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INNOVATION

By Bruce Einhorn

A Dragon In R&D

China's labs may soon rival its powerhouse factories—and multinationals are flocking in for tech innovation

As a young man, Zhang Xiaolin dreamed of becoming a top research scientist. But to reach that goal, the native of China's Anhui Province felt he had to leave his homeland. Now, after two decades in the U.S., he's back home again, and he couldn't be happier. Zhang will be heading up drugmaker AstraZeneca's ([AZN](#)) Shanghai lab, where he says he expects "to do real innovative research." Adds his boss, James Ward-Lilley, president of AstraZeneca China: "In 20 years, where do you see new ideas coming from? A significant chunk will be from China."

It's the year of innovation in China. Led by President Hu Jintao, the government is exhorting companies to transform China by focusing on the lab as well as the factory. To make that happen, Beijing has pledged to boost funding. In the late '90s, China spent less than 1% of gross domestic product on research and development. That figure is now up to 1.5%, but Hu wants to raise it to 2.5% by 2020 -- meaning outlays of \$115 billion a year. "Everybody from government to individuals recognizes that [the Chinese] need to innovate," says Dan Goldstone, head of the Shanghai office for London consultant ?What!f! The Innovation Co.

Companies, both foreign and domestic, are taking up the challenge. From chipmaker Intel ([INTC](#)) and search giant Google ([GOOG](#)) to AstraZeneca and Dow Chemical ([DOW](#)), multinationals are stepping up investment in R&D on the mainland. Chinese computer maker Lenovo Group ([LNVGY](#)) and telecom equipment giant Huawei Technologies are pouring resources into cutting-edge technology. Manufacturers such as Chery Automobile are hiring top engineers to design cool new models.

Biotech startups are offering experimental therapies unavailable or prohibited in the West. Shenzhen Beike Biotechnology Co., for instance, is implanting adult stem cells in patients to treat conditions such as autism, Lou Gehrig's disease, and strokes. While some foreigners might balk, "the whole Chinese government is promoting this," says Dr. Sean Hu, a 39-year-old Guiyang Medical College graduate who earned a PhD in Sweden, did a postdoc at University of British Columbia, and is now chairman of Beike. "That is the biggest advantage we have."

Of course, China has a long way to go. While the Chinese invented gunpowder, paper, and the compass, since the decline of the Qing Dynasty China has taken a backseat not only to Western nations but also to Asian neighbors Japan and South Korea. In the eyes of many Westerners, the Chinese are outstanding manufacturers but lag behind such innovative Indian companies as software service provider Infosys Technologies Ltd. ([INFY](#)) and drugmaker Ranbaxy Laboratories Ltd. Making matters worse, Chinese companies are often labeled copycats of their Western rivals. Cisco Systems Inc. ([CSCO](#)) sued Huawei in 2002 for allegedly stealing Cisco's router technology, and General Motors Corp. ([GM](#)) took Chery to court in 2004 for allegedly copying a GM design for Chery's popular QQ compact. In both cases, the companies settled out of court. China's schools, meanwhile, don't always turn out the kind of worker many companies want. "At Chinese universities, [students] aren't encouraged to take the initiative," says Frans Geidanus, chief technology officer for Asia Pacific for Dutch conglomerate Royal Philips Electronics ([PHG](#)). "They learn the facts, but they don't learn to be creative."

The pace of change, though, is picking up. China accounted for 130,000 patent applications in 2004 (the most recent year for which figures are available). That makes it No. 5 globally, according to figures released on Oct. 16 by the World Intellectual Property Organization, a U.N. agency. Although China was still far behind No. 1 Japan (with 450,000 patents in 2004) and No. 2 U.S. (with 403,000), its 2004 patent applications were six times the number in 1995.

China boosters are betting that the country can fast-track the makeover of its economy. "It's inevitable that [the mainland] will become an innovation center," says Vince Feng, Hong Kong-based managing director for General Atlantic Partners, a U.S. private-equity fund that has invested \$48 million in Beijing Internet company Oak Pacific Interactive. China has history on its side, Feng argues. "Whenever manufacturing is located in a country, innovation always follows," he says, pointing to the British, Americans, and Japanese as examples. "Manufacturing has migrated to China and is there to stay."

