Engineers of foreign manufacturers taught the basics of manufacturing of material, processing and manufacturing technology to the engineers of Chinese manufacturing (Saito(2009)). Subsequently Taiwanese companies of OEM suppliers of Western companies have made inroads into Chinese market. Korean companies of neighboring countries have also made inroads into the Chinese market. Many Japanese companies have made inroads into the Chinese market since the 2000s. China has carried out the policy of market economy, has changed companies to private ownership from state ownership. As a result, China attracted foreign manufacturers, and was able to promote technology transfer. China was able to improve productivity and increase technology in this way. There is not preferential treatment of foreign manufacturers in China after WTO accession. However, there is preferential treatment of engineering and built-in software for foreign manufacturers in China.I think the modernization of China has achieved the results by this state policy.

Companies were classified as state-owned enterprises, private enterprises, collective-owned enterprises after market economic policies (Saito 2009). I analyze the private enterprises in this paper. The state-owned enterprises are in energy and fundamental industry, those companies can not be operated by the company president. The origin of private companies were classified as (1) state-owned enterprises, (2)village enterprises, (3) foreign companies, (4) merger companies, (5) private company from the base. The pure Chinese companies are (1) and (2) and (5). Companies derived from foreign capital are (3) and (4).

Haier, Lenovo, Huawei are world-famous Chinese companies. Haier (consumer electronics) is a (4) type. Lenovo (PC manufacturer) and Huawei (communication manufacturer) are (5) type. The two companies were entrepreneurs in the 1980s. These companies have grown through M & A. This paper will focus on manufacturing companies ((1) (2)) that had been entrepreneurs before 1986 in pure Chinese companies. This is because many of these manufacturing enterprises are established by the work of foreign companies from today. The problem in the future is to prevent foreign manufacturing companies moving out of China. According to the research of the author, there were 3500 Japanese manufacturing companies in Dalian City 20 years ago. However, there are just 1400 today. The transfer to other countries of the foreign manufacturers affects the development of Chinese private

enterprises. I think that the manufacturing companies in China have been put in a very severe situation.

The reason is that the user of the Chinese market, is not satisfied that the car just move. The user of the Chinese market will require the functionality at the same level as developed countries. If the foreign manufacturing companies go out of China, the manufacturing enterprises in China will not be able to transfer value-added technical capabilities from the foreign manufacturers. Chinese will be looking to buy products manufactured in countries other than China. In that case, I think the problem of how to support living standards for Chinese people occurs .

National strength enhancement and Chinese manufacturing industry

The prosperity of the manufacturing industry is a barometer of national power in any country. We can not live if we do not use the products and services that humans have created in the past. Therefore, I think that a high proportion of secondary industry (=manufacturing) in gross domestic product (=GDP) is important. I compare the industry composition ratio of GDP of China and Japan from half a century ago. The primary, secondary and tertiary industry in GDP of Japan and China in 1955 were each the same 45%, 25% and 30%. But the composition ratio of the two countries after 30 years has changed greatly. The composition ratio of China in 1985 was 17%, 28% and 55%, the composition ratio of Japan was 9%, 33%, and 58%. China's manufacturing industry in 1985 was textile industry and heavy industry supported by Eastern Europe. On the other hand, Japanese manufacturing industry was called "the factory of the world". Japanese manufacturing industry in 1985 was the automobile and consumer electronics and heavy industry. Since then, China has been implementing the policy of market economy, and the composition ratio of China in 2011 was 10.0%, and 46.6%, and 43.4%. China's manufacturing industry was now called the "factory of the world". On the other hand, the composition ratio of Japan was 1.2%, 24.2%, and 74.5%. The composition ratio of secondary industry is reduced, and the composition ratio of tertiary industry was much higher.

I show the industry composition ratio of nominal GDP in Table VI-4-1.I show the world ranking top 10 and the value for Indonesia in Table VI-4-1.

There are two facts that can be read from Table VI-4-1. For China it is the fact that it is in the process of evolving to secondary and tertiary industry from primary industry. However, China is different from the pattern of countries in the world rankings 10 in Table VI-4-1. China is similar to the composition ratio of Indonesia The primary industry ratio in China is high in comparison with the growth process of the other industrially advanced countries. I think this is due to the policy that China does not allow rapid internal population movements.

A think tank has performed a forecast of China's GDP. It has been written that the GDP of China will become largest in the world overtaking the GDP of the United States between 2020-2050. For example, it is written China will become largest economy in the world in 2030 by "21st Century Public Policy Institute".

Table VI-4-1; The industry composition ratio of nominal GDP

(Unit: percentage)

world ranking	2	1	3	4	5	6	7	8	9	10	16
Country	China	U.S.A	Japan	Germany	France	Britain	Brazil	Russia	Italy	India	Indonesia
The primary	10.0	1.2	1.2	0.9	0.2	0.7	4.7	3.7	0.2	14.1	12.7
The secondary	46.6	16.6	24.3	30.8	18.8	23.4	23.5	28.0	24.7	25.7	39.9
The tertiary	43.4	82.2	74.5	68.3	81.0	75.9	71.8	68.3	75.1	60.2	47.4
(breakdown)											
Farming	10.0	1.2	1.2	0.9	0.2	0.7	4.7	3.7	0.2	14.1	12.7
Mining	39.8	1.9	0.1	26.2	12.6	16.6		9.2	18.7	2.1	7.7
Manufacturing		11.2	18.6				23.5	13.2		15.7	25.7
Building	6.8	3.5	5.6	4.6	6.2	6.8		5.6	6.0	7.9	6.5
Wholesale / Retail	9.2	11.6	14.3	16.0	18.6	18.9	57.1	16.7	20.6		17.8
Finance	5.3	20.3	4.9	4.4	4.7	9.6		3.5	5.5	18.1	9.6
Service		27.6	19.4	10.5	15.6	15.7		7.1	12.4		9.4
Other	28.9	22.7	35.9	37.4	42.1	31.7	14.7	41.0	36.6	42.1	10.6

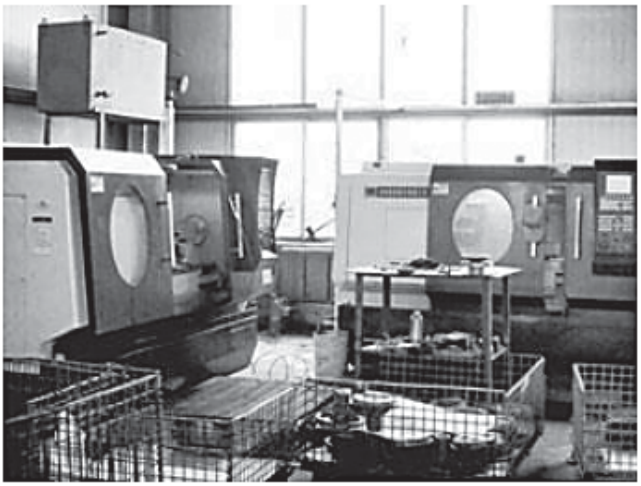
Note: The author created the above based on the GDP data for 2011 of JETRO.

Then I have examined the technology of the manufacturing industry. I compared the technology of the science and production. The technology of science is not necessary to reduce manufacturing costs. The power of 1.3 billion people is going to be a major force in that regard. In fact, that the technology of science is high can be understand from the fact that China has the technology to fly a manned satellite, and the technology to produce a nuclear bomb. Can China complete all on its own critical control technology? Can China acquire manufacturing techniques for implementing the technology? It is not necessary to

have their own technology. If there is money in the global society of today it is possible to acquire external procurement. If national power is strong, the technology is transferred inevitably. China should be recognized as being at the top level of the world most advanced technology.

I have examined the technology of production. There is a need to mass produce in a reasonable way products such as consumer goods products (consumer electronics, automobiles…) and industrial goods (machine tools, plant equipment…). The performance of industrial goods becomes a technical evaluation of the one. Table VI-4-2 is the machine tools made in China that I took in a certain factory in 2011.

Table VI-4-2; Machine tools made in China (at a company in Dalian)



Note: The author took the photo.

When machine tools made in China are compared with those made in Japan,the life is one-fifth and the cost is one-tenth. The performance (function / price) is doubled for most made in China against most made in Japan. The control mechanism is they what they were equipped with was made in Japan. It can therefore not be said to be purely Made in China.

The author did a factory survey and interviews. Three facts were found as a result.

1. The technology for molding steel is the same as industrially advanced countries. The technology for molding,casting and forging is the world's top.
2. The quality of industrial products (Machine tools, pumps, motors and power units…) is a little lacking. The technology of industrial products is inferior to that of industrially advanced countries.
3. The productivity for consumer goods (consumer electronics, automobiles…) is low, the quality is poor.The consumer goods can be used.

The important thing is the fact that the labor costs are cheaper and the overall cost performance is good. However, the effect of cost performance is reduced five years later. I think that productivity and quality improvement will be important in five years. With chemical products,it can not be said that the level is still high.

Here, I enumerate the checkpoint of national strength enhancement.

1. Can China understand the technical details of all domestically and can China produce domestically? Yes China has reached a level where this can be domestically.
2. Can China make control mechanisms and built-in software? Yes currently, China has implemented foreign incentives to enhance that part. So it will be able to domestically in the next 10 years.
3. Are there the engineering capabilities? Yes there is. Because there is the technological capability to fly manned
4. satellites.

China can ensure the technical level of the industrially advanced countries in the same level within the next 10 years. I think China will be a level where this can be achieved all on their own.

The real ability as the world factory

I will report the results of two empirical studies. (September 2011 survey) I will analyze the power of the world as a factory in China. The first is a work time analysis of the processes in the electrical and automotive industries. The second is a management interview survey

of Chinese manufacturing enterprises.

Working time analysis of assembly industries

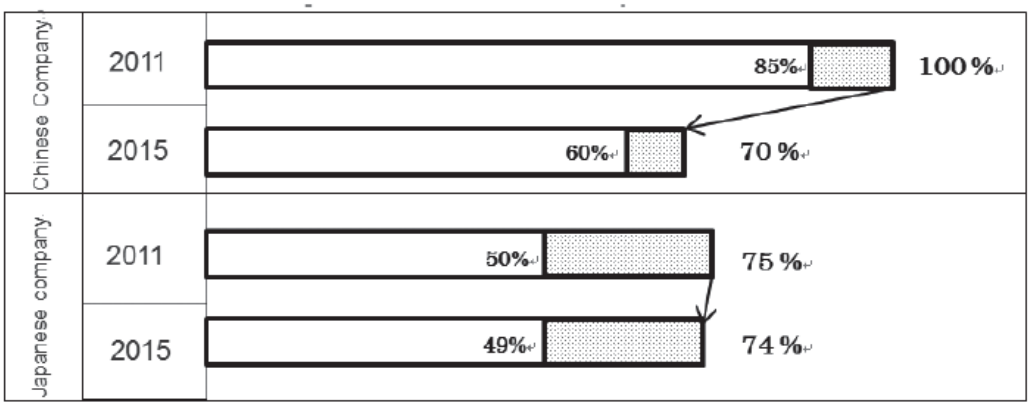
I analyzed the assembly line of the Japanese automobile and the consumer electronics industry in China (Sakurai 2011,Sakurai 2012). I show the analysis results in figure VI-4-3.

Table VI-4-3 is the comparison of the working time for a Japanese company and for a Chinese company in the same industry. I look the 2011 working time of a Chinese company as 100%. I compared the difference in working time for Japanese companies and Chinese companies in China in 2011. Japanese companies can produce in a 25% shorter time than Chinese companies. It is about the same working time when it comes to 2015.

The white background in table VI-4-3,I show the net working time . The shaded background of table VI-4-3 shows the working time for quality assurance. The working time for quality assurance includes the tasks of self-inspection, process inspection, final inspection, and maintenance work. The quality assurance working time of the Chinese company is 10%, while that of the Japanese company is 25%. The working time for quality assurance is about 20% in automobile companies in Japan. The productivity of Japanese companies is more than 30% better than companies in the other countries in 2011.

Table VI-4-3; Working time analysis of assembly industries

(Chinese company VS. Japanese company)



Note: Study created by the author.

Management interview survey of Chinese manufacturing enterprise

I interviewed the president of some Chinese companies. The interview content is technology transfers between Chinese companies and foreign companies. The interview targets are as follows. The manufacturing technology of the infrastructure include casting, die casting, forging, pressing, cutting, polishing, sheet metal and welding. There is a difference in the attitude towards technology at a rate of dependence of Japanese companies in China manufacturing enterprises. The ratio of dependency was decided based upon a rate of sales amount of Japanese companies in the total amount of sales for several years.

The recognition of the president are as follows.

1. The president of these Chinese companies where dependency on Japanese companies dependence is high, says “The technology improvement is the quality improvement”.
2. The president of Chinese companies where dependency on Japanese companies dependence is low, says “The technical improvement is the acquisition of proprietary technologies”.
3. The president of Chinese companies where dependency on Japanese compa-

nies dependence is low has a tendency to disregard profits due to technical improvement.

Would Chinese manufacturing industry be able to dominate the world?

I think that there is a possibility that China manufacturing industry can dominate the world.

Deng Xiaoping advocated the dual Chinese system and 30 years have passed. The dual Chinese system is acceptable capitalist economic system in the communist political system under the one-party rule. The dual system is made up with exquisite balance.

It is the same with the statement that “it doesn’t matter if a cat is black or white if it can catch a mouse, it is a good cat” . Today, the economic activity of the state in a capitalist economy does not work well with the action of only the private sector. The head of state in a capitalist economy is a salesman in order to grow his economies, he is acting in the forefront of economic negotiations with multilateral. It is a product of globalization. At that point, one-party regime would be a powerful weapon. One of the reasons that Japan, USA, EU are in economic crisis is due to the fact of majority rule approach democracy politics. It will be the economic policy of half-baked compromise-oriented. For example, about 30,000 casting factories in China are dotted about. The Chinese government is planning to reduce in the near future to 10,000 . The reason, the government’s announcement is efficiency using electrical energy and environment-friendly. But if the companies with casting technology leave, other companies truncate as without value. Companies of the casting technology improvement, are helped with the cost by the Chinese government. I do not know the movement in industries other than casting. From this case, I think manufacturing will grow under the one-party rule. I think that there is a possibility that China manufacturing industry can dominate the world

China’s GDP is second in the world. Perhaps in the near future, China will overtake the United States. As a result, China’s GDP is going to be first in the world. People say “GDP per capita in China is low”. The mechanism of the global economy is dominated by the total value of trade between countries. The mechanism is not dominated by the value of GDP per capita . Today, If Japan and the United States went be to zero trade with China, the two economies would be paralyzed . Therefore, the power relationship between countries

should be evaluated by total GDP . No doubt, China will become the world's top economy by 2030. As a result, China will support the world economy and exert great influence in the world politics. Therefore, it's going to be China's leading manufacturing industry in the world.

Conclusion

There are the problems in China's manufacturing industry. The reason is twofold. The first issue is the impact of the one-child policy, which began 35 years ago. Young people are not working in the manufacturing industry. This is a serious problem. I studied the manufacturing companies in Dalian and Shanghai about six weeks in 2011 and 2012. The president of manufacturing companies said "I can not hire employees".

The second issue is the multi-ethnic country that has existed for thousands of years (Wang 201)). The United States is a multi-ethnic country. However the United States is a multi-ethnic country made by immigrants from 230 years ago. On the other hand the Soviet Union was also a multi-ethnic nation. However, the Soviet Union has changed into Russia. The Soviet Union has divided into dozens of countries. When China's economic growth makes progress, these two issues will be its Achilles heel in the future. According to some reports, domestic infighting in the interior is continuing.

China will perform one of two choices. Two choices is the over-concentration of management and the distributed management. China in the future will depend on the decision of Xi Jinping of the top of the new administration (Nihon Keizai Shimbun Inc. 2013). The decision-making of politics is to act human thinking. Thus prediction is impossible. In best case scenarios, China becomes a nation such as the United States, and it will be possible that manufacturing industry leads the world. On the other hand, such as when the Soviet Union became Russia, the pessimistic scenario would be secession. In such a case, manufacturing would be subject to considerable damage. That direction could be plausible within the next five years.

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5 Technological Challenges: Biotechnology and Pharmaceutical Science

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Introduction

According to WHO Global status report on noncommunicable diseases 2010, it is found that non-communicable diseases such as cardiovascular diseases, diabetes, cancer and chronic respiratory diseases are expected to increase 15% from 2010 to 2020, and that a significant rise in the youth of low-income countries is also predicted. This report was formulated as a part of the 2008–2013 “Action Plan for Implementing the WHO Global Strategy on the Prevention and Control of Noncommunicable Diseases”, which World Health Assembly had agreed in 2008. The report suggested that advancing public health and economic growth will increase life style-related diseases. These diseases, known as “lifestyle related diseases” in English, “maladie de comportement” in French, or “Zivilisationskrankheit” in German, represent a group of diseases whose onset and progression are affected by people’s lifestyle such as dietary, exercise, rest, smoking and drinking. The diseases pose a common health problem for the developed countries. Most notable is obesity, which could cause diabetes, cardiac diseases and cerebrovascular diseases, because it may pose a future challenge even in the developing countries as the people develop a taste for Western meals amid globalization, and are susceptive to food satiation and unbalanced diet because of the changing diet and lifestyle.

