

## CHAPTER 3

### COMPUTERS IN CHINA

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Over the past ten years, Chinese-built computers have become nearly state-of-the-art devices and very competitive with the multinationals. China's personal computer (PC) market accounted for a 37 percent share in the Asia-Pacific region (Japan excluded) by the end of 1999. Top Chinese computer companies like Legend Group, China Great Wall Computer Group, and Beijing Founder Electronics are working diligently to establish a reputation for quality service and a brand-name prominence in not only the domestic market but also the world market. China's mainframe computers lag behind its PC development, but with technology and manufacturing advances, this difference will surely decrease.

#### **HISTORY OF COMPUTERS IN CHINA**

China's computer industry started in the late 1950s. In 1958, the first Chinese-made computer (a vacuum-tube computer called the 901) was manufactured at the Institute of Military Engineering within the prestigious University of Harbin. During this time, China received foreign aid from the former Soviet Union to assist in scientific research of computer technology. In the 1960s and 1970s, several computer systems were developed by China, including the 100 and 150 series. These were installed in universities, military laboratories, and some important industrial conglomerates, primarily to address national security. China developed these computers for its own large computer systems, including a navy command system, missile launching and satellite control systems, geological data analysis systems, production systems for oil fields, and similar operations [Zhang and Wang, 1995].

In the 1980s, with the open-door policy and economic reform, China reevaluated its computer development strategy, and switched from research and development of large-scale mainframe computers to the development of personal computers (PCs). In 1985, the State Computer Industrial Administration selected a group of core technicians to form a scientific research task force. By June 1985, the task force had successfully developed a personal computer, Great Wall 0520CH, which was the first PC using Chinese character generation and display technology, capable of processing information in Chinese.

The appearance of Great Wall 0520CH gave rise to the birth of China's PC industry. Soon after, Great Wall 0520CH began batch processing and gained a significant share of the domestic market. As of 1996, many Great Wall 0520CH computers purchased by China's General Customs Administration were still operating normally, storing large quantities of vouchers [Li, 1996].

The rapid development and diffusion of information and communications technology and products around the world have provided vast growth for the Chinese PC industry. However, domestic production has been unable to satisfy the increasing demand for PCs in China. Hence, relevant government agencies have opened the door to foreign enterprises in the hope that imported foreign information products will stimulate China's domestic PC technology development and accelerate the rate of domestic PC adoption. Notable name brands, such as Acer, AST, Compaq, and IBM, have set up sales offices or joint ventures in China.

### NATIONAL DEVELOPMENT GOALS

In China's Ninth Five-Year National Development Plan (1996-2000), there were many goals devised to advance the domestic electronic information industry, including [China IT Market Report, 1997; Simon, 1996; Yang, 1997]:

- developing supercomputer systems with massive parallel processing (MPP) capability and computing speeds reaching fifty billion floating point operations per second;
- increasing the percentage of Chinese-made components in domestic computers, and the nation's capacity to produce peripherals, such as monitors, printers, floppy and hard disk drives, and printed circuit boards;
- achieving a computer penetration rate of one percent, 20 percent among urban families;
- developing two to three domestic microcomputer manufacturing enterprises with an annual production capacity of over \$1 million;
- applying computer products and techniques to the renovation of traditional industries;
- promoting industrialization of multimedia computers and supporting products, such as high-storage-capacity equipment and high-definition displays;
- developing a PC production licensing system and implementing uniform standards for standardizing the domestic microcomputer market and improving service and intellectual property protection.

These goals reflect the efforts of China's computer industry in the following four major areas. The first area is to build up domestic industrial capability of core computer technologies. China has determined that its computer industry should remain as a so-called "shell" industry, which lacks core technologies. An example involves China's zero capability of independently developing and manufacturing microprocessors, the heart of computers. The second area is to renovate and modernize the traditional industry, using computer technologies. The third includes an effort to consolidate the domestic computer industry to significantly improve its competitiveness both domestically and internationally and standardize the domestic market. The last is an effort to develop and master top computer technologies that no more than a few countries and companies in the world have so done. Typical examples of these kinds of technologies are those of super-computer technologies.