INTRICATE FABRIC

Tal Apparel Ltd. highlights the link between manufacturing and innovation. The Hong Kong clothing maker, with production

and R&D operations on the mainland, has prospered in the past 50 years. But today, the \$720 million company is trying to survive in a fiercely competitive industry by pioneering new fabrics such as cotton cashmere and washable wool, and it is working with a mainland partner to develop the textiles necessary for new products. "There's a lot more science than you think in making clothes," says Managing Director Harry N.S. Lee.

China's health challenges also help to spur ingenuity. The country's status as an incubator of deadly viruses is a powerful motivator, says Yin Weidong, the 42-year-old founder of Beijing's Sinovac Biotech Ltd. (**SVA**), the mainland's leading producer of vaccines. The Tangshan native studied infectious diseases in the 1980s as a doctor for China's Centers for Disease Control & Prevention. In 1992, Yin started the company that eventually became Sinovac and developed the country's first hepatitis A vaccine. More recently, Sinovac scientists helped other Chinese researchers develop a vaccine against SARS, the respiratory disease that spread across the mainland in 2003. "With hepatitis, there was a lot of information available, but SARS was completely new," says Yin. "We didn't even know the characteristics of the virus or if a vaccine could be made."

The experience helped prepare Sinovac for its next challenge: an avian flu vaccine the company is developing. It's unclear whether the disease will spread worldwide, but in China it's a real threat that has killed 14 people, lending urgency to Sinovac's efforts. "If SARS and avian flu...become problems in the West, people will find that Sinovac is the company to talk to," says Yin.

While foreigners might well benefit from China's innovation push in the event of an avian flu outbreak, mainland researchers are already gaining from increased contact with colleagues overseas. John Deng, 38, founder of chip designer Vimicro Corp., has a PhD from the University of California at Berkeley and worked for IBM (**IBM**) before returning to China in 1999 and launching Vimicro, a successful designer of chips for PC cameras. Other Vimicro executives have PhDs from the U.S. or have worked there, and today the company has partnerships with Intel (**INTC**), Microsoft (**MSFT**), and Texas Instruments (**TXN**). "You really need to be interacting with the Sony (**SNE**)s, the Hewlett-Packard (**HPQ**)s, and the IBMs to make sure your innovation is state-of-the-art," Deng says.

China's universities are getting a helping hand from the multinationals, too. Not long ago, professors, strapped for funding, were abandoning school and entering the business world. There was even a popular expression for giving up on the ivory tower: "jumping into the sea."

There's little need to bail anymore, says Tao Linmi, an associate professor in the department of computer science and technology at Tsinghua University. Tao's main project is a camera system that follows movements and gestures, automatically keeping an image in camera range. He's working with engineers from the Intel research center in Beijing and is collaborating with nearby R&D centers run by France Télécom (**FTE**) and NEC (**NIPNY**). He says he's happy to see others join the crowd. "Google's research center just opened outside our gate," he says with a grin. "More research institutes mean more funding for us." Without foreign money, Tao says, his work wouldn't have advanced nearly as much as it has. "Five years ago, we usually published in Chinese journals," he says. "Now we are in international journals."

Western companies are helping Chinese knowledge workers think more creatively. Nokia Corp. (**NOK**), for instance, relies increasingly on Chinese engineers. The Beijing Product Creation Center is one of just four R&D labs for handsets that the Finnish phone maker operates worldwide. Running the Beijing lab, which opened in 2003, was difficult at first, says chief Steven P. Marcher. The engineers were very bright, he says, but they didn't know how to navigate a corporate culture that emphasized innovation. "They were always dependent on me telling them what to do," he recalls.

So Marcher developed a training program to encourage Nokia's Beijing managers to "think for themselves." The cultural obstacles were daunting. "It's a completely new way of thinking compared to a Chinese company," says Marcher. "They are coming from a hierarchical setup to one where I am fully empowering my team to take control." The yearlong class, involving coaching and mentoring aimed at developing leadership skills, has produced impressive results, Marcher says. Last year, the Beijing center was the driving force behind four new Nokia models, which Marcher's Chinese engineers produced in 12 months -- a very short time by Nokia standards. "We broke all sorts of records," he says. And, he boasts, "everything was done from Beijing."