Another risk is that diseases endemic in the tropical-to-semitropical zones may spread to the countries in the temperate zones because of the environmental destruction entailed by global warming. The Japanese Ministry of the Environment (Ministry of the Environment 2006) and Infectious Disease Surveillance Center (Ichiro Kurane 2009) have issued warnings in this regard. In particular, mosquito-borne infectious diseases such as malaria, dengue fever and West Nile fever may increase due to global warming, according to some re-

ports. However, the risk of such infectious diseases requires careful assessment because it is determined not only by the temperature but also secondary factors such as regional water distribution and desertification affected by the amount of rain-fall and of insolation. Infectious diseases that are expected to increase because of global warming include: 1. vector-borne infections such as malaria, dengue fever, West Nile fever, Japanese encephalitis, Rift Valley fever, tick-borne encephalitis and hantavirus pulmonary syndrome; and 2. environment-borne infections caused by polluted-water, most notably, diarrhea caused by cholera and the like (Ministry of the Environment 2006).

In any case, it is important to understand that the global disease structure may change by Year 2030, transforming needs for therapeutic drugs. The production capacity should improve to supply enough therapeutic drugs, and prevention and treatment measures should be implemented at a national level. Thus, government must implement necessary policies for the pharmaceutical and health-related industries to meet the needs.

Therapeutic Needs and Drug Development

Drug development has drastically changed its trend today since the end of the 20th century. Specifically, human gene analysis starting around 1995 was made a significant difference by enabling us to describe diseases at gene or protein level. This innovation caused a paradigm shift in drug discovery technology. Now, we can take molecularbiology-based therapeutic approaches to study disease-causing genes and protein abnormalities, and to examine the resulting biotransformations. With a shift toward innovation-centric drug discovery, so-called “bio-pharmaceuticals” has been invented and are now being applied in clinical settings. The production of bio-pharmaceuticals (Figure VI-5-1) shows that new technologies from antibody libraries to antibody engineering to mass culture technology to fermentation engineering to bioengineering are now required in addition to the development of the conventional low-molecular compounds.

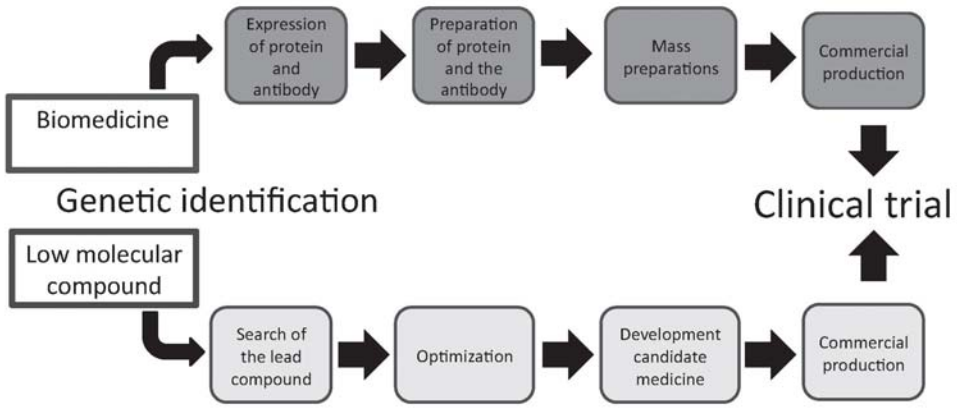

Figure VI-5-1; Innovative drug development process of the biomedicine (Ministry of Economy 2009)

●Culture methods are often yet to be established. ●Established culture methods are patented in other countries. ●Quality control is difficult. ●Experts are needed. ●Because manufacturing requires advanced techniques, expensive investment may need to be made at an early clinical phase.

Table VI-5-1; Differences between biopharmaceuticals and low-molecular compounds (citing and partially editing Reference (Ministry of Economy 2009)

Biopharmaceuticals are rapidly gaining share as new therapies in the disease areas where the conventional drugs fail to offer sufficient therapies. The number of biopharmaceutical products listed in the global sales ranking, which was just 1 in 2000, increased to 4 in 2007 and 7 in 2012 (figure VI-5-2).

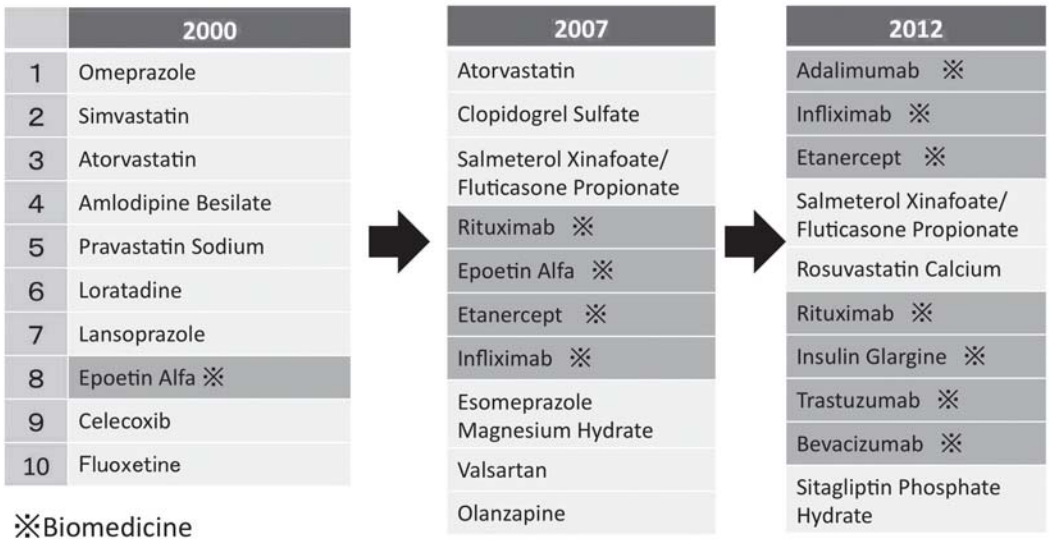

Figure VI-5-2; Biomedicine in the world sales ranking (Ministry of Economy 2009, Soichiro Giga 2006)

The global market size for biopharmaceuticals increased more than fourfold over the 5 years between 2003 and 2007 from 8 billion to 33 billion dollars. The sales accounts for 4.6% of the total pharmaceutical market (Ministry of Economy 2009), and are expected to steadily rise in the future. The biopharmaceutical products currently available in the market are delivering certain therapeutic results for intractable diseases such as rheumatoid arthritis, Crohn's disease and other autoimmune diseases, cancer and chronic hepatitis C. The conventional therapeutic drugs failed to deliver sufficient and satisfactory treatments for these types of diseases. Many other disease areas await the development of novel therapeutic drugs (figure VI-5-3), placing high hopes for biopharmaceuticals.

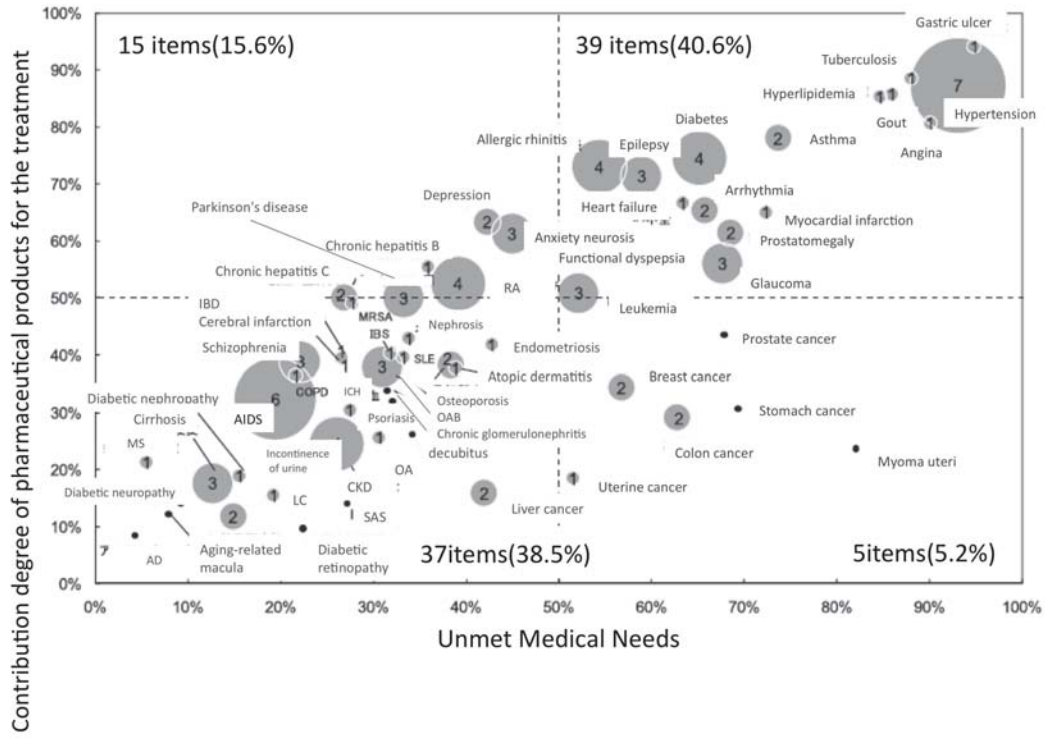

Figure VI-5-3; Unmet Medical Needs（*Japan Health Sciences Foundation 2010*）

However, because biopharmaceuticals are generally expensive, we need to note that the medical expenses and drug costs put an economic burden on the government and patients. While more patients benefit from the pharmaceuticals, soaring medical expenses will pose a larger fiscal burden. To curb rising medical expenses, switches to biosimilars must be encouraged after patent expiry of biopharmaceuticals. To strategically foster the pharmaceutical industry also requires a sense of balance as we need to aim to foster mega-pharmas capable of drug discovery as part of industrial policy and to promote the use of biosimilars to curb rising drug costs at the same time.

Disease Structure and Pharmaceutical Market

Clinical applications of biopharmaceuticals are advancing as new therapies to meet unmet medical needs. It is also important to improve prevention measures for a series of lifestyle-related diseases and therapies for infectious diseases. Furthermore, considering the shift toward generics after patent expiry of blockbuster drugs, we predict key product lineups in the future global pharmaceutical industry in Table VI-5-2. Above all, we need to enhance

research capability to help to speed up drug development processes and make them more efficient. Such enhancements include the development of drug discovery biomarkers and disease-model animals.

Backgrounds and Events	Corresponding Pharmaceutical Product Groups
To meet unmet medical needs Advancement of biotechnology	Next-generation molecular targeted drugs Biopharmaceuticals
Threats of infectious diseases such as the new strain of influenza	Next-generation vaccines, novel therapeutic drugs for infectious diseases, AIDS therapeutic drugs, therapeutic drugs for unknown infectious diseases
Changing lifestyle	Pharmaceutical products for preventing and treating diseases associated with changing lifestyle
Rising costs of medicine and pharmaceuticals worldwide, fiscal burden	Generics Biosimilars
Improvement of pharmaceutical production system	Drug substance (bulk)
Global population aging	Therapeutic drugs for dementia with new mode of action, pharmaceutical products for alleviating peripheral symptoms of dementia, anti-aging pharmaceutical products
	Other pharmaceuticals

Table VI-5-2; Pharmaceutical Categories with Expected Market Growth (compiled by the Author)

Of course, we need to focus investment on new drug development. But more reliable evidence will certainly be more important than ever before. Thus, we particularly need to conduct large-scale clinical trials, to improve clinical trials, and to strengthen cooperation with medical institutions in Asia. Furthermore, we need to increase well-equipped facilities with clinical trial capabilities. Above all, we need to establish companies that support the conduct of clinical trials, a national review system to support commercialization after clinical trials, and to develop a system for industry-academia collaboration. China needs to enhance its capability to conduct large-scale clinical trials for Asian populations in cooperation with US, Europe and Japan. The country also needs to improve its arrangements and practices of clinical trials in light of the international standards.

As figure VI-5-2 shows, the global pharmaceutical sales ranking fluctuates quickly, making prediction difficult. Patent expiration is clearly one of the main factors that significantly change the ranking. Other factors include changing disease dynamics, advancement of

development technologies, trends of pharmaceutical industries in the developing world and changing markets. These elements are complexly intertwined with one another to change the ranking. As many global pharmaceutical companies will set out Asia-focused strategies, we would like to closely monitor the future trend.

Ranking of Pharmaceutical Companies in the World

Year 2012 marked a turning point in the global pharmaceutical market. This was mainly because all top 10 pharmaceutical products by sales worldwide in 2011, the key products of major global pharmaceutical companies, saw patent expiration in the year, spurring the shift toward generics. For example, the sales of Lipitor® (atorvastatin calcium), a hyperlipidemia drug, plunged to 5.03 billion dollars in 2012, less than half the 2011 sales of 10.86 billion dollars. Simple calculation indicates 5.83 billion dollar-worth prescription has shifted to generics in the year alone. Likewise, other major products that used to sell more than 2 billion dollars a year significantly declined their annual sales after patent expiration. Eight out of top 20 companies suffered decreased sales. Only exceptions that enjoyed increased revenues among the top 10 were Roche (Switzerland), Johnson & Johnson (US) and Abbott Laboratories (US) (Table VI-5-4). This suggests that global pharmaceutical companies that invented blockbuster drugs cannot recover lost revenue after patent expiration unless they develop key non-low molecular products such as biopharmaceuticals. Expected market growth in Asia will reinforce this trend. That is to say, the shift toward generics after patent expiration is expected to accelerate mainly in the developing countries. Information strategy is required to secure sales early prior to patent expiration in the growing markets.

Chinese pharmaceutical companies tend to operate under complex intra-group capital ties by owning affiliated pharmaceutical wholesalers and pharmacies (Mizuho Corporate Bank, Ltd 2010). This means that a typical Chinese pharmaceutical company serves as an integrated business entity, encompassing not just manufacturing but also distribution and retail functions. Such a business category is quite different from that of US, Europe and Japan. Table VI-5-3 indicates the ranking of pharmaceutical companies in China by sales. Similar data are also available from other sources. What is common to all data is that rankings fluctuate quickly, and that Chinese companies do even not stay in the same tier, whether be top or middle, unlike the more stable global ranking. Because of the diversified services

that they provide, sales figures alone are insufficient to allow an accurate comparison of Chinese businesses. With advancement of pharmaceutical companies in China, the trend is expected to continue for some time. M & As and merger integrations may form Chinese megapharmas and specialty pharmas. According to data by pharmaceutical product category (Soichiro Giga 2006), the rankings of pharmaceutical products by sales differ between areas ranging from infectious disease drugs to cardiovascular disease drugs to gastrointestinal disease drugs to anti-cancer drugs. Foreign companies make it into the top group in some areas. However, when we examine the total sales of therapeutic drugs for the 4 categories, infectious disease drugs rank first with 35.8%, whereas anti-cancer drugs came last with 7.4% (Soichiro Giga 2006). This resembles the global market of a decade ago. Therefore, with the change of the disease structure in China, some disease areas expect market growth, offering chances for companies to strengthen in the manufacturing and marketing in the particular areas to grow their revenue. With many variable factors, the ranking of pharmaceutical companies in China by sales is expected to fluctuate drastically in the future.

Table VI-5-3. Drug industry of the sales amount high rank in China

Report	M.Watanabe et al [10]	Kim K[9]	T.Noji et al[5]	Y.Tsuruta et al [8]
	2004	2009	2010	2012
1	上海医薬集団有限公司（190.01）	哈薬集団（148.0）	哈薬集団	上海医薬集団
2	天津医薬集団有限公司（121.80）	石薬集団（70.3）	石薬集団	哈薬集団
3	広州医薬集団（100.74）	上海医薬集団（195.7）	上海医薬集団	広州医薬集団
4	三九医薬集団（90.05）	吉林修正薬業	天津医薬集団	揚子江薬業集団
5	南京医薬産業集団（81.56）	揚子江薬業	揚子江薬業集団	天津医薬集団
6	揚子江薬業集団公司（80.56）	広州医薬集団	修正薬●集団	吉林省修正薬業集団
7	華北製薬集団有限責任公司（78.14）	天津医薬集団	広州薬業集団	石薬集団
8	北京医薬集団有限責任公司（74.64）	華北製薬集団	●北製薬集団	華北製薬集団
9	哈薬集団有限公司（74.39）	歩長集団	天津金耀集団	西安歩長製薬集団
10	大極集団有限公司（71.10）		北京同人堂（集団）	（Beyer）

※（　）:Sales amount（hundred million Chinese yuan）
※※Because I quote it for documents faithfully, the company name may vary in notation in the same company
※※※●:TypeError

Ranking	Company	Country	Sales ($1 m)	Y/Y
1	Pfizer	US	51,214	−11.3%
2	Novartis	Switzerland	46,732	−2.5%
3	Merck	US	40,601	−1.7%
4	Roche	Switzerland	40,514	8.1%
5	Sanofi	France	39,328	−5.1%
6	GlaxoSmithKline	UK	34,934	−3.9%
7	AstraZeneca	UK	27,925	−15.3%
8	Johnson & Johnson	US	25,351	4.0%
9	Abbott Laboratories	US	23,133	3.1%
10	Eli Lilly and Company	US	20,567	−9.0%
11	Teva	Israel	18,535	11.1%
Reference	AbbVie	US	18,380	5.4%
12	Bristol-Myers Squibb	US	17,621	−17.1%
13	Amgen	US	17,265	10.8%
14	Takeda Pharmaceutical	Japan	16,317	3.2%
15	Boehringer Ingelheim	Germany	16,011	12.3%
16	Bayer HealthCare	Germany	15,210	8.2%
17	Novo Nordisk	Denmark	13,826	17.6%
18	Astellas Pharma	Japan	11,705	3.7%
19	Daiichi-Sankyo	Japan	11,068	6.5%
20	Otsuka Holdings	Japan	9,905	8.8%

Table VI-5-4;. Pharmaceutical Sales Ranking 2012

Source: Uto Brain Division, Cegedim Strategic Data K.K. (Partially citing Reference Uto Brain Division, Cegedim Strategic Data K.K.)

