

Scott Kennedy

kennedys@indiana.edu

China's government dominates technology policy, but its companies somehow remain globally competitive**Preferences for domestic technology firms infuriated foreign trade partners****www.gavekal.com**

China Policy Watch: Indigenous Innovation Techno-nationalist Retreat?

The stench of government intervention in Chinese technology policy is sometimes overwhelming. At last November's high-tech fair in Shenzhen all eleven sponsors were government agencies, and several ministries had their own exclusive exhibition halls populated by favored companies. Huawei and China Mobile sat in an almost empty hall run by the Ministry of Industry and Information Technology (MIIT). The products *du jour* included a Rmb400m super computer facility, new energy vehicles and LEDs, as companies competed to fit their business into one of seven "strategic emerging industries" identified by the government in its last five-year plan. Almost no foreign companies exhibited their wares. I had to cover my mouth as I left.

But just six weeks later, Chinese firms were prominent at the world's most popular, market-driven product party, the Consumer Electronics Show (CES) in Las Vegas. Over 340 Chinese companies had exhibition booths; Lenovo, TCL, Haier, and Huawei unveiled new products that will likely gain serious traction among global consumers. And Apple revealed a list of its key suppliers, among them several Chinese companies.

Moving up the value chain, indigenously

Welcome to the confusing world of "indigenous innovation," in which Chinese tech firms constantly kowtow to government edicts, yet somehow remain globally competitive. Several years ago Beijing policy makers decided that Chinese manufacturing had been stuck at the low end of the technology value chain for too long, and announced a policy of promoting "indigenous innovation." While the term was never clearly defined, in practice the policy meant throwing billions of dollars at Chinese firms in the hope they would become the next Apple or Qualcomm, holders of critical intellectual property (IP) who could cash royalty checks from here to eternity.

Those subsidies irritated China's trading partners, but friction turned to firestorm in 2009-10, with a series of events (some related to indigenous innovation and some not) formed a sinister pattern in the eyes of foreign companies and governments. Beijing defined "indigenous" technology as that owned by Chinese firms (the China-based units of foreign companies were shut out), and gave Chinese-owned technology preference in government procurement. Regulators insisted that all computers sold in China carry a specific, questionable, and Chinese-made internet filtering software program. News reports accused Chinese companies and agencies of hacking into foreign companies' computer systems, and Google cited such a hack as the reason behind its decision to shut down its China servers and move its Chinese-language search business to Hong Kong.

**Indigenous Innovation:
Techno-nationalist Retreat?**

China has retreated from techno-nationalist rhetoric and now speaks of 'strategic emerging industries'

The policy may be wasteful, but China is so big it can afford a lot of waste

China's national-level strategic emerging industries (SEIs)

Environmental protection	New-generation infotech	Biotech	New energy	New materials	New energy vehicles	High-level equipment
High-efficiency conservation	Next-gen networks	Medical engineering products	Next-gen nuclear	New-function materials	Electric hybrid vehicles	Passenger aircraft
Environmental protection	Internet of things	Bio-pharma	Solar	Newly structured materials	Pure electric vehicles	Satellites
Recycling	Cloud computing	Bio-agriculture	Wind	High-performing compounds		High-speed trains
		Biotech mfg	Biomass			Ship building
						Smart mfg equipment

Source: Ministry of Science and Technology

Critics accused China of a techno-nationalist rampage. Scholars questioned whether this blatant protectionism would actually spur innovation, or simply deliver rents to second-rate Chinese firms.

Partly thanks to foreign outrage, Beijing reversed its most obnoxious policies, toned down the techno-rhetoric, and shifted its focus to supporting the more blandly titled Strategic Emerging Industries (SEI). In the technology sphere, direct government funding is less central and policies less overtly anti-foreign than in 2009. Yet this is a shift in tactics, not strategy: the belief in government's central place in guiding innovation is as entrenched as ever.

Is this approach good or bad for Chinese firms and the global economy? Most likely, it is neither as beneficial for Chinese firms as alarmist foreign critics assert, nor as damaging to true innovation as some scholars lament. China's high-tech policy will create a massive amount of wasteful spending and mismanagement. But China's size means it can afford much more waste than smaller countries. Many Chinese firms have benefited from integrating into global production and innovation networks, and some will inevitably move up the value-added ladder. Barring a systemic economic or political crisis, this hybrid approach is likely to endure.

