



Statement Before the
U.S.-China Economic and Security Review Commission
China's High-Technology Development
April 21, 2005
Palo Alto, California
by
Ernest H. Preeg
Senior Fellow in Trade and Productivity
Manufacturers Alliance/MAPI

The Emerging Chinese Advanced Technology Superstate

China is an emerging advanced technology superstate, which poses a serious challenge to longstanding U.S. leadership in technology innovation and related production and exports. A further relative advance in Chinese advanced technology performance will have important impact on U.S. commercial, national security, and foreign policy interests.

An advanced technology superstate is defined in terms of economic, technological and financial power, leading to political power in international affairs and to becoming a military super power as well. The essential ingredients for superstate status are a very large internal market, correspondingly large public expenditures for research and development (R&D), education, and infrastructure, a highly competitive private sector, and an open trade and investment policy. China meets all of these conditions, although further market-oriented reforms are needed, especially in the financial services sector.

These are the central conclusions of my study, The Emerging Chinese Advanced Technology Superstate, scheduled for publication in June. More specific conclusions, grouped in terms of the analytic assessment and the recommended U.S. policy response, are as follows:

Analytic Assessment

(1) Deng Xiaoping's "Four Modernizations", put forward in 1978, have led to 25 years of 9 percent annual GDP growth in China, and a fivefold increase in per capital income. This rapid growth, however, has been in two distinct stages. The first stage, from 1980 to 1995, centered on export-led growth in low technology, labor-intensive industries, while only during the past 10 years has advanced technology industry development become the top priority.

(2) The two principal "resource" indicators of advanced technology development are R&D expenditures and science and engineering graduates. Chinese R&D expenditures grew by 22 percent per year from 1995 to 2002, compared with 6 percent in the United States. Projected to 2005, Chinese expenditures will be higher than those of Japan, more than 60 percent of the EU level, and about 40 percent of the U.S. level. Chinese R&D is more heavily concentrated in manufacturing than is U.S. R&D, with 60 percent of the Chinese R&D performed by enterprises, 28 percent by government research institutions, and 10 percent by universities.

(3) Chinese science and doctoral degrees increased by 14 percent per year from 1995 to 2001, compared with minus 1 percent in the United States. Projected to 2005, annual Chinese doctoral degrees will be half that of the U.S. level. Chinese doctoral degrees in engineering grew 18 percent per year from 1995 to 2001, compared with minus 2 percent in the United States. Projected to 2005, Chinese engineering doctorates will be 70 percent higher than the U.S. level.

(4) Two performance indicators are patent applications and technical article authorship. Chinese patent applications increased annually by large double-digit percentages from 1995 to 1999, as did technical article authorship from 1995 to 2001, but from very low base levels. More up-to-date figures would be revealing, and the National Science Foundation is urged to provide more current figures.

(5) Foreign direct investment (FDI) in China was relatively low during the first stage of labor-intensive industrial growth, less than \$5 billion per year through 1991. FDI then increased sharply, related to wide-ranging incentives for advanced technology investors, to \$38 billion in 1995 and \$62 billion in 2004. Seventy percent of FDI is in manufacturing, with heavy concentration in export-oriented companies and advanced technology sectors. In 2004, 57 percent of total Chinese exports were by foreign investors.

(6) Taiwan is the largest foreign investor in China, accounting for up to half of total FDI, but there are no precise figures because most of it comes indirectly through Hong Kong and other sources. The United States was the second largest foreign investor through 2002, but in 2003 and 2004, South Korea and Japan pulled ahead of the United States. In 2004, South Korea invested \$6.2 billion, Japan \$5.5 billion, and the United States \$3.9 billion.

(7) Taiwanese investment is concentrated heavily in the information technology sector, including the semiconductor sector. China plans to build up to 18 semiconductor plants by 2005, and there are now about 400 chip-design companies in China, about one-third of which are foreign.

(8) American investment in China is broader in industry scope, although with 70 percent in manufacturing. China provides tax incentives and exerts coercion on American companies to do R&D and upgrade the technology level of production in China, and many companies are doing so. There is also a trend to work with Chinese suppliers and thus increase value added within China. Ingersoll-Rand employs 20 engineers to train Chinese suppliers to meet quality standards. Cisco CEO John Chambers predicted that "China will be the IT (information technology) center of the world."

(9) Chinese exports grew 35 percent in both 2003 and 2004, and will probably come close to that again in 2005. China passed Japan in 2004 to become the third largest exporter after the United States and Germany, with most of German exports within the EU, and on current course China will be the number one exporter within three years.

(10) Chinese high and medium high technology exports are growing the fastest and their share of total manufactured exports increased from 33 percent in 1995 to an estimated 52 percent in 2004, while low and medium low technology exports were down from 67 percent to 48 percent. In 2004, less than 20 percent of Chinese exports were in textiles, apparel, and footwear.

