



China's Growing Talent for Innovation

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As a business innovator, China has a wealth of advantages. These include a huge, adaptable population with an affinity for improvisation and reverse engineering; low-cost labor, operations and overhead; and mature industrial clusters ready to supply a variety of parts, components and subassemblies. These elements are creating a strong culture of innovation, one that companies from developed economies soon will either profit from, or compete against, as China moves beyond labor-intensive, low-value-added consumer goods.

Already, many large multinational corporations (MNCs) have set up R&D centers in China, and the government is encouraging the development of design capabilities among its workforce. But China is not an easy place for outsiders to be innovators. Companies from developed economies looking for R&D partners in China must learn to operate within an industrial structure quite different from their own, and take great care in selecting whom to work with and how, experts caution.

MNCs are likely to find that the best opportunities for harnessing Chinese-style innovation lie in two areas: discrete, targeted pieces of larger products and products for home-market consumption.

In this article, part of a special report on Chinese manufacturing, experts from The Boston Consulting Group (BCG) and Wharton look at how companies can profit from Chinese innovation, what drives this innovation, and what challenges they face in sourcing R&D in China.

Global Recession's Role

Jim Andrew, a senior partner and managing director in BCG's Chicago office and head of its global innovation practice, says that in the current recession, companies need to ensure that they are getting full benefit from every dollar they spend -- including their investments in innovation. Andrew sees growing innovation in low-cost countries such as China and India as one way for companies to increase the cost-effectiveness of their innovation spending. "The crisis in the developed markets has accelerated the move to developing markets because they are lower-cost and now have a track record," he says, noting that the changes afoot are redefining the innovation landscape. "We will look back on this time and say it was an inflection point with regard to the speed at which certain innovation activities were scaled up in China and India in particular. There is really a step-function change in the rate at which some of these activities are growing."

Innovation in China before its economy opened up was limited to design institutes that were part of government departments, says David Michael, a senior partner and director of BCG's Beijing office. Some of institutes have since been repurposed for new commercial goals. Such is the case with the state-owned oil company PetroChina, which has a large network of design institutes within it, according to Michael.

MNCs now realize that China has tremendous development capabilities, including the ability to size up opportunities and rapidly bring products to shelves at low cost. The availability of well-educated talent is particularly attractive, Andrew says. "You can access that talent to do a lot more of the 'R' (research) that is increasingly relevant not just to China's domestic markets but to developed markets." For MNCs that set up R&D centers in China, "It is more about accessing talent rather than some unique source of innovation," Michael notes. That makes innovation in China substantially different from that in other



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global hubs such as the Silicon Valley. "There is low-cost engineering talent in China, but that's different from saying that there is a whole fountain of innovation we can tap into," he adds.

This raw engineering talent is a valuable resource for companies from developed economies. The best way for MNCs to tap into Chinese design skills is by sourcing select pieces of their product, Michael says. As is true for contract manufacturing, much of the advantage of Chinese R&D is in low-cost labor -- but for brains, not brawn. "When Western or world-class business practices line up with low Chinese costs, new types of companies develop to take advantage of this opportunity," he notes.

In health sciences, for instance, some Chinese companies are already responding to Western research needs with low-cost services. Michael offers WuXi PharmaTech in Shanghai's Waigaoqiao Free Trade Zone as an example. WuXi, a leading provider of contract research work for the global pharmaceutical industry, has become adept at setting its engineers to work on Western pharma projects. "It's run by people who understand the needs of Western pharmaceutical companies and know how to leverage local engineering talent to do the work."

This kind of division of labor is common in such East-West partnerships. Western companies typically tap into Chinese design for parts or modules, Michael says. One global energy company gets "a lot of its design for oil exploration and drilling facilities in China at the local oil companies' design institutes," he notes. Microsoft and other Western and Korean gaming and software development companies have a network of local software developers. Michael also points to Perfect World, a Chinese gaming software writer that "is booming in the 3-D world." It may not be a household name in the United States or Europe yet, but Perfect World is a leader in the country's online game market, according to Morgan Stanley Research.

