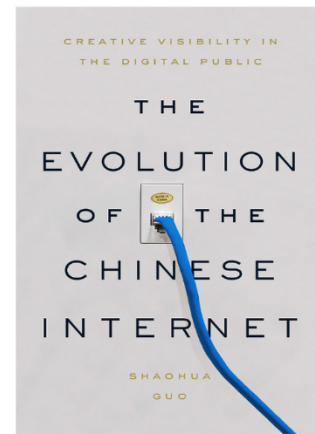
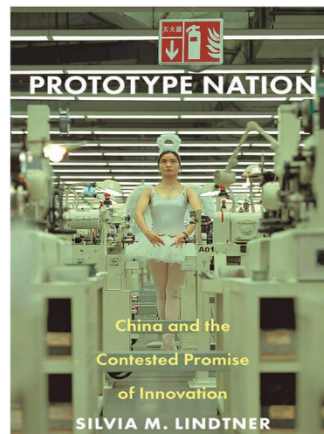
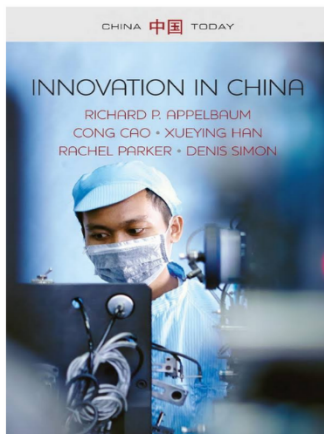


CHINA, INNOVATION NATION?



Innovation in China: Challenging the Global Science and Technology System (2018) by Richard P. Appelbaum, Cong Cao, Xueying Han, Rachel Parker, and Denis Simon

Prototype Nation: China and the Contested Promise of Innovation (2020) by Silvia Lindtner

The Evolution of the Chinese Internet: Creative Visibility in the Digital Public (2020) by Shaohua Guo

Takeaways

1. China's innovation system is undergoing a hugely aspirational and transitional moment, driven by the state's goal to transform China's manufacturing, export-oriented economy that spurred so many decades of post-Mao growth into an innovation- and knowledge-based economy.
2. Developing *indigenous* innovation and innovators are crucial goals of this transformation.
3. The question of whether China offers, or will offer, an alternative model of technological progress and innovation is an essential question for technologists, innovators, and policy makers around the world, with huge implications. Academic research follows this interest.
4. The state's ubiquitous role in directing technology investment and fostering cultivation has advantages (infrastructure) and disadvantages (waste, inefficiency), but it is too early to gauge to what degree it offers a clear alternative model of technological progress.
5. Despite its restrictions and censorship, the Chinese internet is vibrant, creative, and can foster technological innovation.

China, Innovation Nation?

Brian Spivey

For the UCI Long US-China Institute's second Book Roundup, I covered three recently published books about China's involvement in Africa, where it has become the continent's largest trading partner, bilateral creditor, and infrastructure financier. Those books complicated sensationalist, often politically driven narratives that try to paint Chinese investment in Africa as either categorically good or bad. They also revealed a growing academic field of China-Africa studies centered on trying to understand and describe the new political, social, cultural, and economic configurations that arise out of China's involvement in the continent. This third Book Roundup looks at another quickly growing field of research with similarly broad political implications: China and technological innovation.

Common tropes of China's relationship to technology and science is that China lacks systemic technological innovation, relies primarily on copying and imitating the innovations of others (usually in the "West"), and that ham-fisted censorship and regulation—especially in the digital sphere—will handicap Chinese innovation and preserve the nation's "backwardness." These tropes are usually employed to denigrate Chinese science and technology and, often at the same time, to downplay the perceived threat it poses to American global technological hegemony. Below, I look at three recent books that provide some important nuance to these often reflexively employed mantras.

Innovation in China: Challenging the Global Science and Technology System (2018) by Richard P. Appelbaum, Cong Cao, Xueying Han, Rachel Parker, and Denis Simon is an in-depth evaluation of China's effort to transition from the manufacturing,

export-oriented economy that spurred so many decades of post-Mao growth to a world-leading innovative, knowledge-based economy—in other words, "from 'made in China' to 'designed and created in China'" and "from imitator to innovator" (22). The Chinese state is, unsurprisingly, the principal architect and driver of this economic transition. A key policy framework for this planned transition is the 15-year Medium to Long-Term Plan for the Development of Science and Technology (MLP) that began in 2006 and was aimed at cultivating "indigenous innovation" (*zizhu chuangxin*) in a wide variety of high technology fields, like life sciences, nanotechnology, clean energy, and supercomputing (to name a few). However, despite the state's centrality in guiding science and technology development in China, it would be overly simplistic to describe innovation there merely as "state-led." Multinational corporations and Chinese firms play a significant role in research and innovation as do market forces. The risk then, according to Appelbaum et al., is whether a balance can be maintained—or if the privileges given to the institutions behind state-led innovation will ultimately lead to the marginalization of "the more technologically dynamic sectors in society" (92).

Appelbaum et al. argue that the state's massive investment in science and technology—despite some "promising trends"—has not yet paid its anticipated "big dividends." What are some of those promising trends? For one thing, the massive amount of money invested through the MLP has yielded world-class scientific infrastructure in the form of cutting-edge laboratories, research stations, instruments, and facilities—though the authors note that facilities alone do not innovations make. Another promising trend, depending on your perspective, is the relatively unfettered access to big data that technology firms in China enjoy, unburdened by

privacy concerns (though [a recent court-ruling in China](#) has raised questions about whether public pushback in China will finally establish some limits). This is a particularly stark advantage in the realm of artificial intelligence, as Chinese firms can acquire and use huge datasets much more quickly than international competitors.