Premier Wen's first baby: indigenous innovation

Indigenous innovation is really the offspring of Premier Wen Jiabao. The term was first used by a Chinese scholar in 1994, and Beijing promoted technological upgrading for years before Wen took office in 2003. But Wen was determined that one of his legacies would be to make China a world leader in science and technology, and he has personally guided every step of technology policy over the past decade.

The indigenous innovation strategy was formally unveiled with the 2006 Medium- and Long-Term Plan on the Development of Science and Technology (MLP), a massive document compiled with the help of dozens

**Indigenous Innovation:
Techno-nationalist Retreat?**

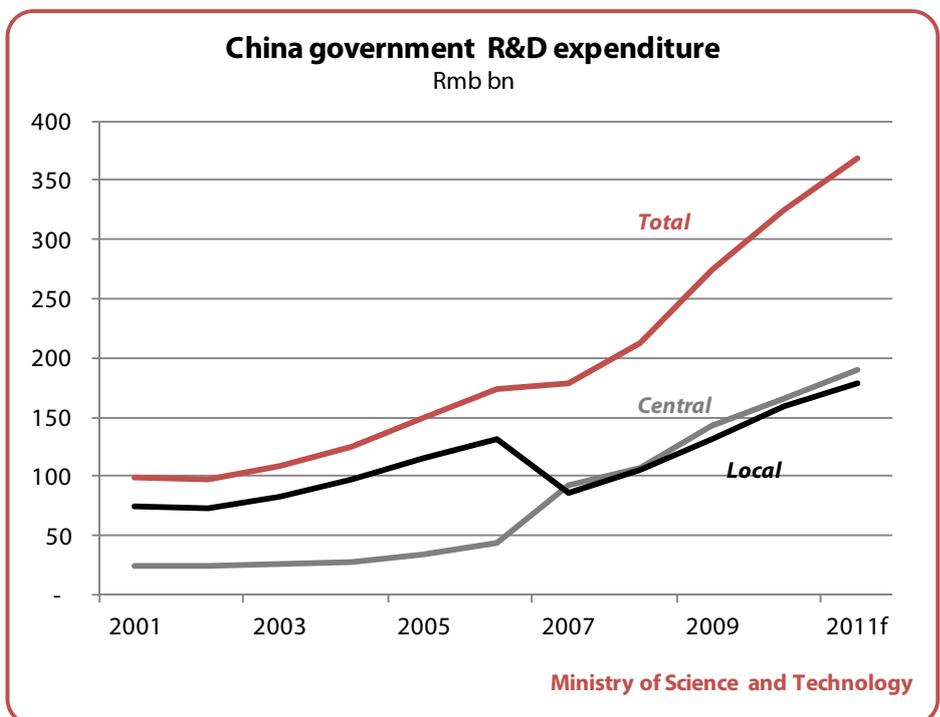
China's R&D spending leads the developing world, but still trails the OECD

Policy tools include 16 mega-projects, incentives for Chinese scientist to return from abroad, and financial rewards for patents

of government agencies, over a thousand technical experts, and state-owned, private and foreign firms. Since then Beijing has used just about every policy tool at its disposal to realize the vision of a high-tech China (see [“Indigenous Innovation: Not as scary as it sounds”](#)). The main tool was money, and lots of it: government funding for science and technology has quadrupled in the last decade, and the central government share of spending doubled to half of the total. China now spends 1.8% of GDP on R&D, still behind Japan, South Korea and the US, but far ahead of developing-world rivals India and Brazil. (Some analysts think that China's R&D data are exaggerated and that as much as a third of what Chinese firms claim they spend on research actual flows to other purposes, notably real estate.)

Government investment focused on 16 mega-projects in civilian and military technologies including core electronics, advanced machine tools, passenger aircraft, high-resolution earth observation system, and lunar exploration. Each project is run by a ministry or big state-owned enterprise; the full set is coordinated by the Ministry of Science and Technology (MOST). Beyond the mega-projects, the main tactics for spurring technological development include incentives to lure back Chinese scientists from abroad, massive funding for basic and applied research, financial rewards for registering patents and copyrights, efforts to set technology standards with locally-owned IP, mandatory technology transfer as a condition of inward foreign investment approvals, tax breaks for “new high-technology enterprises,” and government procurement preference for certified “indigenous innovation products.”

