Can Asians Innovate?

Clusters of craftsmen have existed as long as people have lived in substantial settlements—certainly since they have lived in cities. Modern examples include diamond cutters in Antwerp, knife makers in Sheffield, sock makers in Yiwu, and the cinematic entertainers in Mumbai. This phenomenon is widely present in Asia’s information technology (IT) industry.

Clusters form because firms benefit from having others in the same, or complementary, industries close by. There is a supply of skilled labor, specialized suppliers and buyers, and flows of knowledge among firms. This is the classic story told by the 19th century economist Alfred Marshall. However, the story is a static one, and high-tech industries are quintessentially dynamic. New firms can form new clusters.

As these examples suggest, market forces create them (with Silicon Valley being the prime example), but governments often like to accelerate the process. They do this to enjoy the benefits of having a vibrant cluster sooner than the market might produce and from a belief, which might on occasion be warranted, of establishing a vibrant cluster before some other nation does, that is, to gain a first-mover advantage. However, such initiatives imply that government officials know how to do this. The record on this is checkered.

Governments have used many methods to attract individuals and firms to the localities they pick: cheap financing, tax breaks, subsidized land and housing, special schools. If the conditions are favorable, such policies can successfully attract firms. However, have governments done little more than cause firms that would form anyway to locate in a favored place instead.
of somewhere else in the country without substantial spillover benefits arising? It can be hard to tell. One needs to consider the presence—or absence—of good public research organizations in the region and, arguably even more, overall conditions for innovation and entrepreneurship in the country. These can vary greatly.

Beginning in the 1970s, a well-known cluster emerged in Taiwan’s Hsinchu Science-based Industrial Park (HSIP) that now contains several hundred companies, mostly in the IT industry. HSIP became noted for its fast-moving firms that were initially original equipment manufacturers (OEM) for foreign firms before turning into original design manufacturers (ODM); presently some have become “orchestrators” of product designs offered to buyers worldwide. At its core was ITRI, the Industrial Technology Research Center, which took technologies in the pre-competitive state and developed them for commercialization by local companies. Its most famous firm was the pioneering chip foundry, TSMC, which was a spin-out from an ITRI lab. HSIP and ITRI were founded by the government which, together with powerful market forces, has led to a highly productive region.

### Of Parks and Politics

**Taiwan Has Pursued** the “science-based park” model of Hsinchu with new parks in the south and in the center of the country. Since 2000, its IT companies have moved most of their manufacturing to mainland China where, unsurprisingly, they tend to cluster, notably in Kunshan, near Suzhou.

In the 1980s, clusters in software services began to develop in several Indian cities, first in Mumbai, then in Bangalore, followed by New Delhi, Hyderabad, Chennai and Pune. In contrast to Taiwan, the government has long been a major obstacle to industry development through a host of restrictive regulations. Only when it began to seriously liberalize in 1991 did this industry take off. Foreign demand, notably in the U.S., was—and still is—essential, and foreign firms have played a major role, but the leading Indian suppliers were domestic ones with some of them still growing. Governments can still be a problem; for example, the government of Karnataka state, whose capital is Bangalore, seems to be driving its thriving software industry away through inadequate investment in infrastructure. Although the role of government was not entirely negative (with, for instance, building a satellite ground station in Bangalore fairly early), the growth of Indian clusters has been essentially a market phenomenon.

China has many IT industry clusters, varying from strong to mediocre ones in performance. As is customary in China, the government has approached the cluster phenomenon from the top-down. The Ministry of Science and Technology began its Torch industrial technology program in 1995 and as of 2005 had 83 groups in 16 provinces.

The three major high tech regions are Beijing, Shanghai and Shenzhen. The biggest is Beijing’s Zhongguancun Science Park, which contains China’s leading universities, Academy of Science Institutes and thousands of companies. Legend Computer (now Lenovo) came out of the Chinese Academy of Sciences soon after economic liberalization began and is the leading firm in the cluster. Zhongguancun has the leading concentration of software firms and companies controlled by the state. Its clusters flourished with government assistance and support to these firms will likewise continue in the future.

Shanghai has the foremost integrated circuit-making cluster. The government subsidized the building of an IC foundry industry and, in turn, that industry led to the formation of many integrated circuit design
houses. Shenzhen, in the South, specializes in manufacturing IT products; one firm, Foxconn (from Taiwan), has 300,000 workers. In all three cases, the government and market forces play significant roles in support of developing clusters.

