

China's Indigenous Innovation Policy

Testimony of

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Overview and Recommendations

While economists may not believe that nations compete, this is not the view of the governments of most major trading nations. These governments generally promote science, technology, engineering and math, and take a keen interest in promoting innovation within their borders, not just because this is a public good in the abstract, but because they wish to have higher paying employment for their workers, have a greater share of world trade in higher value products, and increase their economic rate of growth.

This last month the Brazilian President travelled to Beijing to discuss the composition of bilateral trade between the two countries, which the Brazilian government felt was imbalanced – too much in the way of exports of primary commodities and too little in the way of exports of manufactured goods from Brazil. She was able to announce the sale of 35 medium-range passenger planes to China Southern Airlines and Hebei Airline and that Huawei Technologies had announced it will build a research centre in the Sao Paulo area, with total investment of \$300-400 million.

Reportedly President Rousseff also wanted to know more about China's industrial policies and how they contributed to China's success in creating internationally competitive companies and industries. Perhaps what Beijing did could be a model for Brazil to follow.

China uses a variety of promotional measures to spur innovation. Some do not differ that much from those of its trading partners. It fosters STEM education, and graduates a prodigious number of engineers each year. It supports research consortia and builds enormous science and technology parks. It is increasing public spending on R&D. It differs from other countries is the degree of emphasis it place on “indigenous innovation” – that is the creation and use of Chinese intellectual property owned by Chinese companies. Some of this effort may be wasteful – producing a very large increase in the number of scientific papers but not necessarily all of the highest quality. But this is of no concern to China's trading partners.

China also differs in the ways it seeks to promote more directly this "self-innovation". Chinese pronouncements and policy documents suggest that China would, in a wide variety of settings and sectors, press for purchasing within China to be based on home-grown intellectual property content – a new form of protectionism. Were these policies fully effective, they would pose in some instances an almost insuperable barrier to foreign firms' sales in China. On top of complaints about a wide range of other barriers – including national standards, lack of adequate IP enforcement, failure to join the Government procurement agreement and an undervalued currency -- to discriminate against foreign products on the basis of the origin of their intellectual property would seriously strain commercial relations between China and other countries with which it trades. For this reason, when visiting Washington in January of this year, President Hu promised to take a number of remedial steps.

This paper is about how the current situation came about and assessing where we are today.

Recommendations

1. Develop a comprehensive and strategic approach. The United States cannot afford to be indifferent. While it is very likely that the more market-distorting aspects of China's industrial policies will ultimately prove counter-productive for China, they will continue to reshape the American economy to an extent that should be considered unacceptable. Identify the national interest. The handling of the U.S. relationship with China is far more important to the United States than its current interests in Afghanistan, to take one example. Establish a clear set of goals reaching to ultimate solutions and a planned path on how to achieve them.
2. Do the right things at home. This has to be done for the sake of America's future. Build on American successes: including its entrepreneurs, venture capitalists, Federal government backing of basic R&D, labor market mobility, universities, science parks, STEM education, high-skilled immigration and similar strengths. .
3. Monitor more closely Chinese policies that cause competitive harm to U.S. commercial interests. This will take a substantial investment of government resources and close cooperation with the private sector (companies and trade associations) and governments of countries with allied interests whenever possible.
4. Engage in a continuing intensive dialogue with the Chinese government. This is a very long-term effort undertaken with the knowledge that it will be most effective when and if China's begins to reconsider its current policies for its own reasons. (e.g. in the May 6 U.S.-China Innovation Dialogue and the May 9-10 Strategic and Economic Dialogue.) Expect no near term conversion.
5. Seek to obtain from China prompt, effective and full compliance with its commitments.ⁱⁱ At this week's S&ED, China's leaders should state that they will shortly clarify by means of a State Council proclamation that China will void provincial catalogues and other measures that contain a link between indigenous innovation and government procurement, and make this clear in pronouncements for the domestic Chinese audience. This would be a very small step.
6. Litigate WTO cases more aggressively. There is more to be done, more risks to be taken. Resources will need to be enhanced. Additional litigation is worth pursuing selectively, without overestimating what can be gained from enhanced enforcement of agreements.
7. Negotiate new binding disciplines. Success depends on the evolution of the Chinese leadership's views on China's long term self-interests. Any bilateral investment treaty (BIT) with China must address the central issues of concern and not simply be a re-tread of past BITs. The possibilities of reaching a 21st century BIT or other binding agreement with China should be probed. In the meantime, it is imperative that every trade or investment agreement that the U.S. negotiates with any country contains disciplines on the kinds of conduct confronted in China (and in other countries where the state plays a major role in the economy through state-owned, state-invested and state-influenced commercial competitors) that skirt existing rules. The only active negotiation at present to implement this initiative is the Trans Pacific Partnership (TPP) and that is the place to

start. A policy of containment is needed for the model of neo-mercantilist state developmental capitalism. An international consensus can be formed on some issues in the OECD.

8. Consider what leverage exists. Wherever possible, allies whether among developed, emerging and developing countries should be found with respect to particularly offensive Chinese industrial policy measures, in preference to imposing unilateral restrictions. Besides WTO complaints, there is a need for a private internal review of what is left in the arsenal. It is not wholly empty. It should be noted that China's playbook seems to call for its own reciprocal retaliation for conduct it finds unacceptable.
9. Encourage China to take a leading positive role in multilateral trade negotiations. Examples clearly in China's interest (and those of the world trading system) include: an agreement on duty-free, tax-free information and communications technology products and services signed onto by all WTO members; an agreement on environmental goods and services that would lessen growth in demand for fossil fuels and be good for the environment; and an agreement on increasing assurance that sources of food, feed and raw materials will be shared equitably.

Major challenges are far from new to generations of U.S. trade policymakers – the protectionism of the depression, post-WWII import quotas, Britain's imperial preferences, the discrimination inherent in formation of the European Common Market, and Japan's state developmental capitalism. China, as the world's number one exporter, and a major market, poses its own set of challenges. No past challenge has proved insuperable, nor should this be the case now. There is reason to believe that the harmful aspects of policies that China is embracing will at some point be recognized more clearly both in Washington and Beijing. Ultimately solutions will have to come not just with outside encouragement but primarily by changes in China's perception of how its best interests are served. After all China changed thousands of laws and regulations to join the WTO. The idea of openness to international competition as a primary driver of domestic reform is not foreign to China.

There is a darker vision of the future: if China continues to pursue policies that distort trade and investment, and the U.S. does little to put its own house in order – in other words neither changes its policies. In that direction lies increasing trade conflicts. The pressure in Congress would grow for U.S. measures limiting trade and/or investment. More interventionist responses to China's industrial policies would not be confined to the United States, as there many emerging countries that have a trade imbalance in terms of composition (exports of basic commodities and few manufactured goods to China and large imports of Chinese manufactured products). Chinese retaliation would probably occur. Escalating reciprocal imposition of restrictive measures would serve no country's interests.

Alternatively, in addition to China and the United States each following a more productive course to foster economic growth and employment through innovation, both could benefit from cooperation -- working together to develop new sources of energy, commercializing renewable alternatives to oil and coal and thereby addressing climate change; and by improving global health, transforming large investments in research to affordable and personalized treatment and care. The two countries also have a mutual interest, as yet unrealized, to exercise shared leadership in multilateral trade negotiations in the WTO.

For the United States, doing nothing is not an acceptable policy option – both in terms of U.S. domestic policies and engaging in appropriate responses to China’s neomercantilism. China moving back onto a path to liberalization will not be worth much to the United States economy if its own competitiveness erodes. The United States must revert to its basic strengths, but it cannot accept its economy being shaped by the industrial policies of others.

U.S. policies toward Chinese mercantilist measures, to be successful, need to be based upon six basic elements: 1) understanding the problem, 2) having a strategy to deal with it, 3) assigning solving it a sufficiently high priority, 4) having first-rate intelligence and analysis, 5) dedication of sufficient resources, 6) persistence and 7) leverage. There is no substitute for this recipe. And as noted, the strongest leverage is China understanding that the policies about which foreign governments complain are not in China's own interests.

Discussion

One of the most prized attributes of civilization is innovation. Progress through innovation is recorded with awe, from the Stone Age to the Bronze Age to the Iron Age, through the development of writing, all the early sciences, leading to the industrial and information revolutions, the discoveries of Edison, Einstein, Shockley, Crick and Watson, Noyce, and more recently Steve Jobs and Bill Gates. The benefits due to application of the new technologies have been global. National boundaries have been porous in this regard. Witness the presence of 400 million cell phones in use in Africa todayⁱⁱⁱ. Mo Ibrahim, founder of Celtel, has estimated that these phones contributed about 1 per cent to the nearly 6 per cent GDP African countries on average enjoyed in 2007^{iv}. The World Bank estimates of the benefits of information and telecommunications technologies (ICT) for developing countries are even higher.

While innovation is increasingly collaborative and cross-border in nature,^v and the products of invention are in principle available globally, countries care a great deal about where the innovation takes place. For the firm, the benefits of being able to innovate in the right legal and policy environment are profits and the ability to plough those profits back into creating next generation products. Multi-millionaires and billionaires are created through ownership of innovative companies which have intellectual property rights – whether in breakthrough medications or the I-Pad. For governments, the benefits of having innovation take place within their boundaries are an enhanced possibility for gaining more numerous high paying jobs as well as broad contributions to the economic and physical well-being of their peoples as well as increasing the rate of growth in GDP.