Current and Future Status of Pharmaceutical Industry in China

China's health care reform unveiled in 2009 articulated 5 main initiatives Table VI-5-5). The Chinese government currently invests heavily to promote health care reform, and one third of the investment is said to be spent on improvement of its medical infrastructure (Yuji Tsuruta 2012). This reform suggests that efforts are underway to improve health care services in the inland areas including middle and western China, to equalize health care services throughout China, and to improve public access to and convenience of health care.

1	To establish a basic medical insurance system
2	To establish a national basic pharmaceutical product system
3	To reestablish a community medical insurance service system
4	To promote public hospital reform
5	To improve and equalize the level of public health services

Table VI-5-5; Main Initiatives of Health Care Reform (Citing and partially editing Reference 10)

In October 2012, the State Council issued the 12th Five-Year Plan for the development of

public health services known as“12-5” plan (2011-2015). According to the plan, the council proposes to speed up the establishment of pharmaceutical and public health systems. The plan aims to raise industrial concentration by improving national policies and promoting integration and reorganization within the pharmaceutical industry, and to hone competitiveness in the global market by supporting companies’R & D capabilities. The plan not only marks a shift in drug development objectives from “imitation” to “original” but also signifies a significant step forward in production schemes from mid- and small-sized companies to consolidation into big companies. At present, the number of pharmaceutical companies above a certain size reaches 7,000, and the number of drug substance (bulk) manufactures alone surpasses 4,750 (Kenbin Kin 2010). Such a crowded market is causing fierce domestic competition. Seventy % of the companies are mid- and small-sized with 50 million RMB in annual sales or below. This was one of the reasons why Chinese firms lagged behind both in drug discoveries that meet international standards as well as global market entry. Domestic regulations are also cumbersome. Any pharmaceutical products must clear 16,695 items, or approximately 170,000 items to be manufactured (Kenbin Kin 2010). The industry itself is far from being neatly organized.

The sales of these companies, however, range from 10 to 20 billion RMB, which translate to 1.6 to 3.2 billion dollars if we use the RMB exchange rate of 0.16 to the dollar (as of Aug 2013). This is far from the global top-tier benchmark of 10 billion dollars in sales. So far, the management strategies of major companies have emphasized the domestic market (Kensuke Kubo 2007) with a focus on cooperation with domestic medical institutions. These strategies include scale merit-derived mass production for the domestic market, and product differentiation through a form of exclusivity given to research results obtained at universities and government institutions. The abovementioned “12-5” plan clearly indicates that it will provide non-public medical institutions room to grow. The plan also urges systemic revision and realignment of public hospitals including hospitals run by state-owned enterprises. Therefore, we should expect that Chinese companies will aim at expanding shares in the growing domestic market. Bearing some analogy to former Japanese business models, Chinese firms could gain a toehold in the global market by doing so. Interestingly, this contrasts sharply with India, where the main pharmaceutical companies are already exporting to the developed countries.

It is difficult to predict what the Chinese pharmaceutical industry will look like in Year 2030. Assuming the current economic growth will continue at the current pace, Chinese pharmaceutical companies may make it into the world's top pharmaceutical companies. For that, China not only needs to achieve its economic growth but also needs to establish a new business model in the increasingly severe pharmaceutical industry.

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6 The Influence of Chinese ICT on the world

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Information and Communications Technology (ICT) is one of the most potent forces shaping the twenty-first century (Okinawa Charter on Global Information Society, 2000). The Global Information Technology Report 2013 analyses the impact and influence of ICTs on economic growth and jobs in a hyperconnected world. The report shows the progress that countries are making to fully utilize ICT to boost productivity, economic growth and quality jobs in the current economic environment. ICT is one of the most dynamic market sectors in China's economic boom. ICT in China is currently a prominent representative of high-tech industries, and plays a very important role in the promotion of social employment and economic growth, adjusting industrial structure and changing the mode of development and maintenance of national security. This paper provides a broad overview of the influence on the world, based on a comprehensive overall analysis with detailed drill-down of the ICT market, ICT industry, and ICT technology in China. The insights are broken down into the following four general categories with regards to China's major achievements in ICT: government policy and promotion; patents and Chinese standardization; cyber-attacks and state intervention, and Chinese global ICT companies.

The ICT Industry in China

Largest stable exporter of ICT products in the world

The electronic information industry in China grew rapidly after the liberalization of the economy under the national strategic policy of accelerating the “informatization” of its industrial development. Due to the Investment Promotion Agency of the Ministry of Commerce (MOC), China’s electronic information industry contains radar, communication equipment, radio

and television equipment, computer, software, and home appliance manufacturing within six categories, 23 fine sub-industries. It can be considered as being the same as the Information and Communication Technology (ICT) industry.

	Unit	Production Amount	Growth Rate (%)
Large companies of electronic information industry			
Sales revenue	100 Million RMB	84619	13
Profits before taxes	100 Million RMB	3506	6.2
Taxes	100 Million RMB	1513	21.6
Number of Employees	10000 people	1001	6.5
Fixed assets	100 Million RMB	9592	5.7
Total Amount (Input&Output)	100 Million US$	11868	5.1
Export Amount	100 Million US$	6980	5.6
Input Amount	100 Million US$	4888	4.5
Software Industry			
Software revenue (preliminary)	100 Million RMB	25022	28.5
Main products			
Mobile Phone	10000 units	118154	4.3
PC	10000 units	35411	10.5
Color TV	10000 units	12823	4.8
IC	100M units	823	14.4

Table VI-6-1; Production for China's Electronic Information-related Products

Source: Ministry of Information Industry

According to China's Ministry of Information Industry statistics, total revenue of the electronic information industry in 2012 was around 11 trillion Yuan (approximately US$1.8 trillion), up 15% from 2011. Table VI-6-1 describes the production output of principal electronic information-related products in 2012. The major product output such as mobile phones, computers, TV, integrated circuits, reached 1.18 billion, 350 million, 1.3 million and 82.31 billion units, indicating a year-over-year increase of 4.3%, 10.5%, 4.8% and 14.4% respectively. Mobile phones, computers and TV production as a proportion of total global shipments were more than 50%, stably occupying the world first position.

Market Sharply Expanding

China had the largest number of internet and mobile phone users in the world. According to

the 32nd Statistical Report on Internet Development on July 17th, 2013 by the China Internet Network Information Center (CNNIC); by the end of June 2013, the number of netizens in China has reached 591 million, an increase of 26.56 million compared with the end of 2012. The Internet penetration was 44.1%, increasing by 2% compared to that at the end of 2012. Of the new netizens, up to 70.0% of them used mobile phones to surf the Internet, outnumbering those netizens who use other equipment to surf the Internet. It is worth mentioning that the Internet penetration was quite fast in the rural areas of China. Of the new netizens in the semi-annual period, rural netizens accounted for 54.4%.

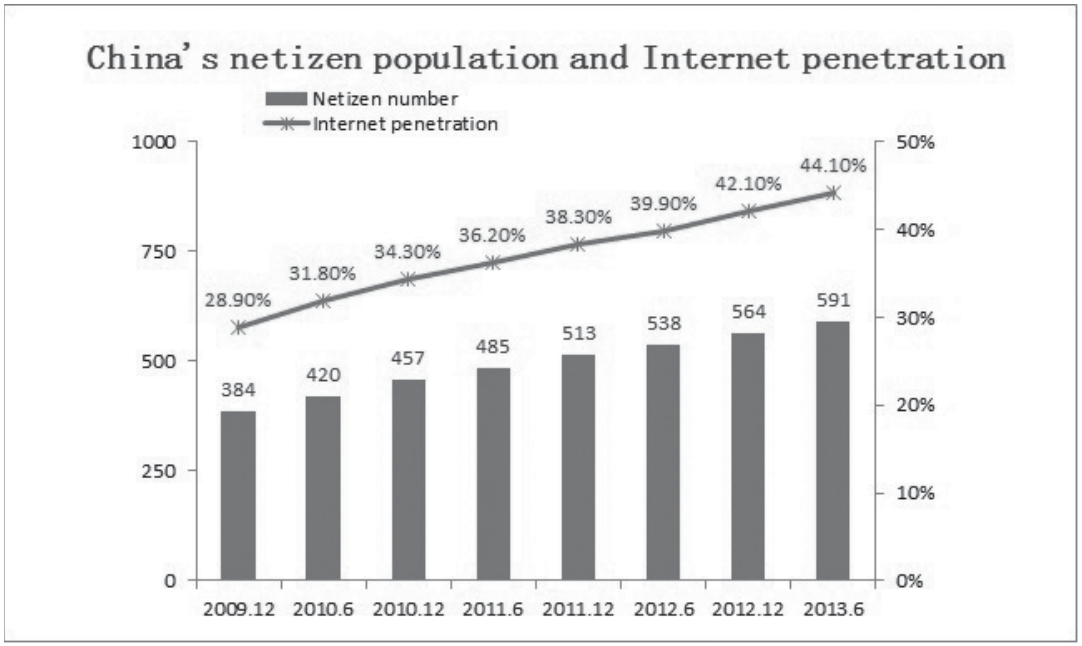

Figure VI-6-1; Netizen population and Internet penetration Source: CNNIC, 2013

Meantime, the number of mobile phone netizens in China has reached 464 million by the end of June 2013, increasing by 43.79 million compared with the end of 2012. Netizens using mobile phones rose to 78.5%. Popularity of 3G, development of wireless networks, and innovation of mobile phone applications greatly facilitated the rapid growth of mobile phone netizens. (Refer to Figure VI-6-1 & 2).

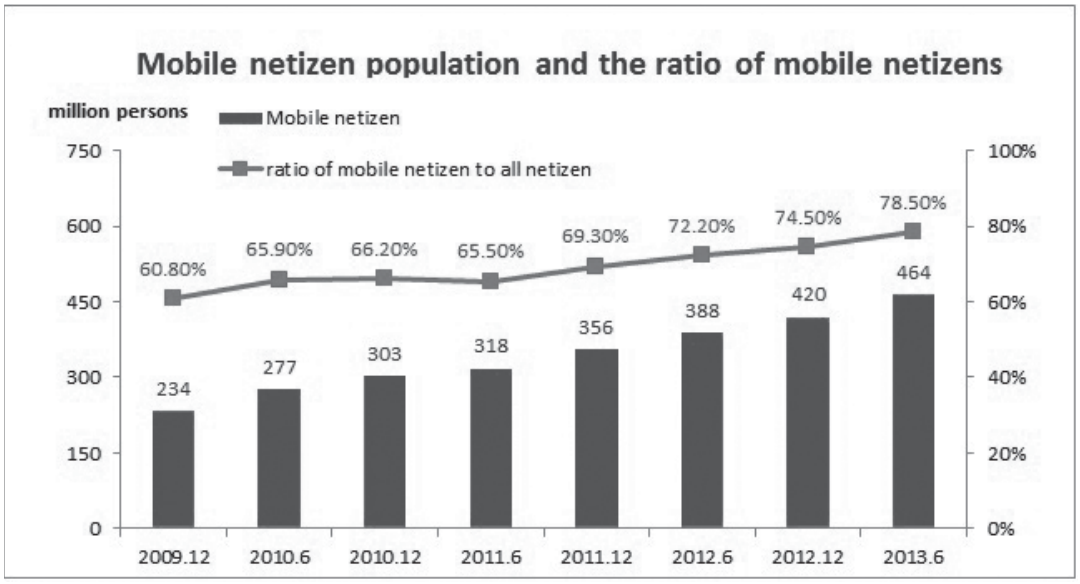

Figure VI-6-2; Mobile netizens Source: CNNIC, 2013

Industrial Clusters and Transfer

With the upgrading of industrial concentration, industry has come to display an increasingly prominent regional cluster effect. At present, China has formed 9 national information industry bases, and 40 national electronic information industrial parks as the main regional industry clusters. Especially in the Yangtze River Delta, Pearl River Delta and Bohai Rim region, labor, sales, industrial production and the proportion of the total industry profits have exceeded 80%, and the industrial clustering effect and the base occupies an increasingly clear dominant position in the global industry layout, with influence growing. These industry clusters of ICT have shown a spatial division between the prototype, mainly reflected in the two major aspects of industry and the value chain. Global production shift is a long-standing trend during the “globalization” process. The “localization” of the Chinese ICT industry has become a breakthrough in the direction of domestic manufacturing upgrade. The ICT industry at the level of technology, R & D inputs… is rapidly increasing, contributing significantly to industrial development. The ICT industry is poised to be ushered into the mergers and acquisitions boom.

ICT Technology in China

Focus on Breakthrough High Technology

The ICT industry is characterized by active innovation, and shorter life cycles of product and technology. For example, according to the PCT application statistics provided by World Intellectual Property Organization (WIPO), PCT application numbers for ICT are constantly keeping to the top three levels of PCT application. In the high technology area, Chinese scientists landed breakthroughs in a range of key technologies for super integrated circuits, high performance computers, high speed broadband networks, electric automobiles, clean energy..., though not so many others.

China's fastest supercomputer, Tianhe-1 (TH-1), as one part of the National Programmer for High-tech R & D, was released on 29 October 2009 by the National University of Defense Technology (NUDT) in Changsha, Hunan. TH-1 ranked fifth worldwide on the Top500 organization's list of supercomputers in 2009. In June 2013, Tianhe-2 topped the TOP500 list of fastest supercomputers in the world. It was built by China's National University of Defense Technology (NUDT) in collaboration with a Chinese IT firm. TH-2's attracted the most attention to many technologies such as the "Kylin" Operation System (OS), Front End Processor (FEP), network … made in China. With Chinese Kylin OS which is collaborated with "Ubuntu" (an open source) base, China now has its own secure and stable desktop OS, which China will bring to the full range of platforms for desktop, server, cloud, tablet and phone. In addition, China houses 66 of the top 500 supercomputers (Top500 List, 2013). It can be seen as the symbol of China's unflinching commitment to the supercomputing arms race. China must protect its own assets first in order to preserve the capability to go on the offensive. The rush to participate in the "national security operating system" arms race is fairly evident across the world.

Strategic Emerging Industries

Since the inception of the reform and opening-up more than 30 years ago, China has established a record of astonishing economic achievements, and surpassed Japan as the world's second-largest economy. Enhancing comprehensive strength through a deepened reform, China has witnessed a remarkably enhanced comprehensive Science and Technology (S & T) strength since the 10th Five-year period, with a greatly improved proprietary innovations capacity.

The 12th Five-Year Plan clarifies the priority development directions and tasks of the seven industries. In particular, “next-generation information technology” (ICT) is one of China’s strategic emerging industries. Specific areas of focus include growing sectors such as Internet of Things, cloud computing, integrated circuits (ICs), basic software, and broadband technology. The Chinese government hopes to create a strategic emerging industry in these sectors in an effort to transition from a manufacturing to a knowledge-based economy and realize technological breakthroughs to compete on a global stage. Challenges such as R & D investment, standards, and cyber security…, remain in the development of the ICT sector. In addition, the protection of intellectual property is an important issue in order to increase foreign direct investment and promote domestic innovation.

Analysis and Insights

The Chinese government is promoting the development of “indigenous innovation” and promoting the ICT industry as a strategic emerging industry. What are the influences and likely effects of this government policy in the ICT industry and in the global market?

Government Policy and Promotion

The new scientific and technological revolution has been rapidly progressing worldwide over the last decade. China’s ICT industry has been an engine of the country’s economic growth and substantially contributed to its GDP. (Hemashti & Yang 2006). Chinese government policies did contribute to the development of ICT growth and its increased contribution to GDP.