Development Attitude and Disruption

Such industry specialization is common. Corporate R&D in China tends to focus on specific industries and on product development rather than basic research, says [Marshall Meyer](#), a Wharton management professor whose research focuses on China. "You see successes in China in machine tools and lasers, but it has been a combination of development and marketing more than basic research."

Chinese companies have been good at the "D" (development) part, Andrew says. "You could grow very large very quickly by playing in existing markets if you developed new products that were just a little better than everybody else's. But with increased competition everywhere, it takes products and services that are more innovative and targeted to needs that are not already being met." One recent example is a soybean blender that produces a popular soy milk drink. Joyoung Co. in Jinan, China's Shandong province, manufactures the blender, which has become "a big hit product." The blender has no fancy technology -- just a plastic body with an electric motor, but its "fundamental concept is what local consumers want," he says.

More dramatically, according to Michael, Taiwanese computer manufacturer Asus used its development capabilities to "single-handedly invent the netbook segment of the PC market." Producing computers stripped down in functionality and priced at \$300 each, Asus "has completely disrupted the global PC market."

As existing markets become saturated, however, China must invest more in the "R" part of R&D to compete differently or to expand into fundamentally new markets, Andrew says. And while piracy has eroded profit opportunities in China's traditional gaming software industry, Michael points out that it has not similarly affected online games. "People are paying for the experience of playing games with each other, and that turns out to be profitable despite some piracy."

Longer-term, the capacity to innovate seems likely to grow. "The culture is very, very good at devising quick and often effective solutions to problems," Meyer explains. "I see a lot of improvisation." An increasing demand for a Chinese language card in computers, for example, prompted Lenovo years ago to create one for its products. Chinese white-goods manufacturer Haier found that potato farmers in China were using their washing machines to clean produce, so it designed a heavy-duty, special-purpose machine that can be used outdoors and will "wash your clothes or your potatoes," Meyer notes. Electronic and electrical manufacturers often design products that work with "very heavy-duty power supplies

because of the poor quality of electricity" in the country.

Nor are Chinese innovators focused entirely on their domestic market. According to David Jin, managing director and head of BCG's Shanghai office, some Chinese companies have already tried to out-innovate large MNCs -- and succeeded. In one highly publicized case in 2006, Chinese electrical products maker Chint won a lawsuit over its patent for a circuit breaker against the Chinese unit of the French company Schneider Electric. "Usually, it is the other way around," Jin says, alluding to Western companies accusing those in developing countries of patent infringements. Many high-tech operations are succeeding abroad as well. China Medical Technologies, a supplier of in-vitro diagnosis and treatment systems, competes with MNCs and commands a market share of more than 90% in at least one product segment and 70% in another, according to a July 2008 report from Citigroup Global Markets.

Choosing a Business Model

For companies in developed economies that want to harness Chinese innovation, Wharton and BCG experts say it's important to select the right business model. These models range from plain-vanilla purchasing through a series of one-off orders, to joint technological collaborations through supplier development programs, to taking an equity position in Chinese suppliers, says David Lee, partner and managing director in BCG's Beijing office and a supply chain and procurement specialist.

No one-size-fits-all formula exists for such partnerships, Lee adds. He has seen several MNCs invest in their suppliers, but "a lot of them don't like the idea," in part because of potential management disagreements. Some Chinese companies "are reluctant to change the way they have worked historically," he says, adding that the handling of human resources and material waste, in particular, could be points of friction. However, many of them have begun reining in waste of materials in manufacturing processes and increasing wage levels have got them to focus on lean manufacturing and productivity enhancement, he adds.