Initial results from this surge looked promising. Patent filings for patents rose rapidly, and high-tech patents and invention patents rose even faster. By 2010 the production value of high-tech goods reached 19% of GDP and 31% of exports, double the levels of a decade earlier.



**Indigenous Innovation:
Techno-nationalist Retreat?**

The meaning of 'indigenous innovation' has never been quite clear

Officials can agree on one thing: government should play a big role in guiding technology development

www.gavekal.com

Plans gone awry

Yet the problems were equally obvious. Many if not most Chinese patents were worthless; high-tech production and exports were still dominated by foreign firms; the most innovative Chinese firms—private small and medium sized enterprises—found themselves starved of capital and shut out of markets. And Beijing's blatant favoritism for domestic firms infuriated foreign companies, trade associations and governments, which in 2009 began publicly to assault this system of preferences.

Thanks to this pressure—and a growing realization that some of their more extreme policies were counter-productive—policy makers began to adjust their focus. Indigenous innovation originally meant helping Chinese companies, particularly state enterprises, gain technological independence and competitive advantage *vis-à-vis* foreign competitors by developing their own IP—either through assimilation (legal or otherwise) of foreign technology or their own efforts. Beginning in 2010, however, officials began more carefully to define indigenous innovation in non-discriminatory ways, such as “innovation that occurs in China” and “innovation for China's development,” neither of which obviously excludes foreign firms. Some localities went further: officials in Shanghai told me they intentionally avoid the term “indigenous innovation” in policy documents. A systematic review of the media in Beijing, Shanghai, and Shenzhen shows that use of the term has declined since 2010, with short spikes of usage around the time of the annual National People's Congress meeting.

There was no retreat from the idea that government should play a leading role in guiding technology development. Chinese officials observed that governments in Japan, the EU and the US at various times all spent billions of dollars to support high-tech R&D in key sectors, and the 2008 global financial crisis severely diminished support in the Chinese government for market-oriented solutions to anything. At the same time, policy makers realized the need to improve their methods. Direct government spending could not address all of China's needs: firms and the financial sector needed to play a bigger funding role. And of course the complaints from foreigners needed to be handled more effectively.

Wen's second baby: strategic emerging industries

Finally, the vision of which technologies to support had to be refined. In the first few years, just about anything counted as “indigenous innovation,” and this led to waste. After much discussion, it was decided to concentrate on new technology industries that would strengthen the chances for long-term growth: “strategic emerging industries (SEIs),” a term coined by vice premier Li Keqiang in May 2009 and formally adopted in a speech by Wen several months later. Wen set up a government commission, headed by Zhang Ping, the director of the National Development and Reform Commission, to develop a strategy for supporting SEIs.

The decision about which industries to designate as SEIs came after lengthy debate; the final list included some inspired by international

Indigenous Innovation: Techno-nationalist Retreat?

Strategic emerging industries should account for 15% of GDP by 2020—but no one knows how to measure them

On the surface, China is playing more by international trade rules, but pitfalls remain

comparison, some that would support the mega-projects, and Wen's personal preferences. Once the national list was set, provinces were instructed to identify their own SEIs. Most chose the same SEIs as the national government, but some jurisdictions added other sectors, some of which are not obviously technological: aeronautics, culture, tourism, nuclear power, public safety, and "modern services."

In October 2010, the State Council issued the "Decision on Speeding the Nurturing and Development of Strategic Emerging Industries" and set the goal of having SEIs account for 8% of China's GDP by 2015 and 15% by 2020. This apparently precise and ambitious goal is deceptive: the SEIs are broadly and vaguely defined, and each sector comprises a supply chain with thousands of products. Officials admit they have absolutely no idea how to calculate SEIs' contribution to GDP, making the target something of a fiction.

Measurement problems have not prevented a flood of pronouncements. Since the State Council decision, central and local governments have issued at least 40 policy documents on SEIs. Still oddly missing, however, is the long promised overall five-year plan for each of the specific strategic industries and sectors. Policy documents on intellectual property, standards, and the specifics of policy support are also still in the drafting stage. Nonetheless, the money has started to flow, partly through established government science and technology funding channels, and partly through bank loans. One source estimates that expenditures by 2015 will total Rmb9.5 trn.