According to the Outline of the 10th Five-Year Plan for National Economic and Social Development delivered at the Fourth Session of the 9th National People’s Congress on March 5, 2001. China’s government set the main targets for economic and social development for the next five years, including doubling the 2000 GDP (8.94 trillion yuan) by the year 2010 and accelerating development of the technology industry. China’s 11th Five-Year Plan featured the development of the information industry. The Ministry of Industry and Information Technology (MIIT)’s key goals for the 2006-2010 timeframe were as follows: move the industry up the global value chain to higher value-added manufacturing and services; develop “global brands” for Chinese MNEs and increase domestic R & D capabilities; con-

tinue the focus on government procurement and subsidies to pursue new technologies; foster the development of Chinese standards; and accelerate construction of IT networks, particularly with regard to rural broadcasting, telecommunications, and telephone networks.

In October 2010, China unveiled its determination to develop seven strategic emerging industries in the State Council's Decision to Accelerate the Development of Strategic Emerging Industries. The seven "strategic emerging industries" are (1) energy-saving and environment protection, (2) new-generation information technology, (3) biology, (4) high-end equipment manufacturing, (5) new energy, (6) new materials, and (7) new-energy cars. The State Council approved the 12th Five- Year National Development Plan of Strategic Emerging Industries, which is a detailed national plan designed to implement supporting policies for the development of the seven industries from 2011 to 2015. China hopes the strategic emerging industries will account for 8% of the country's GDP by 2015 and 15% by 2020.

The 12th Five-Year Plan stresses a number of industries that the Chinese government wants to develop during the next five years. These industries are prioritized in order to bolster China's importance as one of the world's top economic powers through scientific and technological innovation, while at the same time balancing the country's need for growth against the necessity of protecting the environment and conserving resources.

Patents and Chinese Standardization

Enhancing sustainable S & T innovation capacity, China is working on a patent strategy to intensify the management of intellectual property, in an effort to encourage and facilitate innovations, and turn new findings into core competitiveness. In 2012, China filed 18,627 patents under WIPO's Patent Cooperation Treaty (PCT), overtaking the fourth-ranked PCT-filing country worldwide (Source: WIPO, 2013). Two Chinese companies, ZTE Corporation and Huawei Technologies Co., LTD., were ranked among the top ten applicants under the PCT system. With 3,906 published applications, ZTE Corporation of China remained the top applicant in 2012, while Huawei ranked fourth, down by 2 places comparing to the previous year. To encourage innovation and avoid foreign intellectual property, China has been developing indigenous technical standards. One example is the TD-SCDMA 3G standard. Time-Division Long-Term Evolution is being implemented as China's indigenous 4G stan-

dard. Supporters argue that it has increased technical abilities and experience, which has increased Chinese competitiveness regarding 4G.

With the aim of reducing China's dependency on foreign-developed technology, the Chinese are imposing some national standards. Technical standard strategy is also called on to establish China's own technology standard system, in a move to be part of the regulated competition, and strive for a leading position in S & T development. Today, the Standardization Administration of China (SAC), is in charge of the management and coordination of national standardization in China. All new items of national standards need to be registered and approved by SAC. The preparation and drafting of a national standard takes place in a relevant technical committee and the final draft standard is to be approved and issued by SAC. A few large companies like Huawei, Lenovo, Haier... as well as some large state owned enterprises have the ability to participate in standardization at national level and international level.

China's 11th Five-Year Plan for Standardization defines standardization as an enabling platform for indigenous innovation. It reflects a major transition in China's development model from export-oriented industrialization to an upgrading-through-innovation strategy. By an in-depth analysis of China's recent policy initiatives on indigenous innovation products, government procurement regulations, and the role of patents in standardization, it seems that to be successful in catching-up, needs must be adjusted once the strategic focus shifts to an "upgrading through innovation" strategy.

Cyber Attacks and State Intervention

Cloud computing has increased over the last few years because of the potential to revolutionize the operation and management of applications and data for corporate and personal use. This lies in the fact that cloud computing is operated beyond borders. Data security risks that involve the leaking of private information from domestic companies and the public to overseas pose a challenge.

According to the "China Internet Security Report 2012" reported by the National Computer Network Emergency Response Technical Team Coordination Center of China (CNCERT), in 2012, a significant net security incident did not occur in China, although monitoring and

intrusion-attack incidents to target the internet infrastructure of China have occurred often. Serious damage has not occurred, but organized cyber-attacks have become a serious security challenge for the internet's infrastructure.

Google and the Chinese government have been battling it out over the censorship issue for years, since Google began offering its search service in the country in 2006. The government would disconnect users from the Internet when they attempted to view politically sensitive material and Google would counter with workarounds.

But now, according to New York Times reports (Savage Charlie et al. 2013), the data from online providers including e-mail, chat services, videos, photos, stored data, file transfers, video conferencing and log-ins may be collected by Internet monitoring program. In confirming its existence, US officials said that the program, called "Prism", is authorized under a foreign intelligence law that was recently renewed by Congress, and maintained that it minimizes the collection and retention of information "incidentally acquired" about Americans and permanent residents. Several of the Internet companies said they did not allow the government open-ended access to their servers but complied with specific lawful requests for information. The Chinese government believes that the United States already is carrying out offensive cyber espionage and exploitation against China. Chinese believe China must protect its own assets first to go on the offensive.

Another example is according to the House Intelligence Committee report (House Permanent Select Committee on Intelligence, 2012) on Huawei Technologies Co. and ZTE Corp., China's two largest phone-equipment makers, subtly hinting at a massive national security breach in the making. The committee report says Chinese intelligence services could spy on the U.S. by using the two companies' equipment to tamper with American telecoms networks. Chinese telecoms companies were already meeting stiff resistance in the U.S. prior to the committee report. However, there is no doubt of a large impact on business from the world of global cyber security issues.

New birth of Chinese global ICT companies

With regards to ICT; by the number of mobile subscribers and Internet users, China has already become the world's largest major power user. In the background of a huge market

size, it becomes an advantageous position in the bargaining power externally surrounding the technology and standards. This is also the foundation for Chinese companies active in this market.

The performance of ICT firms was investigated comprehensively in “The Internet Economy Outlook” by OECD published in 2012, looking in particular at annual revenues, net income, R & D expenditure, net cash and employment for 2000-11. The top 250 ICT firms are ranked by 2010 total revenues, using the most recent financial year for which reporting was complete at the time of the data collection. Although China is by far the largest exporter of ICT goods, very largely driven by foreign investment and sourcing arrangements, only 3 Chinese firms were counted in the top 250 firms ranking. Anil K. Gupta and Haiyan Wang argue that the opportunity of the century will pass them by, when the firms think of China and India largely for off-shoring and cost reduction and limit their marketing to the wealthiest few people. Gupta（Gupta 2010）talks about why China and India are the only two countries in the world that simultaneously constitute four game-changing realities: mega-markets for almost every product and service, platforms to dramatically reduce a company’s global cost structure, platforms to significantly boost a company’s global technology and innovation base, and spring boards for the emergence of new fearsome global competitors.

Led by China and India, the rise of emerging Asia is transforming the structure of the global economy. By 2030, if not sooner, China will almost certainly overtake the U.S. to become the world’s largest economy. The strategies of China’s “attracting-in” (import and selective introduction of inward foreign direct investment, foreign technologies) and “walking-out” (export and outward investment expansion) have enabled it to achieve a leadership position in the world ICT industry. In the near future, the new birth of Chinese global ICT companies will continue to increase after the Asian “catching-up” era.

Conclusion

The ICT industry is the backbone of the Chinese export driven growth strategy, as the primary driver of China’s economic growth. Due to China’s growing domestic demands and the government’s investment, the Chinese ICT market experienced a period of high-speed

growth, and is expected to grow moderately from 2013 onward.

China has shown that it is one of the most powerful countries in the world. With the rising cost of labour, maybe we will see manufacturing firms shift from China to Southeast Asian countries. However, the Chinese government is promoting the integration of “Informatization” and “Industrialization” in order to open a path of new industrialization with Chinese characteristics. The integration of the two is a process whereby information equipment, products and technology are widely applied in industrial R & D, production, circulation and management in order to promote the development of digital design, intelligent manufacture, production automation, marketing networks and management information so that the general level of industry information can be improved. The integration of the two is also a process of personnel training, information exchange, knowledge development, and technological innovation.

The next challenge in the economic battlefield is the globalization of Chinese enterprises. Many Chinese companies have gone global through mergers and acquisitions, establishing capabilities beyond cost leadership, and other measures. There is no doubt that the next generation of ICT standards, in accordance with evolving standards, will bring a new birth of giant Chinese ICT companies. Chinese ICT will certainly have an increasingly significant influence on economic and social development both within China and worldwide.

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VII The competitive balance of strength

China has identifier very early the importance of the acquisition of information in the development process. The techniques learned in the East/West confrontation, particularly in the military industrial area, were reused in the economic field. To know-how from the Cold War China has added a systematic search for information in the industrialized countries.

Opening special economic zones, the Chinese authorities have focused on technology transfer to developing a competitive and able to quickly gain market share outside its borders industrial infrastructure. This policy of openness to foreign investment has facilitated the upgrading of China's economy in many industrial sectors. It has also resulted in a competitive aggression that some countries do not hesitate to call economic predation. This is the case in the solar industry, where the United States has taken protectionist measures to counter dumping policy practiced by Chinese firms. The European Union has adopted a similar approach in 2013.

1 A big step forward for the Chinese competitive intelligence?

Nicolas Moinet

Nicolas Moinet is a university professor at the Institut d'Administration des Entreprises (IAE) of the University of Poitiers. He has been a specialist in the field of competitive intelligence in France for 20 years and has written and cooperated to many books and articles on the subject. He published Competitive Intelligence Toolbox (Dunod) and Competitive Intelligence: Myths and Realities (CNRS Éditions) most recently. He is a doctor in information and communication sciences as well as a researcher at the Centre of Management Research (CEREGE) where he supervises doctorate theses. He is also an associate researcher for the Institut des Sciences de la Communication (ISCC) of the CNRS. He went on several trips to study national systems of competitive intelligence, especially in Japan and China. He supervises the Competitive Intelligence & Strategic Communication Master, the oldest French university course in this field, at the IAE of Poitiers.

Diplomatic Telegram

A French delegation composed of experts in competitive intelligence went to China.

A French delegation was invited to the Shanghai Competitive Intelligence Forum 2011 on the 20th and 21st of October. This Forum was partly devoted to the publishing of a book in Chinese, **National Competitive Intelligence: A Comparative Study on the French and Chinese Practices**, launched by a work group lead by the Professors Henri Dou and Qihao Miao, the President of the Shanghai Society for Technical and Scientific Information, situated at the Shanghai Library. With as a base the French model of competitive intelligence (CI), Mr Miao also wrote a confidential report destined to the Chinese authorities so as to promote a similar public policy in China. A part of this delegation then went to a French-Chinese seminar that is organised every year by the Competitive Intelligence Centre of Hunan Province. They also went to an experts' meeting in Nanjing.

Comments:

This visit resulted in a stronger cooperation between France and China in the CI domain. The strong involvement of the government in the French CI model is a feature that is of interest for the Chinese authorities. It is an influence that should be developed in the future. Nevertheless, there is still much to do, such as to obtain more information on the Chinese system in order to balance the exchange, and make way to a real cooperation.

A Chinese saying more or less states: "The one who goes to China for three weeks wants to write a book, the one who stayed there three months might try an article, and the one who stayed several years won't want anything at all." An important notion lies behind the humour colouring this saying: the complexity of a great country that has become a major economic power in a few years only. This is the reason why we offer here a feedback on a trip to China and the meeting we had there with Chinese experts or foreign experts. Our

aim is to make light on a partially visible process that is being built by questioning it.

From the 'Made in China' to the 'Made by China': competitive intelligence contributing to global innovation

The Shanghai Competitive Intelligence Forum (SCIF) was held on the 20th and 21st of October 2011. The few opening sentences of this Forum reflected the opinion that certain Chinese competitive intelligence (CI) professionals have regarding the world economic competition, and thus immediately set the tone for the small French delegation. For example, "Without Intelligence, your company will never win in the market", or, "We have to know the enemy" or, "Otherwise, as Sun Tzu reminds us," adds one of the speakers, "we will lose the battle." Yet, beyond these introductory sentences that aimed at motivating the audience, the Forum was focussed on innovation. China clearly wishes to change its status: from follower to innovator, from the 'Made in China' to 'Made by China'. By questioning its system, it decided to take advantage of the feedback to 'make its system fit to work'. This immediately coloured the tone of the programme[92] of the Shanghai Competitive Intelligence Forum 2011 that included conferences by Chinese, American, Japanese or French experts on:

- Economic innovation and CI;
- The use of patents to improve one's level of innovation;
- Innovation in the context of our very knowledgeable world;
- The Blue Ocean Strategy;
- Open sources in the United States;
- CI practices in Japanese firms;
- Technology and innovation transfers.

This 'Made by China' strategy could be analysed through the notion of re-innovation, which is defined as the "importation, absorption, and assimilation of foreign know-how".

"This is the method China chose in 2006 so as to catch up its lateness with the industry," explains Marie-Pierre Van Hœcke, "It is going to file Chinese or indigenous patents on

[92] http://www.istis.sh.cn/cisf2011/english/index.aspx

foreign technologies. And China is conscientiously applying its strategy. The submissions of 'domestic' patents have been tripled between 2005 and 2010. One could hope that Chinese engineers and researchers will bring some improvement to the're-innovated' foreign patents. The risk is that such practices could lead to the emergence of a global war of patents." (Van Hœcke 2013, p. 32) And the fact is that in 2011, China filed more patents than the United-States[93].

Besides this notion of 're-innovation', China also counts on original innovation as well as on rupture innovation. The fact that the themes introduced during the SCIF covered the entirety of competitive intelligence applied to innovation was explained by this global strategy. In addition to these classics methods and tools, more offensive practices are used. They are not publicized but cannot be ignored by the specialists of the field. A good example would be the genuine industrial patriotism; Chinese regulations require an information-screening process prior to any acquisition of national firms by foreign firms. Using a reasoning based on collaboration between public and private domains, juries mix State representatives and firms' representatives alike. They then evaluate the soundness of prospective buyers by analysing the information these had to provide, such as their industrial processes or their business plans (Van Hœcke, op. cit, p 31). Likewise, indigenous innovations benefit from a genuine national preference when the State has to purchase anything within six fields [94]. China has little to learn from other countries in this regard. Yet, the same cannot be said from the strategic use of open information, or of territorial intelligence. France is still a step ahead in these sectors.

Chinese competitive intelligence adopts a French touch

In parallel to this Forum that gathered almost two hundred participants, was held a meeting between a Chinese delegation and a French delegation. The latter were invited for the publishing of a book (in Chinese only) entitled **National Competitive Intelligence:** A Comparative Study on the French and Chinese Practices. It is the result of the collaboration of a workgroup lead by Qihao Miao, President of the Shanghai Society for Technical and Sci-

[93] Number of submitted patents in 2011: 526,412 in China, 503,583 in the United States, 342,610 in Japan and 142,793 in Europe.

[94] IT, communication, office software applications, software, new energies, energetic efficiency.

entific Information, and Henri Dou[95], university professor emeritus. A report describing the example of the French competitive intelligence was handed to the Chinese authorities, so as to promote a similar public policy in China just before the rise to power of a new team. A part of this delegation then went to a French-Chinese seminar that is organised every year by the Competitive Intelligence Centre of Hunan Province. They also went to an experts' meeting in Nanjing.

Qihao Miao is a renowned CI expert in China. He created, amongst other things, the independent Chinese branch SCIC[96] of the American society SCIP[97]. Yet this independence is not a cause for isolation, for Qihao Miao was once the editor of the Competitive Intelligence Magazine. But he is also the head of an institute for scientific and technical information in Shanghai, and advises the town council regarding ITs or even territorial CI. This pioneer's aim is not to deny the Chinese cultural intake on strategic intelligence (which is symbolised by the mythical Sun Tzu), he simply assesses that the priority must be given to learning methods that were implemented a long time ago in Occident. He especially insists on respecting the ethical aspects through the use of the 'guanxi' [98], a network strategy specific to the Chinese and that means that "you need to lubricate your social relations so that you can gain from them. There is a very positive aspect that is consistent with the CI theory and with the analysis of knowledge and the social context. Yet," explains Qihao Miao, "the setback is that the 'guanxi' can drive you to corruption and illegality, if, for instance, it leads you to mistake your own wealth with that of your society." (Godeluck, 2005).

In France, the tendency is to teach a culture of strategy to executives for whom market economy is an everyday concern. In China, on the contrary, the aim for managers would be to shift from a notion of administered economy to a market economy. Besides, as says Qihao Miao, Chinese managers who go study management at the universities in their country, need to learn theory before anything else. Would this be the reason why Chinese economists are particularly interested into France, which is, without a doubt, one of the occidental countries with the highest intellectual production in this field?

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[95] CI pioneer, Henri Dou is the Director of Atelis – France Business School.

[96] www.scic.org.cn

[97] www.scip.org

[98] For a complete perspective: Liu Pei, "Networks analyses in an intercultural perspective: Guanxi in China, Thesis for a Doctorate in Information and Communications Sciences defended at the University Sud Toulon Var on the 10th of September 2012.