Localities have been in economic competition since trade began millennia ago. With the globalization brought about by rapid high capacity transportation and instant communication, today all officials in all governments – from school boards, to mayors, governors and central government ministers and heads of state -- have been under increasing pressure to foster innovation. All industrialized and emerging nations invest in their schools' STEM education, in their universities, in basic R&D, and in an intellectual property system -- each step designed to create an environment in which innovation will be more likely to take place. Financial support – whether from the private market or from government -- is used to create translational innovation, moving from invention to marketable products. Science and technology parks^{vi} and Bayh-Dole legislation^{vii} seek to link university research to firms that can create marketable products. All of these activities are designed to nurture innovation, often open to foreign participants, whether it is IMEC in Flanders or Zhangjiang Hi-Tech Park in Pudong near Shanghai.

Where there is open international competition in the fostering of innovation, this is all to the good.

a. The origins of the quest for indigenous innovation.

China, the source of countless marvelous inventions over the better part of several millennia^{viii}, ceased to innovate much at all for the last few centuries. Once Deng Xiaoping succeeded in re-starting China's economic development, the need to return to innovation was not lost on China's leadership:

In today's world, the core of each country's competitive strength is intellectual innovation, technological innovation and high-tech industrialization.

- Jiang Zemin, General Secretary of the Communist Party of China Central Committee, keynote speech National Technological Innovation Conference, August 23, 1999

And more recently:

[We] must ... create a policy environment beneficial to technological innovation

- Hu Jintao, General-Secretary of the CPC Central Committee, November 27, 2005

and

- *Innovation is the core of our national development strategy and a crucial link in enhancing overall national strength.*

President Hu Jintao, Report to the 17th National Congress of the Communist Party of China, October, 2007.

It was not long before this need for promotion of innovation began to develop a more noticeably nationalistic side:

. . . China's competitive edge is to a great extent based on cheap labor, cheap water, land resources and expensive environmental pollution. [This] will be weakened with the rising price of raw materials and enhancement of environmental protection. Therefore, we must enhance independent innovation capability vigorously...

*... [W]e will promote development by relying on **enhancing independent innovation** capability, as a national strategy shift economic growth from relying on the input of capital materials to relying on scientific and technological advancement and human resources.*

Ma Kai, Minister, National Development and Reform Commission, *the 11th Five-Year Plan (March 19, 2006)*^{ix}

*[We shall] formulate policies that **encourage independent innovation** and restrict unscrupulous and redundant imports.*

China's Long Term S&T Plan To 2020 (February 2006)

A conclusion that these pronouncements might be antithetical to open trade was reinforced by other statements aimed at industrial policy objectives:

[We will] significantly increase the self-sufficiency ratio to over 70 percent for integrated circuits used for information and national defense security, and to over 30 percent for integrated circuits used in communications and digital household appliances....

We should basically achieve self-sufficiency in the supply of key products

Ministry of Information Industry, August 29, 2006^x.

Nothing in this statement explicitly excludes the possibility that the semiconductors could not be made in China by foreign companies employing their own technology, but that would not be in line with numerous statements made around the same time emphasizing the need to create Chinese-owned IP (and more explicit pronouncements a few years later):

The objective of formulating the National IPR Strategy is to improve national competitiveness and China's Comprehensive National Power.

[We shall] abide by international principles and meet the lowest standards of the WTO.

...
[We shall] not only encourage self innovation, but also encourage absorption, consumption, and innovation of introduced technologies.

Lu Wei, Deputy Director General of the Technical Economic Department, Development Research Center of the State Council, *Caijing Magazine*, October 17, 2005.

The thrust toward independent innovation embodied in intellectual property was clearly to be reflected in the development of other policy tools:

*[We shall] actively promote the formulation and implementation of **technical standards with self-owned intellectual property rights** and translate that technological advantage into a marketplace advantage to maximize the benefits of intellectual property rights.*

[We shall] actively take part in the formulation of international standards, and drive the transferring of domestic technological standards to international standards....

Shanghai Municipal Government, September 14, 2004.

Major government documents designed to shape the Chinese economy adopted the formulation "independent innovation" as a central theme, a key element of programs designed to transform China. A policy document of very high importance, the Outline of the National Medium- and Long-Term Program on Scientific and Technological Development (2006-2020)^{xi} prescribed the following actions:

- *Make intensive investment in crucial high technology products;*
- *Use policy tools to promote, favor, and reward indigenous innovative technologies;*
- *Increase R&D spending to 2.5% of GDP by 2010; and*

- *Engage in key state projects to generate important strategic products and create the environment for innovation through “Guiding Opinions”*

State Council of the People’s Republic of China

Foreign investment was to play a role in the pursuit of indigenous innovation as well:

[We shall] encourage foreign enterprises especially large-scale multinationals to transfer the processing and manufacturing processes with higher technology levels and higher added value and research and development organizations to China, ... to develop the technology spillover effect, and strengthen the independent innovation ability of Chinese enterprises.

National Development and Reform Commission, 11th Five Year Plan for Use of Foreign Investment, (November 2006)

b. Making indigenous innovation operational

i. Government procurement

Foreign expressions of concern over the policy of “indigenous innovation” began to become more pronounced as effect was given to policy through Chinese government measures. For example, China had pledged when it acceded to the World Trade Organization (WTO) in 2001 to join the Government Procurement Agreement (GPA). Desultory negotiations have dragged on for the last decade, with China believing itself entirely free to discriminate against foreign goods and services in the interim, pointing to a requirement for indigenous innovation as one basis for discrimination:

The government shall establish a priority procurement policy for important high-tech equipment and products developed by domestic enterprises with independent intellectual property.

[We shall] provide policy support to enterprises purchasing domestic high-tech equipment.

Outline of the National Medium-and Long-Term Program on Scientific and Technological Development (2006-2020), State Council of the People’s Republic of China, February 9, 2006^{xii}

*... Government procurement of imports shall be constantly regulated in such a way as to establish a system for evaluating foreign products and methods to manage imported products. In addition, **an effective means to encourage the purchase of indigenous innovation products shall be established.***

Article 11. ... For those entities that have been approved for the purchase of foreign products, they should uphold the principle that is in favor of understanding and utilizing

core technologies; and give priority to award contracts to those foreign companies transferring core technologies.^{xiii}

Notice of the Ministry of Finance on Distributing the Administrative Measures on Government Procurement Contracts of Products with Independent Innovation, Ministry of Finance, April 3, 2007.

Interim Administrative Measures for Accreditation of National Indigenous Products:

Products submitted for accreditation shall:

- ***have indigenous intellectual property rights and a definite owner ... having proprietary access to the intellectual property rights;***
- *possess a proprietary brand;*
- *possess state-of-the art innovation;*
- *[contain] advanced technology [comparable] to the international advanced level among similar products ;and*
- *have potential economic benefits and wide market prospect or can substitute for imported merchandise.*
-

Accredited ... products shall be given priority in procurement for government and national key projects ... and related industrialization policies [in order to] support the development of indigenous innovation products.

Articles 2 and 4, Administrative Measures for Accreditation of National Indigenous Innovation Products, (Interim draft, undated)

Government procurement in China should not be viewed in isolation as constituting the whole of the market access problem. The indigenous innovation policy has implications for transactions that extend far beyond government purchasing:

In response to the international financial crisis, the implementation of the CPC Central Committee and State Council on the capital growth, [we shall] expand domestic demand, transfer the structure of the general requirements to ensure a smooth development of equipment manufacturing industry, speed up structural adjustment, and enhance the capability of independent innovation and enhance the level of autonomy to promote industrial upgrading, especially the preparation of the planning, equipment manufacturing industry as a comprehensive response to the action.^{xiv}

Imports of key equipment using foreign capital will be subject to “strict examination and study”. . . There will be special review of mergers and acquisitions in the sector. Foreign control of key domestic equipment manufacturers will be prohibited.

State Council on the Acceleration of the Revitalization of the Equipment Manufacturing Industry, Several Opinions of the State Council on the Acceleration of Revitalization of the Equipment Manufacturing Industry, (February 13, 2006)^{xv}

When the word went forth from the highest levels that "indigenous innovation" was a central precept of Chinese industrial policy, ministries and government agencies throughout China began to translate the policy into reality, especially in the area of government procurement where it was so pronounced that it received more attention from foreign industry and governments. The U.S. China Business Council as of February of this year identified 61 indigenous innovation catalogues at the provincial and municipal level, and noted that in Shanghai's catalogue, of 523 products made in China only two appeared to involve foreign companies, and in these two cases, the companies were joint ventures with majority Chinese partner ownership.^{xvi}

What emerges from the mass of Chinese government pronouncements and implementing documents is the desire to establish in the near term competitive Chinese companies with their own IPR to meet China's needs in energy, transportation, raw materials, defense sectors and the equipment manufacturing industry.

ii. The MLPS

Another area in which indigenous information has been put forward as an essential requirement is that of information security. In June 2007, the Ministry of Public Security (MPS), the State Encryption Management Bureau (SEMB), the State Secrets Bureau, and China's State Council Informatization Office (SCITO) promulgated the Administrative Measures for the Multi-Level Protection of Information Security (MLPS), which mandated that all systems nationwide be classified into one of five security levels. These are:

- Level 1: The damaged information system causes harm to the legitimate interests of citizens, legal persons and other organizations, but without harm to national security, social order and public interests.
- Level 2: The damaged information system causes serious harm to the legitimate interests of citizens, legal persons and other organizations or social order and public interests, but without harm to national security.
- Level 3: The damaged information system causes serious damages to social order and public interests or harm to national security.
- Level 4: The damaged information system causes especially serious damages to social order and public interests or serious harm to national security.
- Level 5: The damaged information system causes especially serious damages to national security.