(11) The U.S. merchandise trade deficit with China increased from \$57 billion in 1998 to \$162 billion in 2004. For advanced technology products (ATP), which have the highest R&D and engineering content, the United States was in rough trade balance with China in 1998, but had a deficit of \$36 billion in 2004. The ATP deficit was \$39 billion in the information technology and communications sector, offset by small surpluses in semiconductors and commercial jet aircraft.

(12) The "export platform" issue involves Chinese exports of advanced technology products with large import content of high technology components. There are no precise figures for the extent of this relationship, and the import content varies widely by plant and industry subsector. The overall

degree of export platforming is probably relatively small and declining steadily as the share of Chinese value added increases. The very large majority of export platforming is by Taiwanese, South Korean, and Japanese companies, and very little is by American companies.

(13) The net assessment is that China, indeed, is an emerging advanced technology superstate, in terms of its domestic market size, the resource commitment to R&D, engineering, and infrastructure, the rapidly growing and highly competitive investment sector, and the spectacular export performance.

(14) One indicator for final arrival as an advanced technology superstate will be the emergence of internationally competitive Chinese firms, with brand recognition, quality product reputation, and a leading edge R&D program. A number of large Chinese firms in several sectors are approaching this stage of multinational competitiveness.

(15) China nevertheless will have to make important structural adjustments to maintain its high rate of growth in advanced technology development. Financial sector reform is most important, and significant steps are under way. A sectoral shift from export led to domestically generated growth needs to be made, which should include a greater resource commitment within China to health care, infrastructure, and environmental improvements.

(16) Political change in China is difficult to predict, but disruptive change that would undermine advanced technology industry is highly unlikely. A process of democratization within China, whatever the pace and modalities, is almost inevitable as China progresses toward being an affluent, more highly educated, information-based society, with a rapidly growing middle class and a highly productive private sector.

(17) One geopolitical consequence of the Chinese rise to advanced technology superstate status is that it is becoming the economic hegemon in East Asia. China is or will soon become the principal trading partner of all other East Asians, including Japan and South Korea. China is the largest recipient of FDI by far, and an outward flow of Chinese FDI to Southeast Asia is gathering momentum. Once the yuan becomes a convertible, market-based currency, Shanghai, Beijing, and Hong Kong will soon become the financial centers of Asia. As a result, China will have the dominant economic influence within the region, with corresponding growing policy leverage.

(18) One geostrategic consequence of the Chinese rise to advanced technology superstate status is that Chinese internally generated military modernization is moving ahead much faster. A fundamental restructuring of Chinese defense industry in 1997-1999 shifted control of defense enterprises from the military to the civilian government, and integrated their operations with commercial advanced technology enterprises, including competitive bidding for defense contracts. In effect, China shifted from the discredited Soviet model toward the U.S. model for weapons development and production.

(19) The result has been a more rapid rate of military system modernization, particularly for the navy and defense electronic systems. During the 1990s, the U.S. Department of Defense (DOD) consistently assessed the Chinese military capability as being at least 20 years behind the United States. The 2004 DOD annual assessment was that China will have uneven success in its goal of catching up with the industrialized nations within 5 to 10 years, and the 2005 assessment will likely indicate an even faster narrowing of the gap.

The U.S. Policy Response

(1) China is the most important U.S. bilateral relationship. A new relationship, resulting from China's emergence as an advanced technology superstate, centers on a deepening economic engagement of wide-ranging mutual benefit, together, up to this point, with a far less engaged set of mutual national security interests. The most important medium to longer term U.S. interest in play is

to maintain U.S. leadership in advanced technology industries, which is importantly related to relative military force capabilities.

(2) The political relationship is troubled, but likely to move in a positive direction over time through democratization within China, largely as a result of the deepening economic engagement, which can be helped through targeted U.S. diplomacy. Deepening ethnic and cultural ties between the two countries, including through study and travel, will also help. Confrontation over Taiwan should be avoided as a mutual interest, but this can become more difficult as Chinese military modernization proceeds at a faster pace.

(3) The recommendations here focus on the economic relationship, beginning with the most important immediate problem, Chinese currency manipulation. The Chinese yuan is estimated to be at least 40 percent lower than a market-based exchange rate, as a result of massive purchases of foreign currencies, over the past four years, by the Chinese central bank. Others, particularly Japan, South Korea, and Taiwan, have followed suit, which has had a substantial overall adverse impact on U.S. trade, particularly the manufacturing sector, including advanced technology industries. The U.S. trade deficit is in the order of \$150 billion larger as a result of such currency manipulation, which is in violation of IMF and WTO obligations. The United States should act vigorously against all four East Asians to cease the practice, initially through direct consultation, but making clear that the United States is prepared to pursue IMF and WTO dispute settlement procedures if necessary.