France's legitimacy in terms of CI was acknowledged by Qihao Miao who recalled that the first expert to come and talk about this subject in France was the young Philippe Baumard in the early 1990s, followed then by Robert Guillaumot (Moinet 2010). That fact is that twenty years after the launch of CI in France [99], this meeting allowed a stronger collaboration between China and France in this field. Chinese authorities are very interested into the French CI model that comprises a strong governmental participation, and their choice of the French contributions was quite meaningful. In **National Competitive Intelligence: A Comparative Study on the French and Chinese Practices**, Alain Juillet (his former position as an Executive Manager for Competitive Economy could be used as an example; and he since became an Interdepartmental Representative in 2009) wrote a preface. It is followed by a collective introduction, and by five specific articles: history and tendencies of the French concept of 'competitive intelligence'; competitiveness clusters in Europe and in France; the role of the government and of professional organisations in the development of CI for food-processing industries; territorial CI with the example of the Poitou-Charentes region; and finally, a public/private approach of the influence diplomacy through the example of the French image policy regarding interstate competition.

Since we are dealing with influence here, we can easily wager that it will continue throughout the future. This said, there is still a lot to do in this exchange so as to obtain more information about the Chinese system, and therefore develop a true cooperation. And we still need to give ourselves the means to do so, especially since the themes that are tackled by the Chinese articles can only attract the attention of professionals. They are: CI strategy for science and technology in China, between cooperation and competition; CI and the development of naval construction in China; the implementation of a territorial CI centre with the example of the Hunan province; Shanghai's reflection and experience on a public CI platform for SMBs' innovation; and Shanghai's experience regarding international commerce surveillance and early warnings.

Almost 5,000 copies of the comparative study on CI practices in France and in China were printed and sold 28 Yuans (approximately €3). It was largely distributed to State executives, less than a year before the National Congress of the Communist Party of China took

[99] The report of the General Plan Commission – also known as Martre Report – already presented an annex on 'marketing intelligence' of the Centre for Scientific and Technical Information of Sichuan that was then translated from English (Moinet, 1994).

place and, during which it was to be renewed and welcome the 'Red Prince', Xi Jinping who replaced Hu Jintao at its head. The son of a former Vice Prime Minister whose mission was to create special economic zones, Xi Jinping was the designated successor to Hu Jintao. He is an important figure of the future China. As a consensual strategist, he is open to the idea of a 'new democracy' and to an extended participation of the unions and the entrepreneurs. He is close to the Army, as demonstrated by the fact he was Vice Chairman of the Central Military Commission, but remains open to the world. For instance, he sent his daughter study at Harvard. There is not doubt that Chinese competitive intelligence will never remain a simple concept. Also, as the second world economy who wants to shift from a status of follower to one of innovator, China will know how to give itself the means to apply its policy as it did in so many other fields.

A huge step forward... but in which direction?

China now seems to have left the cocoon status of competitive intelligence. According to Qihao Miao, more than a half of the big Chinese firms admit practicing CI activities, a fact that compensates the absence of structure of the CI state system (Marcon & Moinet, 2011). The Chinese thus develop practices in provinces and big cities in an empirical manner. The common theme? Innovation. One of the most successfully completed examples today is the Competitive Intelligence Centre of the Hunan Province. Its director, Xuekui Xiao considers that the point is to understand competitive intelligence as a chain composed of five links: facts, data, information, knowledge and intelligence. He explains: "This way, thanks to the gathering of technical data on rivals (technical CI) and of information on the environment surrounding the sectors (environmental CI), government services and the people in charge of the CI in activity sectors, can develop policies, create and rearrange the legislative and regulatory environment so as to favour local economy. They encourage the structuring of clusters as well as their upgrading, through the planning and the formulation of policies based on both business intelligence and intelligence regarding the market and other productive situations. The final objective is the constant increase of competitiveness in the regional economy." (Xiao 2012, p14).

For all that, strategic sectors have been defined on a national level: health, medical, iron, mines, naval and aeronautical industries, electronics, green energy. On an international

level, China has implemented a real CI strategy regarding the establishment of standards. Likewise, several experts regard the technologies' attraction process by joint-ventures as a mean to systematically send students follow the experts' occidental trainings and courses: a well-known system that drains technology and knowledge towards China, before eventually alienating occidental firms that have become obsolete. And one must not forget about the offensive actions of the Chinese secret services (Faligot 2008). Truth or fantasy?

Conclusion

Philippe Clerc (then the Director for Competitive Intelligence at the Assembly of the French Chambers of Commerce and Industry [100]) quoted Qihao Miao in the preface of the book Made by China: the Secrets of an Industrial Conquest (Dufour, 2012) and explained that:

"China counts Taiwan amongst its models for its industrial experience. As a very small country, Taiwan is launching its third technological revolution, particularly thanks to the projection of 'networks of technological and scientific intelligence' on markets. This country successfully developed multinational companies through the use of special strategies that are based on the 'endogenisation', the imitation and the integration of know-how enriched by purchased technologies.

Thus is China's strategy, as it retains communism's specificities that it assimilated to make 'more Chinese': retainment of the centralised communist power, strategy of openness and of commercial hegemony that rests on an industrialisation policy with an upscale move, and an added-value production with an important financing from the State.

The Chinese industrial environment has therefore operated a transformation thanks to the impulse of several factors. In the end, these factors have opened a competitive confrontation, and thus a strategic learning process of techniques and approaches that are part of it." (Clerc 2012, pp. 11-12).

There is then a certainty: the level of practice and of structuring of the Chinese competitive intelligence is going to carry on progressing with big companies and regional centres as its

[100] It became CCI France: www.ccifrance.fr

strategic hearts. Yet, given the geo-economic stakes and the necessity of developing an open information culture, the Chinese government will not be able to ignore and demean a public policy of competitive intelligence. Chinese competitive intelligence would therefore take a huge step forward.

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2 Technology transfers and innovation in China: Technical sovereignty and techniques for gaining sovereignty and power

Isabelle Bocquillon

An engineer in physics by training, Isabelle Bocquillon subsequently focused on risk management, working first for France's nuclear safety authorities and then for Electricité de France (EDF). After serving as an expert with the national crisis management team, she has specialised in various areas of security and management that require acuity in terms of trend monitoring and the sharing and delivery of information related to the design of advanced technological processes and human organisational structures. In addition to supervising Ph.D.'s, she lectures at various international relations institutes (Lithuania, Turkey and Slovakia) and at the School of Economic Warfare in France, addressing issues that relate to geopolitics.

In spite of its considerable size, no country has every moved as fast as China [101]. In 2007, OECD (2007) experts were sceptical about the innovation capacity of the Chinese, emphasising the need for technology transfers. Five years later, the strategic analysis and numbers speak for themselves (Fortat 2013). China has, since 2012, ranked No. 1 worldwide in terms of training engineers and scientists, pulling in front of the US, which it also now surpasses in nanotechnology R & D spending [102]. The number of foreign R & D centres in China rose from 200 in 2004 to 1,300 in 2010, making it the largest country where English is spoken, including by the tens of millions of Chinese who have returned home after studying abroad. Accounting for 12% of global R & D spending, China is resolutely moving up from the number two to the number one slot, which observers estimate it will hold by 2015, given the resources being devoted to this goal: the share of GDP devoted to public R & D should double to 2.5% by 2020 [103], and the country recently announced the creation of about 100 more universities, after 11 existing ones were ranked among the top 200 worldwide[104]. There are 25 million students in China overall. The country has also risen from

[101] China's share of global GDP rose from 5% to 15% between 1950 and 2012, and it is aiming for 24% by 2030.

[102] $2.25 billion vs. $2.18 billion in the US, where several nanotech R & D centres have cut back their budgets.

[103] Analysts estimate that this official target, included in the "National Medium- to Long-Term Plan for the Development of Science and Technology (2005-2020)", will be met, following the measures taken in 1995 (the targets for nanotechnology having already been achieved).

[104] http://www.topuniversities.com/world-university-rankings/qs-world-university-rankings-2011

the 14th to 2nd ranking worldwide for scientific publications. Patents on inventions have already increased tenfold in recent years, and China's National Patent Development Strategy 2011-2020 calls for the number to rise from 1.2 million to 2 million by 2015 (with the number of patents filed outside China doubling). Foreign doubts about whether the country is not putting quantity before quality are increasingly being removed.

This dynamism and the sheer size of the country are creating a paradigm shift that makes it hard to compare China to other emerging markets, if only because it is home to more than 20% of the world population (1.4 billion consumers). Whereas when Japan was the technology leader in the 1980s, it, with Korea and Taiwan, barely accounted for 10%. Bearing this in mind, in what terms should we think about innovation and technology transfers in China today? Not in terms of government support, though it is considerable, and consistent with the country's centralised system and programmes developed in 1983 for the 2050 horizon [105]. Obviously, the central issue is no longer one of the procedures – some more legal than others – behind transfers and innovation, since in the past ten years these have become clear, both through R & D relocated to different parts of China and through transfers into the country by Chinese nationals from abroad. And lastly, there are no longer any doubts about China's ability to follow through on its autonomous innovation programme: it will meet this goal, more or less on schedule, thanks to exchanges between the national and local levels. Today, the main question seems to be about the rest of the world: how will it be affected by the existence of a central pivot delivering so much innovation of its own? Where will global technology transfers come from in future, and what kind of foundations and leverage will China have?

We will discuss here the geostrategic changes under way, and the review societal conditions in China and the country's specific technological duality.

[105] The 12th five-year plan, for 2011-2015, built on the goals outlined in the 2006 S & T plan, which was a continuation of the measures introduced in 1983 already with an eye to 2050.

R & D and technology transfers in China: a geostrategic metamorphosis

Transfers, t for two: from R & D to the quest for sovereignty and power

For its 863[106] and 973 R & D programmes, the Chinese did not follow the South Korean model to the letter, Asia having experienced an economic crisis in the 1990s. With its opening-up policy, some of China's elite had been trained in the US, so the country took teachings from Japan-Korea and America and adapted them to its very unique governance system wherein resources are decentralised but the same cannot really be said of power. Following a period of massive technology transfers from all sources[107], China is working hard today to position itself in the upstream portion of markets, in an area very closely related to R & D: that of standardisation (Ernst 2011). Since the early 2000s, it has introduced projects 211 and 985, to which 40 of its top universities are contributing, and it participates in or is an observer to more than 600 international standards bodies. The fact is that autonomous innovation could allow China to impose its standards on the rest of the world. And it has every incentive to do so, since this would enable it to shift its economy towards high value-added technology segments while also eliminating the West's technological supremacy. In a word, China's research through development strategy seems to be a quest for sovereignty[108] and power. This is leading the country to monitor foreign research conducted on its soil on high-stakes technologies more closely and make its own R & D, both private and public, more international, which it is doing in various ways.

Where the former is concerned, the country has set up 14 Special Economic Zones along its coasts, along with some 60 High-Tech Industrial Parks (HTIPs), especially to serve its Torch programme. They have been attracting exceptional growth in foreign direct investment (FDI)[109] since 2008, although several ministries have recently been authorised to conduct close anti-cartel surveillance. The joint ventures in question – the country has historically required this type of arrangement to ensure technology transfers – are being ordered to step up their R & D with performance criteria also improving, including in terms of how

[106] 863 is a reference to March 1986.

[107] Notably through the Torch programme, approved by the State Council and managed by the intelligence arm of the Ministry of Science and Technology, the aim of which is to integrate cutting-edge technologies into industrial manufacturing processes. The programme involves about 60 industrial parks, hundreds of incubators and millions of employees.

[108] By definition, sovereignty means imposing norms that take precedence over all others.

[109] Between 2010 and 2011, FDI increased by 9.72%, to $116 billion.

innovative products created or “re-created” in China are marketed. Before mergers and acquisitions are approved in strategic areas, proof must be provided of the link between the national interests set forth in the five-year plan or white paper and future R & D programmes, with this entire process being supervised closely by the NDRC [110]. In sum, China is using a variety of means to boost the productivity and efficiency of different types of R & D, with technology transfers continuing to play a central role. It is notably focusing on strategic takeovers involving state-owned enterprises (SOEs), and applying tougher intellectual property standards (International cooperation workgroup 2010) all the way down to SMEs[111], especially in segments where technological value added is high. This has made the offset agreements included as riders in foreign supply contracts all the more important.

As regards the internationalisation of its R & D, both public and private, China is using different types of leverage that could prove rather formidable for Western countries. The first thing to remember is that for China, innovation and transfers that come from foreign countries are substantially more profitable as they save time, boost the patent scores of its research bodies in international rankings, and bring with them knowledge about management methods used elsewhere. In 2010, the Chinese filed 6,970 patents with the US Patent and Trademark Office, 2,049 with the European Patent Office and 1,063 with the Japan Patent Office. Even more remarkable than the numbers themselves is the fact that they increased by 19.6% that year in the US, by 35.7% in the EU and by 37% in Japan. Other figures can be used to illustrate how China is working to assimilate Western management skills: 80% of researchers at its national Academy of Sciences and 54% at the Academy of Engineering have studied in the West (Schaeffer 2006) (more than half of them in the US), as have 22% of the top executives at Chinese firms. Another move in China’s quest to internationalise its R & D was its decision to export to Southern countries its highly successful model of economic zones and associated technology transfer. For instance, the idea of special economic zones was at the centre of the new phase of the partnership agreed on at the fifth annual Forum on China-Africa Cooperation (FOCAC) organised on July 19 & 20,2012 in Beijing, with support from Huawei, ZTE and others. The Chinese had previously set up this

[110] National Development and Reform Commission.

[111] The country has been reported to the WTO for failure to comply with TRIPs (Trade-Related Aspects of Intellectual Property Rights), notably because of allegedly illegal technology transfers. China also adopted a law on February 10, 2010 on “substantial interests”, potentially compromising patent applications by foreigners in the country. Along these lines, it has introduced an “indigenous innovation” certification policy.

type of zone in Egypt and Zambia, and may do the same in Angola, Ethiopia, Ghana and possibly Nigeria. They are also creating training centres for Africans, so they can have access both to local labour and future consumers. In some cases, R & D centres have been set up in Africa, with an impressive $166 billion invested, i.e. more than the considerable amount currently received through all FDI in China. On other continents, South-South tech transfers have been organised: for instance, the relocation to Brazil of the head of Xi'an's Development & Design Technology Centre in May 2011 was highly productive, especially at the R & D centre in Sao Paulo ($200 million), where Brazil's state-owned aircraft maker Embraser was able to learn about Dassault and Boeing processes from the Chinese.

China to become the world leader for innovation: transfers of sovereignty and power through technology transfers

China's technology transfer and innovation policies have recently allowed some domestic firms to move up to the international technology development level. Be that as it may, it is still not easy to evaluate their ability to innovate on their own[112]: to use the example of one of the biggest names in this area, Dalian Machine previously effected a hostile takeover of Ingersoll and a large stake in Zimmerman. Similarly, Suntech Power had taken over Japan's MSK Corp. and Germany's KSL-Kutter Automation Systems. By taking these various paths into the world of technology (World Bank 2013, pp. 161-227), China has become a global leader in innovation, especially in areas that fit with its power strategy. For instance, everyone was caught off guard by the speed with which it sent its first astronaut into space using its own technology (albeit inspired by Russia's LMF ii), and at the same time launched about 100 satellites of different types (weather, surveillance, telecommunication and navigation, with its Beidou system), all with the Shenzhou launcher that had just been developed… in China. All of this has left Western countries to deal with a nascent low-cost market in strategic capital-intensive areas. They will have to adapt quickly by adjusting their business models if they want to stay competitive and avoid losing market share: by 2020, the cost of launching satellites[113] with space rockets will be halved thanks to China, where effects of scale translate into very low sourcing costs. The country's aerospace capacity is not totally separate from the aircraft capabilities it is acquiring. It was thought that technol-

[112] Examples from industry include Huawei and ZTE (telecom-NICT), Suntech Power (energy) and Dalian Machine Tool Group (engineering).

[113] This is a substantial market, as illustrated by the programme named "O3B", for "Other 3 Billion", an allusion to the fact that 3 billion people still do not have access to the internet.

ogy transfers were protected – either because assembly operations were relocated without critical components (Airbus), or because it was believed that critical components were not being provided (Boeing realising after the fact that it had transferred its onboard electronics, particularly the autopilot system). So when AVIC and COMAC announced in November 2012 that they were developing their own jet engine for 2015, it cast a chill over the four leading makers of this key component, and took airline manufacturers by surprise as well. Had it not seemed that it would take China at least ten years to do this, with the West enjoying its 'technology advantage' in the meantime? The output of these firms immediately became dependent on China's planning schedules, which are not always kept, a shift that could pose as much of a security threat as the scarcity of materials required for high tech production.