Those systems deemed to involve critical infrastructure reportedly must meet at least level 3 security standards under the MLPS. This extends the level of "national security" review of information systems well beyond the traditional areas of sensitive government and military networks. Among the systems that must be graded under the MLPS are basic information telecommunications, broadcasting and TV networks, Internet information services entities, and

systems related to transportation, banking, insurance, commerce, education, culture, labor and social security.^{xvii}

According to the MLPS Administrative Measures, information security products graded at level 3 or above must meet a number of requirements, including:

- (1) The product developers and manufacturers must be owned by Chinese citizens, legal persons or the state, and have independent legal personality in China;
- (2) the core technology and key components of products must have independent Chinese or “indigenous” intellectual property rights; and
- (3) products that have been listed in the CNCA catalogue of information security products must acquire a certificate issued by the National Information Security Center (ISCCC). The Administrative Measures also provide that products containing encryption technology must be approved by the Office of Security Commercial Code Administration (OSCCA), and no imported products with encryption functionality can be used without approval. The combination of these requirements may significantly restrict the use of foreign information security products in systems classified at Level 3 or higher under the MLPS.^{xviii} The conclusion of the European Commission puts this somewhat more starkly: "It therefore appears that for IT systems classified in categories 3 to 5, the MLPS will forbid the use of foreign products."^{xix}

iii. Competition policy

Another concern about abuse for industrial policy purposes of intellectual property arises in the context of competition law. While no member country is required by the WTO rules to adopt a competition law, there is an assumption implicit in the WTO system that with border measures curbed and national treatment committed, that the member's market will be contestable. This suggests the adoption of a competition law, in China's case its Antimonopoly Law (AML). China adopted this law in 2007^{xx} in a remarkably open process, taking into account comments and suggestions from its major industrialized trading partners (principally the EU and the US as far as I know) as to how an AML ought to be constructed. In terms of transparency, this was a far different China than the one that existed pre-WTO accession, when drafts of laws were simply not available either to domestic interests or to foreign persons. Foreign commentators were not without concerns that the new competition law might be used in a protectionist manner by China's administering authorities, particularly where intellectual property was concerned, engendered in part by policy pronouncements such as the following:

[We shall] prevent the abuse of intellectual property that unfairly restricts the market mechanism for fair competition and may prevent scientific-technological innovation and the expansion and application of scientific-technological achievements.

We shall prevent vicious competition in the industries.

State Council of the People's Republic of China, Outline of the National Medium-and Long-Term Program on Scientific and Technological Development (2006-2020)

A Chinese concern was that dominant patent positions of foreign competitors would stifle the growth of Chinese competitors. In fact, in 2004, while the AML was being drafted, the State Administration for Industry and Commerce (SAIC) commissioned a survey to identify abuses of intellectual property by MNCs so that appropriate regulations could be drafted and remedies imposed. The list of abuses included unilateral refusals to deal, and the example used in the survey to illustrate that practice involved the largest network equipment manufacturer (i.e., Cisco) that allegedly had refused to license its IP to Chinese companies which wanted to connect to its equipment.^{xxi} Ironically, Cisco had sued one of those Chinese companies (Huawei) for illegally copying its IP before the SAIC survey was completed.

A 2005 draft of the AML contained a provision that would have considered it an abuse of intellectual property for dominant companies owning IP related to “essential networks” failing to license that IP to competitors without which IP they could not compete. Extensive foreign criticism, however, persuaded China to remove the provision from the final law. Instead, intellectual property rights are dealt with as follows in AML Article 55:

This law is not applicable to conduct by undertakings to protect their legitimate intellectual property rights in accordance with the IP Law and relevant administrative regulations; however, this law is applicable to conduct of undertakings to eliminate or restrict market competition by abusing intellectual property rights stipulated in the IP Law and administrative regulations.

The AML has not been applied to date as a protectionist device with respect to IP (as it has with respect to foreign acquisitions) but over time there have been repeated statements that this was an area requiring special scrutiny. For example, in 2006, Vice Minister Zhang Qiong of the State Council's Legislative Affairs Office reportedly took the view that the intellectual property rights could be anticompetitive: “If you use IPR to restrict others, you abuse it.” Specific examples have been given where foreign intellectual property rights might pose a problem:

The restriction [by foreign companies] on transfers of foreign high-end technologies will continue., . Intellectual property rights and patent disputes will worsen. With the penetration of global competition, multinationals use their dominance in technology, marketing, and capital to advance competition based on higher technological levels in intellectual property, and domestic enterprises face pressures from various sides in their development.”

11th Five-Year Plan for the Integrated Circuit Industry Ministry of
Information Industry, Jan. 8, 2008

What is not clear is how the new law will be administered with respect to intellectual property, especially IP owned by dominant companies. Several months ago, the State Administration for Industry and Commerce (SAIC) finalized its regulation on abuse of dominance. The regulation ignores stakeholder input that criticizes an earlier draft because it prohibited dominant companies from engaging in a number of routine transactions unless justified. In other words, industry has the initial burden of proof to justify ordinary transactions, specifically those that:

- Reduce the current volume of the transaction with the current transaction counterparts
- Delay or terminate the on-going transaction with the current transaction counterparts
- Refuse new transactions with the current transaction counterpart
- Set restrictions to make it difficult for the current transaction counterparts to continue the transaction with the undertaking in question
- Refuse transaction counterparts' using its essential facilities for production activity on reasonable consideration.

All of these restrictions could apply to IP licensing transactions, especially the last one that is reminiscent of the IP abuse provision dealing with “essential networks” and removed from the 2005 AML draft.^{xxii} The same “essential facilities” concept has reappeared in SAIC’s draft IP enforcement guidelines that have not yet been issued for public notice and comment. Article 18 of the IP Guidelines states that a dominant company may be abusing its dominance where it refuses to license IP considered to be an “essential facility” in that a competitor cannot compete effectively and there is “a negative effect on competition and innovation in the relevant market.”^{xxiii} So it is feared that forced technology transfer from successful companies to struggling competitors may be one method PRC regulators might employ to seek to increase domestic innovation.

There are many unanswered questions about the AML. For example, given that many PRC officials strongly disfavor Chinese companies paying royalty fees to foreign companies, would abuse of the dominant position be found where sales took place at what the AML’s administrators might consider too high a price for essential IP?^{xxiv} Will the AML be applied to principal Chinese competitors of foreign firms – state-owned enterprises? The AML is ambiguous on this point:

Article 7. Industries controlled by the State-owned economy and relied upon by the national economy and national security or industries implementing exclusive operation and sales in accordance with the law shall be protected by the State to conduct lawful operation by the undertakings. The State shall regulate and control the price of commodities and services provided by these undertakings and the operation of these undertakings so as to protect the interests of the consumer and facilitate technical progress. The undertakings mentioned above shall operate lawfully, honestly, faithfully, strictly self-disciplined, accepting public supervision and shall not use their dominant or exclusive positions to harm interests of consumers.

So only time will tell whether the AML will be used to tilt competition in favor of domestic producers through allegations of abuse by foreign entities of intellectual property.

iv. The National IP Strategy

The pervasive nature of the indigenous innovation policy thrust is described by the U.S. International Trade Commission in a study it released just a few months ago^{xxv}:

The goal of promoting Chinese IP was reinforced in China's 2008 National Intellectual Property Strategy (NIPS). The NIPS urges the government to "guide and support [Chinese] market entities to create and utilize intellectual property" through a variety of policies linked to indigenous innovation. The NIPS sets various targets, including significantly increasing the level and quantity of China's indigenous IP, developing a group of internationally famous brands, increasing Chinese value in core copyright industries, and effectively protecting trade secrets. Similarly, recent guidance from the Supreme People's Court on the implementation of indigenous innovation policies instructs the courts to (1) support and promote indigenous innovation by helping to promote the creation of indigenous famous brands and the development of a brand economy, and (2) increase the level of protection of indigenous IPR on key technologies.

iv. The spread of indigenous innovation to additional areas

In addition, the Medium and Long Term Science and Technology Plan (2006-2020) appears to focus indigenous innovation policies on sixteen key targeted projects which are themselves vast areas of economic endeavor. They are:

- core electronic components;
- high-end software; general chips and basic;
- the technology for manufacturing extremely large integrated circuits;
- new-generation broadband wireless mobile telecommunications;
- high-end numerical controlled machine tools and basic manufacturing technology;
- development of large oil and gas fields;
- large nuclear power plants with advanced pressurized water reactors;
- high-temperature gas-cooled reactors;
- control and treatment of pollution in water bodies;
- nurturing of new, genetically modified biological species;
- development of important new drugs;
- control and treatment of major contagious diseases such as AIDS and viral hepatitis;
- large aircraft;
- high-resolution earth observing system;
- manned space flights; lunar exploration projects; and
- technologies useful for both military and civilian sectors and defense technology.^{xxvi}

v. The increasing level of foreign concern

Were the indigenous innovation policies limited to these areas, which by their nature are far-reaching and extremely important to the future of any leading industrialized country, they would be very serious indeed. But in fact the problem extends beyond the sectors listed. Nor are these policies limited to government procurement. Nevertheless, given the large size of China's government procurement, the American business community made government procurement a focal point of concern in light of a series of facially discriminatory procurement regulations issued during 2009. On December 10, 2009 fifteen leading American trade associations addressed a letter^{xxvii} to three ranking Chinese officials, the Ministers of Science and Technology, the Minister of Finance and the Chairman of the National Development and Review

Commission (NDRC) requesting a change in direction in China's indigenous innovation policies, at least insofar as government procurement was concerned:

We are... deeply troubled by the joint circular (Notice No. 618) posted November 15, 2009 that would implement an Indigenous Innovation Product Accreditation system. Implementation of this system will restrict China's capacity for innovation, impose onerous and discriminatory requirements on companies seeking to sell into the Chinese government procurement market, and contravene multiple commitments of China's leadership to resist trade and investment protectionism and promote open government procurement policies. . . .