(4) Once China moves to a convertible, market-based exchange rate, which is its stated objective, the international financial system will soon take on a new structure oriented around three key currencies, the dollar, the euro, and the Chinese yuan. The IMF system will also change fundamentally, with few if any large IMF loans, the policy focus on how floating rates are managed, and possible initiatives for currency unions. The most challenging financial relationships will be within Asia and across the Pacific with the dollar. The United States and China will thus take on principal leadership responsibilities and need to structure their bilateral financial collaboration more effectively.

(5) The U.S.-China trade and investment policy relationship has bilateral, multilateral and regional dimensions. The bilateral dimension centers on implementation of Chinese WTO accession commitments and involves negotiations on a wide range of issues. Protection of intellectual property rights (IPRs) is the biggest problem area, with serious adverse impact on U.S. advanced technology industries. Other issues of particular interest to U.S. advanced technology industries which need to be addressed include investment policy, standards and technical regulations, taxation, subsidies, telecommunications services, and biotechnology regulations.

(6) The multilateral dimension currently involves the WTO Doha round, which is bogged down largely over the issue of nonreciprocity for developing countries. The United States and China could go a long way to breaking the impasse through a jointly supported formula for tariff reductions in the nonagricultural (almost all manufacturing) sector, in which China would make a fully reciprocal offer in view of its strong export competitiveness in manufactures.

(7) The regional dimension of trade policy is now focused most importantly on East Asia, in view of the China/ASEAN free trade agreement (FTA), with Japan and South Korea following in the wake. Such an East Asian preferential trading bloc would have further substantial adverse impact on the U.S. trade deficit in view of the high tariffs throughout East Asia, and would also have a negative geopolitical consequence as a high visibility Asian grouping in an adversarial position vis-à-vis the United States.

(8) The only practical way the United States can head off an East Asian preferential trading bloc, which excludes the United States, is through initiatives to create an Asia-Pacific free trade agreement, as agreed at summit level in Bogor in 1994. The centerpiece of such an agreement would be U.S.-China free trade, which although not feasible at this time, should be addressed through the

formation of a high level U.S.-China study group to examine the economic costs and benefits of free trade between the United and China within the Asia-Pacific context.

(9) In parallel, the United States should undertake or complete FTA negotiations across the Pacific with Thailand (negotiations under way), South Korea (official talks under way), and Taiwan (informal talks under way). This “three spoke” initiative, in addition to existing U.S. FTAs with Singapore and Australia, would definitively move the United States into the trans-Pacific free trade relationship, and would be incorporated as part of a proposed formal APEC review of progress toward the Bogor objective. Such trans-Pacific FTA initiatives, moreover, could well lead to a multilateral free trade agreement for the nonagricultural sector.

(10) A U.S. domestic economic policy response to the Chinese challenge to U.S. leadership in advanced technology industry is essential. In broadest terms, the U.S. manufacturing sector is the engine for technology-driven economic growth and needs to be more competitive internationally. The \$552 billion trade deficit in manufactures in 2004 was one-third the size of U.S. production, which greatly reduces the domestic revenue and employment base for continued innovation. The trade deficit needs to be greatly reduced or eliminated, which involves two principal domestic policy areas.

(11) The first macro-policy area is the need to increase domestic savings so as not to have to borrow abroad to finance investment which, in turn, drives up the trade deficit. Greater incentives for private and business savings, and the reduction or elimination of the federal budget deficit, are the policy vehicles.

(12) The second remedial policy area involves various specific policies that place cost or other disadvantages on U.S. manufacturing industries compared to major trading partners, and to China in particular. Specific proposals and conclusions are offered for tax policy, education, R&D, tort reform, health care, regulatory policies, and the Sarbanes-Oxley law.

(13) The current U.S. domestic policy response to the Chinese advanced technology challenge is disturbing and points to an increasingly difficult road ahead for American companies. To remedy this, there is a need for better public communication about the relationship between the advanced technology engine for growth phenomenon and U.S. international as well as domestic interests. What is lacking most of all is a sense of national purpose in responding to a rapidly changing world, driven most importantly by the development and application of wide-ranging new technologies on a global scale.

(14) The final conclusions extrapolate the Chinese advanced technology experience over the past 10 years into a broader historical perspective ahead. Prevailing paradigms about the post-Cold War world are found inadequate. A revised and updated new order of international relationships will center on political, economic, and military power relationships increasingly dominated by three advanced technology superstates—the United States, the EU, and China—each a regional advanced technology hegemon within the North America/Caribbean, European, and East Asian regions, respectively. The three regions together include 52 percent of global population, 79 percent of GDP, and 85 percent of merchandise exports. India may rise to advanced technology superstate status within 10-20 years, as the South Asian advanced technology hegemon. Relationships among the three advanced technology hegemonies are not yet well defined, however, and other regions of the world will face important adjustments as well.