SITC Study of Innovation and Technology in China
科技创新
AN IGCC PROJECT

Policy Brief No. 18

August 2011

Toward Greater Pragmatism? China's Approach to Innovation and Standardization

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Summary

China's innovation policy and its perceived threat to American innovation and competitiveness is a hot topic in U.S.–China economic relations. The role of standardization, together with intellectual property rights and government procurement, are at the center of this conflict. Fundamental differences in their levels of development and economic institutions lead to quite different approaches to standards and innovation policy by the two countries. China's strategy of pursuing indigenous innovation based on local standards faces internal challenges in trying to bring together a diverse group of stakeholders with conflicting interests, as well as external pressures to adopt international standards. Enhanced cooperation on standards and innovation policies should be possible, once the United States and China accept that, while their economic and innovation systems are different, they are deeply interdependent. Both sides would benefit, creating new Chinese markets for American firms and easing technology licensing restrictions for Chinese firms.

The Study of Innovation and Technology in China (SITC) is a project of the University of California Institute on Global Conflict and Cooperation. SITC Policy Briefs provide analysis and recommendations based on the work of project participants. Author's views are their own.

WHY CHINA'S APPROACH MATTERS

Only a few years ago, China's approach to innovation and standardization barely played a role in international economic diplomacy. With its economic power on the rise, that assessment has changed dramatically. Today, China's innovation policy and its perceived threat to American innovation and competitiveness is a hot topic in U.S.–China economic relations, adding to contentious disputes about exchange rates, trade, and foreign direct investment. Standardization, as well as intellectual property rights and government procurement, are at the center of this conflict.

As the United States and China display fundamental differences in their levels of development and in their economic institutions, they pursue different approaches to standards and innovation policy. The U.S. consensus is that market forces and the private sector should play a primary role in innovation and standardization. China, on the other hand, relies much more on the government to define strategic objectives and key parameters.

LIMITED CONVERGENCE

In the United States, there is a widespread expectation that further reforms of China's standards system will "naturally" converge to (almost) full compliance with a U.S.–style, market-led, voluntary standards system. That expectation can be found, for example, in the American National Standards Institute's "United States Standards Strategy," which proposes a "universal application of the globally accepted principles for development of global standards" based on the U.S. voluntary standards system.[1]

China's evolving system provides little evidence that convergence to the American system is likely to materialize. When Chinese reformers argue for a transition to a more market-driven standards system, they emphasize that the government will continue to play an important role as a promoter, enabler, and coordinator of an integrated standards and innovation policy.

China's leaders are committed to indigenous innovation as the key to ending poverty and to accelerating China's catching up with the United States, European Union, and Japan. Indigenous innovation is considered essential not just for moving beyond China's precarious export-oriented growth model. At stake is the survival of the system. Chinese leaders understand that export-led growth can no longer guarantee rapid gains, hence they place all their bets on indigenous innovation as a catalyst for industrial upgrading.

CONFLICTING PERCEPTIONS

China's indigenous innovation policy and its entry into the global standards game as a contender has raised concerns in the United States that this may erode American leadership and hasten the decline of the U.S. economy. The U.S. government considers China's innovation policy to be "discriminatory," implying that this policy is used as a trade-distorting ploy to challenge American supremacy in the global knowledge economy.[2] The U.S. Chamber of Commerce claims that China's innovation policy "… restricts the ability of American companies to access the market and compete in China and around the world by creating advantages for China's SOEs and state-influenced champions, … [and has] … the potential to undermine significantly the innovative capacity of the American economy in key sectors ..."[3]

China's standardization strategy is viewed in the United States as a critical weapon of China's neo-mercantilist policies to keep American companies at bay. The U.S. Information Technology Office (USITO), which represents the U.S. information and communications technology industry in China, observes "a clear trend to promote indigenous technology which is developed outside the international standards development system."[4] And for the chair of the National Academies

1. American National Standards Institute, *United States Standards Strategy* (New York: ANSI, 2005).

2. Commerce Secretary Gary Locke, as quoted in "U.S., China Begin Talks on Innovation Trade Dispute," at http://www.reuters.com/assets/print?aid=USTRE66J6SO20100720.

