

Part 3

SHORT- AND LONG-TERM IMPLICATIONS OF TECHNOLOGY TRANSFER

US COMPETITIVENESS

How does China's recent growth and progress in several industrial sectors translate into competition for the United States? At present, it would seem that although some progress has been made in China in relatively high-tech industries (as the case studies have shown), there are numerous difficulties and obstacles such as infrastructure deficiencies with which China must still contend. Perhaps the most worrisome issue with regard to China's increasing manufacturing capabilities in high-tech sectors is that of over capacity. China is already the number one recipient of US anti-dumping complaints, and this trend is not likely to change in the near future. The sheer volume of products (even those in high-tech sectors) that China is capable of producing is staggering and could have serious global repercussions (as is already apparent in the auto sector).

Over the last decade China has become a large exporter of electrical items. The "electrical machinery, TV equipment" (HTS85) category, which includes a wide range of electronic and electrical appliances and components, has been the number one United States import category from China since 1994, displacing toys (HTS95) and footwear (HTS64) from the lead positions. As Chinese manufacturing becomes more sophisticated and technical in nature, Chinese high-tech products could potentially undercut similar products of other countries (and therefore jobs as well) as prices fall or are lowered due to excess supply in China.¹ Of course, this presumes that Chinese products would also be of equal or greater quality than foreign products, which will certainly not always be the case. However, as the market for PCs in China demonstrates, Chinese firms have been able to achieve a level of sophistication and quality control sufficient to take the lead in domestic sales when combined with a price lower than that charged for foreign products. Thus, similar situations could conceivably arise in the auto sector, various parts and components, as well as telecommunications equipment and other high-tech areas in the not-too-distant future.

In the most competitive sector — electronics — China may have come a long way over a relatively short period of time, but much improvement remains to be made before Chinese indigenous capabilities become competitive with US products. Results of a survey published by the World Technology and Evaluation Council (WTEC) drafted by US industry experts concluded that the only electronics capability in which China was deemed moderately competitive in 1994 was manufacturing, and even then not very much so in relation to neighboring countries and the United States. For overall R&D, design, marketing and sales, China received only "negligible" or "weak" ratings. However, the report also concludes with a warning for industry leaders: "The

competitive pressures to upgrade technological capabilities [throughout the Asia-Pacific region] directly challenge Japanese and US high-technology leadership. Development of the Internet provides for even more rapid transfers of technology than in the past and will challenge even the best firms to keep pace.”² This would seem to be good advice, especially when one looks at the technological advances and economic growth made possible primarily in Southeastern China due to the proximity of increasingly sophisticated, newly industrializing nations on China’s periphery.

The key to rising Chinese competitiveness in its own market as well as the global marketplace is China’s ability to absorb the vast amounts for foreign capital and technology that have come its way this decade. China’s well-planned economic, industrial, and science and technology advances will only be realized if more flexibility is allowed for China’s bureaucracy, researchers and scholars, as well as entrepreneurs. China’s new generation of leaders also realize this to be the case, given their own backgrounds in scientific and technological fields. China’s scientists, students, foreign experts and joint ventures will play a key role in determining the degree to which China is able to assimilate and then innovate technology. There are scant examples of this going on in China today, but the idea seems to be catching on quickly in some regions and industrial sectors. As these ideas do take hold, US technology transfers to China, especially those in the form of joint R&D centers, will be increasingly important vehicles for technological improvements. It is, therefore, incumbent upon US industry and the US government to be vigilant in assessing the type and level of technological advances that are taking place in these centers and to protect the rights of US corporations to these results and the technology transfers that will one day flow from China to the United States.

Generally speaking, China at present poses no direct threat to US economic competitiveness in high-tech industries. However, if current projections by Chinese and international financial institutions are correct, China will be a major competitor and world economic power in another decade or two.³ Under current conditions, this seems inevitable. Indeed, a 1997 survey by Grant Thornton of US manufacturers finds that more US companies view China as a future competitor than any other country.⁴ Interviews of industry representatives conducted for this study have also indicated some concern for US competitiveness vis-à-vis China in the not-too-distant future due to technology transfers to China by US firms and others. However, there does not seem to be great anxiety about this on the part of US high-tech firms at this time.

