# Standards, Stakeholders, and Innovation

*China’s Evolving Role in the Global Knowledge Economy*

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Today, China is moving rapidly toward fulfillment of its objective to become an “innovative society” by 2020. The implications of this transition are multifald and will bear significant consequences for the future of global information and communications technology (ICT) and other high technology sectors. A core component of this strategy is the development of indigenous innovative activities, or zizhu chuangxin. China has highlighted the development of technology standards as an integral part of this broad goal, and as a result, over the past several years we have witnessed China strengthening domestic institutions for standardization and increasing its activity in international standards bodies. With the country having emerged as a large and fast-growing market and an increasingly important site for a wide range of innovation-intensive activities within regional and global production networks, China’s policies in the area of standards are now a subject of intense interest for the international business community as well as for the academic and policymaking communities in many of China’s major trading partners.

Over the past five years NBR has directed a research project to examine a range of issues associated with standards-setting policy in China that has resulted in several international conferences, articles, reports, and briefings for policymakers. Marking the culmination of the third phase of this ongoing research initiative, this report both sheds new light on the environment in which China is developing its own standards-setting policies and assesses the implications and prospects for the success of these efforts.

Given the importance of China’s development in this area, standards and innovation policy in China will continue to be a priority research area for the Economics and Trade Affairs Group at NBR. As such, we are already in the process of undertaking a new round of research on this important topic.

We would like to express our appreciation to Scott Kennedy and Richard (Pete) Suttmeier for their service as project research directors who played key roles in developing the agenda for the round of research that lead to this report. Their leadership was instrumental in ensuring a successful research project. We are also indebted to the third author of this report, Jun Su, who has partnered with NBR over the past three years by hosting workshops and conferences in Beijing, writing papers, and giving presentations. We would like to thank Professor Su for his all-around support of the project. Finally, we would like to thank Yao Xiangkui for his support of this project, in particular for the tremendous amount of work he put into the Chinese-language translation of this report.

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EXECUTIVE SUMMARY

This report examines the circumstances in which China's efforts to develop its own technology standards are occurring and assesses the implications and prospects for success of the initiatives.

MAIN ARGUMENT

- In information and communications technologies (ICT), China is making a long-term commitment to the development of standards as part of an effort to promote domestic technological innovation and make China an “innovative society.”

- China’s aspirations to become a standards setter in ICT should be seen against a background of institutional uncertainty in an international economy struggling to devise mechanisms of governance to accommodate rapid technological change and the emergence of large economies, and amidst a pluralism of views on techno-nationalist versus techno-globalist approaches.

- China’s efforts to set and commercialize ICT standards domestically have met with only limited success due to inappropriate government intervention, failures to forge winning coalitions in standards-setting forums, and an inability to displace established international standards. Nevertheless, China is learning from experience, will push forward with standards development, and is likely to have greater success in the future.

- China has achieved some success in having its domestic standards adopted internationally and has made some contributions to jointly developed standards but has proven less capable of blocking standards initiatives that it opposes. Those elements of the Chinese government, research community, and industry that are most deeply integrated into the global economy have had the greatest chance for success because they have more quickly adapted to the global standards system.

POLICY IMPLICATIONS

- The techno-nationalist sentiments sometimes associated with China’s standards initiatives should be tempered with a techno-globalist vision, both to promote the technological progress of the Chinese economy and to contribute to the provision of international public goods.

- The international community will want to monitor the implementation of China’s innovation and standardization strategies and work with China in developing its capabilities for standards development.

- The international community can accommodate the emergence of a technologically dynamic, standards-setting China by facilitating Chinese participation in international standards bodies and consistently engaging Chinese experts, industry, and officials.
Since 2003, when China announced its mandatory WAPI standard as an alternative to the widely used Wi-Fi wireless communications standard, international interest in standardization in China has expanded rapidly.¹ The growing size and influence of China’s economy, and China’s steadily improving technological capabilities, make analysis of Chinese standardization an ongoing challenge. This is especially true in light of recent trends.

The first is China’s growing involvement with international standards organizations—formal standards development organizations (SDO) and various standards consortia that have become key forums for information and communications technology (ICT) standardization—and the increasingly differentiated and expanding institutional arrangements for standardization in China itself. China’s participation in international standards organizations has grown rapidly and indicates a commitment to a Chinese presence in governance mechanisms. China’s learning curve regarding the operation of international standards organizations is showing itself to be remarkably steep.

