

GLOBAL PERSPECTIVE

China's Telecom Market: Change and Competition

Alexandra Rehak and John Wang

Ms. Alexandra Rehak is a senior associate at Pyramid Research, Inc., covering telecommunications developments in the Asia-Pacific Region. Prior to working at Pyramid Research, Ms. Rehak served as assistant editor of *TeleGeography*, an international telecommunications yearbook, and as a consultant to Link Resources, a telecommunications market research firm. She received her M.A. in International Economics and Asian Studies from the Johns Hopkins School of Advanced International Studies, and holds a B.S. from Brown University. She has also studied at the Harbin Institute of Technology in the People's Republic of China. Ms. Rehak has spoken on telecommunications developments in the Asia-Pacific region at a number of international conferences. She has been quoted as an authority on telecommunications in China by the *Asian Wall Street Journal*, and is a contributor to the journal *Telecom Asia*.

Mr. John Wang is an associate at Pyramid Research, Inc., covering telecommunications developments in the Asia-Pacific region. Prior to joining Pyramid, he served as legal assistant for Jardine Matheson in Hong Kong and research analyst for the United Nations in Vienna. He received his M.A. in International Law and Business Relations from the Fletcher School of Law and Diplomacy, and holds a B.A. in International Relations from Tufts University. He also studied politics, philosophy, and economics at St. Catherine's College, Oxford. Mr. Wang is fluent in Chinese. Mr. Wang has been published in *Telecom Asia* and has represented Pyramid in a number of events sponsored by the Telecommunications Industry Association.

China's telecommunications market has undergone significant changes over the past two years. Growth in the public and mobile networks has continued at a rate unprecedented anywhere else in the world, fueled by a tremendous increase in competition. Suppliers stopped at nothing to establish a foothold in the Chinese market, slashing prices and agreeing to technology transfers on a scale that would not even be considered in most markets. Foreign operators signed countless Memoranda of Understanding (MOUs) agreeing to invest in network development, with no guarantee of returns or legal protection. In addition, China saw a major increase in domestic competition. On the operating side, the licensing of another operator, China Unicom, and the tremendous growth of new paging and value-added services operators marked a significant change in market conditions. On the vendor side, Chinese-designed telecommunications equipment finally found a significant niche in the market. Initiatives are now underway to further develop Chinese equipment to compete with foreign suppliers.

Unprecedented Service Competition Spurs Growth

The major player in China's telecommunications market is still the Ministry of Posts and Telecommunications (MPT), the former monopoly services provider. MPT income from telecommunications services more than doubled over the 1992-1994 period, from \$2.67 billion (RMB 22.18 billion) to \$6.76 billion (RMB 56.1 billion). Fixed asset investment in posts and telecommunications grew from \$1.65 billion (RMB 13.7 billion) to \$8.35 billion (RMB 69.3 billion) over the same period. Originally, the MPT itself was completely responsible for both regulation and operation of networks; however, a new division, the Directorate General of Telecommunications (DGT), was split off last year to handle telecom network operation and maintenance. The division of responsibilities between the two entities is still being worked out, and, at present, many aspects of network operation are still under the direct control of the MPT.

The MPT has had to reconsider its development strategy in the face of expected competition from Unicom, which gained the right in 1994 to compete with the MPT in all areas of telecommunications

operations. Unicom has the backing of three powerful ministries within the Chinese central government—the Ministry of Railways (MOR), the Ministry of Electronic Industries (MEI), and the Ministry of Electric Power (MEP)—as well as 13 other important Chinese investors. The operator came into existence thanks to tremendous political pressure exerted by these three Ministries:

- The MOR and MEP both operate extensive private networks and wanted to use their excess communications capacity to offer public network services.
- The MEI, which is primarily involved in the manufacture of telecommunications equipment, was a natural partner for an operating venture.

Unicom’s total initial capitalization stands at \$154 million (RMB 1.34 billion). As of mid-1995, Unicom has invested an estimated \$82 million (RMB 700 million) in network installation.

Unicom has extensive plans to install a nationwide trunk network, based on the private networks of its investors. However, the operator is initially focusing on cellular networks, and has been a driving force behind the spread of the digital Global System for Mobile (GSM) Communications cellular standard in China. Revenues from Unicom’s cellular networks—which now number 16 and are expected to double this year—will then be funneled back into fixed network development.