Does China play fair?

For foreign companies who may variously be competitors or partners of Chinese firms in these strategic industries, a crucial question is whether Beijing's massive support for these industries is fair play within international trade rules. On the surface, Beijing has modified its techno-nationalist rhetoric and tried to conform to its WTO commitments. Foreign firms are glad for this progress, but still not convinced: as one business association leader told me, China has "lowered the reddest of the red flags," but there are still major challenges. Three issues stand out: the linkage of indigenous innovation with government procurement, the use of standards to favor domestic firms, and the question of whether foreign firms operating in China can benefit from industry support policies on an equal footing with domestic companies.

For the moment, the government procurement problem seems to have been solved. During his January 2011 visit to Washington, President Hu Jintao declared an end to preferences for domestically-produced "indigenous innovation" products in government procurement, and the government formally abolished those preferences as of December 1. Yet no sooner were the indigenous innovation preferences done away with than NDRC starting drawing up a list of SEI products, and it is quite possible that this list could form the basis of a new set of discriminatory government procurement rules.

**Indigenous Innovation:
Techno-nationalist Retreat?**

Technical standards are one way to favor domestic firms

Multinationals produce many goods crucial to China's strategic industries, so a big market beckons

The practice of creating distinctive Chinese technical standards that favor local companies has been a recurring problem. Lately, however, China's leading high-tech firms have started to lose interest in setting local standards and pushing them on the world stage. For one thing, China's market power is not great enough to force global changes. And even though foreign companies usually may not vote in Chinese standards committees, they exert a lot of influence via their observer status or local partners. So the top Chinese companies now spend more of their time trying to influence international technical standards, rather than inventing their own. Companies lower down the food chain, however, still seek to use the domestic standards process to their advantage.

As to whether the SEI strategy is open to participation from foreign firms, there are some positive signs. In September 2011 the Ministry of Commerce and nine other ministries issued guidance encouraging the internationalization of SEIs. This regulation, which does not seem to have been prompted by foreign lobbying, aims to encourage foreign industry participation in SEIs, through technology transfer and joint product distribution in third countries. Whether this policy will ultimately benefit foreign firms remains to be seen.

Advice to multinationals: positioning is key

Adding it all up, how much do high-tech multinationals have to fear from their Chinese competitors? Chinese companies will continue to receive plenty of overt and covert support from their government. But the position of multinationals is strong. Many have technologies, products, and services that will be critical to the success of strategic emerging industries; the SEI strategy offers them a large potential market. Just about everything telecom giant Cisco makes supports one or another SEI. General Electric, Honeywell, Rockwell Collins, and Eaton all are leaders in technologies that will support China's C919 airliner. And Cummins makes highly efficient hybrid engines that fit into the large trucks sold by leading state-owned vehicle producers. As in the past, Chinese firms may well replicate many of these products, but their ability to generate true cutting-edge innovations remains in doubt. As one observer remarked: "I have faith in China's ability to reverse-engineer and remain one step behind the world leaders."

And one should not hold one's breath waiting for China to seize global leadership in any of its strategic industries. Probably its best hope lies in 4G mobile telephony technology. But Chinese investment in cloud computing and wireless internet-connected sensors ("the internet of things") look more like real estate development projects than high-tech advances.

Electric vehicles have received a lot of media hype, but the data paint a bleak picture. In 2011, new energy hybrid or fully electric vehicle sales totaled a mere 8,100 units, 0.04% of the 18.5m passenger cars sold during the year. Based on the current subsidy rate of Rmb80,000 per vehicle, it would cost the government nearly US\$5 bn to get new-energy vehicles up to 2% of car sales. Nanotechnology has also been widely touted, and

**Indigenous Innovation:
Techno-nationalist Retreat?**

**China will subsidize 10,000
technology projects in the
hopes that 100 will pan out**

Chinese scientists are genuinely world leaders in basic research in this field; but companies are reluctant to commercialize their discoveries because the cost is prohibitive.

The waste and losses involved in subsidizing all these industries are large; yet China has the advantage of scale. It is like a giant venture capitalist, funding 10,000 projects in the hopes that 100 will prove successful. Given the abundance of technical skill and entrepreneurial talent available in China, it's just possible that this big bet may pan out. Beijing is unlikely to throw in the towel on government-guided high-tech policy any time soon.