



Innovative firms in the People's Republic of China are redefining manufacturing

Since at least the beginning of the 1990s, economists have noted that innovation is indispensable to competitive advantage. But what about for manufacturing? Conventional wisdom has long been hostile to altering proven production methods.

But this is changing. Take the example of the People's Republic of China.

Twenty-two years after the government's 1978 economic reforms, China's global manufacturing output was one-quarter that of the United States. Eleven years later, China had eclipsed the United States to become the world's greatest producer.

Explanations for this surge highlight abundant labor, state subsidies, and growing local demand. Yet those could be found elsewhere, not just in China. The explanation must go deeper.

China's breakout is a testament to the power of wedding learning and knowledge production. The result is the new bedrock of China's production. Far from being siloed in set production methods, China's producers have included unique learning strategies in their processes and redefined which parts of production are the most important.

In China's culture of production, the old virtues of scale, isolation, and centralization, while still prevalent, enjoy less esteem than they once did.

The new watchwords? Pace, technology, and flexibility. Above all, interactivity. These virtues drive innovative production because they are fundamentally more interactive, combining in a powerful new way not found elsewhere in the world. Because these virtues can be combined more readily, China's producers are thus more able to adopt new technology, create new incentives, streamline tasks, imitate processes, and impact designs.

What are the learning strategies that have cultivated these new virtues?

Learning by doing, learning by exporting and actively ensuring that knowledge is absorbed at the same time as it is used, and learning by making institutions a part of this process each contribute to China's ability to consistently create indigenous incentives for firms to innovate.

To capture the nuances of China's unique knowledge production goals, scholars have drawn on the unusually wide variety of variables such as location, output, and R&D investments documented by the government's *Annual Report of Industrial Enterprise Statistics*, compiled for 2004–2007.

This was a particularly vivid time of economic change and throws the patterns of Chinese innovation into stark relief.

One such pattern is innovation intensity. The success of production in China shows that it is not enough for ambitious firms just to invest in R&D, although an Asian Development Bank Institute survey shows that, from 2005 to 2007, 40% of listed firms did just that.

There are always disincentives to invest in R&D. Yet once these are overcome, firms tend to double-down on research and multiply their innovative gains. The 40% of firms in the survey that chose to innovate did so by increasing their R&D spending by 115%.

This shows another pattern: that learning by doing must invoke a firm's prior knowledge base at the same time as it responds to its environment. Intense innovation isn't for everybody. While older firms might have the knowledge base to prosper from innovating, they might also be less inclined to innovate in the first place given the demands.

The lesson? Firms must actively engage with external sources of knowledge. This means being also aware of indirect sources of knowledge, such as those generated by businesses in the same industry clustering in the same area. At the same time as industries gravitate to a region, that same region can also promote innovation if, conversely, its economy is diverse. Firms that are flexible, nimble, and quick will be able to pivot to accommodate a wider variety of innovations.

China's firms have progressively opened themselves to foreign know-how and technology in exchange for preferential rates and access to domestic markets. This underpins much of China's industrial policy.

Yet, innovation can flag if a firm is too reliant on this second aspect of indigenous innovation, that is, external learning spillovers.

Firms that focus on exports can often be seduced by cutting costs that draw focus away from in-house R&D. Simply stated, if you can find new ways to improve the bottom line by doing things the way you've always done them, there's little reason to think of innovation.

Statistics from China show how going beyond short-sighted cost-cutting and uniting knowledge to production later in the innovation cycle sets the stage for competitive advantages. The ability to leverage subsidies, labor, and the domestic market allows firms to respond dynamically to outside influences and innovate accordingly.

The presence of mediating institutions is the third trait of indigenous innovation in China. They help ensure knowledge doesn't just flow into pre-existing production molds but is instead channeled into the kind of R&D intensity that has helped China innovate. Statistics from China show that firms that use debt to invest in R&D will likely have to hedge their bets. Why take risks if industrial demand could change overnight?

Institutions work hand in glove with firms through all stages of innovation to mitigate risk. Loans, tax breaks, and support for R&D allow the leveraging of knowledge crucial to build the basis for innovation.

These patterns show that, contrary to the common view, China's manufacturing does not exist independently of innovative efforts and outputs but exploits diverse and flexible knowledge that can generate innovation.

Manufacturers' ability to extrapolate their knowledge has proved attractive to world industries looking to do more than reduce their bottom lines. In all models employed by scholars studying statistics from China, intensity positively affects innovation. From 2004 to 2007, productivity among the surveyed firms rose just under 7%.

But intensity must match with a knowledge base that is a world-beater not just in size but also in its ability to combine its own parts as well as external knowledge.

Firms with greater experience in this mode of indigenous innovation show greater productivity.

And the catalyst for all this remains strong institutions. They can help firms by establishing the overall economic context for innovation and influencing productivity for the better.

Worth noting is that the protectionism that often goes with such institutional efforts has influenced many innovative firms in China, which now depend on it to fight intellectual property theft, unfair competitive practices, and other disincentives.

This episode is based on [research](#) done for the Asian Development Bank by Anthony Howell, an assistant professor at the School of Economics of Peking University, Beijing, People's Republic of China.

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