On the other hand, China's innovation system faces some daunting obstacles: a scientific brain drain, inefficient distribution of funds, and wastefulness. Technology firms are also more prone to spend effort cultivating ties with the bureaucracies managing science and technology than on the innovations themselves. Moreover, the state's oft-changing policies continue to accrete on top of one another, creating institutional uncertainty for small and medium-sized entrepreneurs and a more favorable environment for state-owned enterprises (SOEs). *Innovation in China* gestures to the fact that China's innovation system is undergoing a hugely aspirational and transitional moment—it is helpful for understanding the Chinese government's broad intent, goals, and early returns, but the designations "success" and "failure" cannot yet be placed.

Silvia Lindtner's *Prototype Nation: China and the Contested Promise of Innovation* (2020) is an ethnographic study of the global community of innovators and tinkerers that were searching for and found represented in China—specifically the city of Shenzhen—"a place to prototype alternatives to existing models of modern technological progress" (6). The essential value of this "maker movement" is the idea that the making of technology can be democratized (and thus also the ownership of that technology) and so function as a way to "intervene at scale" against exploitation and injustice. The principal target of their critique is the dominant, capitalist, neoliberal American-centric systems of innovation found in places like Silicon Valley—where the vast majority

of us merely figure as consumers of technology and not as makers. The maker movement is a response to the broadening realization that the disruptive promise of the U.S. tech industry (especially in the 1990s) has been mostly unfulfilled and that Silicon Valley was complicit in the "loss of control, vulnerability, and insecurity" fundamental to contemporary capitalism—cumulatively what Lindtner calls a "techno-crisis" (11).

How did Shenzhen, long pilloried as the capital of *shanzhai* (fake goods and knockoffs) and as Silicon Valley's "unimaginative counterpart," come to be seen as a realm of new possibilities and alternatives by tech innovators and investors around the globe? "Exactly" Lindtner argues, "because it was construed as 'other' than the West, i.e., because it was seen as a site of fakes, copies, violations of IP regulations and copyright law, and lax rules of law and regulations writ large" (16). What made the Shenzhen maker culture distinctive was that it encouraged people to "become entrepreneurial" and in so doing develop a "*feeling* of intervention and agency" that an alternative was possible. The CCP, though, had a desire to appropriate these maker ideals and their attendant feelings in order to develop a national, indigenous innovation economy that can engineer China's national rejuvenation, a goal which reveals the "CCP's own neoliberal agenda" (43). As such, the feelings of intervention and agency just served to mask underlying "racism and colonial othering, sexism, gender discrimination, old and new forms of labor exploitation, and the spread of precarious conditions of work and life" inherent in neoliberal capitalist expansion and technological promise (216).

In *The Evolution of the Chinese Internet: Creative Visibility in the Digital Public* (2020), Shaohua Guo argues that one of the more innovative technological spaces in China is the internet—despite our tendency to associate it with the "Great Firewall of China" and draconian censorship. The authoritarian nature of Chinese internet governance is, of course, true, but the

binary classification of internets as either open or closed obscures just how vibrant the Chinese internet is. How can creativity and innovation persist in such a restricted and policed ecosystem? Guo tracks the development of four popular internet platforms in China—"the bulletin board system, the blog, the microblog, and WeChat" (230)—to reveal a competitive digital market where old and new players must "continuously reinvent themselves" to stay in the game (233).

Guo develops a concept that she calls "the network of visibility" to provide a more nuanced and "ambivalent" analysis of what drives the vibrancy of China's digital sphere. This "network of visibility" refers to how different players in the digital sphere—the state, media firms, corporations, individuals—compete with one another for "user attention, content authority, and market share" (10). In other words, the internet is not a perfect reflection of the type of discourse desired by the state, as regulated through its considerable tools of censorship and surveillance. The reality is far more negotiated and nuanced. The popular social media and lifestyle platform WeChat, for example, has a great number of self-published public accounts that "decentralize the process of content production" and that allow individual users to blog or share their thoughts on a wide range of topics (203). In short, Guo describes a vibrant, exciting, and creative digital sphere that complicates the typical preoccupations about whether China's internet will either lead to the CCP's downfall and China's democratization or—increasingly—if it will actually be a tool to strengthen Xi's authoritarian grip instead.

The United States and China are now engaged in what the Biden administration has characterized as "[extreme competition](#)" in a range of strategic arenas. As the 21st century unfolds, arguably no struggle is more important than the tussle for global leadership and top spot in the value chain of advanced scientific and high-tech industries.

Recognizing the discursive dominance of the U.S.-China "tech war" goes some way in explaining the titles and subtitles that frame many of the other recent publications about China and technology, like Kai-fu Lee's *AI Superpowers: China, Silicon Valley and the New World Order*; Rebecca Fanin's *Tech Titans of China: How China's Tech Sector is Challenging the World by Innovating Faster, Working Harder, and Going Global*; or Winston Ma's *The Digital War: How China's Tech Power Shapes the Future of AI, Blockchain and Cyberspace*. The broader ongoing "decoupling" of China and the U.S. will surely encourage simple characterizations of rivalrous U.S. (or Western) and Chinese systems, like closed vs. open, innovative vs. backward, and freedom vs. unfreedom. Recent academic studies about technological innovation in China show that, as always, the picture is much more complicated.

For more information on innovation and tech in China, check out the following recent publications and links:

AI Superpowers: China, Silicon Valley, and the New World Order (2018) by Kai-Fu Lee

Tech Titans of China: How China's Tech Sector is Challenging the World by Innovating Faster, Working Harder, and Going Global (2019) by Rebecca Fanin

The Digital War: How China's Tech Power Shapes the Future of AI, Blockchain and Cyberspace (2021) by Winston Ma

[South China Morning Post on US-China tech war and rivalry](#)

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