China has been applying a significant effort and has made remarkable progress in achieving its goals. In the early 1999, the National Research Center for Intelligent Computing Systems announced its success in developing a super server system capable of conducting 20 billion floating-point operations per second, which put China among the few nations in the world that is capable of developing high-performance servers [China Daily News 14 January 1999]. In early 2000, China's Great Wall Group put the first independently developed, high-performance 4.3GB and 6.8GB hard disk into the domestic market, representing the end of zero Chinese-developed hard disk in the domestic market [Great Wall Group News, 1999-2000]. By the end of 1999, there had already been an estimated 20 million PCs in operation in China, or one PC for less than 70 Chinese individuals. This indicates that China has already achieved its goal of developing a computer penetration rate of one percent set by the end of 2000. Regarding the effort in market standardization and industry consolidation, the government continuously supports the handful of players in the computer industry led by the Legend Group, initiated a strategic merger with its state-of-the-art motherboard manufacturing facility, being the fifth among the world's motherboard manufacturing giants in May 1999 [China Daily News 1 May 1999]. The number of the licenses issued by the government to PC OEMs during 1997-1999 is almost equal to the total number that had been issued before 1997. To improve the quality and competitiveness of domestically made computer products, the government is making a significant effort to enhance its licensing systems. In April 2000, two types of the Great Wall computers obtained the first electromagnetic compatibility (EMC) certificate issued by the Chinese government for PCs [Great Wall Group News 11 April 2000].

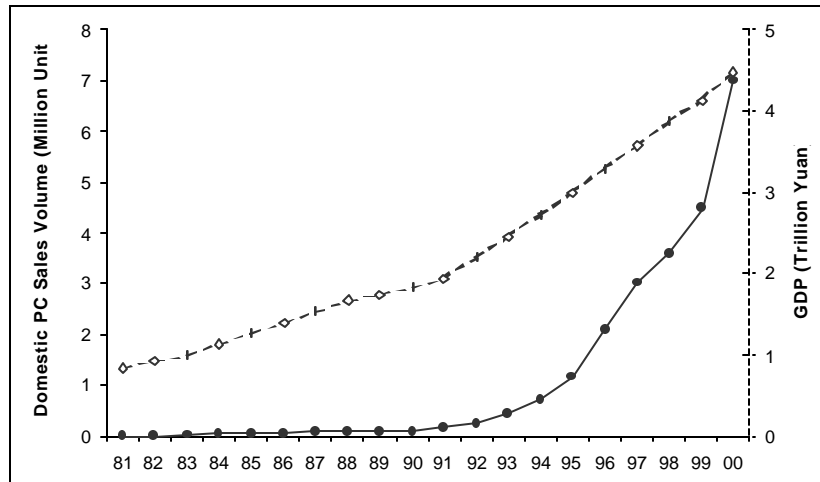
As the Ninth Five-Year period ends, China's Tenth Five-Year National Development Plan (2001-2005) will begin shortly. Since the agreement between China and the United States on China's accession to the World Trade Organization (WTO) was signed on November 15, 1999, China has accelerated its preparation process for its accession to the WTO. As the four areas mentioned earlier remain or become even more critical issues for China after its accession to the WTO, the ongoing effort in these areas is considered to still be the core of the Tenth Five-Year Plan on computer and other electronics developments [Xinhua News Agency 27 April 2000].

**CHINA'S COMPUTER MARKET**

The growth and use of PCs in China's midsize and small businesses, and the acceptance and need for graphical user environments, such as Windows and related applications, are the two specific factors contributing to the boom in the Asian PCs market [Forbes, 1997]. Since 1998, China's enterprise reform has been a driving force behind the big demand for computers. The Chinese computer market sold 2.1 million PCs in 1996 with a total value of \$3 billion (24.6 billion yuan), an increase of 47 percent since 1995 [China IT Market Report 1997]. In 1997, Chinese consumers bought 3 million personal computers, an increase of 40 percent over the previous year. The monetary value of 1997 PC sales was \$3.6 billion, up 17 percent from 1996, according to the data released by China's Ministry of Electronics Industry (MEI). In 1998 and 1999, although remaining healthy and robust, China's domestic market grew slower than what had been expected, due to the effect of the financial crisis in the Asia-Pacific region and weak domestic demand. In 1999, PC sales in China reached 4.5 million units with a total value of \$7.2 billion (60 billion yuan). It is estimated that it will grow at a faster pace to more than 7 million units sold in 2000 [Legend Internal Report, May 2000].

The increase of PC sales volume compared to the growth of China's gross domestic product (GDP) in the 1980s and 1990s are shown in Figure 1. Since 1991, the growth rate of domestic PC sales has far exceeded the GDP growth rate. Compared to the rapid growth rate of annual PC sales, the slower rate of increase in monetary value was due, at least in part, to the fact that there was intense competition among local vendors. This led to price cuts that averaged 15 percent for companies such as Legend and Founder. These price cuts caused prices that were almost 60 percent less than those of foreign competitors for similar products [China Telecommunications Weekly 3 March 1997]. In 1997 alone, Legend lowered its PC prices four times at an average of 15 percent each time [Lim and Trinh, 1998]. In 1999, responding to weak domestic needs, the war of price-cutting to promote sales among domestic PC vendors substantially escalated. Great Wall lowered the price of its Pentium II 400MHz computers three times in 1999 and the price of its Pentium III 500MHz computer just at the beginning of 2000 [Great Wall Group News 1999-2000]. In the list of the 1999 top 100 domestic electronic enterprises released by the Chinese government, Legend was ranked first in sales, but only tenth in terms of profit [China Daily News 3 April 1999].