The Accreditation Program also runs directly counter to the commitment of President Hu and other world leaders to pursue open trade and investment policies and avoid protectionism. Additionally, it would dilute, if not effectively nullify China's commitment at the July 2009 U.S.-China Strategic and Economic Dialogue in which China clarified that its procurement policies were open to foreign invested enterprises (FIEs) and recognized the importance of non-discriminatory procurement policies.

Pressure from the foreign business community kept mounting. In April, 2010, some progress was noted. The U.S. China Business Council, which has been, along with the U.S. Chamber of Commerce, and the American Chamber of Commerce of China, a leading voice on this issue, noted changes in Chinese government pronouncements under the heading "*China Proposes Partial Solution to Indigenous Innovation Issues*":

Three PRC government agencies today released revised draft rules that would address some but not all foreign-company concerns about China's innovation incentive policies. The Ministry of Science and Technology (MOST), National Development and Reform Commission, and Ministry of Finance jointly issued the Draft Notice Regarding the Launch of the National Indigenous Innovation Product Accreditation Work for 2010. The April 10 notice details the requirements that products must satisfy to be eligible for national indigenous innovation product accreditation.

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There are several noticeable and welcome changes between the 2009 and 2010 accreditation requirements, . . .

Intellectual property. *Requirements governing intellectual property (IP) ownership in China appear to have been relaxed to allow indigenous innovation accreditation for products based on IP that has been licensed for use in China from overseas. This marks a significant departure from the previous requirement that limited indigenous innovation accreditation to products that were based solely on IP developed and owned in China. . . .*

Though the revised accreditation requirements are a step forward, several significant issues in China's indigenous innovation policies remain. In particular, the notice does not address the use of the product list or its link to government procurement preferences.^{xxviii}

That concerns remained among business groups was also reflected in the USITC report:

However, even with the April 2010 modifications to the draft policies, some industry representatives remain concerned. Under the new draft, it appears that products must reflect indigenous innovation by complying with unspecified “national industrial and technology policies” and must be locally researched and developed, including licensing of IP usage rights in China, with the R&D led by a Chinese entity. This could exclude foreign-owned firms, joint ventures in which the foreign partner has a majority interest, and even Chinese firms with R&D centers outside of China, although some foreign firms may qualify.

With U.S. industry concern mounting -- making this a high negotiating priority of the U.S. government, President Hu Jintao at the beginning of this year agreed to the following:

*27. China will continue to strengthen its efforts to protect IPR, including by conducting audits to ensure that government agencies at all levels use legitimate software and by publishing the auditing results as required by China’s law. **China will not link its innovation policies to the provision of government procurement preferences.** The United States welcomed China’s agreement to submit a robust, second revised offer to the WTO Government Procurement Committee before the Committee’s final meeting in 2011, which will include sub-central entities.*

U.S. - China Joint Statement, the White House Office of the Press Secretary, January 19, 2011

Were China’s government procurement market completely open, representing an estimated \$88 billion and, if construction projects are included, upward to hundreds of billions of dollars, this could be a very significant potential improvement in market access for foreign firms. If indigenous innovation has been stripped of playing any role in government procurement decisions, this would potentially be a major step forward in avoiding the use of intellectual property requirements as a means of favoring domestic IP. Of course, at present, China’s government procurement market is not open at all. So the statement above is a substantial policy pronouncement, but has no obvious current effect in terms of actual purchases of foreign goods or services. In addition, it is unlikely that when China does join the Government Procurement Agreement that there will be coverage of as many entities as have already issued catalogues of accredited (meaning having Chinese IP) products.

Has “indigenous innovation” been removed as a distortion of trade and investment?

Less than two weeks after the U.S.-China Joint Statement was issued by Presidents Obama and Hu, the press reported Commerce Secretary Locke as saying that "China is not living up to its commitments made last month during President Hu Jintao's visit to the U.S."^{xxix} Of course, this remains to be seen. However welcome, it is important to understand how narrow the application of the commitment is. Even in the area of government procurement, when China does join the GPA, there will be a plethora of government entities that China may consider to be still free to Buy Domestic on the basis of Chinese IP or any other criterion. The GPA only covers listed entities and the list is highly unlikely to be comprehensive.

As noted, the policy is imbedded in a wide variety of regulations and pronouncements. For example, China's broad concept of IP abuse through the administration of its Antimonopoly Law, although not discriminatory on its face, can in practice easily undermine foreign IP in favor of weaker Chinese competitors. The concept keeps creeping up in various regulatory initiatives, suggesting, as the SIAC survey in 2004 did, that its use is aimed at foreign firms that rely heavily on IP for their success. The latest regulation containing an IP abuse provision is MIIT's (the Ministry of Industry and Information Technology) Document Number 4, which is designed to build up a domestic software and hardware industry through a variety of monetary and other incentives.^{xxx}

(30) . . . crack down upon various behaviors abusing intellectual property rights to eliminate and restrict competition and abusing market dominance to practice unfair competition,

This is just one example. In China, a country that has been led from the top for thousands of years, pronouncements from the top carry great weight. China's leadership could not be more serious about the path it has drawn to its economic future, and that path includes vigorous promotion of indigenous innovation. Indigenous innovation has become an accepted way of thinking about innovation and promotion of domestic industry throughout Chinese ministries and provincial and local governments.

For over a decade, China's leaders have emphasized that the way forward is through indigenous innovation. This is reflected partially in inoffensive ways. As noted, there are impressive figures of increases in the production of scientific papers and patents being created by large orders of magnitude greater than in the recent past.^{xxxi} Yearly, the number of engineers graduating from China's schools is in the hundreds of thousands. China may find the quality uneven in each of these categories. At least with respect to production of scientific papers and engineers, these measures will not be a cause for foreign complaint (unless inferior patents are used to attack valid intellectual property rights of others). The increases in these activities are, with the possible exception just noted, completely a domestic matter for China and perhaps a positive for the world.

What must be taken into account is the nature of the Chinese economy. There is certainly a good deal of entrepreneurial spirit and freedom –within bounds, but the state has enormous influence. There is more than a slight element of what in India is called a license raj – that is, government permissions are needed for a number of activities. State-owned banks provide most of the finance. Government entities approve plant location and expansion, and grant benefits. Government entities control the vast industrial parks. Government pronouncements – as opposed to those made by Western leaders about their aspirations for their own economies -- carry great weight in a one party system. We cannot expect pronouncements from China's current or new leadership that indigenous innovation is suddenly unimportant, given all the pronouncements and measures that are infused with the conviction that it is vitally important. The vast part of China's economy that consists of state-owned enterprises, and all other firms -- whether wholly Chinese-owned, joint ventures with foreign firms, or solely foreign-owned enterprises -- are all to some extent state-influenced. In the case of the state-owned enterprises, it would be a remarkable act against human nature and the personal interests of their SOE executives to completely ignore the strongly held views of their single shareholder. All know

that creating intellectual property in China – indigenous innovation – is part of the grading system. Where one of these state-enterprises is engaged in commercial competition with commercial competitors, as in software, telecom or integrated circuits, this is a valid matter of concern to other governments.

So Party Secretary General Hu’s welcome agreement in January to a statement that *China will not link its innovation policies to the provision of government procurement preferences*, non-operative at present because Chinese government procurement is not in fact open to foreign bidders, is not the whole story. . For instance, the statement does not apply by its terms to purchases by China’s state-owned enterprises, to the NDRC concession projects to the acquisition of turbines for large wind farms, nor to any of the sixteen major priority projects contained in the Medium and Long Term Plan. In short, Mr. Hu’s commitment is not a game-changer in China’s economic relations with its trading partners, absent something more.

The correct question is, is China on a path to opening its market completely, not just the market for procurement by government entities? There is no evidence of its doing so.

In fact, in the standards area, there is evidence is to the contrary. Over the last several years, the Chinese government has partnered with Chinese industries to develop standards that benefit home-grown technologies. Such domestic standards, which the government often mandates by regulation, can make it more expensive for foreign manufacturers to compete by requiring a separate product SKU or even block foreign access to China’s market if compliance with the standard is not feasible. Examples of Chinese standards in the wireless, security and digital home markets include:

- WAPI^{xxxii}, a homegrown WLAN security protocol originally applied to laptops that the Chinese government sidelined in 2004 due to international pressure, is now re-appearing in cell phones.
- A Chinese standards body is developing “UHT”^{xxxiii} (i.e., refinements to the international standard known as 802.11n) to benefit Chinese wireless technology; if UHT is mandated, the market for WiFi products in China could be negatively impacted.
- To give time for its homegrown TD-SCDMA technology to gain traction in the Chinese market, China delayed issuing WiMax licenses.
- China also has exerted pressure on original equipment manufacturers to adopt the proprietary Trusted Cryptographic Module (TCM), a home grown derivative of the well established international Trusted Platform Module (TPM).
- DLNA^{xxxiv}, accepted by the International Standards Organization (ISO), provides foundational capability for digital home products by enabling interoperability and is viewed as a driver of end user demand. IGRS, a homegrown version of DLNA/UPnP^{xxxv}, has slowed DLNA/UPnP adoption in China.

The ability of foreign companies to influence standard-setting processes is limited because they typically have only observer (non-voting) status in the standard-setting organizations in China. For national standards (i.e., mandatory requirements applicable across China), Chinese authorities have made it clear that foreign participation in the standard setting process is contingent on agreement to license IP royalty-free or for low/nominal royalty rates.

The policy toward protection and promotion of domestic industries, with indigenous innovation as a major element, has been in the making for a decade or more. The policy, like a giant ocean-going vessel, cannot be turned quickly. And there is no evidence yet that it is the intent of China's leadership to do so.