The projections of China’s market and economy are largely based on best-case scenarios in terms of expected future economic growth in China and in Asia and do not take sufficiently into account potentially serious economic or political crises (such as the current Asian financial troubles). Similarly, projections made by many foreign firms with regard to the potential of China’s market often do not account for the realities of doing business in China today. China’s market is not as open as it would appear despite the vast changes obvious in Chinese society since 1978. As a result, significant US commercial technology transfers to China are occurring with only limited access to China’s market in return. Moreover, as the country with the greatest trade deficit with China, the United States is also paying the most for the privilege of access to China’s market in terms of lost potential exports and job opportunities. How long the

present situation continues will determine the extent to which US commercial technology transfers to China will affect global US economic competitiveness.

US NATIONAL SECURITY

The implications of US technology transfers to China for US national security have long been a concern for the US government and have become increasingly difficult to gauge due to the increasing number and types of dual-use items utilized in modern civilian society and military forces. China presents a particular problem due to the uncertainties about the relationship between China's military and defense industrial sectors. These difficulties will only become more complicated as US firms begin to invest in China's central regions where China's main military and defense institutions are located, along China's "Third Front." Accordingly, determining the end use and the end-user will become more of a burden on US industry and could conceivably lead to increased export license applications, missed business opportunities due to hesitancy on the part of US firms to consider investing or applying for a license, or potentially more cases requiring investigation in the future. (The US Department of Commerce provides a guide for US exporters entitled "Know Your Customer Guidance" to assist US businesses exporting or doing business abroad to determine possible violations of the Export Administration Regulations. These "Red Flag Indicators" can be found on BXA's website: www.bxa.doc.gov).

Despite having reduced the number and type of items still subject to export licensing, US government concerns remain over Chinese intentions and military capabilities. The list of items subject to review has been significantly reduced since the end of the Cold War. Export controls, however, are not and never have been a means to analyze or track the cumulative, long-term effects of US commercial technology transfers on US competitiveness or national security. Given the rapid pace of development and advances in many high-tech industries, it may be too late by the time US industry or the US government as a whole realize there is a problem emerging in either of these areas.

China needs and wants all the high technology the United States is willing to provide. As this study shows, the transfer of advanced technology is often the key to gaining market access in China. US high-tech firms now less hampered by US export controls appear willing to provide a good deal of "state-of-the-art" technology as commercial offsets for even limited access to China's market. These direct and indirect commercial offset agreements involve meeting local content requirements, providing employee training, and R&D collaboration. This situation opens the possibility for harm to long-term US economic competitiveness and national security interests from ongoing commercial technology transfers to China.

However, simply having access to advanced technology does not imply an effective or efficient Chinese use and understanding of the technology. Although China's military leaders may aspire to a Gulf-War type modern military capability, this reality is a long way off for the PLA. The record does not show that Chinese military forces have made, or are likely to be able to make, significant advances in the near future as a result of US commercial technology transfers. According to a respected expert on the Chinese military, "modernization of China's defense industrial base and

R&D, as this term is understood in the United States, Europe, Russia, and Japan, remains at least two decades into the future.”⁵

CONCLUSION

As this study has attempted to show, China’s laws, regulations, and policies with regard to foreign investment and trade include numerous provisions and mandates for foreign technology transfer. These policies are clearly intended to support domestic reform and modernization efforts toward self-sufficiency in high-tech sectors. Furthermore, many of the provisions included in China’s existing industrial policies appear to raise questions as to their consistency with international trade practices and bilateral agreements. (These issues are among those being addressed in bilateral and multilateral fora on China’s potential accession to the World Trade Organization.) Despite these policies, however, many foreign corporations continue to invest in China, including US high-tech companies. In doing so, these companies often must transfer commercial technology in various forms in order to accommodate Chinese foreign investment and import regulations, which have become increasingly selective in terms of the level and type of technologies allowed. Thus, it is clear that foreign firms are being coerced into transferring technology (which they probably would not otherwise do) as the price to be paid for access to China’s market.