A second, crueller consequence would be if Western firms had no chance to compete in tenders for the 200 civilian helicopters and 4,000 new jumbo jets Asia will need by 2020, with China's COMAC C919 possibly winning out as early as 2016, both in the domestic market and internationally, at the expense of Europe's A320. China has been gaining ground so quickly in part because employees and subcontractors are becoming more skilled, particularly when they are working through JVs and are able to assimilate the technical and managerial skills of foreign partners. In the equally strategic area of energy, China benefited from[114] civilian nuclear technology transfers from as many countries and with as many licences as possible and then positioned itself among the world leaders on other technologies for diversifying energy mixes: wind power (Sinovel No. 3, Golwind No. 5 and Dongfang No. 7), solar power and electricity storage (Build Your Dream, Gazlanz Group and HiSense Group). This positioning has already carried a price tag for the West. For instance, Gamesa, which ranked No. 3 worldwide at the time, was forced to source at least 70% of its components in China to gain access to that market (yet another example of a violation of WTO rules) and to provide training to Chinese subcontractors. Five years later, these same subcontractors became its competitors, and captured more than 80% of

[114] Sometimes as much as 90%, for instance the plans for the new AP1000 passive nuclear reactor from the US, which it simply acquired to turn it into the Chinese CAP1400: the plans reportedly cost $400 million, plus $15 million in royalties per year and per reactor, which is well below the initial $8 billion, creating competition distortion for Europeans.

their domestic market[115].

Societal issues, upstream and downstream: operability of technology transfers and innovation in China

For the technologies acquired to pay off over the long term, China needs a competitive market with an open management style along with design capabilities and good customer relations (Kao 2007). Its ability to create these will depend in large part on the recently-created middle class, which holds promise for Western firms given the size of the market, but also poses threats, since addressing it will require an all-out drive for low-cost sourcing. This growing middle class will provide leverage both for technology transfers and innovation in China.

The middle class has begun to recalibrate R & D and tech transfers towards the needs of civil society. For instance, the "Built in China for China" movement is changing the landscape, both because a mass effect is required in the internal market for new developments to be competitive and productive, and because rampant urbanisation requires innovation on the technical and management fronts to ensure that environmental factors are considered: as is accurately said in reference (World Bank 2013, pp. 161-227), "urban development strategy intersects with strategy for technology development and growth". Megacities produce talent and ideas, serving as in-situ sources of relative creative freedom. The ability to switch to a more bottom-up approach (from the local to the central level) through "home-grown innovation" will be all-important if the environment (human, natural and industrial) is to be taken into account in shaping technology transfers and innovation in China.

This same middle class will be educated and the source of new scientific brainpower. As such, the state will have to invest ever-larger amounts in this key source of human capital. For this to happen, the school system, like the economy, will have to start encouraging creativity, team spirit and open communication. New ad hoc teaching methods will need to be introduced to this end, since the current system is based on passive learning. This will involve a shift in the governance of Chinese firms, which employ almost half of the country's

[115] Gamesa has nonetheless seen its sales double in China, given the huge potential for wind power there, notably in Inner Mongolia. Rather than taking their case to the WTO, US firms have imported the same low-cost components from the Chinese rival they helped create.

scientific researchers, away from the very cultural "market-oriented" system to one that is more "creative-oriented" (World Bank 2013, pp. 161-227). Going forward, their business plans will have to be centred round innovation and technology transfers, moving beyond a top-down style toward one geared to business executives who are knowledgeable about risk management, project management, and tools to measure how efficiently their own R & D is being managed. Above and beyond transfers of actual technologies, which the West has not always controlled perfectly, what the Chinese need most is a transfer of work methods. China is aware of this, which is why it is currently enhancing its ability to operate with scientific networks[116], notably forging links between private and public R & D so the latter can benefit from the momentum international exposure has given the former. To officially confirm that initiatives are allowed (though regulated), the state is implementing systems to calibrate its various research bodies, public and private, and will introduce awards to recognise researchers. It is also stepping up training cooperation with foreign countries and even trying out ethical standards. It is worth noting that when companies emerge outside the remit of SOEs, they tend to create positive momentum through R & D investments. They are also closer to consumers, both domestically and internationally, meaning they are more in tune with market signals. The goal is thus to create an 'aura' underpinning the creation of brands and the development of patents and standards, all of which helps China expand in the global market, just as Lenovo has become the world's third-biggest PC maker.

Civilian-military transfers: duality and security

On the fast track: duality and sharing of transfers in China

China started reorganising in this area in 1998, and said openly that it was doing so (Harlan 1998), at a time when its around 300,000[117] debt-laden and corrupt SOEs employed 70% of workers in China but only generated 30% of national revenue. COSTIND[118], which was founded in 1982 and the army's pillar of "Defence Science and Technology Information", operating under the aegis of the State Council, was put in charge of sorting out the contradictory demands coming from military R & D and the related industrial fabric[119]. The goal

[116] 1.2 million researchers out of a worldwide total of 6 million.

[117] Reduced to about 120 post-reorganisation

[118] Commission of Science, Industry and Technology for National Defence.

[119] A lack of coordination had given rise to several high-profile failures, one example being the FB-7 attack aircraft that was in development for 20 years but was not operational.

was to modernise the system to allow mass production, notably of weapons, and begin to convert the defence industry by moving toward “spin-ons” in the military-industrial complex. Its first step was to create the “big five”[120] that would be responsible for R & D in both sectors, with a distinction drawn between electronics for the defence industry and for cyber-security and cyber-defence. The plan was for this process of decentralising resources to take ten years (still under way), with the General Armament Department (GAD) playing a central role in identifying needs, allocating resources and coordinating. Similarly to a matrix, those operating in high-tech industrial development zones (HTIDZs) identify within companies technologies that could also be used for defence applications. The Chinese Academy of Science (CAS) plays an important role where civilian interests are involved, cooperating with the Chinese Academy of Engineering Physics (CAEP), which is notably responsible for the nuclear weapons programme. They distribute the crossover R & D programmes between leading institutions, renewing their labels and budgets every year. A clean separation of the civilian and military activities conducted within the big five was considered but never implemented for them or other crossover companies: research may in some cases be conducted jointly, but development may have to be separate, depending on the application. The current position of the civilian-military balance in Chinese R & D suggests that the mastermind behind many foreign technology transfers, the GAD, is less constrained in terms of budget than before[121] to deliver the transfers demanded by the Army[122], the PLA, whereas the latter seems more interested in quick results and thus less keen on the idea of autonomous innovation than the COSTIND[123] or industrial companies involved. Moreover, the retraining of employees, particularly researchers, is a custom in China, and it poses another challenge in terms of training-reconversion and the resources actually available for this purpose. China’s dual corporate culture is profoundly risk-averse and resistant to change, a system based more on authoritarian rule than imagination and creativity. At the

[120] One could almost say that five government departments were replaced by five companies: China National Nuclear Corp (CNNC), Aviation Industries of China (AVIC), China Ordnance Industries Corp (OIC/ Northern Industrial Corp), China State Shipbuilding Corp (CSSC) and China Aerospace Industry Corp (CASC).

[121] In its 2012 report, the Stockholm International Peace Research Institute estimated China’s budget for 2011 at $143 billion, the second largest in the world behind that of the US, for a year-on-year increase of 12.7%.

[122] The army operates with more than 10,000 companies including Poly Technologies Corp and Lantian Corp (Air Force).

[123] The COSTIND currently controls 11 civilian/military crossover groups, notably shipbuilding firms that make methane carriers and tankers.

same time, the skills of the Chinese are being mobilised for a wider variety of tasks in the field of security, particularly due to the country's new strategic priorities related to high-tech, as alluded to elsewhere, for instance cyberspace and developing the rare earths that are indispensable to high-tech in the West (duality of civil-military R & D at the Baotou Research Institute).

Internal and external security

Civilian (Maulny 2013) and military R & D (Daguzan 2005) are being increasingly pooled as the number and nature of security issues evolve. One example is the use of drones for both internal and external security, i.e. civilian and military applications. Serious legal issues are being raised by allegedly illegal technology transfers to China for defence purposes, and the number of disputes could mount as the country's budget grows. One good illustration is the Russian Su-27 combat jet, which reappeared as the Chinese J-11B in 2007 after China abruptly, and wrongfully, cancelled the contract in 2004. Similarly, Canada is claiming that China misused the technology transferred to it for civilian helicopters to create the Z10 combat helicopter, which came out late in 2012 and was indeed made using the Pratt & Whitney technology. The Z10 now competes directly with the American Apache and Russian Mil Mi 28. In this same sector, the Chinese president announced late in 2010 that the country was building the J-20 stealth fighter, the Kongjing 2000 airborne warning and control system and the Changjian 10 cruise missile, and putting the first Chinese aircraft carrier into service. One cannot help but notice the many overlaps between the weapons and energy industries: in 2011, Algeria received a frigate equipped with 300km-range missiles while oil and gas negotiations were under way. The J-9 fighter was supplied to Libya in exchange for concessions in Sirte. Artillery was sent to Nigeria and China gained access to the country's uranium mines[124], making similar arrangements in Sudan for oil concessions. And China is applying this same strategy to southern countries on other continents. The fact that discussions were starting with Brazil in 2011 about three nuclear submarines, just as AVIC was being awarded a contract, is a case in point: the clauses governing military transfers to China related to the SNECMA M-88 engines of the Rafale and Thales cockpit life support and controls systems, in exchange for which Brazil received engines, weapons and the Russian SU-35 navigation system, which was copied in India!

[124] China North Industries Company (Norinco) supplied S-86 and QBZ-95 rifles, and even ZM-87 laser weapons, banned by the United Nations.

Here again, the number of South-South transfers is increasing, which China is resorting to because of the arms embargo by the US and EU.

Conclusion

The question of how technologies are transferred is central to the domination-dependence game, and vice versa. This is leading China to take shortcuts in technology transfers, focusing instead on the inventions of the future, and in doing so challenging our ideas about the technology maturation process. In the meantime, it is using the traditional transfer model, particularly the so-called “flying geese” paradigm (continuous waves of transfers from developed to less developed countries). It is doing this through an Asian regionalisation policy, hoping to be seen as an integrator. The inclusion of other Southern countries in its practice often ties in with its weapons market and, consequently, its bids for projects relating to sovereignty. All of this allows it to make fast technological advances, increasingly involving direct South-South technology transfers. If this trend continues, some counterparties from Northern countries will be eliminated from negotiations for access to civilian and military markets, as well as resources. The question of responsibility in current transfers between states and their industries is thus becoming more pressing, particularly when technologies tying in with sovereignty are concerned. The impact of the strategic resources China is mobilising is being underestimated by the West, which is undoubtedly too sure of its own control and the time it has before it, even though UNESCO sounded the alarm bell in 2005 in a report tellingly entitled: “China Challenging US and Europe in Scientific Research”. With a preference for bilateralism, China frequents multilateral bodies to take advantage of divisions between Western countries: when one company refuses to transfer a technology, another one agrees to do so. This was the case with the high-speed train transferred in 2004 by Japan’s Kawasaki to China South Locomotive (CSR), which perfected it and now competes on the international scene with Siemens, which had also transferred its technology, and Alstom, which had refused to do so following its problems in Korea. Industrial firms consider that the risk of being excluded from the market is greater than the risk of transferring technologies, since without the revenue from the Chinese market, they would no longer be able to fund their R & D to try to gain a technological advantage. More and more doubts are being expressed about the West’s ability to keep its lead in terms of technological innovation. Advanced countries are adapting their methods of protecting non-

transferrable technologies. For instance, they are looking more closely at parts of the value chain where material interoperability is possible (these being tactical vectors for standards) and those where it is not at all possible (stronger intellectual property protection), or they are segregating applications very carefully, as is done with semiconductor materials (for example, optoelectronic applications for a given silicon wafer depend on mineral impurities implanted to create nano-currents, and determine the potential civilian or military application of the finished product). The West is making its business architecture more complex to better protect is technologies and thus better control direct and indirect transfers, and this know-how will not be transferrable.

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3 The competitive balance of strength, the strategic value of predation

Emmanuel Meneut

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In strategic culture, the predation notion is linked to a political actor decision making process. His goal is not simply economic interest. He is also looking for political gain through an asset he dominates. Generally, predation strategy is spreading in economy when investment and companies' margin are constant or decreasing. In the case of China, this notion seems inadequate to describe its "pacific rising" since 1979, its last armed conflict with his Vietnamese neighbor and the beginning of its economic modernization. This expression from the political scientist Zheng Bijian, accounts for the renouncement of coercive policy and the comeback of China as a great international economic power. A position it had lost since the middle of the XIXth century with the rise of western imperialism (Mitter 2008). Actually, China is the second world economic power since 2010. Its economic development followed the strategy of technologies transfers and low cost labor instead of wealth predation from its partners and neighbors. However, we are describing the case of wind energy chain development, to highlight a permanent feature of the Chinese decision making and strategy, through the notion of structural predation within the field of energy infrastructure. Our analysis focuses upon the decision attributes and the implementation stages of the wind technology since the middle of the 1980s. We will see how Chinese strategy necessary leads to the predation of its domestic market, and then the international one, in its development model named the "Beijing Consensus".

The Chinese wind energy development

Globally, in 2011, “clean tech” investment increased by 17% to $257 billion. The developing countries, included China, represented 35%. Wind energy is closed to 20% of this amount (Pialot 2012). In 2011, the world wind capacity was 238 GW (IRENA 2012). It was a 20% annual growth or +40.5 GW. Upon the last decade, the average growth rate was 28% (IRENA 2012). China represents 26% of the world wind capacity. The Chinese capacity increases of 18 GW. It is the same value as 2010. It represents 44% of the added world wind capacity (IRENA 2012). So China is the dominant actor of the wind energy capacities sector.

Following the Chinese wind energy development phases, we will identify the important role of the State and its correlation with the wind capacity level. Our purpose is to illustrate the impact of its decision making process. The implementation of wind capacities may be described through four stages:

- Phase 1: inception and demonstration, 1986-2000, 404 MW
- Phase 2: domestic market securization 2001-2004, 765 MW
- Phase 3: growth of national actors, 2005-2007, 5 871 MW
- Phase 4: domestic market domination, 2008-2011, 62 733 MW

The origin of wind technology is in Germany and Denmark during the 1980s. The local development of wind farms demonstrated feasibility and initiated an industrial wind sector in Northern Europe. The limits of its energy market led these producers to look for oversea opportunities. These prototypes were useful for local power demand. They strengthened users’ energy autonomy. Local communities were a key factor for success. These advantages drove wind turbine producers to look for developing countries, like China, where the energy situation was in accordance with such features.

Phase 1: inception and demonstration, 1986-2000, 404 MW

A relatively long first stage started in China with the evaluation of feasibility through experimental wind farms financed by foreign turbine producers, Germans and Danishes. It was the case in 1986 in Rongcheng (Shandong) and in 1989, in the Nan’ao Island (Guangdong) (IRENA 2012 & Laurent 2012, pp. 34-37). In 1997, once the proof of concept was validated

and the gain in energy autonomy was translated in the security framework, the China State Planning Commission determined a capacity goal of 1 000 MW for 2000. It was reached at 40% or 404 MW (IRENA 2012).

This capacity was developed by joint ventures with foreign companies from countries which had financed experimentation, for example, between the Chinese Xian Aero Engine and the German Nordex Balck Durr (IRENA 2012). Local companies had limited supply capacities. They produced turbine with a power range of 500 kW (IRENA 2012). At this time, 97% of installed turbines in China were built with imported components (Caprotti 2009, pp. 6-10). To enable the growth of a national industrial wind sector through these joint ventures, the government initiated a localization program in 1997. It constraints all wind turbines to contain a components ratio of 80% from local producers (IRENA 2012). The purpose was to increase the proportion of Chinese components, in order to increase domestic turbine supply capital. This first try is also linked to an import taxes regime. Between 1990 and 1995, there were no importation taxes for wind components; the government's goal was to convince foreign partners to transfer technology to ignite an industrial base. Then, between 1996 and 1998, an import taxes regime was established to reinforce local production incentives (Caprotti 2009, pp. 6-10).

As early as 1997, the environmental concern with the Kyoto treaty could have also favored this political willing of clean energy development. However, the IXth five years plan (1996-2001) was built more on the national development target than a real environmental issue. It really appeared with the XIth (2006-2011) and XIIth (2011-2016) five years plans. The XIth goal was to get 15% of energy production from clean energy chains. For instance, wind energy should reach at least 30 GW to feed 30 million homes with "clean" electricity (Caprotti 2009, pp. 6-10).

Phase 2: domestic market securization, 2001-2004, 765 MW

This political will of an industrial sector development was asserted with the Xth five years plan (2001-2006). The National Reform and Development Commission (NDRC) framed a field's grant program, wind sources, tailored to guaranty turbine producers with a market. The goal was to favor joint producers, Chinese and foreigners, investment to increase technological capital growth. This program offered wind fields concessions through competitive

bidding under the constraint that wind turbines contained at least 70% of local components. It is a little decrease from the precedent level, but without significant strategic consequence (IRENA 2012). In parallel, the Chinese government dropped the import tax regime, because it was less efficient than the grant program, to increase the local components ratio. It revealed the strong strategic concerns of the State and its pragmatism for the development of this industrial sector.

This phase set the conditions for the national wind sector take off. It is a lever of securization for this new energy chain. The Chinese companies are a mean of wind sources securization. The Chinese wind industrial sector started to grow between 2003 and 2005. The local wind production went from $25 million to $104 million. In the same time, the importation share increased from $35.9 million to $211.9 million (Caprotti 2009, pp. 6-10). The Chinese producers' shares were 18% of the 765 MW capacity already installed in 2004 (IRENA 2012).

