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BY DOMINIQUE JOLLY, BRUCE MCKERN, AND GEORGE S. YIP

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Just 15 years ago, China was home to 200 foreign-run R&D centers. Today, multinationals operate more than 1,500 innovation facilities throughout the country — and this number is poised to increase 20 percent by 2018 (*see exhibit*). But this trend involves more than sheer presence. Over the last 10 years, we've witnessed a dynamic shift in what motivates multinational corporations (MNCs) to set up an innovation shop in China. For many, what began as low-cost support for local operations became an effort to adapt technologies to cater to local market demand. Now, some multinationals are changing course yet again: Having recognized China's rise as a global innovation leader, they are tapping into the country's thriving science and technology knowledge base to pursue fundamental research.

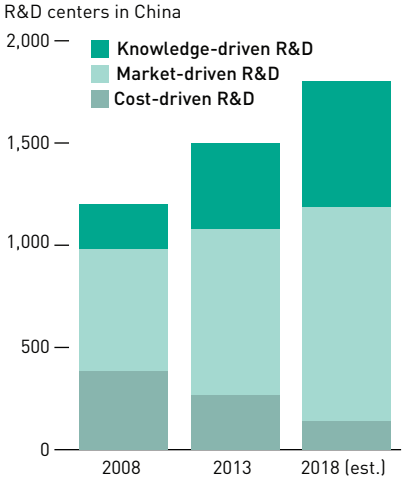
To better understand this evolution, we conducted a study of 50 R&D centers established by MNCs in China. The companies have headquarters in the U.S., Europe, or Asia, and operate in the chemicals, pharmaceuticals, automotive, and IT industries, among others. Some of the centers in our sample were launched more than 10 years ago, but most were set up more recently. Ten of the centers have more than 1,000 employees, and 25 have between 100 and 1,000; only 15 have fewer than 100 employees. On the basis of our research and experience working with companies in China, we believe that our survey results are indicative of the foreign R&D picture in the country as a whole.

We found that 72 percent of our survey respondents are still focused almost exclusively on the first two stages of innovation activities: those centered on cost savings, or "cost-driven" R&D (18 percent), and those aimed at entering the Chinese market, or "market-driven" R&D (54 percent). In the past, such activities could almost guarantee success, and companies were relatively unconcerned with intellectual property (IP) rights.

But that was in a different China. The country now has leading research universities, modern science and technology parks, and innovative startups. Chinese companies, which are investing more and more in R&D, are demonstrating a growing concern for IP rights. Since 2011, China has filed the most domestic patent applications of any country. And in fields such as telecommunications equipment and photovoltaic panels, China has become a recognized leader in technology development. Forward-looking MNCs are transforming their R&D focus to capitalize on this shift: 28 percent of our respondents have now engaged in "knowledge-driven" R&D.

Exhibit: **Shifting R&D Focus, 2008–18**

The number of foreign innovation centers in China is on the rise, and more are conducting knowledge-driven R&D.



Source: Survey interviews; Maximilian von Zedtwitz, "Managing Foreign R&D Laboratories in China"; PwC, "Tax Preferential Policy for R&D Activities in China," Jan. 2012; Arthur Yeung et al., *The Globalization of Chinese Companies: Strategies for Conquering International Markets* (Wiley, 2011)

Three Phases of R&D

The first foreign-run R&D centers in China appeared in the mid-1990s. At that time, MNCs sought to support their local manufacturing facilities by setting up labs inside their factories. These companies wanted to reduce R&D personnel and operating costs by offshoring to China parts of the costly development phase of innovation.

Companies that still conduct cost-driven R&D are largely focused on "end of development" activities, working on products close to commercialization for which repetitive tasks are the norm. This group is dominated by companies in industries that require laborious testing operations. For example, some software companies have several thousand employees dedicated to such tasks in China.