**Figure 3-1. PC Sales Volume and Growth of GDP in China, 1983-2000**



Sources: China IT Market Report, 1997 (1992-1996); *EE Times*, January 19, 1998 (1997); *Semiconductor Business News*, June 25, 1997; and China Daily Market News, 1998-1999 (2000 \*forecast) for the PC sales volume. Zhang and Wang 1995, SCMP China Outlook, 2000 for China's GDP growth.

### Market Profile

Asia's recovering economy powered a distribution surge in the global PC market in 1999, and the Massachusetts-based International Data Co. (IDC) described the Asia-Pacific region as "the high-growth engine among the world's personal computer markets." China has already become the largest PC market in the region (Japan excluded) with a 37 percent share in 1999 compared to 26 percent in 1997 [China Daily News 1 December 1999]. In 1997, the number of 3 million personal computers that were sold in the domestic market made China the world's sixth largest PC market, following the United States, Japan, Germany, Britain, and France. China's PC market most likely surpasses Germany's to become the world's third largest computer producer, competing with Japan for second place in 2000, according to Liu, the chairman and CEO of the Legend Group.

The top five companies in the Asia-Pacific's PC market in 1996 were Legend, IBM, Compaq, AST, and HP [China IT Market Report, 1997], among which Legend, IBM, and Compaq remain the top three and close rivals in the region's PC market. In the first quarter of 1999, Legend led the market share of 8.5 percent in the Asia-Pacific region (Japan excluded), according to IDC, with IBM's 7.8 percent and Compaq's 7.4 percent. However, by the end of 1999, IBM reclaimed the market's top spot with a 8.4 percent market share followed by Compaq with 7.3 percent and Legend with 7.1 percent [IDC Market News 15 February 2000].

By the end of 1999, Legend remained the most popular brand in China, leading the domestic market share at around 20 percent compared to 10 percent or more in 1996-1997 [Wallace, 1998; China Daily News 1 December 1999]. Legend has been the top PC seller in China since 1996. Domestic vendors, led by Legend, whose PC sales surged to over 79 percent in 1999 [IDC Market News 15 February 2000], remain the dominant share of China's PC market. One of the negligible reasons is the strong presence of large domestic companies, such as Legend, Tontru, Great Wall, and Founder among government consumers, which, for example, accounted for about 85 percent of the total PC market in 1997 [China Daily News 4 February 1998]. Sales of PCs by Chinese companies accounted for over 60 percent of the total domestic market. Some statistical data for previous years are provided in Tables 3-1 and 3-2.

**Table 3-1: Personal Computer Market in China (US\$ million)**

	1996	1997	1998
Imported market	87	157	221
Local production	4,218	5,761	8,114
Exports	439	502	707
Total domestic market	3,866	5,416	7,628
Imports from U.S.	32	63	88

Notes: 1) Exchange rate: US \$1.00 = RMB 8.27

2) Total market equals imports plus local production minus exports

3) Source: Personal Computers and Peripherals, Lim and Trinh, 1998

**Table 3-2: Personal Computer Sales in China by Brands (Unit sales: millions)**

	1996	1997	1998
Foreign brands excluding U.S.	0.14	0.21	0.26
U.S. brands	0.65	0.77	0.95
Chinese brands	1.32	2.05	2.79
Total	2.11	3.03	4.00

Source: Personal Computers and Peripherals, Lim and Trinh, 1998

### **Business Computers in China**

Computers bought by businesses still dominate China's computer market. Major customers include government, academic institutions, industry, grade schools, organizations, service enterprises, and the military. As mentioned earlier, in 1997, government purchases of PCs, which include those for government entities as well as for all state-owned enterprises and business, including education, accounted for about 85 percent of the domestic PC sales. Although rising incomes and purchase power in China, especially for the urban residents, are gradually bringing the market share of home computer purchases moving upwards in the domestic market, the dominance of computer purchases for business use has not changed significantly since then. The government purchase of PCs in 1999, for example, remained at approximately the same level as the market share was in 1997 [Lim and Trinh, 1998].

Computers for business use and those for home use are not clearly differentiated in China's computer market data. However, considering the income level of the average person in China, computer vendors generally target those classified as high-performance, high-price computers for business use and economic types, sometimes having convenient network connections and multimedia functions for home use. China's business computer market is expected to remain at a fast growth with the government's continuous effort in promoting industry renovation and education enhancement. For example, China's State Education Commission (SEC) has decided to equip its 800,000 primary and secondary schools with PCs at an annual rate of one percent. This raises a demand of about 200,000 more computers from the domestic markets each year [Lim and Trinh, 1998].