3. Testimony by Jeremi Waterman before the U.S. International Trade Commission Hearing on "China: Intellectual Property Infringement, Indigenous Innovation Policies, and Frameworks for Measuring the Effects on the U.S. Economy" (Investigations 332-514 and 332-519), June 15, 2010.

4. USITO, "Written Comments to the U.S. Government Interagency Trade Policy Staff Committee regarding China's Compliance with its Accession Commitments to the World Trade Organization (WTO)," 2009.

Committee on Comparative Innovation Policies, China's standardization strategy "raises serious questions of WTO compliance," as it promotes "[t]he creation and application of a large number of national standards in China, as opposed to the use of existing international standards."[5]

Perceptions in China are very different: "Among Chinese industries and scholars, there is deep frustration with the U.S.–China standards discussions and distrust in the sermon-style arguments propagated by the United States … the disputes between the United States and China on ICT standards and the overarching issue of IPRs in standardization still remain unsolved. The situation may actually be worse in the sense that both sides have noticed the difference but continue to head in their own directions."[6] China's leadership considers the American critique of its innovation policy to be unfair and hypocritical, and suspects that the United States is trying to contain China's rise.

CHINA'S STRATEGY

In response, according to the Standards Administration of China (SAC), China seeks to upgrade its standards system to i) lessen the "control of foreign advanced countries over the PRC," especially "in the area of high and new technology"; and ii) increase the effectiveness of Chinese technical standards as important protective measures or barriers to "relieve the adverse impact of foreign products on the China market."[7] SAC adds that China's standardization strategy needs to fill a policy vacuum, as its accession commitments to the WTO have substantially reduced the use of most other trade restrictions such as tariffs, import quotas, and licensing requirements.

China's efforts to develop a unified standardization strategy are focused on these priorities:

1. Fostering economic development remains critical, with the result that the state will continue to play an important role as a promoter and coordinator of an integrated standards and innovation policy.
2. Standardization should help to reduce the cost of licensing essential patents for both Chinese manufacturers and consumers. Access of foreign companies to Chinese standards development organizations should create a quid pro quo: Foreign companies can participate in technical committees in exchange for technical contributions, including disclosure of essential patents and acceptance of fair, reasonable, and non-discriminatory (FRAND) licensing conditions.
3. A defining characteristic of China's standardization strategy is to use standardization as a platform for indigenous innovation.
4. "Enterprises" are encouraged to be the "main players in formulating standards."[8] This leaves open the question of what role, if any, foreign enterprises are to play. An important objective, however, is to use homegrown standards to develop innovative "national leaders" and to protect domestic industry.
5. Standardization should focus on priority sectors and should reflect sector specific requirements.[9]
6. Effective standardization requires a complementary set of certification and conformity assessment regulations, such as the Compulsory Certification scheme (administered by the China National Certification and Accreditation Administration) and the regulations for telecommunications (administered by the Ministry of Industry and Information Technology) on Network Access Licensing and on Network Access Identification.These confor-

4. A. W. Wolff, "The Direction of China's Trade and Industrial Policies," testimony before the House Ways and Means Committee, U.S. House of Representatives, Washington, D.C., June 16, 2010, 7.

6. Baisheng An, "Intellectual Property Rights in Information and Communications Technology Standardization: High-Profile Disputes and Potential for Collaboration Between the United States and China," *Texas International Law Journal* 45 (2009): 195.

7. SAC, "Study on the Construction of National Technology Standards System," Sept. 2004, preface and part I, sect. IV.

8. Ping Wang, Yiyi Wang, and John Hill, "Standardization Strategy of China: Achievements and Challenges," East-West Center Working Paper, Economics Series No. 107, January 2010, 8.