IT clusters are not universally present in Asia; Japan and South Korea, for example, are different. This is certainly not due to a shortage of excellent technologies or strong companies. It stems from having relatively few new high tech companies. Without them, clusters do not form.

Consider Japan’s array of world-class consumer electronics, computers, and IT component companies, such as Matsushita, NEC, Fujitsu, Sony, Canon, Sharp and many more. These long-established companies have successfully renewed themselves. Already in place and with low labor mobility, the influences to form concentrations of IT firms in a few locations have been weak. A decade ago, the Ministry of International Trade and Industry (MITI, now METI) began promoting more flexibility in industry. As a result, more startups have emerged but not yet much by way of IT clusters (with the exception of a semiconductor concentration in Kyushu).

The pattern in Korea is similar to that in Japan. It also has large, successful IT companies but not many startups—hence the paucity of new clusters—with the exception of gaming and other internet content suppliers in Seoul. The Korean government is also changing the rules to encourage new firms; here, too, reveals evidence of a response from the market.

Japan and Korea have similarly created science parks, Japan in Tsukuba and Korea in Daeduk Science Town. In both places good research was undertaken but neither has formed strong industry clusters due to national policies and customs favoring established firms over the newly created ones.

All of the successful high tech clusters have various combinations of foreign involvements: downstream buyers, upstream sources of technology, professionals with foreign experience and direct investments by foreign firms. The sparser the set of such links the less vibrant the cluster is likely to be.

The question of whether universities are a necessary ingredient comes up because of the prominence of good universities in the leading American clusters. The answer in Asia is “not really, so far.” The main role for its universities, a vitally important one, has been to educate a growing number of talented scientists and engineers. This might seem surprising because of the high status, for example, of the Indian Institutes of Technology and of China’s leading universities. In these cases the universities did not have major research missions before, but now they are beginning to do some serious research. This could influence the nature of new companies formed and their respective locations.

If the American experience is relevant for Asia, having good research universities is a necessary but not a sufficient condition for forming world-class clusters (with the U.S. having more good universities spread around the country than it has high tech clusters). It is also tricky to balance the requisites for academic excellence and a significant research contribution to industry. Even if they do a good job with the latter, and if the American experience is relevant, it is a mistake to expect universities on average to generate significant in-
come from commercializing research findings.

Some government officials have assumed that it is a good idea to invite venture capitalists. There is nothing wrong with inviting them but will they come and do deals? Only if there are deals to be done and this, in turn, depends on the national and local entrepreneurial environments. Thus it is not surprising that the most developed Asian VC industry is in Taiwan with China and India coming along well, and Japan and Korea lagging.

A natural question is what opportunities exist for new clusters to emerge? Are such spaces already occupied? The answer has to do with the emergence of new industries and where this phenomenon happens; this will be decided through a combination of private and government actions. The government of Singapore, for example, is making a big effort to create a bio-tech cluster. It is a safe bet that the clean energy ones will be emerging in many places. With fast-growing markets, clusters could emerge in new places, notably in China and India, as growth in established places is slowed by high costs of land and labor. Taiwan, faced with such constraints in the north, has developed new industry clusters in the south and central regions.

If there is a message in this story for the future of Asian clusters, it is to have national rules that encourage entrepreneurship, openness to foreign connections of various kinds and support for research. Governments now widely recognize these needs, although translating them into actions still prove to be difficult. Creating strong research universities that foster commercialization of research results while also supporting high academic standards is an especially challenging task.

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**Engineers to Researchers**

by Douglas Fuller and Eric Thun

Is China a paper tiger? A number of doomsayers have predicted that the end is near for China, with scenarios ranging from a simple halt in the country’s rapid growth to a complete collapse of the Chinese state and economy. In many cases, the implicit points of reference for these doomsday predictions are China’s neighbors. Where-as planners in Seoul, Tokyo and Taipei successfully built domestic firms to compete in international markets, the pessimists look at China’s extensive reliance on foreign direct investment and see nothing but weakness.

The China boosters, on the other hand, look at the raw data of China’s growth and conclude that China is on the fast track to becoming an economic superpower, with world class companies that combine cutting edge technology with low cost labor. These optimists look to Chinese companies, such as Lenovo and Shanghai Auto, and see the world’s next Samsung and Toyota, but on an unparalleled scale—Japan Inc. times ten. While there is certainly reason for optimism, this view fails to take into account the fundamental weaknesses of China’s national champions. Simply put, many of these firms lack independent technological capabilities and destroy more value than they create.

The two viewpoints assume that suc-