The series of government-directed projects on the construction of computer- and communication-network infrastructure is another significant contributor to the rapid expansion of China's business-computer market as well as the home PC market in recent years. The so-called "Golden Projects" are at the core of the efforts. The Golden Projects include the "Golden Bridge" (a national information network), the "Golden Card" (a nationwide banking network system linking China's banks), the "Golden Customs" (a communication network connecting foreign trade companies with China's Customs Bureau), and the "Golden Tax" (a computerized tax system). In addition, newly established information systems in government agencies have contributed to an increase in computer sales. China is planning to develop its own "Intelligent Card Program" for personal identification and registration. Computers are also being used as management tools in large projects, including air traffic control and road transportation and construction project management.

### **Home Computers in China**

Enhanced capabilities, declining prices, and market focus on PCs, combined with rising incomes in China, have made computers attractive to home users. Almost non-existent before 1992, the number of PCs sold for home use was about 340,000 in 1996 and about 540,000 in 1997, which accounted for 15 percent to 18 percent of the total domestic PC market at the time [China IT Market Report, 1997]. In early 1998, the home PC market share in China went to a peak, approaching 30 percent of the total PC sales. Since then, especially entering 1999, China started to feel some effect of the financial crisis that occurred in the Asia-Pacific region, so the growth of China's entire computer market slowed down. In addition, with the government's ongoing effort in the reform of China's state-owned enterprises (SOEs), millions of workers were declared redundant and were laid off. In 1997 alone, an estimated 13.7 million workers, including those subject to forceful

retirement, lost their jobs, adding to an already-worrisome nationwide unemployment problem. The loss of income triggered a market depression with weak domestic needs, including those computers destined for home use. With the slowing growth of the domestic computer market, the market share of home PC sales was estimated around 20 percent in 1999 [Lim and Trinh, 1998].

Typical PC buyers in China are urban residents with incomes higher than the average in China. An investigation of China's Ministry of Electronic Industry (MEI) indicated that over 60 percent of all home PC owners had purchased their computers in the past two years [Carroll 1998b], and one out of ten urban families had put computers on their list of household essentials, along with color TVs, refrigerators, and washing machines [Lim and Trinh, 1998]. The New Century Group estimates that more than half of the PCs purchased by home users are bought primarily for children's education, approximately a third for entertainment, and a small portion for work at home. Although home purchases of computers generally represent a much larger investment for Chinese families than it is for the average families in more developed countries, the typical PCs purchased for home use in China are comparable in performance and functionality to those purchased in developed countries.

Brand-named PCs are replacing the low-priced, no-name domestic brands and store-assembled or clone PCs that were so popular for Chinese home PC consumers several years ago, indicating that the price of PCs is no longer the number-one factor influencing consumers' purchasing decisions [Home PC Market in China 1999]. The share of domestic name brands like Legend, Great Wall, Tontru, and Founder continuously increases, while the share of foreign name brands is declining.

China's cultural emphasis on education as a means to social betterment, the one-child norm, the prestige of home computer ownership, and rising personal incomes are expected to continue, driving home PC purchases to an annual growth rate of no less than 30 percent for several years. Despite this trend, a lack of quality software in Chinese language, as well as the cost and lack of consumer knowledge, still inhibit demand. Vendors are being pressed to reduce prices, improve software, and enhance support services, especially in remote areas. Influenced by these and other factors, the Chinese computer market has begun to place more emphasis on the value of software and services, as well as on hardware development and manufacturing.

### **Notebook Computers**

There is much enthusiasm in the notebook or laptop computer market among a number of computer manufacturers in China. Firms with products in this market include Toshiba, MAX, IBM, Lunfei, AST, Compaq, Acer, NEC, Hewlett-Packard, Dell, DEC, Fujitsu, several Korean firms, and the domestic PC manufacturers: Legend, Great Wall, Founder, and Tontru.

The high price of notebook computers is a significant inhibiting factor [Roberts and Burbank, 1998]. Costs, however, are falling. The reduction in LCD monitor costs worldwide has helped to make notebook computers more cost competitive. Nonetheless, sales of notebook computers in China remain fairly slow. Users are still comparing prices and features with their desktop counterparts. About 220,000 notebook computers were sold in China in 1997—only about 6 percent of the sales of desktop computers, compared to about 40 percent of desktop sales in most developed countries [Li, 1998]. The notebook computer market in China grew more than 50 percent in 1998 to about 350,000 units sold [Lim and Trinh, 1998]. Taking into account China's gloomy market situation in 1999, the sales of notebook computers in China should have been lower than 10 percent of the desktop sales in 1999, remaining a relatively low percentage of China's computer market.