9. Note, however, that the list of the "eight key areas for standardization" is quite comprehensive, and covers most sectors of the Chinese economy. This comprehensiveness indicates the daunting challenge faced by China's standardization strategy, as it still lacks a highly diversified production and innovation system.

mity assessment regulations are essential for controlling access to the Chinese market.

7. Standardization should take a decentralized approach, in order to reduce the urban–rural gap and to encourage dispersed local industrial development.
8. As a latecomer to standardization, China should pursue a dual-track strategy that combines the adoption of international standards with the insertion of indigenous innovations into domestic and international standards.
9. The role of the voluntary standards should substantially increase, "where the need for standards comes from the market, enterprises are the main drafters of standards, and the implementation of standards relies on the market mechanism."[10]
10. Outward Chinese foreign direct investment should be facilitated through the promotion of Chinese standards practices and processes in overseas markets.
11. China's role in international and regional standards development organizations and consortia should substantially increase, enabling Chinese enterprises and research institutes to move from being standards takers to become standards co-shapers and ultimately standards setters in some areas.

DIVERSITY OF STAKEHOLDERS AND FRAGMENTATION

In principle, a unified national standardization strategy has important advantages. It facilitates the quick mobilization of resources for massive investments in standardization infrastructure. Clear and uncontested objectives can facilitate rapid learning. In addition, a unified strategy makes it easier to create nation-wide markets based on a single mandated standard.

However, implementing this demanding strategy in China will not be easy. From the outside, China's innovation policy presents a homogenous picture of a top-down "model of neo-mercantilist state developmental capitalism."[11] Hence, implementation constraints should be limited, once the leadership has given the go-ahead. But that picture fails to capture the surprisingly fragmented Chinese innovation system, which involves diverse stakeholders with conflicting interests. Like most latecomers, China's innovation system is constrained by multiple disconnects: between research institutes and universities and industry; between civilian and defense industries; between central government and regional governments; and between different models of innovation strategy.[12] In fact, standardization in China today is a hybrid system. The government remains in charge as the main driver and final arbiter of China's standardization strategy, yet the diversity of stakeholders have increased.

This has resulted in a fair amount of diversity in the definition and implementation of strategic goals. However, this diversity of approaches is overwhelmingly restricted to central and local government agencies. Industry and especially private firms and final users continue to play a limited role. China's government documents on standardization all emphasize "openness, transparency, and impartiality." But as China has no tradition of an independent "civil society," standards-making bodies, industry associations, research institutes, and consumer organizations all remain dependent on the government.

Instead, local governments act as pace setters for a more decentralized approach, establishing local standards as a constituent building block of the overall standards system. Pioneered by the Shenzhen government in 2007, the governments of Shanghai, Beijing, Jiangsu, Zhejiang, Shandong, Henan, and Shaanxi have all issued their own local standardization strategies. On the positive side, these strategies are presumably better customized to the specific requirements and capa-

10. Wang, Wang, and Hill, "Standardization Strategy of China," 5.

11. A. W. Wolff, China's Indigenous Innovation Policy, testimony before the U.S. China Economic and Security Review Commission Hearing on China's Intellectual Property Rights and Indigenous Innovation Policy, Washington, D.C., May 4, 2011, 3.

12. Creating university–industry linkages has been the focus of many Chinese attempts to reform its innovation system. More recently, attempts are under way to address the other disconnects, but so far with mixed results.

bilities of the industrial sectors in their respective localities, and to the regions' level of economic development and the needs of their citizens. The potential advantages of decentralized self-government are well-established in theories of innovation and organization.

There is, however, a negative side to Chinese-style diversity. China's standards system is overly complex and displays signs of fragmentation. Ambiguity is a fundamental source of such fragmentation. Key concepts are loosely defined and often differ from the definition of these concepts in other countries. Even China's definition of "standards" deviates from the definition used in the United States, which focuses on voluntary consensus standards.