For many companies, however, as China's economy grew, the cost advantage began to fade. By the late 1990s, China's B2B and B2C markets had exploded. Multinationals realized that their Chinese competitors had quickly become masters at serving local needs. Moreover, foreign companies discovered they couldn't simply transfer all of their technologies from developed countries to China. Adaptation was essential to meet local demand, to adjust to locally available resources, and to comply with local regulations. This strategy was initially most prevalent in industries such as autos, food, cosmetics, and construction materials — all of which make products that are differentiated for national markets and that incorporate domestic components.

This phase led MNCs into market-driven R&D. In this type of R&D, companies conduct primary development, such as creating variants of products using existing prototypes, but only rarely do they conduct applied research (for example, research leading to new patents and prototypes). Our survey revealed that in foreign automotive companies' R&D centers in China, 95 percent of the staff is employed only for development, such as designing cars using platforms developed outside China. That leaves just 5 percent to work on applied research (and none to perform fundamental research).

In the third phase, beginning in the mid- to late 2000s, some forward-thinking multinationals recognized that China was developing significant science and technology know-how. These companies don't perform R&D in China to reduce costs or fit the market. Instead, they seek to integrate their R&D with the latest research coming out of Chinese institutions. They are interested in the full R&D spectrum: development, applied research, and, more and more frequently, fundamental research. A large part of the group pursuing this third phase of R&D is in the pharmaceuticals industry; others come from chemicals and electronics (three industries supported by the Chinese government in its five-year development plans).

These knowledge-driven companies target the pool of high-quality researchers who have recently emerged in China. To do so, they establish research partnerships with leading universities and public research centers and work with local partners and startups.

Barriers to Knowledge

Transitioning to knowledge-driven R&D will become increasingly important for foreign multinationals in China. But along the way, they will need to confront several key challenges.

First, they will have to decide where to locate their R&D centers. Companies have traditionally emphasized one specific type of innovation at a given facility. But it's often impossible to simply change a facil-ity's focus.

Cost-driven R&D has had to follow the manufacturing sector into China's interior, where costs are lower than in coastal regions. Market-driven R&D needs to be close to where the customers are. For example, automakers' equipment suppliers need their R&D centers to be near the automakers' factories, which are scattered across the country.

Knowledge-driven R&D, in contrast, needs to be conducted close to research universities and public research institutes. These are predominantly established in the