Phase 3: growth of national actors, 2005-2007, 5 871 MW

This growth strategy was amplified by the Renewable Energy Law (REL). Indeed, it imposed upon the electricity carriers a standard "feed in tariff" for renewable energy chains. It framed the wind energy economic utility greater than fossil sources. It secured the level of output for wind turbine suppliers and their worth (IRENA 2012). It also set the goal of 1% of electricity from renewable sources in 2010 (IRENA 2012). The REL was a tool to increase the share of renewable energy in the energy supply structure. It was also a strategic move toward an increase of the total energy supply output (Caprotti 2009, pp. 6-10). During this period, the Chinese government added a new criterion to its decision making. This process already rested on the security gain of wind energy. It added the economic competitiveness criterion to promote the national sector development.

In 2007, two years after the REL, they were 40 local turbine producers. One year later, they were 70. It was an exponential growth of the industrial sector. All the great foreign producers had installed supply capacities in China: Gamesa, General Electric, Nordex Suzlon, Vestas. These producers had been leaders of the Chinese market until 2007. But, one year later the Chinese producers got 50% of the market share. The installed cumulative capacity was 5.871 GW (IRENA 2012). Since then, Chinese producers were more and more pres-

ent on their market (Caprotti 2009, pp. 6-10).

Phase 4: domestic market domination, 2008-2011, 62 733 MW

In 2008, as soon as the industrial base started its growth, the central government amplifies the concession program. It identified 7 regions to install several dozens of GW of wind capacities: Heibei, Mongolia, Jiling, Jiangsu, Gansu and Xinjiang (IRENA 2012). These wind sources were on the coast, where is the most important share of electricity consumption. They also were in the interior areas, where the gain in autonomy is the strongest. It is an advantage for energy supply security; because it reduces coal train transportation saturation or its sea imports obstacles.

In 2010, this program reached 22 GW of installed capacity. It is 49% of the 44.8 GW existing capacities. This level should reach 69 GW in 2015 and 138 GW in 2020 for a total capacity of 200 GW. In 2011, the total cumulated capacity in China is about 62.8 GW (IRENA 2012). It is more than half of the Chinese cumulated capacity planned. Today, this program is made of 83 projects. It enables concentration of the wind sector whose number fell to 29 companies; it is a 57% decrease. In 2012 the national supply capacity is 29 GW per year (Laurent 2012, pp. 34-37). The 5 first turbine producers represent 11.5 GW of this supply capacity and 80% of the national market, they dominated it (IRENA 2012):

- Goldwind: 3.6 GW, 20%
- Sinovel: 2.9 GW, 16%
- United Power: 2.8 GW, 16%
- Mingyang: 1.2 GW, 7%
- Dongfang Turb: 1 GW, 5.4%

In 2008, among these Chinese groups, two were part of the world top ten: Goldwind and Sinovel. In 2011, at the end of this phase, 4 Chinese companies were member of this list (Laurent 2012, pp. 34-37).

As a consequence, in 2010, China ended its requirements of local components ration of 70%. Practically, all turbines are supplied by local producers. Since 2008, the import taxes regime has been reactivated for low level capacity turbine, less than 2.5 MW, which are

used to take advantage of low wind. It is also a tool to drive wind turbine toward more important capacity level (Caprotti 2009, pp. 6-10). The result of this phase is the rise of Chinese companies at a world level and their capacities to supply high power turbines for the global market.

Is there a predation will?

The first feature of this strategy led by the Chinese State is the diffusion speed of wind energy chain. Indeed, the following cumulated capacity curve shows this phenomenon at the world level. But the exponential shape of this growth, the technological breakthrough, is mainly explained by the Chinese share (cf. figure VII-3-1):

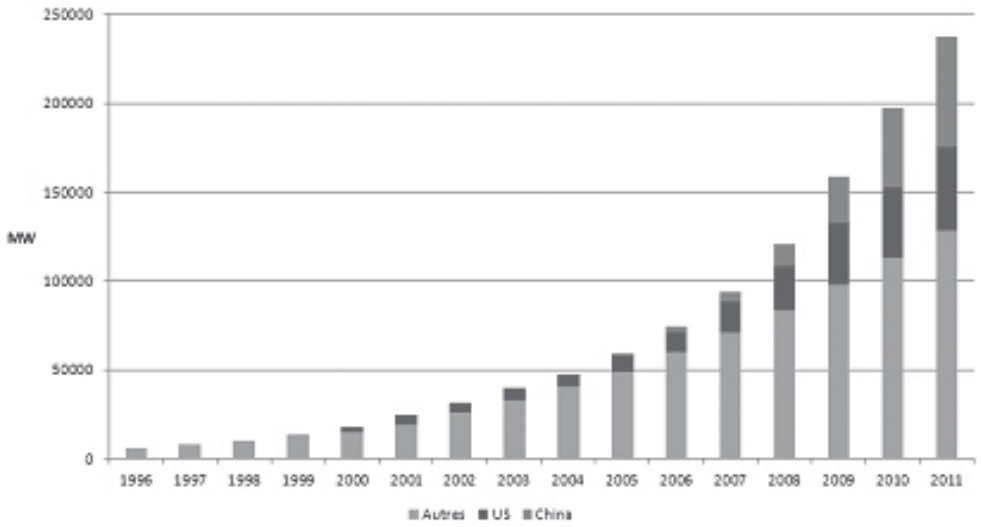

Figure VII-3-1; The growth of the world wind capacity (MW) and the role of China

Indeed, in 2001, the Chinese share of world wind capacity was 1.7%. In 2005, it was always few percents, 2.1%. This ratio rose to 6.3% in 2007. It crossed the 10% level in 2008 and it reaches 22.6% two years later in 2010. This is an exponential growth rate. Due to the size of China, it got the most important wind capacities of the world with 44.7 GW. In 2011, the new capacities increased 18 GW, representing 43% of the new world capacities. The cumulated capacities in China, 62.8 GW, represent 26% of the world capacities (IRENA 2012). The domination of its domestic market entails the rise of China as a key player of the world market.

Actually, the combination of cumulated wind capacity with the 4 implementation stages is the classical “S” curve of a technological breakthrough (cf. figure VII-3-2):

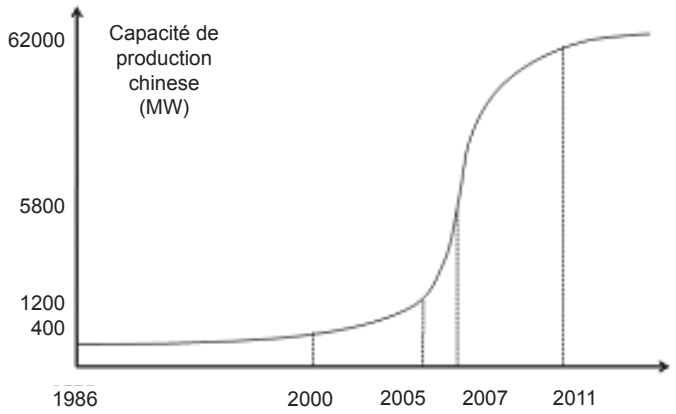

Figure VII-3-2; The “S” curve for the Chinese cumulated capacity

The added capacities in China between 2007 and 2011 (+56.9 GW) are greater than the new capacities in the United States during the last 3 decades (IRENA 2012). It gave an order of the diffusion speed of the wind technology within China in few years. From 2006 to 2009, the cumulative capacity has doubled every year, from 2.6 GW to 25.8 GW (IRENA 2012). In 2008, following the International Energy Agency, the wind energy chain was in the middle of its diffusion curve (OECD 2008). This situation induces a veil of ignorance upon the decision making process. The Chinese government favored the wind energy implementation through this non linear trajectory, typical of technological breakthrough. So, there is a direct link between the speed of the technology spreading and the ability of decision makers to manage this radical uncertainty. This phenomenon illustrates the irreplaceable role of the Chinese State. (The Climat Group, 2009)

The starting milestone of the industrial Chinese strategy is the REL of 2005. As well, the accelerator is the amplification of the grant program in 2008. These two levers favored the rapid wind technology diffusion on the market and the growth of the Chinese technological capital. It is a combination of economic utility and territorial control, through Chinese companies, within the quest for energy security. In August 2011, the national office of energy, a NDRC dependant office, stated its ambition to go from a great nation to a great power of

wind technology (IRENA 2012). The difference is the ability to gain strategic advantages linked to the domination power of an industrial sector.

The structural nature of the predation behavior

The result of the combination of all these factors by the State is a predation of its domestic market by Chinese companies. Because of its size, the consequence is their ability to conquer the global market. At last, the will of predation is visible through the level of electricity production from wind sources. Indeed, the connection phase to distribute electricity without air pollution is just beginning. So, the first goal of the Chinese strategy was to take control of wind sources through the domination of technology. It's a behavior led by a security goal. It is not a trial and error strategy to simply add "clean tech" to the energy mix. But the size of the Chinese market and the decision under a veil of ignorance due to the "S" curve are two keys independent variables of the predation phenomenon.

In his article about the strategic paradigm of China, the "Beijing Consensus", Joshua C. Ramo highlights the great coherence of its decision making process with the technology breakthrough dynamics. The Chinese society and its political regime are focused on a permanent innovation process. The decision makers are sending impulses to non-state actors, companies, to favor technology implementation. And, it also signals to stop when the trajectory is undermining its legitimacy. So, it is particularly difficult to predict China development trajectory. This role is a necessity coming from the decisional situation under a veil of ignorance and the undetermined social effects associated with. This technological obsession is the result of the Beijing decision makers' permanent search for political levers. They come from the rapid diffusion of an innovation like a new energy conversion chain.

As a matter of fact, China development issues covered such a demographic and geographic scales that the social effects search by Chinese decision makers are those contributing massively to the reinforcement of the political order legitimacy. Following J.C. Ramo "one lesson of China's growth so far is that innovation and technology can drive super fast change in some sectors, keeping the country moving fast enough to cure the problem of reform." (Ramo 2004) The first social effect of wind energy development is to reinforce the legitimacy of the government facing air pollution in large cities which are coming from coal

power central. As China is the first greenhouse gas emitter since 2010, it is a valuable political tool which gives some hope of improving the situation (AFP 2010). The second effect is more convincing; the size of the wind industrial sector provides lot of qualified jobs for the labor market of a “clean tech” great power.

The result is the predation of the domestic market by Chinese companies which forbids foreign companies any opportunities to conquer a dominant position. Actually, a small company’s growth rate upon the huge Chinese market entails a strong growth of its technological capital. Because of the Chinese market size, the origin of this predation is structural. Then, the dominant Chinese companies are in a very favorable position to go on the global market.

In 2011, the world capacity added was +40.6 GW; in 2016 it should be +59 GW. At the global level, the world cumulated capacity in 2011 is 238 GW, in 2016, it should reach 493 GW (IRENA 2012). But the annual cumulated capacity growth will be regularly decreasing between 2011 and 2016; it will go from 20% to 14% (IRENA 2012). As a consequence, the world cumulated capacity will tend toward a limit. It will grow less and less quickly. It will be a zero sum market in a decade. In this case, turbine maintenance and performance improvement become of prime concerns instead of production capacity. The wind turbine suppliers at the global level are in a good position to follow this market trend and settle the international regulatory environment.

Now, the Chinese companies should envision the next stage of wind infrastructure conquest at the global level in order to dominate the market when it will be constant. It is predation at the global level. They should develop their technological capital to cover all the ranges of turbine power capacity, from low wind to off shore wind (Laurent 2012, pp. 34-37). The power range growth enables economy of scale and decreases maintenance cost. Today the renewable energy projects target at least 1 000 MW, especially off shore wind farm projects (Caprotti 2009, pp. 6-10).

In 2010, the maximum Chinese turbine power range was 2 MW. Today, Sinovel, Goldwind, YEMC, Shanghai Electric Group and Ming Yang produce turbine greater than 5 MW (IRENA 2012). In 2011, Sinovel and Goldwind had installed the first 6 MW’s turbine (Laurent 2012,

pp. 34-37). The power range increases enable the conquest of offshore wind sources. The sequence is the same as on shore strategy. In 2006, the first off shore wind farm had been installed by the China National Off Shore Corp, with Goldwind 1.5 MW's turbines (Caprotti 2009, pp. 6-10). After few years inception phase, in 2010, the wind farm offshore Shanghai Donghai Bridge was started with a capacity of 102 MW (IRENA 2012). Following this stage, a first coast concession program in the Jiangsu was started with a perimeter of 4 projects and a 1 GW total capacity.

The offshore wind issue is mainly centered on fish resource pressure. Indeed, an offshore farm has a better energy performance with high power range turbines. The ocean wind is a strong energy source. More advantages are coming from their localization around the Chinese coast where high electricity demand is localized. It reduces the security constraint and it reduces land pressure. The loss is coming from the maintenance cost which is more important than installation one in the duration (Laurent 2012, pp. 34-37). In 2011, China got a 242 MW offshore cumulated capacity, the world third rank. The XIIth five years plan main goal is to reach 5 GW in 2015 and 30 GW in 2020. It will be 10% of the cumulated capacity (IRENA 2012).

To this goal one should add the increasing competition among Chinese companies to improve energy performance, turbine quality and liability. This competition will necessarily lead to concentration around a dozen of world class giants (Laurent 2012, pp. 34-37). They will be able to conquer the international market. The offshore wind implementation strategy is a "copy and paste" of the already winning on shore one. It is conformed to the structural origin of the predation behavior.

Conclusion

In summary, the wind energy chain is following an "S" curve. This nonlinear spreading of a technology favored by the State action is resulting in the rapid emergence of the Chinese wind industrial sector. Then, it dominates its domestic market. Due to its size, it favored the rise of world class Chinese groups which take over the global market. This predation strategy is "natural" for Chinese groups because it is structural. Indeed, Chinese decision makers are permanently screening technological breakthrough for social effect levers in energy

policy field. The Chinese size effect is a structural feature of this quest. As a consequence, it is embedded in the cultural strategy denominated by J.C. Ramo the “Beijing Consensus”. However, predation will find some limits in the occurrence of new vulnerabilities linked to the new wind energy conversion chain. Even if rare earth world production, a critical material for wind turbine magnets, a key component to decrease turbine maintenance cost, are secured by the Chinese domination of 95% and an exportation quota regime. The high power capacity turbine connection, especially for offshore wind farms, will require “smart grid” electricity distribution networks which are very vulnerable to cyber-attack.

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4 China's Global Industrial Investment Strategy

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China's global industrial investment strategy gives a perfect illustration of the new economic model that the People's Republic has been building while entering the XXIst Century. The "Socialist Market Economy" that was officially proclaimed in 1999, has found with it one of its most obvious materializations.

China has unleashed the Market forces in an overseas investment and acquisitions process that has been carried out by many competing and diverse enterprises – ranging from giant State-Owned firms to relatively small private companies, through all the in-between configurations that can be met in the Chinese corporate field today.

But at the same time, the State has kept a strategic role of arbitration of this market driven process. When time comes to materialize the initiatives of the different Chinese firms engaged in global prospection, Beijing's control of administrative decisions and, more decisively, of financial resources, gives to China the power to validate or not the proposed investments - depending on wether they correspond or not to the national strategy.

This national strategy, that has been defined in the very first years of the XXIst Century, is oriented toward two goals. One is securing the supply of raw materials playing a decisive role for the Chinese economy, and for which national reserves are not sufficient. The second goal is acquiring technologies that will ensure qualitative progress of the national industry.

This strategy can be considered to have been deployed since around 2005. On that very year, a first major success came in the field of technological acquisitions, with the takeover of the PC division of America's IBM by national champion Lenovo. But a first indication of the limits that this strategy would have to deal with also came, in the raw materials field, with the aborted takeover of California-based Unocal by China's CNOOC.

Securing vital raw materials

As China progressed on its path to the 2nd rank among the World's economies, it became obvious that in some fields, its natural resources would be insufficient to meet its needs.

Oil, for which China holds only limited reserves, was the first sector in which this problem appeared. Some years later, metal ores, although China has important reserves, became insufficient when faced with the huge proportion of World production using that resource that took place in the country.

Oil: few actors, many ways of action

China evolved from a net oil exporter to a net oil importer position as soon as 1994. Since then, its dependency has noticeably accrued, as China had to import 58% of its crude oil consumption in 2012. And the un-substituability of oil in the transport sector, until major technological breakthrough are accomplished, can only confirm that trend.

The global investment strategy on that field has been carried out by a limited group of comparable firms, as China's oil and gas policy relies mainly on the three national oil Majors – CNPC (China National Petroleum Corporation, the holding of PetroChina, China Chemical and Pëtroleum Corporation or Sinopec, and China National Offshore Oil Corporation or CNOOC). But these firms have been deploying a variety of approaches that expose the pragmatism of the Chinese strategy.

China's three oil giants have been using the traditional approach of other Majors, and buying concessions in oil-rich countries. The most important projects of that sort have been those developed by CNPC in Iraq. Involvement (alongside Western Majors BP and Total) in the development of Rumaila and Halfaya's oilfields, should ensure China's main oil pro-

ducer control over yearly volumes of 40 million Tons of crude oil.

