Innovation: The Chinese Experience

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The Chinese view of university-based research parks contrasts with what is happening in the United States and in Europe. When I returned from America after receiving my PhD from Washington University, I became a professor at Beijing University and later department chair and then vice president. For 7 years as VP, I was in charge of business development and ours became the largest university in China—possibly in the world—for such enterprises. Visitors to Beijing University are surprised to see that the scope of the business enterprises we run. They are not spin-off companies; they belong to the university.

High Tech Defined

The Chinese government has delineated eight high-tech areas:

- information technology,
- biotechnology,
- space,
- lasers,
- automation,
- new materials,
- new energy and
- ocean technology.

The strategy for promoting these high-tech areas was borrowed from Silicon Valley and Route 128 around Boston, and later Triangle Park in North Carolina. The effort was initiated in 1991, when government investment was significantly increased and domestic and foreign (United States) venture capital was sought to encourage new businesses. Tax preferences was instituted: high-tech companies pay no tax for 3 years, then 50% tax for the following 5 years. And new policies were instituted to attract talent from the United States, including entrepreneurs.

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Professors as CEOs

The most important aspect of the strategy is that the Chinese government has, since 1991, encouraged university professors to form and run their own companies. Even in public universities, a professor can own shares, act as CEO or chair of the board and run a company using her/his own lab technology. This is very different from the situations in Japan and the United States—the Chinese government has gone significantly further than the US Bayh-Dole Act.

Our model is similar to the relationship that Stanford University has with Silicon Valley—from which we learned a great deal—using campus land for high-tech company infrastructure and receiving profits for reinvestment.

In 1999, the government granted building permission for the first university-associated science park. Since then, fifty have been constructed.

Beijing University Park

Plans were initiated in 1992 when I was a department chair and dean. The college received RMB400,000 (US$400,000 in purchasing power) from the university to form a high-tech company. The company groups formed included the Founder Group, which now controls 92% of newspaper printing technology; the Weiming Group is one of the largest biotechnology companies in the country; and the Science Park Group. The total assets of the Beijing University Enterprise stand at US$3.5 billion.

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Six companies controlled by the Chinese Agricultural University are now listed in the stock-market, three in Hong Kong and three on mainland China, in both Shenzhen and Shanghai. Revenue started to accrue in 1998 with US$900 million; the total was $3 billion at the end of 2005. This rapid financial success was not expected. The businesses run the gamut from computer chips to recombinant DNA.

I formed a company in 1992, using recombinant DNA technology to produce interferon-alpha 1b. This drug was chosen as treatment for hepatitis C, which is a particular problem in China, and this was the first company to produce interferon-alpha 1b

domestically. In addition to being department chair and dean of the college, I was CEO and chairman of the board and the company developed rapidly and soon was the main producer in China of interferon-alpha 1b. We obtained investments from Hambrecht & Quist, San Francisco, of about US$20 million. It is a joint venture: we have a 51% share and they 49%. We are still the largest producer of interferon-alpha 1b in China. As it is such a large operation, we have come in for some criticism as a public university company.

Xinghua and the Chinese Agricultural Universities

China's second largest university, Xinghua University, had business revenues totaling RMB2.8 billion in 2004. I am now the president of the Chinese Agricultural University, and we have about twenty-five companies. One is listed in the Shenzhen stock-market. We have two major businesses. One professor bred a new variety of corn—CAU108, now the most widely grown genotype in China—which, through this company, is 100% owned by our university. It occupies 15% of the area planted to corn. In a sense, the university has become a seed company like Pioneer.

Another professor has bred a new type of chicken—#3 Hen—which consumes much less feed than other varieties while maintaining productivity. Approximately 13 million of these chickens are consumed each year. The Chinese Agricultural University's company assets increased seven-fold from 2000 to 2005.

Part of the company profits are returned to the host institution. About RMB63 million were returned to the Agricultural University last year, and it increases yearly. As president, I use these so-called "free" funds (because they did not come from the government) to subsidize professors' expenses, to finance research and/or teaching or otherwise fulfilling institutional needs.

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About 4,500 companies belong to Chinese universities, of which about 50% are high tech. The total annual revenue was US$12 billion in 2004. Accordingly, university companies pay significant taxes to the government, RMB4.8 billion in 2004. Some of these levies are being used to improve China's patenting system and to enforce protection of intellectual property.

Fifty percent of patent applications in China are from foreign countries. Japan is the leader at 9%, then the United States, South Korea, Germany, Netherlands, France, Switzerland, United Kingdom, Italy and Sweden. Of patent applications from within China, Xinghua University is the leader, then Beijing. Some 2,200 applications in 2005 came from the top-ten universities. Universities in Beijing account for about 10% of patent applications.

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Challenges

Universities will continue to play a very important role in high-tech business development and innovation, making major contributions to a knowledge based economy in China. As mentioned, Beijing University now has the largest printing-technology company and the biggest for PC producer after Legend/Lenovo computers. And the Chinese Agricultural University has one of the biggest seed companies. The trend will continue; more university companies will be formed and will merge according to marketing patterns.

Management is possibly the biggest challenge. When I left Beijing University as vice president, the annual revenue was US$ 2 billion; I had to oversee six companies, including attending their quarterly board meetings. Professors running these companies made large amounts of money, some of which they gave to their best graduate students. Sometimes this created tension not only among the graduate students, but also among the faculty as more money was to be made in computer science and biotechnology than in mathematics or literature, for example. There is no easy means of managing this problem. Perhaps eventually lessons from the United States will be learned and spin-off companies will be formed. On the other hand, visiting presidents and other representatives from US universities, after expressing surprise, sometimes suggest that the Chinese system should be adopted in the United States.

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Dr. Chen has been the president of the China Agricultural University since 2003. He also serves as chair of the Plant Biotech Committee of UNESCO, as a consultant for the International Society for Plant Molecular Biology, and as a member of the Sino-Euro Administration Committee for Biotechnology Cooperation. He was recently elected vice chairman of the Council of Scientific Advisers of the International Center for Genetic Engineering and Biotechnology in Italy.