Current indications are that indigenous innovation as a force to shape the Chinese economy and trade is gaining momentum, not the reverse. On April 16, 2011, Reuters reported that:

China plans to support its integrated circuit sector as a strategically important industry over the next five years, aiming for over a fourth of microchips used in the country by 2015 to be made in China, Xinhua news agency said on Saturday.

The support for the sector is just the latest step in a broader push by Beijing to promote home-grown high-tech and other industries, as the country seeks to reduce its reliance on cheap manufactured exports for growth -- and on foreign companies for imports of high-tech goods.

Xinhua cited Yang Xueshan, vice minister of industry and information technology, as saying the ministry expected Chinese companies to make 27.5 percent of the integrated circuits used in the country by 2015, up from about 20 percent now.

The plan for the sector included the development of more proprietary intellectual property, the state-run news agency added.^{xxxvi}

Reportedly the goal is to have operating systems and CPUs made from Chinese designs owned by Chinese companies (wherever the chips are manufactured, including offshore fabrication facilities) occupy the market first with respect to procurement for the Chinese Communist Party's IT systems, then for use by provincial and local governments and then to occupy the market segment consisting of state-owned enterprises. This would drive Chinese-IP chips from 10% of the Chinese market to 30% within four years.^{xxxvii} As U.S. chip companies account for half the world's supply at present, and China is the largest most rapidly growing market, the implications for the United States is that its number one export (namely, semiconductors) will be greatly impaired if China succeeds in achieving its objectives. With respect to certain major new areas of consumption that are deemed sensitive by Chinese authorities, under the multi-level protection system (MLPS) described above, such as the smart grid for electricity distribution, requirements for use of Chinese IP chips may be set at even higher levels.

A recent article conveys the current state of progress toward relying on Chinese CPUs:

The Central Processing Unit, or CPU, is the core component of a computer. The world's fastest super computer Tianhe-1 (TH-1) is equipped with a CPU from China. TH-1 is ranked number one among the top 500 super computers in the world, as published by the

international organization Top 500. TH-1 is the first Chinese super computer equipped with a CPU having Chinese IP rights. The CPU is called "Fe Teng-1000" and designed by the Chinese National University of Defense Technology. According to Nan Li, the Head of the Engineering Department at the Chinese National University of Defense Technology, Fe Teng 1000 is close to the level of the CPUs of the world's mainstream computer servers.

According to the Chinese government's medium and long-term development plan for science and technology deployment, by the end of the year (2011), all Chinese supercomputers will try to be installed with CPUs from China. During 2006-2010, three main objectives of the Chinese government's development plan were CPU, software, and electronic devices. For these three objectives, China allocated 22 projects with a total budget of 19.684 billion Yuan. 178 companies and universities participated in the projects. The total number of researchers had reached 37 thousand.

During 2006-2010, other CPUs from China included "Shen Wen 1600" from the High Performance IC Design Center (2nd generation 16-core general purpose CPU), "Long Xin 3A" and "Long Xin 3B" from the Chinese Academy of Science Computer Department (4-core and 8-core high performance general purpose CPUs, respectively), and "Hua Rui the First" (a high performance multi-core CPU with Chinese IP rights). In the meantime, the Chinese software developed alongside with the CPU technology.

Using the interaction between computer software and hardware, the Chinese CPUs will spread among industries such as wireless communications, medical electronics, automotive electronics, and the internet. This development will play an important role to help China using information technology to stimulate industrialization and ensuring national information security.^{xxxviii}

It should be noted that there are also pronouncements that tend in a liberal trade direction. The White House Fact Sheet dated January 19, 2011 includes the following statement:

The United States supports China's commitment to allow foreign companies equal opportunities to participate in the development of the country's "smart" electric power grid. China committed that purchases of smart grid products and technologies will be made solely on commercial considerations with no discrimination against foreign companies. China also will ensure that foreign stakeholders have full opportunities to participate in an open, transparent process for establishing smart grid standards. China also committed to make purchases solely on commercial considerations. China plans to spend \$10 billion annually on smart grid investments.^{xxxix}

Which policy direction will be implemented? One can conclude, as one U.S. participant in the Chinese semiconductor market recently told me, that the next five years are going to be even more interesting for U.S. chipmakers in terms of their access to the Chinese market than the last decade has been.

Examples of various linkages to indigenous IP are proliferating. Forced technology transfer is reportedly intertwined with the indigenous IP campaign, noted in this Financial Times article of March 20, 2011:

Mike Dunne, president of Dunne & Co, an industry consultancy, said: “Nothing is written down, but when automakers go to apply for capacity expansion, in their application it’s clear that they should have a plan for an indigenous brand with jointly owned product rights and some provision for new energy vehicles.

“Foreigners want more capacity; China is saying: ‘We want more own brands’.”

From China’s perspective, co-operation with foreign carmakers has yielded little in terms of development of local brands or transfer of intellectual property.

Lang Xuehong, automotive analyst with Sinotrust , said: “During 10 years of trying, China has become a big factory for foreign companies, and their Chinese partners didn’t get advanced technology.

“Through this industrial policy they would like Chinese carmakers to get IP in order to own this market”.

Some foreign carmakers believe a drive into local brands makes questionable business sense at a time when most are trying to reduce complexity.

“None of the manufacturers freely opted for having local brands added to a complex brand portfolio that they all already had,” said Engelbert Wimmer of PA Consulting, which advises the industry^{x1}.

According to the U.S. Trade Representative’s *2011 National Trade Estimate Report* and other sources, a percentage yet to be determined of new capacity will need to be dedicated to New Energy Vehicles (NEV - defined as either a plug-in hybrid or battery electric), from an environmental point of view a laudable goal. Apparently the New Energy Vehicles must have an indigenous brand (no foreign branded NEVs will be given a license for production and sale in China after 2015). “Automakers who intend to manufacture electric vehicles in China must demonstrate a ‘mastery’ level of proficiency in one of three key technologies - electric vehicle batteries, motors, or control systems -before receiving a license to produce and sell such vehicles; . . . the Chinese entity that manufactures the product (either a domestic OEM or joint venture operation) must demonstrate clear intellectual property ownership rights to the technologies that enable such mastery.” Given the lead that many foreign firms have in hybrid and electric vehicle technologies, will they now be induced to contribute their IP to their Chinese joint venture operations in order to fully participate in this new market opportunity?^{xli}

Are there really no WTO obligations applicable to indigenous innovation?

The core obligation of the WTO – the GATT, the GATS, and TRIPs – is national treatment:

Each member shall accord to the nationals of other Members treatment no less favorable than it accords to its own nationals with regard to its own nationals with regard to the protection of intellectual property

Agreement on Trade-Related Aspects of Intellectual Property Rights, Art. 3

As for the government procurement segment, China would say that goods and services purchased for government use are exempted from the national treatment obligations of WTO/GATT and WTO/GATS. But as noted above, indigenous innovation policies are not so confined. How narrowly is the TRIPS national treatment requirement to be read? Was it to apply solely to a requirement of nondiscrimination when China's authorities prosecute those dealing in counterfeit goods or engaging trademark and patent infringement? If the adoption of indigenous innovation policies by a government in an economy where the state has a pervasive role means that once the tariff is paid on an import, that good will still not be able to compete on a level playing field against domestic products because it is made with foreign intellectual property, why would it be defensible to maintain that the commitment of TRIPS Article 3 quoted above has been fulfilled? If using on-Chinese IP disqualifies foreign products from being sold, that is ten thousand miles away from providing national treatment.

And what of China's commitment contained in the Working Party Report of China's accession to the WTO:

46. The representative of China further confirmed that China would ensure that all state-owned and state-invested enterprises would make purchases and sales based solely on commercial considerations, e.g., price, quality, marketability and availability, and that the enterprises of other WTO Members would have an adequate opportunity to compete for sales to and purchases from these enterprises on non-discriminatory terms and conditions. In addition, the Government of China would not influence, directly or indirectly, commercial decisions on the part of state-owned or state-invested enterprises, including on the quantity, value or country of origin of any goods purchased or sold, except in a manner consistent with the WTO Agreement. The Working Party took note of these commitments.

If foreign IP is taken by SOEs to disqualify imports or domestic products that include foreign intellectual property, this is not making "purchases and sales based solely on commercial considerations, e.g., price, quality, marketability and availability".

As noted above, it is also far from clear that an indigenous innovation requirement is not applicable to procurements for large state projects establishing wind farms for the generation of electricity. Foreign bidders had already established under local content requirements (now announced as removed) investments in China. Nevertheless their share of the Chinese market plummeted in the last half of the last decade. A study by the National Trade Council issued last year concluded that:

On November 15, 2009, MOST and MOF jointly issued a notice which required enterprises registered in China to apply for accreditation of indigenous innovation products, with a filing deadline of December 10, 2009 — a timeline that foreign companies have criticized as difficult or impossible to satisfy.

Foreign-invested Chinese enterprises are not excluded from owning qualified "indigenous" technology by the terms of the Provisional Measures, and MOFCOM has stated that foreign-invested enterprises may qualify for accreditation. However, MOST reportedly issued a directive in 2008 to local governments that to gain accreditation under this program an enterprise must be wholly owned by Chinese nationals or, in the case of a joint venture, majority controlled by Chinese nationals. As a practical matter,

most foreign firms find that the requirements for qualifying for certification are difficult or impossible to satisfy.^{xlii}

Foreign company bids have not been successful for the large NDRC concession projects.

National treatment is the fundamental commitment upon which the world trading system relies. If having indigenous innovation remains a condition of selling in the Chinese market or the IP of domestic producers is granted greater protection than foreign IP, China cannot be said to be acting consistently with its WTO commitments.

Where do China's best interests lie?