Overall, China still lacks the capability of independently developing notebook computers. Unlike the desktop market, where domestic brand names are dominant, the notebook computer market rarely sees domestic products. Since China does not allow foreign companies to engage directly in trade with China, aside from marketing goods manufactured in China, foreign computer companies have formed many joint ventures with local partners, such as Toshiba's with Legend, IBM's with Great Wall, and Compaq's with Founder, to provide notebook computers for China's market. China also hopes to obtain the notebook computer technologies and manufacturing know-how through joint ventures. Domestic companies have been working diligently to get their own notebook-computer design and manufacturing capability up to par, since notebook computers were first introduced to China's market in around 1996. Great Wall, for example, announced its

acquisition of capability in developing high-resolution 21" and 29" TFT LCD flat panel displays in December 1999 [Great Wall Group News 28 December 1999].

## **MAJOR DOMESTIC COMPUTER MANUFACTURERS**

China can be roughly divided into five different regions, centering around five major cities: the South (Guangzhou), the East (Shanghai), the North (Beijing), the Northeast (Shenyang), and Central China (Chengdu). China's major domestic PC manufacturers are the Legend Group, the Great Wall Group, the Tontru Group, the Founder Group, and the Stone Group, which subdivisions cover almost all areas in China.

### **Legend Group**

The Legend Group was established in 1984 by eleven researchers from the Institute of Computing Technology, a branch of the Chinese Academy of Science [Zhang and Wang, 1995]. By the end of 1999, Legend had set up local headquarters in Beijing, Shanghai, Shenzhen in Guangdong Province, Shenyang in Liaoning Province, Xi'an in Shanxi Province, and Chengdu in Sichuan Province; there are over a hundred branches with over 8,000 employees covering China with twenty-one branches overseas [Legend Internal Report, May 2000].

Legend's major business areas include computers, system integration, network infrastructure, and software design. Computers, including desktop PCs, notebooks, handheld computers, printers, and other computer peripherals are the major products of Legend. In recent years, with the rapidly growing market of wireless communication systems in China, Legend has begun to expand its business into telecommunication areas, such as cellular telephone manufacture as well as communication network construction. Legend has consistently formed partnerships or joint ventures with foreign companies to acquire advanced technologies. Major companies having partnerships with Legend are Intel for manufacture of microprocessors, IBM in system integration, HP in the design and manufacture of computers and printers, Toshiba for the manufacture of notebook computers, Sun Microsystems in the development of server systems, Motorola in cellular phone manufacture, and Siemens in PC production.

Legend has been China's leading domestic information technology vendor since 1996. The company started its PC manufacture with 2,000 units in 1990. Eight years later, it shipped out 790,000 PCs, and boosted the number to about 1.3 million in 1999 for the domestic market, with the share doubled to more than 20 percent in 1999 from about 10 percent in 1997 (see Figure 3-2). For reaching the goal to become one of the world's top-10 PC makers in 2000, Legend already had the capacity of producing 1.5 million units annually and this capacity will reach 3 million in 2000 [China Daily News 1 June 1999]. Legend's total worldwide sales were \$2.12 billion in 1998. In the 1999, among the top-100 electronics firms, unveiled by China's Ministry of Information Industry (MII), Legend, which ranked the second in 1998, took the lead in 1999, surpassing Changhong, China's dominant TV supplier. Legend's ambitious goal is to achieve \$10 billion in sales by 2004, the 20<sup>th</sup> anniversary of its founding, five time more than 1998's figure, according to Liu, the group's president [China Daily News 28 September 1999].

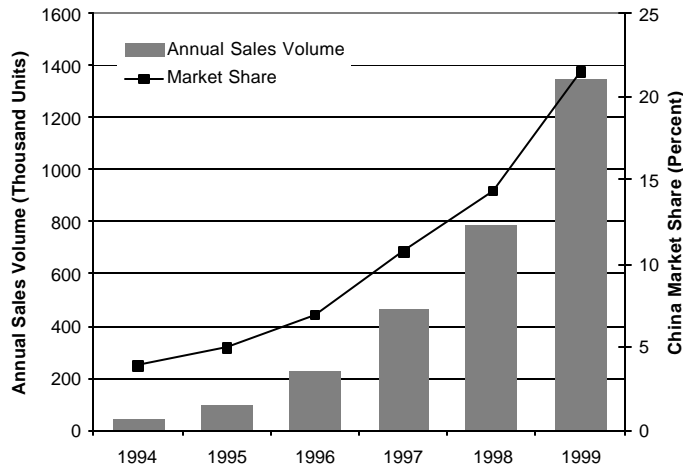
In recent years, Legend has significantly strengthened its research teams and expanded its research facilities to accelerate the process of acquiring cutting-edge computer technology. In 1993, Legend became the first Chinese PC maker to open a design center in California's Silicon Valley [Dexter and Einhorn, 1997]. In 1998, Legend established the Legend Central Institute in association with the Institute of Computing Technology of the Chinese Academy of Science for research on computer technologies. This auspicious institute is so far the largest company-owned institute focusing on production technology in China [Legend Group News, 1998].