There is also typically a lack of clarity about the boundaries and the division of labor between competing national, industry, ministry, and provincial standards. Equally important sources of fragmentation are inter-agency rivalries and turf battles among different ministries and their respective stakeholders. These inter-agency rivalries reflect the conflicting interests of major Chinese stakeholders in innovation and standardization.

Stakeholders

There are four main groups of stakeholders who seek to impose somewhat conflicting objectives on China's standardization strategy and, more broadly, on the country's innovation policy.

China's export industry is a strong supporter of compliance with WTO commitments. This position reflects China's deep integration into global corporate networks of production and innovation.[13] Support for greater compliance with international standards also comes from leading Chinese ICT firms that have accumulated a critical mass of intellectual property rights, like Huawei, ZTE, Lenovo, and Haier. Huawei, China's leading telecommunications equipment vendor, is now the third largest global player in this industry. A broad portfolio of *essential patents* in important technologies (such as next-generation mobile communications and convergence of fixed and mobile networks) has established this company as a serious player in the development of architectural and radical innovations.[14]

A second group of stakeholders emphasizes the need to improve China's absorptive capacity in order to benefit from foreign technology through strengthened domestic capabilities. Equally important objectives are to reduce the cost of patent licensing fees paid on foreign technology and to reduce China's dependence on foreign technology overall. Strong support for developing China's indigenous innovation capabilities can be found in public research institutes, in SOEs in China's priority industries (such as the *Strategic Emerging Industries* initiative), in parts of the domestic high-tech industry that seek to take domestic market share away from multinational corporations, and in parts of the defense and space industry. This coalition of domestic stakeholders supports, for example, policies on patent licensing for standards that seek to reduce the costs of licensing foreign patents.

A third group of stakeholders are "copy-cats" that seek to retain space for low-cost reverse engineering, unauthorized copying, and opportunistic incremental innovations. Typical of this type of successful low-cost innovation are no-name *shanzhai* (unlicensed) handsets that are estimated to have at least a 40 percent share of the Chinese handset market. The main thrust of these stakeholders is to prevent a modernization of China's laws and regulations on IPR, including any reform of China's patent law that would reduce the role of utility model patents.

Fourth, China's defense industry and top planning institutions like the National Development and Reform Commission seek to broaden the space for developing mission-oriented, complex technology systems (space, military, energy, environment, climate). These stakeholders view information security and certification regulations as a critically important policy tool of China's innovation strategy. They fear that China's critical information networks provide an easy "target of attack, sabotage, and terrorism by hostile forces and

13. A good proxy indicator for China's integration into global production networks is that foreign-invested enterprises dominate China's manufactured exports. They account for 58 percent of China's total exports, and more than 88 percent of its high-technology exports.

14. Essential patents are frequently quoted in other patent filings, and hence shape technology trajectories. Patents are also called essential when it is not possible to comply with an international standard without infringing those patents.

elements."[15] A strategic assumption is that control over standards and a strong Chinese information security industry are necessary to protect China's information networks.[16]

TOWARD GREATER PRAGMATISM?

It is difficult for outsiders to assess which of these four stakeholder coalitions has most leverage in shaping decisions on China's innovation policies. A detailed analysis of recent developments of China's innovation policies finds a fairly consistent pattern of response to foreign complaints.[17] In the first round, government regulations start out with requirements that exceed established international norms. This typically gives rise to a wave of criticism from foreign enterprises and business organizations, and also from Chinese companies that have established a significant position in the international market and that have begun to accumulate a broad portfolio of intellectual property rights. In response to this criticism, the second round then leads to adjustments in government regulations that combine a selective relaxation of contested requirements with persistent ambiguity.

This raises the question of what will happen in further rounds of negotiation. In the run-up to the 18th Party Congress, there are signs that Chinese policymakers are moving toward more dogmatic positions on economic policies, political ideology, internal control policies, and geostrategic and foreign policy positions. It is unclear whether the shift toward greater dogmatism is a temporary tactical move dictated by internal power struggles. Some observers see a growing role for security considerations in China's innovation policy.