Innovation through public procurement cannot be "ordered"; rather, it has to be the result of a sophisticated articulation of demand for innovative products or services and of a transparent competitive process.

OECD Reviews of Innovation Policy: China Synthesis Report^{xliii}

There are now two competing philosophies – loosely termed the Beijing Consensus^{xliiv} and the Washington Consensus^{xliv}. While there is actually some overlap, for our purposes today the difference between the two is the degree and kind of government intervention. At the front end, the way the U.S. and Chinese governments approach innovation are similar in a few respects, at least in kind – for example to foster STEM education and pre-competitive R & D. The U.S., Canada, Australia and Europe then rely heavily on the market to determine competitive outcomes.

Beijing comes from a tradition of state intervention, and while market forces are strongly in evidence in many respects, the presence of the state in terms of promotion of industry is far more pervasive. As far as I know, it would frankly not occur to the most nationalistic trade policy advocate in or outside the U.S. government to recommend that the United States discriminate against foreign products based on origin of their invention. One of the principal benefits of the world trading system is to have the advantage of the latest and best products. This is in fact widely seen in this country as an American competitive advantage.

Reportedly, Brazil, unphased by the lack of success of its import substitution policies, is seeking to learn more about the secrets of China's success to be found in state intervention.

When Brazil's President Dilma Rousseff begins her first visit to China today for a summit of leaders from the Brics club of fast-growing emerging markets, she will be interested in more than just diplomacy. While she will raise Brazil's gripes with Beijing, such as China's allegedly undervalued currency and greater reciprocity for Brazilian manufactured exports, Ms Rousseff will be keen to witness first-hand the Asian economic powerhouse's successful experiment in statist industrial policy – an approach her government is increasingly moving towards at home.^{xlvi}

Financial Times, April 11, 2011

Without speculating about which of China's policies Brazil might decide to copy, it would be a mistake for Brazil to copy the worst aspects of the indigenous innovation policies. It would be a recipe for innovative stagnation. Five centuries ago, Paracelsus opined that whether a substance was a poison or not depended on the amount of the dose. That is equally true of measures to promote innovation. It is one thing to promote basic R&D and fund it; it is something different to deter one's citizens from purchasing products, whether made at home or abroad, depending on their country of invention.

There is probably no amount of argument that will persuade China or Brazilian leaders that innovation needs to be nurtured but that it cannot be ordered. Where lines are crossed, and international obligations are breached, rights can be asserted. Otherwise the most effective influence will be the crucible of competition in the marketplace. One thing the Chinese hosts might think about when they provide lessons to their Brazilian guests about the Beijing model for economic development is that to the extent it is mercantilist (through devices such as the trade and investment restrictive elements of the indigenous innovation policies), if Brazil emulated them – whether or not successfully -- it would be Chinese exports to Brazil that would be among the first to suffer. In fact a major reason for President Rousseff's visit to Beijing was to address the bilateral imbalance in manufactured goods trade between the two countries. If adherence to the Beijing Consensus results in competition between national industrial policies, its practitioners might do a fair amount of harm to each other. That would provide an interesting and ironic twist to the resort to the more interventionist aspects of the indigenous innovation policy.

Policy Choices

Recognizing that the U.S. government has sought to address a number of the more egregious problems posed by China's indigenous innovation measures, there are a variety of policy choices that can be made going forward:

- Do nothing. This is always a default position. This would be firmly based in the widespread belief (although not as widespread as it once was) in the economics profession that industrial policies are ineffective and mainly harm those countries which practice them as inefficiencies and errors multiply as government choices substitute for market forces in determining competitive outcomes. After all, didn't the Soviet Union self-destruct and Japan's crony capitalism create a *cul de sac* in its path to growth?" Let China find its own developmental dead ends.
- Look solely to doing the right things at home. Ignore what others are doing. Build on American successes: its entrepreneurs, venture capitalists, Federal government backing of basic R&D, labor market mobility, university system, science parks, STEM education, and high-skilled immigration. .
- Monitor more closely Chinese policies that cause competitive harm to U.S. commercial interests. This will take a substantial investment of government resources and close cooperation with both the private sector (companies and trade associations), and if possible, governments of countries with allied interests. Expanding the investigative capacity of the U.S. government would be needed.

- Engage in intensive dialogue with the Chinese government and engage in intensive commercial diplomacy. This is another default position. It is a very long-term effort. These are activities that, in my view, are undertaken with the knowledge that they will be most effective when and if China's becomes disenchanted with its current trade and investment distorting policies. The next session of the U.S.-China Innovation Dialogue is scheduled for May 6, 2011 and chaired on the U.S. side by Science Advisor John Holdren. The next Strategic and Economic Dialogue will be held on May 9-10 in Washington, chaired on the U.S. side by the Secretaries of State and Treasury, and will have as one of its subjects implementation of President Hu's January 2011 commitment to de-link IP content and government procurement. Work with allies to the maximum extent possible.
- Litigate WTO cases more aggressively. There is more to be done, more risks to be taken. Resources will need to be enhanced. Drafting of or getting volunteers from the private sector should be undertaken to deepen the bench. In addition, serious dedication of investigative resources need to be seconded from within the government departments or engaged by contract. There are limits to what the litigative approach can deliver, however. And if it is too extensive, litigation would drive out alternative approaches to working matters out more broadly. Additional litigation is worth pursuing selectively, without overestimating what can be gained at present from enhanced enforcement.
- Negotiate new binding disciplines. Success depends on evolving Chinese leadership views of China's long term self-interests. Possessing usable leverage in any negotiation is another potential element. Neither condition would appear to be satisfied to any great extent at present, but that should not prevent at least exploratory efforts in this direction.
- Develop a comprehensive and strategic approach. No doubt the U.S. government feels that it is doing so already. But the handling of the U.S. relationship with China is in fact more important than its current interests in Afghanistan, to take one example, and it is not clear that there is a clear set of goals reaching to ultimate solutions and a planned path on how to get there. Trade policy has all too often been somewhat in-box driven (by immediate complaints and crises) rather than strategy. First, identify U.S. national interest, and understand in depth how foreign industrial policies affect the U.S. economy through harmful competition in the market of the country practicing them, in third country markets and in the U.S. home market. For example, in effectively addressing implementation of the AML and China's broad abuse of IP doctrine that is emerging in multiple policy arenas, USTR, the U.S. Department of Justice, Federal Trade Commission and Department of Commerce will need to work very closely together.
- Consider what leverage exists. This has been a challenge for U.S. policy for a very long time, starting in modern times with the closed nature of the Japanese economy in the 1960s through the 1980s. Besides WTO complaints, there is a

need for a private internal viewing of what is left in the arsenal. It is not wholly empty.

- Create an international consensus on best practices in innovation. This might be accomplished in the OECD, and other fora. The Trans-Atlantic Business Dialogue, an advisory body to the Transatlantic Economic Council, has developed a set of Innovation Policy Principles and submitted them to the U.S. government and European Commission for approval with the hope that having those two governments speak with one voice on which principles work and which ones do not would influence emerging markets. Moreover, USTR would like to develop “Core Concepts” on innovation for adoption by the 21 member economies of the Asia-Pacific Economic Cooperation (APEC); unfortunately, China has raised some initial objections and APEC works by consensus. The U.S. government should pursue multiple avenues on developing a consensus view on best practices.
- Include disciplines on new forms of protectionist measures (many of which are cited in this paper) in every trade agreement. Start with the Transpacific Partnership (TPP) Agreement. USTR is working to make this into a “21st Century agreement”, for example, by proposing text in the last round of TPP negotiations that would establish encryption regulation best practices. As briefly alluded to earlier, emerging encryption regulation in China could become a significant barrier to imports of foreign ICT.

Conclusions

One of my extra-curricular activities is to serve as Chair of the Committee on Comparative Innovation Policies of the Science Technology and Economic Policy (STEP) Board of the National Academies. We are in the process of collecting from a range of foreign countries what may be considered best practices in innovation policies. We have published a number of conference volumes^{xlvii} which are available on the National Academies’ website, and will publish conclusions in a final report planned for spring, 2012. This report will be public and available for U.S. policymakers as well as policymakers in all capitals, including Beijing.^{xlviii}

To give you a partial forecast of what we are finding, leading countries and regions are responding to the innovation imperative by providing among other things:

- Sustained support for universities
- Sustained funding for research
- Government-industry partnerships to bring new products and services to market

They are investing very substantial resources to create, attract and retain the industries of today and tomorrow.^{xlix}

A number of indigenous innovation policies are to be deemed positive (or at a minimum not to deemed unacceptably trade and investment distortive), and others are negative and destructive of an open international trading system. Chinese leaders must become convinced that

the negative policies should be excised and discarded as obstructions to, rather than steps toward, China's developmental goals. While it would be a gross error to view China as monolithic, the influence from the top, in a direction that is seen by ministry, provincial and municipal officials as enhancing economic growth, is extraordinarily powerful. What is called for is not a reversal of course, but skirting some shoals.

A skillful use of the policy options described above is called for.

As a first step, China's leaders at the upcoming S&ED should give effect to the January 2011 commitment with respect to indigenous innovation. This can be accomplished only by communications by the Chinese leadership within China. A commitment is needed that the Chinese government will promptly clarify by means of a State Council proclamation that China will void provincial catalogues and other measures that contain a link between indigenous innovation and government procurement.

This would implement only one small component of the cure to the overall problem of the current direction of China's policies that adversely affect market access. Then comes the truly heavy lifting for Chinese and American officials alike.