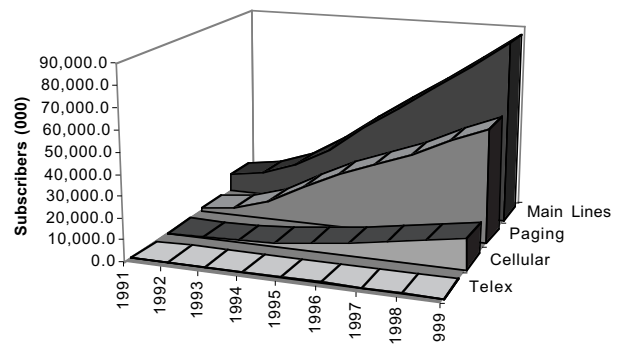
The MPT now faces additional competition in a wide variety of secondary telecommunications services. In late 1993, nine “value-added” service segments, including radio paging, 450 MHz and 800 MHz mobile radio services, and VSAT network operation, were officially opened to non-MPT operators. The market opening directive merely formalized what was already taking place: Hundreds of non-MPT paging operators had been selling pagers to the public through back channels. There are now over 1,700 licensed non-MPT paging operators in China, a factor which has certainly contributed to the boom in subscribership; China had a total of 17.66 million paging subscribers at the end of 1994, and over 26 million at the end of 1995. While the boom in other liberalized services has not been as significant, it marks a move toward opening the market.

Network Expansion Plans Drive Massive Market Growth

The scale of China’s plans for telecoms network development is unprecedented anywhere else in the world. Figure 1 shows historical and projected growth in telecom services subscribership over the 1991-1999 period. The MPT has stated that it plans to add 12 million to 14 million new lines of switching capacity annually during the Ninth Five-Year Plan period (1996-2000), effectively, in one oft-mentioned comparison, the equivalent of the entire network capacity of a regional Bell operating company in the United States. Public network switching capacity is to reach 114 million lines, although some MPT sources have mentioned targets as high as 140 million lines of capacity, including all toll and PBX exchange lines. Teledensity is planned to reach 8% nationwide, and 30% to 40% in urban areas. The MPT expects to have nine million mobile phone subscribers by 2000, but given current demand and growth rates, this target is likely to be surpassed well before 2000—even without counting Unicom cellular subscribers. Data networks are also spreading so quickly, thanks to the efforts of local and provincial telecom authorities, that targets for these are likely to be surpassed as well.

Unicom also has a set of extremely ambitious network development plans, although it is far from clear that these will be fulfilled in the planned timeframe. Unicom is expected to become a significant purchaser of public network transmission equipment from 1996 on, with sales picking up significantly

Figure 1
China: Telecom Services Growth, 1991-1999
(Subscribers in 000s)



Note: Includes non-MPT public operators

Source: China MPT, Pyramid Research estimates

after 1997 as the carrier builds-out its national long distance network. Unicom trunk switching purchases will also pick up during this time period. By the year 2000, Unicom aims to have 2.4 million to three million mobile subscribers (roughly 30% of the MPT's expected national total), to provide 10% of national long distance services, and to raise China's telephone penetration rate by one percentage point. Unicom plans to provide approximately 300,000 users with fixed line telephone service in more than 10 major cities. By the year 2000, Unicom hopes to generate \$1.8 billion in assets and \$600 million in revenues.

One area of China's public network equipment development which has yet to see significant growth is rural networks. China's rural population of 800 million has been seriously under-served, with funds for rural network development taking the back seat to flashier projects such as trial ISDN networks and digital cellular operations. Rural lines nearly doubled during the Eighth Five-Year Plan period, but still accounted for less than 26% of all switching capacity in China at the end of 1994. The MPT leaves most rural network planning to local and provincial authorities. Rural areas are generally strapped for cash, and rural Post & Telecommunications Bureaus (PTBs) have a reputation for accumulating bad debt, making them less-than-popular customers. Rural networks will continue to grow far more slowly than urban networks, but will gain more MPT attention during the Ninth Five-Year Plan period.

Cutting Edge Technologies, Advanced Applications

China has become the world's largest testing ground for some of the newest technologies in telecommunications. Following the lifting of COCOM (Coordinating Committee for Multilateral Export Controls) restrictions on the export of advanced Synchronous Digital Hierarchy (SDH) transmission equipment to China in 1994, China's MPT has become a major customer for SDH fiber optic transmission systems. Under the Ninth Five-Year plan, the primary carrier plans to install 30,000 km of SDH fiber optic trunk lines; this figure does not include provincial and local level transmission networks, many of which will also utilize SDH. AT&T has emerged as the primary supplier of SDH equipment in China, closely followed by Northern Telecom and a bevy of European and Japanese suppliers. China has also become one of the first countries in the world to install long-haul SDH

digital microwave radio equipment. The first national SDH microwave trunk will be an 800-km link constructed between Wuhan, Nanchang, and Fuzhou.

The GSM digital cellular standard is another technology which made a late appearance in China but has rapidly become accepted nationwide. China's cellular subscribership has been more than doubling annually since the first networks were cut over in the 1980s, but virtually all networks utilized the MPT-approved TACS analog standard, and the need for more frequency-efficient digital cellular networks was clear. The GSM digital standard, which is used throughout the rest of Asia, was introduced by the Guangdong Provincial Post & Telecommunications Administration (PTA) in 1994, without having been approved by the MPT. GSM has since become the de facto national cellular standard, with GSM networks being installed by dozens of PTAs as well as by second operator Unicom.