In an already crowded World of oil exploration, China's Majors have also been using the alternative of acquisition of concessions holders, as a way to raise their controlled reserves. Main successes were the acquisitions of Switzerland-based Addax Petroleum by Sinopec in 2009, and of Canada-based Nexen by CNOOC in 2012. These operations had ensured the two competitors of PetroChina control over yearly productions of 7 million Tons and 10 million Tons of crude oil, respectively.

Nevertheless, that sensitive domain has also been the one where China's global investment strategy has suffered its main setbacks. The already mentioned Unocal affair, when US Representatives opposed acquisition of the California-based company in 2005, prompting CNOOC to retreat from what was China's biggest foreign bid, was echoed by the YPF (Yacimientos PetroliFeros) case in 2012. The agreement between Sinopec and Spanish oil Major Repsol, for buying its 57% share of Argentina's main oil producer, collapsed because of opposition of Buenos Aires that led to nationalization of YPF.

To bypass that sort of political problem, China's oil giants have not hesitated to employ traditional State – to – State type relationships, at the same time they recurred to Market mechanisms in other parts of the World. The strategy deployed in that case has implied association with another State heavyweight from the financial sector – namely the powerful China Development Bank (CDB). In 2009 and 2010, CDB was engaged in loans-for-oil agreements with Russia's Rosneft, Venezuela's PDVSA and Brazil's Petrobras, that ensured yearly deliveries of over 35 million Tons of crude oil to CNPC and Sinopec, in exchange for over 45 billion dollars of credit lines.

Metals ores: many actors involved

Oil resources securing saw the use of different techniques, but was the field of a limited number of Chinese firms, whereas metal ores prospection has been a field invested by more Chinese actors. Nevertheless, it shows a clear predominance of State-Owned firms, charged with the strategic mission of controlling raw material supply to the country's giant metals industry.

Logically, this task has involved investments in foreign producers, by ore trading specialists working for China's industry. The two heavyweights China Minmetals and SinoSteel have been involved in operations, implying both majority and minority stakes acquisitions, from Australia to Southern America, Africa and Central Asia.

But securing foreign ores supply has also been an important field of investment for final consumers of those materials, i.e. China's main metallurgical producers. Several of China's major steelmakers have thus been investing in foreign iron ore mines, such as AnBen Steel and Hunan Valin in Australia, WISCO (Wuhan Steel) in Brazil, and Hebei Steel in Canada.

Copper producers are also committed in foreign mining, with investment in huge projects in Afghanistan and Peru by national leader Jiangxi Copper, and smaller operations by some of its competitors in Africa.

But the main player in that field has been aluminum producer Chinalco. At the same time it got engaged in local mining developments in Africa and South America, Chinalco has been in charge of China's interests in a battle with the trio of giants that dominate world metal ores trade. In order to counterbalance influence on iron and other metals ores prices of Brazil's Vale and Australia's BHP Billiton and Rio Tinto (the three of them control 70% of iron ore international trade), Chinalco entered the capital of a weak Rio Tinto in 2008, and tried to gain control of it in 2009. Final failure of that last attempt, seemingly determined by maneuvers from BHP Billiton, was a new example of the limits met by China's global strategy. It has nevertheless permitted the country to enter a power relationship with the giant global ores miners.

By the side of these giant battles involving State-Owned Behemots, smaller operations have been carried out by smaller, including private, Chinese firms. But whatever the official speeches, experience has showed that, past a certain size of projects, Beijing intends to exert control. The raw materials are too sensitive issue for China to allow it to gain influence on the external actors (on that point, see "Control over raw materials: the Hanlong affair" in that chapter).

Acquiring technologies

Acquiring technologies that will permit China's industries to evolve from a position of subcontractor to that of developer, has been the other main goal of China's global investment strategy.

The actors here have been much more diverse than in the case in the raw materials securing process. The huge scope of Chinese interests – in nearly every segment of industry – has made that China has heavily relied on the initiative of all sorts of firms, from State-Owned giants designated as national "champions" with a nearly geopolitical mission, to relatively small firms embarked on a globalization process for purely financial motives.

The move has begun in industries where China hold a decisive position in World production as a subcontractor – such as electronics, which will be taken as a first example here. But it has spread to other sectors where China intends to emerge as a competitor for foreign firms that dominate its domestic market today – such as automotive, which will be the second example evoked in that chapter.

Electronics: lessons from a pioneer sector

With more than 60% of computers and over 50% of TV sets produced in the World, assembled in plants located on its territory, China has become the core of global electronic production. Nevertheless, until 2005 that production was overwhelmingly subcontracting for foreign firms, with very limited benefits for China's industry. Over 90% of PCs and TV sets produced in China then, wore European, Japanese or US brands.

The first major foreign industrial investment by China marked a clear will to change that situation. Acquisition of the PC branch of American pioneer IBM by until then low profile Lenovo, raised this latest to 3rd position among world producers. It brought it an international commercial network, an established brand (with the ThinkPad name associated to IBM), and technologies. This did not mean things were going to be easy. The new Lenovo went through a learning period with relatively deceiving results. But after a shake-up symbolized by the return of its legendary chairman Liu Chuanzhi, the champion went back on the path to success – and began new acquisitions. The PC branch of Japanese group NEC in 2011, and smaller but locally important assemblers Medion in Germany, and CCE in Brazil, in

2012, completed Lenovo's global deployment strategy. As a result, the Chinese group ended the year 2012 in a close tie with American historical leader HP for the first spot in global own-brand PC sales.

Whereas Lenovo provided a model for a successful worldwide investment strategy, the electronics sector also registered some obvious failures in these first attempts to go global. The most obvious case was certainly that of local champion TCL group. One year before Lenovo's IBM deal, this Guangdong-based group engaged in a less important but nevertheless high profile operation, by acquiring French brand Thomson. The historical European leader among TV sets producers was supposed to give the Chinese group a new dimension – and it did so, but for a very short while. In 2005, the new TCL raised to first rank among World TV sets producers. But only five years later, it had fallen to 6th position, far behind its main Japanese and Korean competitors.

The reason for that spectacular failure was a wrong appraisal of technological evolution. Thomson was one of the leaders of CTR TV sets. But it was not prepared to the LCD technology, that revamped the sector in the five years following TCL's acquisition.

TCL was to be saved by its powerful local political partners. But the lesson of its global investment strategy failure was not to be lost when China came to invest in more complex industrial sectors.

Automotive: actors with diverse profiles

At the same time it engaged in investments dedicated to changing its position from subcontractor to developer in a certain number of export oriented sectors, such as electronics. China aimed at constructing its own champions in other fields, for which it had a huge domestic market dominated by foreign firms. The automotive industry, for which China became the World's number one market in 2010, is one of the sectors concerned.

The first big operation can be dated back to 2005 there also. On that year, when the last important vehicles manufacturing group of the UK went bankrupt, its two components were bought by Chinese automakers. While SAIC (Shanghai Auto) bought technologies and trademarks of Rover, smaller neighbor and rival Nanjing Auto bought what remained of

MG. Two years later, when SAIC absorbed Nanjing Auto, the entire of the last British carmaker fell into the hands of China's first automotive group.

Whereas this pioneer move was orchestrated by a State-Owned giant, the following big step in China's auto industry foreign acquisitions was made by a much smaller private group.

When Zhejiang-based Geely bought historical Swedish carmaker Volvo in 2010, it ranked only number 11 among China's vehicles builders. The move made it a symbol but certainly not a heavyweight among global carmakers, raising from number 30 to number 20. China's overseas industrial investments appeared not to be reserved to the State-Owned giant "champions", but opened to private initiative as well.

How the State remains at the helm

From national to local champions, from State-Owned giants to much smaller private firms, China's global industrial investment may appear as a spontaneous and unorganized movement. Nevertheless, analysis reveal that this spontaneity, while real in the exploration phase, disappears when it comes to validating, and transforming foreign investment opportunities in concrete operations. The role of the State as a strategist appears clearly then, through its arbitration.

Control over raw materials: the Hanlong affair

The Hanlong affair illustrates in a spectacular, thriller-like way, how China's central government intends to maintain control over initiatives concerning the vital question of securing foreign raw materials.

Whereas involvement of Chinese private groups in marginal mining operations in Africa became relatively common in the 2000's, in 2011-2012 one of these groups engaged in projects of a totally different size. In 2011, Sichuan-based Hanlong group announced its engagement in a 3 billion dollars iron ore project in Tanzania. The following year, its overseas ambitions came closer to realizing, when the group signed an agreement for buying Australian firm Sundance, that was itself the owner of exploitation rights for the Mbalam

iron ore mine in Cameroon. When the China Development Bank (CDB) announced in October, 2012, it granted Hanlong a 1 billion dollars debt facility, the deal seemed done.

But Hanlong's ambitions appeared as a problem for China's authorities when they scrutinized the proposed deal, because the diversified Sichuanese group had a quite particular - and troubled - background. Hanlong's chairman had a history marred by business violence, including being the target of an assassination attempt by a former partner in 1997. Much worse, the other way, his brother was accused of hiring a hitman who murdered three people involved in an other affair in 2009.

This background obviously raised eyebrows as Hanlong was to use State-funneled funds to take control of strategic foreign iron ore resources. As a consequence, at the beginning of 2013, it was rumored that the private group had been ordered to team-up with a State-Owned steelmaker as a condition for the Sundance deal to be approved. As the attempted union apparently did not work, Chinese authorities then resorted to an other much more direct approach. In March, 2013, just days before Hanlong's chairman was to sign the final acquisition deal with Sundance, he was arrested under accusation of having hidden his fugitive brother, sought after by the police since the 2009 murders. The deal with Sundance was not signed, and Hanlong's foreign ambitions vanished in a few days.

The Volvo versus Saab cases: financial arbitration for technologies

Most of China's foreign investment attempts are settled in a much less dramatic context. And they usually do not need to recur to such extreme measures. Control of the financial system is usually sufficient to shape China's overseas investment strategy, because Chinese banks take instructions for important loans authorizations from the State and the Communist Party of China. And no foreign investment attempt can materialize without these loans. The different fates of Sweden's two historical bankrupt carmakers, in 2010 and 2011, provide a striking illustration of that reality.

When second rank carmaker Geely intended to buy the ailing sedans branch of Volvo in 2010, this was a heavy burden it could not bear by itself. The 1.8 billion dollars Geely had to pay for the acquisition represented 80% of its turnover at that time. Therefore, the Zhejiang-based automaker needed financing for the buyout to materialize; an it needed Beijing's

green lights to the Chinese banks that were to bring it most of that financing. Chinese authorities looked at the issue, and saw that Volvo's former owner, Ford company, would not oppose technology transfers from its former subsidiary. Financing was then approved, and the deal could proceed.

The Saab case was very different. When, only one year after Volvo, the other historical Swedish carmaker ended in the same sort of financial woes, Chinese carmakers also appeared as potential acquirers. Huatai and Youngman groups, that made successive bids, were much smaller than Geely. But the financial needs were also much smaller: 700 million dollars would have been enough to acquire Saab Auto.

But financing of that operation by Chinese banks was not authorized by Beijing. And the reason was very simple: Chinese authorities anticipated (as would be confirmed later) that Saab's former owner, GM group, would oppose transfers of a certain number of technologies of which it was proprietary, to a new owner. The main interest of an acquisition therefore disappeared – all the more considering that in 2009, an other Chinese carmaker, BAIC (Beijing Auto), had acquired a certain number of the technologies of which Saab was owner independently from GM.

The financial arbitrations of the Chinese authorities show that, although Chinese acquisitions overseas can appear at first sight as a spontaneous and uncoordinated move, they enter, in the final stage, in the frame of a strategy. They must obey the goals of securing the national industry's necessary resources, or acquiring technologies that will help it to change its competitive positioning, and thus participate in construction of China's Socialist Market Economy.

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Summary: How to dialog with China?

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Sugasawa Yoshio received Doctor of Engineering in Hokkaido University. It is a professor of the graduate school of business, Japan University of Economics. The recent research area is to apply intelligence to the business fields, especially for R & D. The academic journals in recent year are the method of collecting information in the ara of gray zone and intelligence cycle. I am a chairman of Japan Society of Competitive intelligence and member of the evaluation and examination of technological development with subsidy of Japanese Government.

My specialty is a research that applies intelligence to the business. China has a high ability in Asia countries though it sees from the research area concerning intelligence. Thought the height of the ability to do the information gathering has the image that does an illegal information gathering. The trend of research and Development of another country and the business operation… of the other companies can be guessed from the product and the technology that comes into the market. In a word, a lot of information can be collected as open information.

In this book, recent manufacturing of China or a part of the trend of the technology and the product development is caught. And, it tries to find the beginning of cooperation or the joint development of a Chinese enterprise. Then, it retrieved to grope how it talked with China as a key word through Yahoo. As a result, 200 disseminations or more were “Chinese threat theory”. When the content of the Chinese threat theory that passes 200 is arranged, it is a content concerning “Military affairs”, “Economy”, and “Politics”. Especially, it should make a special mention of information on the content that military affairs integrate with politics is remarkable.

It can be said that it recovered promptly by executing a lot of economic stimulus measures and the domestic demand expansion plans as a general condition of a Chinese market since the world finance crisis. As a result, pretext GDP growth rate in 2009 was 8.7%. Pretext GDP kicked in 2012 was the 1st place United States, 2nd China, 3rd Japan, 4th Germany, and 5th France. China is the second place in pulling out the world as for Japan. Moreover, China has maintained high popularity from two charms “Cheap manpower” and

“Massive market” for the Japanese manufacturing developing ahead of foreign operations. Especially, the change in the environment that surrounds the business of China has a big influence on the active conduct of business and management for the manufacturing of Japan advancement to China from early time. As a result, as for “Cheap manpower”, it keeps rising, and securing cheap manpower is more difficult because of an increase in the expenditure for social insurance load...

In addition, the level at the national life improves, worker’s social security and the demand for the public welfare expand, and it will be forecast that the uptrend of the labor cost continues in the future. Moreover, the price decrease pressure from a strong customer becomes severe more and more as for a lot of foreign companies that advance to China while the competition with a local enterprise that has picked up stream intensifies. There is making for the quality and the environment to the severity as a factor to press other management. Chinese version RoHS(Restriction of Hazardous Substances): The approach of the government like the method of managing the electronic information product pollution restriction, the food safety low, and the circulation economy promotion low… has been strengthened. It is necessary to control the balance with the cost well though it might be able to be said that this area is a strong point of Japanese Company. The location and the role of the overseas subsidiary should flexibly correspond to the business environment though a lot of manufacturing advances from Japan to China by the process of transfigured from “Manufacturing factory in the world” to “Market to which the world pays attention”. Therefore, to be opposite as a better partner, mutual understanding is thought that it is important to construct the relation of deepen WIN-WIN by thinking about China.

It is possible to think about the Chinese threat theory by exactly replacing it with the economic war. The information gathering and the intelligence that can be called a severe infowar are requested from the background. In such an environment, an international seminar concerning the economic war and intelligence was held between Japan-France to grope for “How do it do and do it talk with China? ” in 2012 and 2013.

Graduate School of Business, Japan University of Economics held an international seminar for two days the 17th and 18th, 2012 in co-sponsoring with Ecole de Guerre Economique that specialized only in the research field of intelligence in the world in Paris, France. In

Addition, the seminar was jointly held on July 10, 2013. This book assumes the valuable content obtained in Japan-France international seminar two times to be substance, and is a summary in the background of the content.

The program that had been held on July 17 and 18, 2012 was the following content.

Seminar title: Economic War and Defense

- Operational Concepts of Economic Warfare
  Director of Ecole de Guerre Economique
  Christian Harbulot
- View of the divided world-Trend of Uncertainty and Dispute, Global Background and Economic War Seen from EU-
  Professor of Japan University of Economic
  Eric Romann
- Why does Japanese Firm Dislike Intelligence?
  Professor of Japan University of Economic
  Yoshio Sugasawa
- Cyber Attacks: from Myth to Reality?
  Professor of Ecole de Guerre Economique
  Fred Raynal

The program on July 10, 2013 was the following content.

Seminar title: Intelligence and Influence

- Information Attacks against Firms
- Methods of information warfare taught at the Ecole de Guerre Economique
  Director of Ecole de Guerre Economique
  Christian Harbulot
- Win the Global Competition Utilizing the technology Intelligence
  Professor of Japan University of Economic

Fumiyuki Takahashi

- Influence: Methodology, Strategy and Examples
  Professor of Ecole de Guerre Economique
  Jean-Francois Bianchi

Holding Japan-France international seminar for two years achieved a wonderful result about an intelligence research in Japan and a global economic war. A valuable suggestion was able to be obtained about what should be of correspondence to the economic war obtained through the frame and the practice example of the economic war. It is hoped for the research on the economic war and intelligence to deepen more between Japan-France of both after now and to contribute to the world economy. It is expected to become a help that recognizes that use and the use of correspondence and intelligence to the economic war to which this book has occurred in global economy are extremely important.

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