The more difficult question to answer, however, is the degree to which these transfers are “forced.” The option certainly exists for foreign corporations to simply refuse to invest in China (or to divest) until significant changes are made in Chinese foreign investment policies. There is leverage here: China is, and will remain for the foreseeable future, dependent on foreign capital and technology for its modernization and reform programs. Such a strategy could prove costly, however, if in the meantime other foreign investors are able to build “beachheads” in China, thereby affording them an advantage if and when China’s market takes off. Also lost would be the returns (slim as they may be) from investing in China early on, before other foreign competitors and (in time) domestic producers in China grab most of the market for themselves.

In addition, China’s market represents more than a single national economy. China’s sheer size, population, and share of the world’s economy make the decision on whether and when to invest in China one with potentially global consequences. Thus, foreign investors face a difficult dilemma: to invest early and accept the risks involved in doing so in hopes of minimizing potential losses while creating a market presence and goodwill in China, or to wait and see how China’s market and policies develop, investing when the time is ripe and investment policies less discriminatory. The leading high-tech companies — American, European, and increasingly also the Japanese — seem to have decided on the former strategy. It is therefore difficult to conclude that commercial technology transfers resulting from US foreign investment in China are truly “forced.”

Furthermore, if technology transfers were genuinely “forced” from foreign investors, one could reasonably assume that there would be significant and obvious advances in each of the industries concerned. However, China’s industrial policies have not been uniformly successful in achieving their stated goals. As the industry case studies show, China’s industrial policies have had a very mixed record. On the one hand, in the auto sector, Chinese policies appear to be having the desired effect

on technology transfers (they are increasing in the form of trade, research, and training), but the industry itself has not yet witnessed significant technological advances as a result. On the other hand, the aerospace industry seems to be progressing on both fronts, whereas the electronics industry shows that technology transfers and advances can occur in spite of explicit industrial policies. Thus, it seems clear that technology transfers are not solely the result of discriminatory trade practices or policies and, therefore, again are not “forced.” Rather the degree to which US technology is being transferred to China is a combination of Chinese law and strategic decision-making on the part of US corporations. That is, technology transfer is both mandated in Chinese regulations or industrial policies (with which US companies wishing to invest in China must comply) *and* used as a deal-maker by US firms seeking joint venture contracts in China.

Are Chinese industrial policies sustainable? Perhaps in the short-run, but not over a long period of time. If the investment policies now in place in China are continued without further liberalization and reform, foreign investors are likely to eventually become disenchanted with the China market. However, this would result in the loss of significant amounts of foreign capital and technology upon which China’s economic and military modernization are dependent. A serious decline in foreign investment would also make the prospects of increased efficiency, innovation, and competition in domestic Chinese enterprises more difficult. Thus, a strong motivation exists for Chinese leaders and officials to continue the gradual process of opening sectors to foreign investment and increasing trading rights among both domestic and foreign enterprises, which would likely serve to decrease the per-contract level of technology transfers to China.⁶ In the meantime, it is contingent upon foreign investors and their respective governments to encourage Chinese leaders to hasten the pace of liberalization and reform in the foreign investment and trade sectors. Otherwise, the present situation, which is potentially harmful to US economic competitiveness and national security, will persist and result in more technology transfers in the future.

Yet, if Chinese policies and practices were to reach the point of truly forcing technology from foreign investors, the latter would begin to leave China, taking with them the capital and technology China so desperately needs now and for the long-run. Thus, it is unlikely that circumstances will actually reach this point and that the continuously opposing forces at work (China’s need for technology and US firms’ wariness in transferring it) will serve to maintain some degree of balance. That is, of course, if the prospect of a 1.2 billion-person economy does not continue to mesmerize American business, and if these companies remain sufficiently wary of the risks involved in technology transfers. To date, this does not seem to be the case, however. Rather, during the timeframe in which this study was conducted, it was still largely considered heresy to not be optimistic or enthusiastic about the China market.⁷ It would be a greater service to US industry, if the *realities* of the China market for foreign investors, rather than merely the *potential*, were made more apparent to prospective American investors in China.