Many MNCs have rolled out supplier development programs, transferring pieces of technology and attempting to transfer their best practices to Chinese partners. But this, too, is unfamiliar territory for some. Companies from developed economies typically haven't had to worry much about quality control in their home markets "because suppliers themselves take the initiative to invest in quality-control processes," Lee says.

Markets are so competitive and dynamic in China that innovation is likely to continue relentlessly. Companies are being pressured for ever more gains in productivity. And where Chinese manufacturing wages were relatively flat for many decades -- allowing wage productivity to grow -- labor markets have tightened and wages have started rising, Michael points out.

The challenge going forward will be to accelerate productivity growth ahead of any inflationary pressure on wages, he says. The available labor supply in the medium term will not be as large as it was in the past -- although the global economic slowdown has idled millions of workers for the moment. But the release of large blocks of talent through the restructuring of state-owned enterprises is almost complete. At the same time, rising farm incomes -- at least until very recently -- had constrained the supply of migrant rural labor to the industrial centers, Michael explains. That gave labor more leverage. Ultimately, as labor increasingly absorbs more manufacturing resources in the long run, companies will have to push even further for innovative solutions with "a focus on driving more productivity increases in Chinese operations." The global economic downturn will likely slow the pace of these trends -- and even reverse some -- in the short term. But over the mid-term and beyond, expect China to build upon its already substantial innovative capabilities in manufacturing and services.

Innovation and Intellectual Property

Does porous intellectual property protection have a negative impact on innovation? Not necessarily, says Harold Sirkin, senior partner at BCG in Chicago and global leader of the firm's operations practice. When you innovate, "you're creating a brand, and that's a different kind of intellectual property (IP) than a patent." IP protection is growing less important to innovation, even in the West, Sirkin notes. "The world has gotten so small that even if you invent the next iTunes, you can't rely on patent protection," he notes. "It's readily copied now, everywhere. A lot of the [market appeal with] iTunes and the iPod is about

[their] installed base."

However, innovation and protection of IP have long been connected, and China has duly noted that linkage in its attempts to transform itself from a low value-added manufacturing center to recognized innovation leader, particularly as lower-cost countries compete for China's core business. Mike Chao, a Principal at BCG in Beijing, notes that, "The IP laws have always been there, but what's changed in the last 20 years is how they have been interpreted and enforced. There's a big difference between policy and enforcement." One notable example is the software industry, where Chao battled piracy with Microsoft China for over five years before joining BCG. After strong lobbying by Microsoft in partnership with the US government, China declared in 2003 that the government would only use legal software. That announcement was followed by two additional decrees requiring that PC manufacturers only preinstall genuine software and Chinese enterprises only use legal software. "While that's absolutely a step in the right direction, there's still work to do in terms of bringing up the levels of enforcement and awareness to comply with the policies," Chao says.

On another front, however, he notes the Chinese government's tendency to provide research grants to projects that have the same time frame as the tenure of bureaucrats, thus sacrificing long-term horizons for short-term gains. "Innovation requires a long-term approach, and companies need to know their hard work won't just be stolen right away." Therein lies the difference between betting the company on the "R" or the "D": "Research is never a sure thing, but development can consistently result in realizable output," Chao explains. "With the recently announced government stimulus programs, there is hope that more funding will go to the companies that can actually productize that research and bring it to market." Academic institutions that have traditionally received such grants have "not had a great track record in commercialization," Chao points out.

Evolving IP policies, however, will not necessarily be the savior to spurring a wave of innovation in China. "At the end of the day, the market will force you to innovate and differentiate, and if your company isn't doing that, someone else will." Chao points to the PC industry as an example. Prices of notebook computers dropped 13% on average in China last year, in large part due to pressure from netbooks, other low-cost offerings, and a general lack of differentiation. "Asus saw an opportunity to disrupt the industry with the netbook, and now PC companies are dropping prices and scrambling to catch up." Innovation is and has always been the key to competition. China's ability to do so effectively will undoubtedly determine its future in the global economy.

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