A second important trend is the build-up of China’s science and technology, marked by the initiation in 2006 of China’s “National Medium- and Long-Term Program for Scientific and Technological Development (2006–2020)” (MLP), with

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its goal of creating an “innovative society” in China by 2020, and the complementary science and technology programs of the Eleventh Five-Year Plan. Both plans focus on “innovation,” now a ubiquitous buzzword in government policy statements and popular discourse, and take as measures of success in innovation the development of Chinese standards incorporating Chinese intellectual property (IP). Thus, the filing of patents and the initiation of standards are considered important “outputs” in formal research evaluation, and an organization’s IP and standards record affect its eligibility for technology policy privileges. The plans call for the development of indigenous national innovative activities (zizhu chuangxin) as a measure of technological sovereignty, and with it, national power and international influence. The vision of an innovative China laid out in the plans, and in frequent national policy statements, has clearly captured the imagination of many in China, leading one foreign observer to compare current Chinese enthusiasm for science, technology, and innovation to that of the United States at the time of the initiation of the space race. That this enthusiasm is so tightly linked to standards and IP heightens the interest in standardization as Chinese stakeholders increasingly incorporate standards into their business strategies.

In this study we seek to explore and analyze these two trends and assess their significance for China and for the international community. The study builds on presentations and discussions at the international conference “Technical Standards and Innovation in China: Public Policy and the Role of Stakeholders” held in Beijing in October 2007 and on information obtained through our own research during the past few years. It also incorporates our sense that China’s growing activity in standardization is occurring in the midst of remarkable changes in the broader international environment. Although China’s greater activism has not yet been matched by widespread international adoption of its standards, or the commercialization of Chinese standards in China or globally, we expect that China’s officialdom and industry will continue to advance their standards agenda, with significant consequences for technological innovation and market structures. In the discussion below we explore the factors that will affect the pace at which this will occur and how the global business community, national governments, and international SDOs will adapt to this new entrant to the standards world.

The Context of the Study

China’s interest in developing a national standards strategy and promoting its own technology standards is usefully seen in an international context characterized by significant institutional and technological change. Rapid technological progress, especially in ICT, the sector on which this

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3 Chinese leaders have taken pains to explain that zizhu chuangxin does not entail a retreat from international cooperation. Instead, they suggest that it should be understood as including genuinely “original innovation” (yuanshi chuangxin), “integrated innovation” (jicheng chuangxin, or the fusing of existing technologies in new ways), and “re-innovation” (yinjin xiaohua xishou zaichuangxin), which involves the assimilation and improvement of imported technologies. Originally translated in official documents as “independent innovation,” zizhu chuangxin is now rendered as “indigenous innovation.”


5 Information was obtained from both written sources and interviews. To protect the anonymity of the sources, no citations are included for interviews. The study also builds on an earlier international workshop held at Tsinghua University in January 2006.
report focuses, increasingly involves the fusion, or convergence, of different technologies, which puts a premium on the achievement of interoperability among components. This is especially so in light of the growing importance of the Internet and the ways in which multiple devices become linked together to create an “Internet of things.” Success in achieving interoperability depends critically on standards, and as a result, the importance of technology standards in the strategic economic thinking of governments and corporations around the world has increased, as has interest in the study of interoperability itself and its relationship to innovation.

Changes in technology are closely related to changes in industrial structures involving the creation of global production networks (GPN) and, increasingly, global innovation networks. GPNs both are made possible by and create demands for the modularity of technological systems; progress in ICT facilitates the satisfaction of those demands, as knowledge is codified, digitalized, and diffused throughout the networks. GPNs, however, also require integrators to manage the successful combination of modular components into finished products, a process which calls for the creation of a common technological architecture built around common standards.

In light of the growing importance of standards resulting from both technological change and changes in the global organization of production, it is not surprising that SDOs have also been subject to the forces of change. With technological change moving at a rapid rate, slow-moving standards-setting processes no longer serve the interests of producers in high technology fields. As a result, over the past three decades we have seen both the introduction of accelerated procedures in established SDOs and a proliferation of new, unofficial standards-setting groups—principally standards consortia and alliances—intended to facilitate standards-setting activities. These institutional innovations have been quite successful in a variety of ways, but they have also engendered conflict over inequalities of power and the strategic behavior of the participants, including the ways in which participants deploy intellectual property as a tool of corporate strategy in standards setting. For some observers, international standards-setting institutions are in crisis; for others, while there may not be crisis, there surely are a number of problems occasioned by the factors we are considering here.

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6 This report focuses on the ICT sector, where China’s initiatives have drawn the most concern from the international community. In other sectors there have been minimal tensions.


9 For an interesting discussion of the importance of modularity and limits to it, see Dieter Ernst, “Limits to Modularity: Reflections on Recent Developments in Chip Design,” Industry and Innovation 12, no. 3 (September 2005): 303–35.