Finally, it should also be noted that this is not the first time that the China market has fascinated foreign entrepreneurs. There has been an historic cycle of overly enthusiastic expectations followed by a bitter withdrawal from the China market. Early last century, foreign investors from great powers flocked to China to do business with

China's even then enormous population only to find their trade rights and market access tightly restricted. Arguably, the situation today for foreign investors in China is not entirely dissimilar. If Sino-US trade, economic disputes and miscommunications or misunderstandings are similarly allowed to fester without noticeable liberalization of the ways of business and trade in China, then it is certainly possible that foreign investors will eventually tire of the China market and turn away bitterly once again. As the final years of the 20th Century approach, however, it would surely be catastrophic for both the United States and for China, as well as for the rest of the world, if the two largest economies were to become estranged.

As Part 1 of the this study shows, China's foreign investment policies have followed a clear pattern characterized by an increasingly targeted focus on high-technology investment and imports. These policies are intended to bolster China's modernization efforts in both the civilian and military sectors. The most significant finding of this study, however, is the degree to which US high-tech firms are collaborating on R&D with leading Chinese universities and research institutions in China, an offset agreement frequently accompanying joint venture contracts. Although there is as yet no clear cause and effect as much of the evidence is circumstantial, Part 2 of the study demonstrates that trends in Sino-US trade are worrisome in that high-technology sector exports (such as electronics) are increasing from China to the United States and elsewhere while at the same time the US trade deficit with China is climbing.

As this study attempts to show, commercial technology transfers to China are the condition upon which American high-tech investors are entering the China market, and this trend is likely to continue. Technology, however, is also a key factor in maintaining US competitiveness in the global economy and fundamental to defending and advancing US national security interests. Moreover, technology transfers are not necessarily detrimental to US business, the US economy, or to national security interests and can, in fact, be mutually beneficial to the parties concerned. However, where technology transfers are unduly required in exchange for access to a foreign market or where foreign investment policies mandate the transfer of advanced technology regardless of market demand, there exists an artificial incentive to transfer more advanced technologies than would likely prevail under freer market conditions. This is the situation that exists in China today.

Endnotes - Conclusion:

1. According to a recent report on the effects of the US trade deficit with China, while Chinese exports to the US of apparel, toys, and footwear continue to grow rapidly, China is also rapidly increasing its exports of computer equipment and consumer electronic devices. This new trend suggests that job losses among higher-wage workers will grow as the persistent China trade deficit continues to expand." Jesse Rothstein and Robert E. Scott, *The Cost of Trade With China: Women and Low-Wage Workers Hit Hardest by Job Losses in All 50 States*, Issue Brief 121 (Washington, DC: Economic Policy Institute, October 28, 1997).
2. "Asia's Electronics Manufacturing Infrastructure," *WTEC Report*, Chapter 2, May 1997. Tables E1, 2.3, and 2.6.
3. See "China Engaged: Integration with the Global Economy," *China 2020: Development Challenges in the New Century*, vol. 7 (Washington, DC: World Bank, September 1997).
4. From a sample of 257 manufacturing executives, 31 percent found China to be the country posing the greatest competitive threat to US manufacturers. David Dinell, "Manufacturers say China is Top Global Contender," *Wichita Business Journal*, July 28, 1997.
5. Paul Godwin, "Uncertainty, Insecurity, and China's Military Power," *Current History*, September 1997, pp. 252-257; 257.
6. According to Susan Esserman, China agreed in March, 1997 to "increase progressively the availability of the right to import and export products so that at the end of three years all foreign individuals and companies and all companies in China will have the right to import and export all products throughout China. This commitment represents a major change in China's trading system since only a comparative few companies in China now have the right to import goods directly from US companies. This is an important step in providing national treatment to US exports." Susan Esserman, Testimony before US House of Representatives Committee on Ways and Means Subcommittee on Trade, November 4, 1997.
7. This zeal may well be more evident among executives in the United States than for business persons with experience in China.