Or can we expect, once the Congress is over, a gradual strategic shift to greater openness and transparency to meet China's needs for foreign technology and the requirements of its deep integration into the global economy? There is reason for cautious optimism that China's innovation and standards policies will gradually move towards greater pragmatism. As a specialist on Chinese law puts it: "As China pursues the upgrading of its economy, there will be more debate over policies on technology development. The very tentativeness with which indigenous innovation has been pursued may be a hopeful sign that continued dialogue may bring about adjustments of measures that are deemed protectionist."[18] Another expert's assessment is that, when push comes to shove on implementation of China's innovation policy, "the most mercantilist elements are regularly rebuffed, and given the array of interests in favor of a more open innovation strategy, that pattern is unlikely to change"[19]

POLICY IMPLICATIONS

To conclude, both China and the United States have much to learn from each other as they each face their own innovation imperatives. While they compete in global markets, both would benefit from cooperation on science, technology, and innovation to solve the challenges of economic growth, better and lower-cost health systems, and a greener environment. Given the importance of both countries in the global economy and for geopolitics, it is striking to see that such cooperation remains as yet quite limited.

There is ample scope to extend such cooperation beyond the exchange of scientific knowledge and to include the exchange of ideas on how to develop and upgrade the innovation and standardization systems of both countries. While China's innovation policy has been a success, at least in quantitative terms, the United States is still far ahead in overall innovation capacity. China's persistent innovation gap implies that Chinese firms continue to need access to American technology,

15. Comments by Vice Minister Lou Qingjian, Ministry of Information Industry, at the 2006 BOAO Forum, at http://www.boaoforum.org/AC2006/yjgE.asp, accessed July 6, 2010.

16. For a detailed analysis of China's policy on information security standards and certification, see Dieter Ernst, *Indigenous Innovation and Globalization: The Challenge for China's Standardization Strategy (*La Jolla, CA: UC Institute on Global Conflict and Cooperation and East-West Center, 2011), chap 2.

17. Ibid., chap. 4. This is true for China's definition of products that contribute to indigenous innovation, the revision of government procurement regulations, and new regulations for patents included in standards.

18. Stanley Lubman, "Changes to China's 'Indigenous Innovation' Policy: Don't Get Too Excited," *China RealTime Report,* July 22, 2011, 3.

19. Scott Kennedy, "Indigenous Innovation: Not as Scary as It Sounds," *China Economic Quarterly* (Sept. 2010), 19, 20.

whether in terms of equipment, core components, software, or system integration. This implies that China's innovation push will create new markets for American firms, provided they stay ahead on the innovation curve.

Implementing such cooperation faces many hurdles. These partnerships need to be on an equal footing, with reciprocity of rights and obligations on contentious issues such the right balance between the protection of intellectual property rights and China's interest in technology diffusion.

Establishing such reciprocity between countries at different stages of development will not be easy. While incumbent industry leaders seek to retain the status quo, latecomers like China seek to adjust the old rules to reflect their interests. Progress toward adjusted rules of reciprocity should be possible, once the United States and China accept that while their economic and innovation systems are different, they are deeply interdependent.

China, for example, ought to acknowledge that the United States needs safeguards against forced technology transfer through policies such as compulsory licensing, information security standards and certification, and restrictive government procurement policies. The United States, in turn, needs to acknowledge that Chinese firms feel disadvantaged by restrictions on Chinese foreign direct investment and on the export of so-called dual-purpose technologies to China. The United States also needs to engage more actively with Chinese concerns about issues such as the unequal distribution of benefits that result from the current rules of patent licensing and the role of essential patents in critical interoperability standards.

To move toward greater reciprocity, it is necessary to increase the level of trust. While this is not easy, given deeply entrenched fears in both countries, creative incrementalism through "learning-by-doing" can help to move things forward.

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