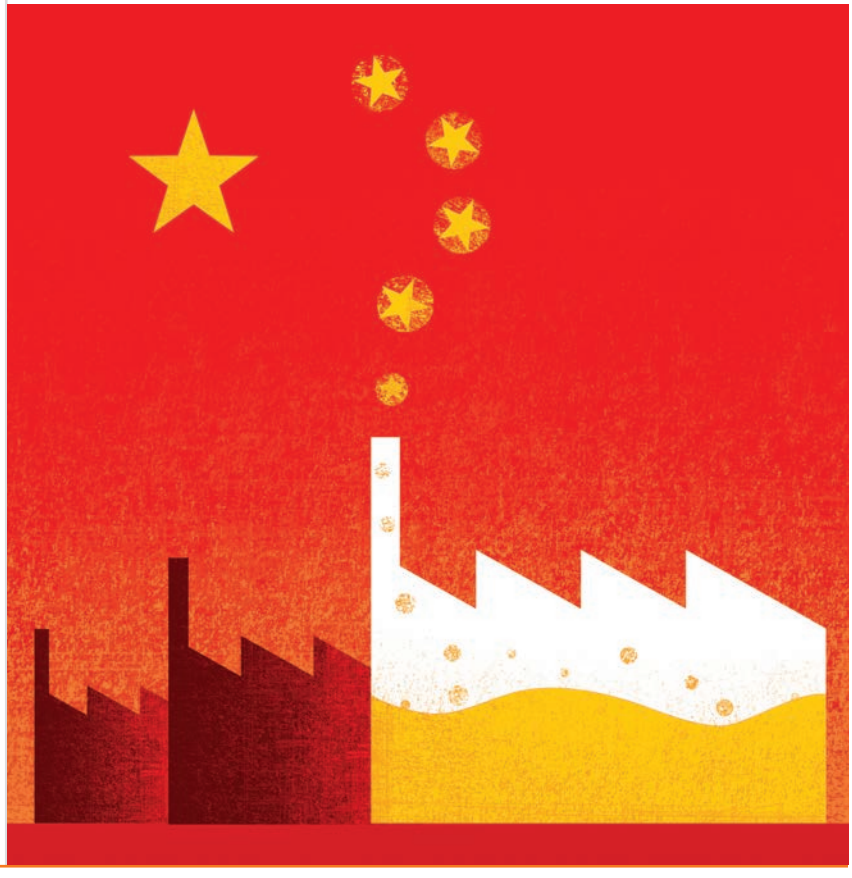


Illustration by Tang Yau Hoong

coastal provinces — in first-tier cities, but also in second-tier cities such as Hangzhou, Nanjing, and Suzhou. A company pursuing knowledge-driven R&D will therefore typically need to open a new facility. Fortunately, MNCs can often receive incentives from provincial or municipal governments eager to attract investment and create jobs.

The second challenge MNCs face involves talent. Companies conducting cost-driven or market-driven R&D are used to hiring people with bachelor's degrees, but people who conduct knowledge-driven R&D typically need master's degrees or Ph.Ds. This means building close links with leading universities and research centers to get preferential access to new graduates.

In many locales, MNCs encounter people with limited international exposure; this makes interactions with expatriates and with teams from the company's headquarters more difficult. Additionally, foreign companies are limited by China's *hukou* household registration system, which constrains where citizens can work. Here, Chinese-born returnees, most of whom are not limited by the *hukou* system — especially if they have dual citizenship — can be assets. They know how multinational corporations work, can bridge the experience gap, and have experience leading teams and mentoring young staff.

Retaining people is perhaps even more challenging than finding them. The Chinese labor market is more dynamic than ever, and churn is high; the annual turnover rate is currently more than 10 percent in the innovation sector. MNCs are no longer the most favored places for young scientists and engineers to work. Private Chinese companies are growing rapidly, and state-owned enterprises can help recruits get the right *hukou*. MNCs will need to develop creative means to stabilize their workforce. This depends less on salaries (offering competitive pay is a given) and more on inspired leadership and providing opportunities for challenging work and overseas assignments.

Next, companies pursuing knowledge-driven R&D need to find the right academic and business partners. MNCs must adopt a long-term strategy to become accepted players in the Chinese innovation ecosystem. To do so, they'll need to become "insiders" as early as possible. They should build relationships with university researchers and government research institutes by working on joint projects of mutual interest, preferably ones that fit national or local government priorities. Newcomers will have to devote resources to catching up by conducting thorough assessments on the ground and making sustained efforts to visit key research centers across the country.

Finally, managing IP rights remains a continuing challenge for MNCs in China. By many accounts, China's regulatory landscape and strategies for protection are evolving quickly. Still, companies need to have clear internal policies for employee IP security at their R&D centers. To reduce security breaches, they can break R&D projects into components — dealing with one part in the West and another part in China. And patents, including IP produced outside China, must be registered in China both for local protection and to foster a positive relationship with the authorities. MNCs that have failed to protect existing IP in China have sometimes found that a local company has registered the patent, along with full rights to use it.

Compounding these practical concerns, company leaders must also commit to a change in mindset. They need to recognize China's rise as a global innovation leader, and understand that knowledge is quickly becoming the next big source of competitive advantage. Among our survey respondents, this shift is already under way. Our advice for those whose innovation presence is focused on the early phases? Take stock of your R&D needs in today's competitive market, and determine whether your China facility is still meeting them. +

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Dominique Jolly
dominique.jolly@skema.edu
is a professor of strategy at SKEMA Business School in France and a visiting professor at the China Europe International Business School (CEIBS) in Shanghai.

Bruce McKern
bmckern@ceibs.edu
is a visiting fellow at Stanford University's Hoover Institution and Oxford University, and a visiting professor of international business at CEIBS.

George S. Yip
gyip@ceibs.edu
is a professor of strategy at CEIBS, and co-director of its Center on China Innovation. He is also a visiting professor at Imperial College Business School in London.

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