In component manufacturing, Legend has become an important supplier of PC motherboards worldwide. It exported motherboards to over forty countries, and its motherboard sales put the company in fifth place in the world in this market. To sharpen its competitive edge in the international market, in May 1999, Legend initiated a series of what it called strategic mergers, including the one with its state-of-the-art motherboard manufacturing facility, Quantum Design International Co. (QDI) [China Daily News 1 May 1999].

### The China Great Wall Group

The Great Wall Group is a large state-owned enterprise with several significant subdivisions and joint ventures with IBM. One is the International Information Product Company, Ltd. (IIPC), founded in February 1994; another is GKI Electronic Product Company, Ltd., in operation since September 1995 [Dexter, 1996]. In addition, Great Wall signed a license deal with Intel in May 1996 to manufacture Pentium motherboards. Great Wall was also the first company in China to create a server series based on Intel's Pentium Pro processor.

**Figure 3-2. Personal Computer Annual Sales of Legend Group Since 1994.**



**Note:** The ranking of Legend Group, according to market share, was the third in China for 1994 and 1995, and has become the first since 1996. Source: Legend Internal Report, May 2000.

IIPC is one of IBM's six major PC production bases worldwide. It has five production lines, three offering IBM PCs labeled "Made in China," and two producing the Gold Great Wall series of PCs for domestic consumption [Li, 1996]. The number of IIPC PCs under the brand names of Gold Great Wall and IBM reached 100,000 in 1995. The second joint venture, GKI, was established, based on the cooperative experience on IIPC. GKI was equipped with the world's most advanced overall plane welding technology. The enterprise has an annual production capacity of two million boards [Li, 1996]. GKI thus became one of IBM PCs' major OEM suppliers.

The Great Wall Group is not only producing IBM brand name products, but is also developing its own brands. In 1995, Great Wall was able to develop large-scale production of computers and a sales alliance for the sale of monitors, terminals, disks, software drivers, video disk drivers, power disconnect switches, envelopes, and board cards [Li, 1996]. In 1997, Great Wall introduced an ultra-thin laptop computer configured with a Pentium 100 and a multimedia notebook PC, both in the low \$3,000 price range [China Telecommunications Weekly 24 March 1997]. In addition to producing parts and components for Great Wall PCs, the Great Wall Group also supplies domestic markets with monitors, software drivers, and battery backup systems and has become one of China's largest original equipment manufacturers (OEM) for do-it-yourself computers.

### Tontru Information Industrial Group

The Nanjing-based Tontru Information Industrial Group is part of the key Information Industrial Group for China's Ministry of Electronics Industry. Manufacturing and marketing PC-related products, the Tontru Group, by the end of 1996, had a full-line of PC series available on the market — a business PC (Tongshi series), a home PC (Tongle series), an education PC (Tongxue series), a PC server (Tongfei series) and a portable PC (Tonguin series). Tontru has also produced Intel-based MMX PCs, and as of 1998, Tontru had



six production lines in Guangdong province and Nanjing that manufacture Pentium-type PCs, most using Intel chips, including the MMX chip, but some have 5X86 Cyrix chips. Tontru has twenty-eight offices and authorized maintenance centers throughout China. Half of its sales are in China's north and eastern regions [China Computer Trends 3 March 1997].

In 1997, Tontru had become the second largest PC vendor in China, behind Legend, with a selling capacity of more than 200,000 sets in domestic markets. Intel is Tontru's most important partner in China. In addition, the Tontru Group has developed close cooperation with Digital, Sunsoft, Samsung, LG, Leo, and Daewoo. The group has established six joint ventures and twelve branches and undertakes production of monitors, keyboards, cards, power supplies, and cases.

### **Others**

The Founder Electronics Group, which is controlled by Beijing University, recruits top graduates for its three hundred-person research institute, which expects to add a hundred new employees annually during the nation's Ninth Five-Year Plan. As a leader in Chinese software, the Founder Group diversified into PCs in late 1995. In 1993, however, Founder was not among the top twenty PC vendors, but it zoomed to an eighth place ranking in 1997. An estimated 100,000 units of PCs were expected to be produced in 1997 [Dexter and Einhorn, 1997].