In parallel to this commercial diplomacy, a dialogue should be continued as to what America sees as positive innovation policies, without expecting near-term adoption by China. My assumption is that Presidential Science Advisor John Holdren in his U.S.-China Dialogue is speaking to measures that he sees as creating innovation in this country:

- Technological innovation is created in an environment that is welcoming to its creation.
- Having plenty of engineers, and emphasizing STEM education is positive.
- Immigration -- attracting the best and the brightest -- was once a U.S. strength.
- Government support of pre-competitive R&D, open to all companies, regardless of nationality, is a universal accepted practice as being effective. It is necessary to include universities heavily in this process.
- Truly effective protection of intellectual property attracts R&D from multinational companies. At present, deficiencies in China's IP protection make China is far from a preferred location for this reason. (See study of U.S. semiconductor industry placement of R&D around the world¹). Trying to force technology transfer is counter-productive.
- Technology transfer is primarily achieved through mobility of skilled, innovative persons, changing employers. Because of IP protection concerns, many if not most MNCs appear reluctant to put the latest technologies into their facilities in China. They may not be training Chinese engineers to the extent that they would if they were free of IP concerns. Chinese engineers and foreign engineers should find China's emerging high tech companies increasingly attractive to move to, especially if co-located in a high tech park.

- Create prizes for innovation, not catalogues for preferred products. Depriving China of the latest technologies because they are foreign will impair China's development. Creating incentives for domestic market share for indigenous IC's means a permanent lag for Chinese products including ICs -- no future Chinese products like I-Pads, no leading-edge products, without global sourcing.
- Guarantee openness of markets for China's innovative products through taking a leading role in multilateral trade negotiations (e.g. an agreement on duty-free, tax-free information and communications technology signed onto by all WTO members would be a superb boost to economic development in the less developed countries; an agreement on environmental goods and services would lessen growth in demand for fossil fuels and be good for the environment and for China's interests with respect to the price of imported energy; and would be of direct and immediate benefit to China's industries). Another area of common interest would be an agreement on increasing assurance that sources of food, feed and raw materials will be shared equitably.

These messages, and others like them, can be reinforced by commercial diplomacy and selective WTO cases where trade and investment distortions arise due to China's current or planned measures that are harmful or will cause harm to trading partners' interests. Serious negotiations with China on what is permissible should take place.

The U.S. should include detailed standards of conduct proscribing mercantilist practices in all of its agreements, starting with the one currently underway – TPP, and eventually obtaining adoption in the WTO. The OECD may help to forge the international standards. The reason for this strategy is not just to contain China's protectionist policies, but also to deter other governments of emerging countries, like Brazil and India, from adopting similar policies.

There have been major trade policy challenges in the past. Britain's system of imperial preferences, the formation of the European Common Market, and its enlargement, and Japan's state developmental capitalism each caused major trade distortions that were problematic for other trading nations including the United States. Brazilian and Indian reluctance to bind autonomous liberalization is a challenge. China, as the world's number one exporter, and a major market, poses its own set of challenges. No past challenge has proved insuperable, nor should this one. It is ingrained in the American spirit to believe that no problems are incapable of being solved. There is no good alternative to working with the view that the harmful aspects of industrial policies that China is embracing will be dealt with, with outside encouragement but primarily by China's own recognition of where its best interests are served. After all China changed thousands of laws and regulations to join the WTO. The idea of openness to international competition as a primary driver of domestic reform is not foreign to China.

There is a darker vision of the future: if China continues to pursue policies that distort trade and investment, and the U.S. does little to put its own house in order – in other words neither changes its policies. In that direction lies increasing trade conflicts. The pressure in Congress would grow for U.S. measures. A domestic policy review process of inward foreign direct investment (going beyond national security concerns) could be enacted, and is already being talked about informally. This would be a very regrettable step to take. Tougher controls on technology transfer might be imposed. Import restrictions might proliferate, as "indigenous

innovation” products were scrutinized for possible IP violations, or simply because Chinese practices are deemed “unreasonable” and “are a burden on U.S. commerce”. Chinese retaliation would probably occur. This would serve neither country’s interests. Protectionist responses to China’s industrial policies would not be likely to be confined to the United States, as there are many emerging countries that have a trade imbalance with China in terms of composition (exports of basic commodities to China and large imports of Chinese manufactured products).

The brighter vision for the future would include close collaboration on common challenges. Both could benefit from working together to develop new sources of energy, commercializing renewable alternatives to oil and coal, thereby addressing climate change; and by improving global health, transforming large investments in research to affordable and personalized treatment and care. The two countries also have a mutual interest, as yet unrealized, to exercise shared leadership in multilateral trade negotiations.

For the United States, failing to fashion effective responses is not an acceptable policy option – both in terms of U.S. domestic policies and engaging in appropriate responses to China’s neomercantilism. Getting China back on a path to liberalization will not be worth much to the United States economy if U.S. competitiveness erodes. The United States must revert to its basic strengths, but it cannot accept its economy being shaped by the industrial policies of others.

ⁱ This testimony is personal and is not intended to reflect the views of any institution or organization with which I am affiliated.

ⁱⁱ Time and space limitations do not allow for an inquiry here into the major U.S. efforts in the Joint Committee on Commerce and Trade (JCCT). This focus of this paper is on the nature of the problems posed by indigenous innovation policies and measures and broadly how they should be addressed.

ⁱⁱⁱ March 7, 2011, New Yorker Magazine. <http://archives.newyorker.com/?i=2011-03-07#folio=048>.

^{iv} Lunch with the FT: Mo Ibrahim by William Wallis Published: February 15 2008 20:20 | Last updated: February 15 2008 20:20

^v *Innovation is diffusing at ever increasing rates, is increasingly interdisciplinary, technologically complex, and thus collaborative and global. Council on Competitiveness. 2004. Innovate America. For example, some companies have R&D centers in various geographies that enable them to design products around the clock international. In addition, co-authorship of scientific research papers has increased significantly, from only about 7% of scientific articles in 1985 to about 22% in 2007. (OECD) Notably, out of the awards given to the top 100 U.S. product innovations each year, the number of award-winning innovations attributed to a private sector firm operating alone averaged 67 in the 1970s, but dropped to an average of only 27 in the last decade. Today, about two-thirds of award-winning innovations involve some kind of inter-organizational collaboration. Source: The Information Industries and Innovation Foundation (ITIF)*

^{vi} *Understanding Research, Science and Technology Parks: Global Best Practice: Report of a Symposium; Committee on Comparative Innovation Policy: Best Practice for the 21st Century, Board on Science, Technology, and Economic Policy and Global Affairs, Charles W. Wessner, Editor, NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMIES, THE NATIONAL ACADEMIES PRESS, Washington, DC*

^{vii} See *MANAGING UNIVERSITY INTELLECTUAL PROPERTY IN THE PUBLIC INTEREST*, Committee on Management of University Intellectual Property: Lessons from a Generation of Experience, Research, and Dialogue, Board on Science, Technology, and Economic Policy, Committee on Science, Technology, and Law Policy and Global Affairs, Stephen A. Merrill and Anne-Marie Mazza, Editors, NATIONAL RESEARCH COUNCIL OF THE NATIONAL ACADEMIES, THE NATIONAL ACADEMY PRESS, Washington, D.C., www.nap.edu

^{viii} “Not many Americans know that China was first to invent the magnetic compass (200 BC), moveable type (1050 AD), wrought iron (early 5th century BC), the blast furnace (250 BC), paper money (700 AD), paddle wheel boats, printing (650 AD), metal bells (200 BC), the fork (2400 BC which preceded use of the chopstick), lacquer ware (5000 BC), plowshares (3500 BC, of stone), toxic gas for use in war (400 BC), the use of chromium (terra cotta warriors, 210 BC, but not used in the West until around 1797), the game of golf (1000 AD), the crossbow (200 BC), the use of diet (vitamin rich foods to cure diseases – 200 BC), the diagnosis of diabetes (in 200 BC and its treatment with diet by 650 AD), the isolation of hormones from urine in 1110 AD and their use over the centuries to treat various disorders, the fishing reel (4th century AD), manned flights with kites (mid 6th century AD in China, 1891 in Europe), standardized dimension lumber (by 1100 AD), natural gas for heat and light (4th century BC), negative numbers (in the third century in both China and Greece, but not until 1550 widely used in Europe), the pinhole camera in 450 BC, a century before Aristotle discovered it, raised relief maps (3rd century BC, one millennium before they were invented in the West), the rotary fan for cooling (200 BC) powered by hand or by water power (in the West first used in the 16th century to ventilate mines), the seismometer (132 AD), steel (2d century BC), treatment of goiter with iodine (7th century AD in China, 1860 in France), the chain suspension bridge (early 15th century AD), toilet paper (589 AD), tuned bells (8th century BC), and underwater salvage (1065 AD).” From the author’s presentation to US-China Meeting at the National Academies, “Building the 21st Century: U.S. - China Cooperation on Science, Technology, and Innovation”, May 18, 2010. The material was inspired by a biography of Joseph Needham, *The Man Who Loved China: The Fantastic Story of the Eccentric Scientist Who Unlocked the Mysteries of the Middle Kingdom* by Simon Winchester (May 6, 2008), with examples drawn from that book and websites.

^{ix} http://english.gov.cn/2006-07/26/content_346731.htm

^x “Outline of the 11th Five-Year Plan and Medium-and-Long-Term Plan for 2020 for Science and Technology Development in the Information Industry,” Ministry of Information Industry, Xin Bu Ke [2006] No. 309, August 29, 2006. Note that the text of the Outline itself is undated, but the MII website posting the Outline is dated August 29, 2006.