The Stone Group was established in the mid-1980s. It has ongoing cooperative relationships with Compaq and the Mitsubishi Corporation of Japan. In 1996, the Stone Group was classified by *Business Week* as one of China's PC champions [Dexter and Einhorn, 1997].

### **MAJOR FOREIGN COMPETITORS**

China's PC market will remain competitive and challenging for both foreign and domestic producers. In 1998, major foreign computer manufacturers operating in China included IBM, AST, Compaq, Hewlett Packard, Dell, Gateway 2000, Apple, Sun Microsystems, Texas Instruments, and Packard Bell of the United States; NEC, Fujitsu, Hitachi, Casio, Oki, and Toshiba of Japan; Samsung of Korea. In June of 1999, Siemens, the number-one PC seller in Germany and one of the top ten distributors worldwide, also entered the Chinese market, joining hands with Legend [China Daily News 1 June 1999]. Figures 3 and 4 show the top ten PC vendors in China and the Asia-Pacific region, according to their market share. In China's market, foreign brands lag far behind domestic brands, which are led by Legend. IBM, Compaq, and HP are the top three foreign computer vendors in both China and the Asia-Pacific region.

IBM's business in China dates back to 1934, when the company first installed a bookkeeping machine for the Peking Union Hospital. IBM resumed its business in China in 1979 after the introduction of economic reform by the Chinese government. In 1992, it set up a wholly owned subsidiary in Beijing, IBM China, to manage and coordinate all of IBM's marketing and production activities in China. IBM has set up seven joint venture companies in China since 1994. There are three manufacturing joint ventures: IIPC in Beijing makes IBM and Great Wall brand PCs; Tianjin Advanced Information Products Corporation in Tianjin manufactures banking peripherals and point-of-sale terminals; and GKI Electronics in Shenzhen makes electronics cards and boards.

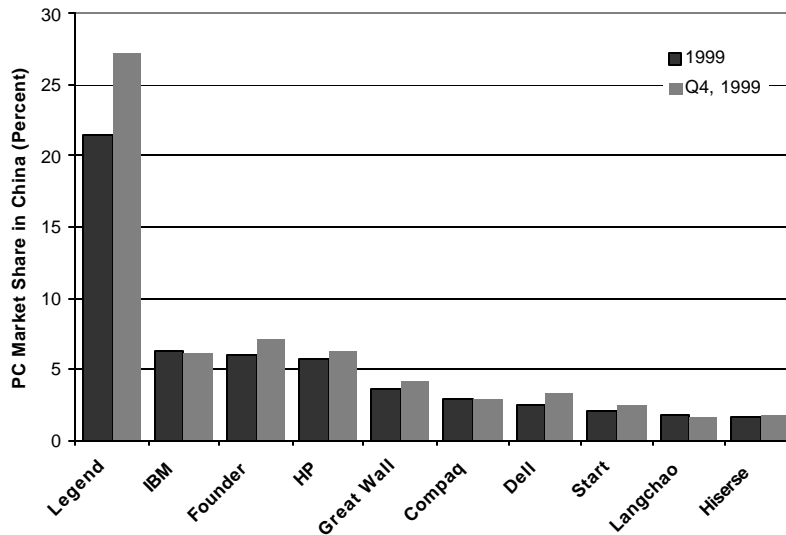
Compaq, one of the fastest growing PC suppliers in China, delivered 80,000 PCs to the Chinese market in 1993. Compaq was one of the leading PC vendors in 1996 with 7 percent of market share [China IT Market Report, 1997]. AST is a major collaborator with the Legend Group, and in 1993, it sold 140,000 desktop PCs in China, a market share of 30 percent. However, it only sold 145,000 PCs in 1996, which accounted for a market share of only 6.9 percent [China IT Market Report, 1997]. AST entered the Chinese market in 1985 and set up a factory in the city of Tianjin that reportedly produces more than 100,000 PCs annually [Zhang and Wang, 1995]. AST became the number-one PC supplier in 1995, but due to severe competition from both domestic OEM PC makers and foreign entries equipped with abundant resources and marketing skills, AST's significance in China's PC market has been reduced.

One of the fastest growing foreign computer companies in recent years is the U.S. giant Hewlett-Packard (HP) Corporation, which has started to challenge the position of Compaq and even IBM in both China and the Asia-Pacific region. In 1999, HP was already ranked the fourth biggest PC vendors in China, based on market share, following Legend, IBM, and Founder. HP even proceeded to third place, surpassing IBM in the fourth quarter of 1999 (see Figure 3-3). According to a senior company official, HP expected its China PC revenues to grow 30 percent, which is expected to be approximately five percent faster than the overall PC market in China, spurred by the prospect of China's WTO entry and an Internet boom [Reuters Finance News, March 2000]. HP's China revenues exceeded \$1 billion in 1999 with more than a quarter coming from PCs, including commercial and consumer desktops, servers, and notebooks, as well as other contributors including printers, mini or hand-held computers, software, and consultation services [Reuters Finance News, March 2000].