^{xi} *State Council of the People’s Republic of China*, Outline of the National Medium-and Long-Term Program on Scientific and Technological Development (2006-2020), (February 9, 2006), Provisional Translation from Chinese on file, original available at <http://www.cas.cn/html/Dir/2006/02/09/13/70/88.htm>

^{xii} *State Council of the People’s Republic of China*, February 9, 2006 at <http://www.cas.cn/html/Dir/2006/02/09/13/70/88.htm> (Provisional Translation from Chinese) p. 21

^{xiii} - Opinions of the Ministry of Finance on Implementing Government Procurement Policies That Encourage Indigenous Innovation, Ministry of Finance, June 13, 2006.

^{xiv} http://info.e-to-china.com/investment_guide/53396.html

^{xv} Measures to promote the development of a domestic equipment manufacturing industry include:

 Preferential taxation

 Incentives for purchase of Chinese-made machinery

 VAT rebates on imported parts and materials

 Allocation of special funds for technologically advanced products

 Relief of enterprises’ “social responsibilities”

 State Council, Several Opinions on the Revitalization of the Equipment Manufacturing Industry, (June 28, 2006)

Preferential tax treatment. The Ministry of Commerce (MOFCOM), NDRC, and relevant state organs are to implement specific preferential tax policies, provide exemptions from tariffs and provide value added tax rebates with respect to the importation of key parts and raw materials used to develop key equipment and projects. Encouraging domestic purchasing. Companies are encouraged to purchase their “initial” equipment from domestic manufacturers. Purchasers, equipment makers, and insurance companies are to work together to share risks and profits arising out of such purchases. Insurance companies will be guided to provide insurance coverage to the companies making domestic purchases.

Increasing financial support to key technological equipment manufacturers. The government will allocate special funds annually for the creation of key programs and technologically advanced projects.

Relieve enterprises’ societal responsibilities. National and local governments are to provide funds and support to relieve enterprises of their “societal responsibilities.” The state-owned Assets Supervision and Administration Commission of the State Council are to facilitate this process and reduce social burdens on enterprises.

China State Council Issues Opinions on Equipment Manufacturing Industry, Dewey Ballantine LLP

^{xvi} http://www.uschina.org/public/documents/2010/11/local_ii_catalogues.pdf.

^{xvii} Ministry of Public Security, Notice on Grading Work of National Important Information System Security Multi-Level Protection, Gong Xin An [2007] No. 861.

^{xviii} Wolff, Dempsey, and Oh, “*Policy Issues Arising in China’s Development of State-Sponsored Domestic Standards*,” September 2009.

^{xix} European Commission’s Market Access Data Base, updated through April 18, 2011; http://madb.europa.eu/madb_barriers/barriers_details.htm?barrier_id=085196&version=2.

^{xx} Passed in 2007, the AML became effective on August 1, 2008.

^{xxi} “Multinationals’ Anti-Competition Behavior in China and Counter-Measures Therefore,” *Industry and Commerce Administration*, Section (1)D, Issued by the Anti-Monopoly Division, Fair Trade Bureau, State Administration for Industry and Commerce (March 1, 2004).

^{xxii} See Provisions on Industry and Commerce Authorities' Prohibiting Abuse of Dominant Market Position (2011). Before finding abuse of dominance involving the last transaction listed, factors such as the possibility for transaction counterpart to build or develop a substitutive, the degree of reliability on the essential facilities for the transaction counterpart's production, the possibility for the undertaking in question to provide the essential facility, and the effects of the providing on the undertaking itself, are to be comprehensively considered.

^{xxiii} Guidelines for Anti-Monopoly Law Enforcement in the Area of Intellectual Property Rights (Fourth Draft Revision).

- ^{xxiv} Selling products at “unfairly high” prices. Could this apply to licensing fees for IPR that are deemed “too high?”
- Buying products at “unfairly low” prices
- Selling below cost “without any justification.” Does this mean below average cost, marginal cost, or some other measure of “cost?”
- Refusing to trade with relative parties “without any justification.” Does this mean the refusal to transfer technology/IPR to Chinese enterprises?
- Limiting relative trading parties to exclusive deals with the dominant firm or designated parties without any justification. How does this apply to existing distribution arrangements?
- Tie-in sales “without any justification.” How will this apply to complex combinations of products and services offered?
- Discriminatory prices or other transaction terms to relative trading partners. Does this apply to differential pricing in different national and regional markets?

^{xxv} United States International Trade Commission, “China: Intellectual Property Infringement, Indigenous Innovation Policies, and Frameworks for Measuring the Effects on the U.S. Economy,” Publication 4199, November 2010, <http://www.usitc.gov/publications/332/pub4199.pdf>.

^{xxvi} State Council of the People's Republic of China, Outline of the National Medium-and Long-Term Program on Scientific and Technological Development (2006-2020), Feb. 9, 2006

^{xxvii} http://www.uschina.org/public/documents/2009/12/indigenous_innovation_letter.pdf

^{xxviii} <http://www.uschina.org/public/documents/2010/04/indigenous-innovation-memo.html>

^{xxix} <http://www.economyincrisis.org/category/taxonomy/indigenous-innovation>.

^{xxx} *Circular of State Council on Printing and Distributing Policies Further Encouraging the Development of Software and Integrated Circuit Industries*. Promulgated and effective as of January 28, 2011.

^{xxxi} There are actually potential and real adverse affects on competing foreign firms. “The combination of a first-to-file system with a system where a patent may be granted with little or no investigation results in the obvious: patents granted to non-inventors. It is a relatively easy matter, at least as to utility model and design patents, for an interloper to file for and be granted a patent on an innovation created by another person or which has been afforded protection in another jurisdiction, such as the United States. For instance, if a foreign entity has a United States patent but fails to file or register that patent in China, a Chinese company can easily take the innovation and get a utility model patent in China in its own name. The Chinese company then can use its utility model patent to prevent others, including the foreign entity, from producing products in China that incorporate that innovation.” **Patents in China – Is There Any Real Protection?**

http://wraltechwire.com/business/tech_wire/opinion/story/2776264/.

^{xxxii} WLAN Authentication and Privacy Infrastructure

^{xxxiii} Ultra High Throughput Wireless LAN.

^{xxxiv} The Digital Living Network Alliance (DLNA) is a non-profit collaborative trade organization established by Sony in June 2003, and has more than 250 member companies in the mobile, consumer electronics, PC, and service provider industries.

^{xxxv} A **UPnP AV media server** is a computer system or a similar digital appliance that stores digital media, such as photographs, movies, or music and shares these with other devices. These media servers use the Universal Plug and Play (UPnP) protocols to communicate with other devices.

^{xxxvi} <http://www.reuters.com/article/2011/04/16/china-microchips-idUSL3E7FG05G20110416>.

^{xxxvii} MIIT Vice Minister Yang Xueshan announced that the development of China's IC sector has been raised to a national strategic level, China's top level of national priority. By 2015, China's IC-sector sales will reach USD \$50B, aided by the emergence of indigenously-developed core chip technology.
http://www.chinadaily.com.cn/hqcj/xfly/2011-04-16/content_2329480.html

^{xxxviii} Electrical Engineering Forum, March 30, 2011. at http://forum.eet-cn.com/FORUM_POST_1000039391_1200201276_0.HTM?click_from=8800076581,8940536493,2011-04-01,EECOL,FORUM_ALERT
http://forum.eet-cn.com/FORUM_POST_1000039391_1200201276_0.HTM?click_from=8800076581,8940536493,2011-04-01,EECOL,FORUM_ALERT

^{xxxix} FACT SHEET: U.S.-China Economic Issues, Office of the Press Secretary, The White House, January 19, 2011.

^{xl} <http://www.ft.com/cms/s/0/4a5c8d82-5328-11e0-86e6-00144feab49a.html#ixzz1KxOTm3m1>.

^{xli} 2011 National Trade Estimate Report, Office of the U.S. Trade Representative.

http://www.ustr.gov/webfm_send/2694.

^{xlii} *China's Promotion of the Renewable Electric Power Equipment Industry*, March 2010.

<http://www.nftc.org/default/Press%20Release/2010/China%20Renewable%20Energy.pdf>, at p. 29.

^{xliii} <http://www.oecd.org/dataoecd/54/20/39177453.pdf>.

^{xliv} “China’s economic development model, the Beijing Consensus, refutes Western notions of political liberalization or economic reforms as indispensable for long-term, sustained development.”
CHINA’S SOFT POWER IN AFRICA: FROM THE “BEIJING CONSENSUS” TO HEALTH DIPLOMACY;
China Brief: Volume 5, Issue 21 (October 13, 2005); By Drew Thompson, citing Harvard Professor Joseph Nye.
http://csissandy.forumone.com/files/media/csis/pubs/051013_china_soft_pwr.pdf.

^{xlv} John Williamson, of the Peterson Institute of International Economics, coined the term which includes trade and investment liberalization. *citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.145.3639...*

^{xlvi} <http://www.ft.com/cms/s/0/1f82a382-646a-11e0-a69a-00144feab49a.html#ixzz1KYuydZ7z>

^{xlvii} For example, see **Understanding Research, Science and Technology Parks: Global Best Practice: Report of a Symposium;**
http://www.nap.edu/catalog.php?record_id=12546.

^{xlviii} In the meantime, USG should digest a recent comprehensive study on the impact of innovation policies. See Stephen J. Ezell & Robert D. Atkinson, “The Good, the Bad, and the Ugly (and the Self-Destructive) of Innovation Policy: A Policymakers Guide to Crafting Effective Innovation Policy,” ITIF (October 2010).

^{xlix} This list is from a presentation by Dr. Charles W. Wessner, Director, Technology, Innovation, and Entrepreneurship, The National Academies, and the Academies” director for this project, delivered on April 21, 2011, in Cleveland, Ohio.

^l *Maintaining America’s Competitive Edge, Government Policies Affecting Semiconductor Industry R&D And Manufacturing Activity*, http://www.sia-online.org/galleries/default-file/Competitiveness_White_Paper.pdf.