### PC DISTRIBUTION CHANNELS IN CHINA

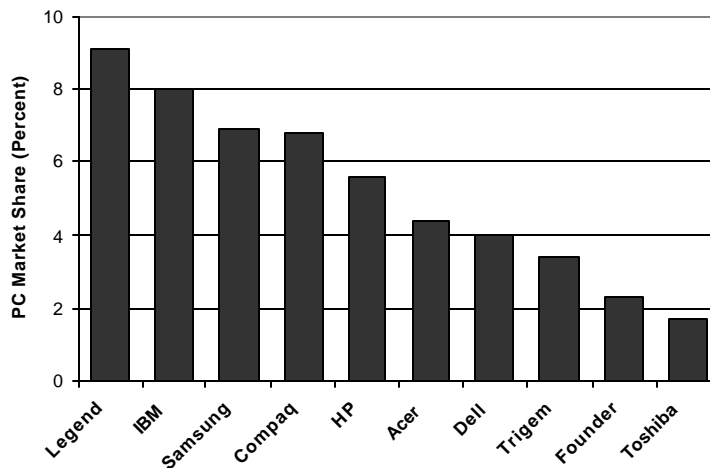
China was affected little by the Asian financial crisis in early 1998. However, especially entering 1999, China's computer industry suffered from the gloomy domestic economic situation and witnessed a dramatic drop in sales growth [China Daily News 1 March 1999]. Nevertheless, China is still a designated fast-growing area and stands as one of the few growth markets in the Asia-Pacific region for PCs. The main beneficiaries of the growth in the PC market are the domestically produced models, favored by local distributors, rather than foreign manufacturers [Carroll 1998b]. Local computer makers, particularly Legend, which has doubled its domestic share from about one tenth to more than one fifth of China's PC market in the recent three years, by 2000, have retained the lead in market share, while U.S. and other foreign OEMs in the region, such as Compaq and IBM, have seen their presence slide or remain stable at best.

**Figure 3-3. Top 10 vendors and their PC market share in China for the fourth quarter and the whole year of 1999.**



**Note:** The total sales volume of personal computers in China's market for 1999 was about 4.94 million units with 1.35 million units sold in the fourth quarter. Source: Legend Internal Report, May 2000.

**Figure 3-4. Top 10 vendors and their PC market share in the Asia-Pacific Region, excluding Japan, for the fourth quarter of 1999.**



**Note:** The total sales volume of personal computers in the region for the period was about 4.06 million units. Source: Legend Internal Report, May 2000.

The critical issue is the implementation of a successful distribution channel strategy, especially in a place lacking well-established existing channels and trade transparency. As a result, foreign entries still rely on local distributors and dealers to sell their products, even if they have to set up their own representative offices locally. Establishing joint ventures or strategic alliances with local manufacturers or even competitors is one way to distribute products successfully in China. For example, Legend manufactures its own PCs and is also the largest distributor for AST. The Stone Computer Group produces its own brand-name PCs and also represents Compaq in China.

Personal connections are absolutely critical in all walks of life in China, particularly in business. Because of cultural reasons and an age-encrusted legal system, the Chinese prefer to deal with people with whom they have personal relationships. Thus, it is extraordinarily important for foreign companies to establish and maintain a close relationship with their Chinese counterparts in government and in the private sector.

The three basic avenues in which computer systems are being purchased in China are face-to-face meetings or discussions, customer walk-ins, and fax/telephone communications. The fax/tel method is not popular in China because customers and the communications infrastructure are generally less technologically sophisticated, while credit card ownership and acceptance is still uncommon. Understanding this kind of atmosphere, large domestic companies, such as Legend, the Great Wall, and Tontru have been expanding into the Internet. The China Great Wall Group, for example, unveiled an ambitious plan in September of 1999 to attract more Chinese people to the Internet and greatly promote online shopping. They will now provide a 5,900-yuan (about \$710) package, including a Great Wall 499 computer with a built-in 56k modem, three-year free Internet service, and 365-yuan (about \$44) worth of virtual cash for shopping on the Web.

The importance of channel partners is critical to doing business in a foreign country. Strong capability of providing local services and support is essential. Since the buying cycle tends to be lengthy in China, a sound financial background and the ability to finance purchases is also important. Overall, China's computer

channel infrastructure is different from those used in industrialized nations. Face-to-face selling and buying methods continue to be the most comfortable and common method for many Chinese buyers.

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