The local loop also presents important opportunities for new technologies, given the number of subscriber lines the MPT plans to install under the Ninth Five-Year Plan. Virtually all local loop installations in China thusfar have been copper wire, but there will be opportunities for both fiber optic access and wireless local loop (WLL) access over the next several years. As China's more developed cities ramp up broadband networks, fiber optic access will spread to an estimated 1.85 million subscribers by 1999. Meanwhile, WLL, which is being heavily pushed by suppliers to local PTBs, is expected to be implemented on a wide scale by second operator Unicom, which has rights to part of the AMPS cellular frequency band and has already stated its intention of using the frequency for WLL. The MPT is also expected to begin implementing various forms of WLL for both rural and urban applications, and will trial several major suppliers' WLL solutions in 1996.

Getting Underway on China's Information Superhighway

The spread of data communications has been another significant development in the Chinese market. Currently, China is constructing three datacom backbones:

- ChinaPac, an X.25 packet-switched data network.
- ChinaDDN, a nationwide digital data network.

- The Golden Bridge network, a VSAT-based data communications backbone which will be operated by non-MPT carrier JiTong Communications.

The MPT and provincial PTAs have been building out the national packet-switched network, ChinaPac, since 1992. Northern Telecom is providing the backbone nodes for ChinaPac, which already has over 10,000 users, and will ultimately have 5,500 nodes covering all major cities in China.

ChinaDDN began construction in 1993. Digital data networks have spread like wildfire in China, with hundreds of local and provincial PTBs and PTAs constructing their own digital data networks to interconnect with the national data network backbone. Both ChinaPac and ChinaDDN also serve as platforms for Internet services.

Currently, Internet access is available to roughly 30,000 subscribers in China; by the end of 1996, the MPT expects availability to extend to 150,000 users. The country's first Internet link was set up in 1988, and a number of university-based Internet connections followed. China's first commercial Internet service, ChinaNet, was cut over in April 1995. ChinaNet uses the ChinaPac network and allows users to make international 64 Kb/s and 256 Kb/s Internet connections via Sprint's SprintLink service. Dallas-based AsiaInfo Services is serving as systems integrator for the recently-announced expansion of ChinaNet. The network is scheduled to have 31 nodes covering all provinces and municipalities by mid-1996, and will be one of the world's largest wide-area computer networks. CERNET, another major Internet project, is a major educational network centered at Qinghua University. CERNET is managed by the Chinese State Education Commission; planned investment in the network is \$9.6 million over the 1993-1996 period. ChinaDDN will serve as the platform for CERNET.

Alongside the MPT networks, the Ministry of Electronic Industries, through JiTong Communications Corporation, is undertaking construction of the "Golden Bridge" VSAT-based ISDN backbone. JiTong plans to invest \$11.8 million (RMB 100 million) in the network over the 1994-1997 period. Golden Bridge, which will be interconnected with the MPT data networks, will support a variety of datacom services, including e-mail and electronic data interchange (EDI), at speeds ranging from 144 Kb/s to 2 Mb/s. Plans call for 300 VSATs to interconnect a vast array of state and private information networks nationwide. The Golden

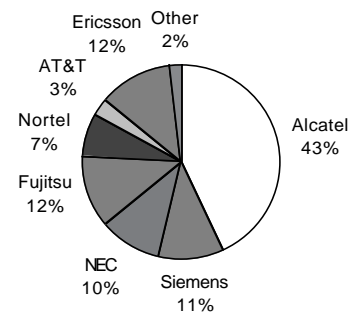
Bridge network will eventually be connected to the Internet via satellite.

Vendor Competition Drives Growth

One important factor driving growth in all areas of the public network market is supplier competition. In one example, after a brief period of restricting the switching market to a handful of foreign manufacturers, China has effectively permitted seven foreign switching suppliers to sell to the MPT, doubling competition and pushing prices to the lowest level anywhere in the world. Alcatel is the dominant supplier of central office exchanges, thanks largely to its highly successful joint venture Shanghai Bell. Figure 2 shows a breakdown of central office switching market share by supplier. The situation for transmission equipment is similarly competitive, with SDH fiber optic transmission equipment emerging as a particularly cutthroat area in terms of price wars as suppliers vie to establish their shares of this new market.

The level of competition has also made financing a key ingredient for vendors interested in selling to the MPT or its local and provincial level subsidiaries. The ability to provide favorable financing terms, whether through government soft loans, installment payment plans, or other means, has meant the difference between winning and losing contracts for all of the major suppliers. Suppliers have, however, found their financing options increasingly curtailed over the past several years.

Figure 2
China: Digital Switching Market Share, 1994 (Installed & On Order)



Total 1994 = 76.43 million lines

Note: Figures include lines and trunks

Source: Pyramid Research estimates, company reports

Accompanying the growth in competition has been the increase in joint venture production of public network equipment. All foreign switching suppliers have set up local production of switching, subsequent to (and in some cases even preceding) the MPT's decision to formally permit them to enter the market. Similarly, most significant foreign manufacturers of fiber optic transmission equipment are in the process of setting up joint manufacturing ventures that will be capable of producing SDH multiplexers. These will allow suppliers to bypass some of the restrictions on imports of foreign equipment, although the joint ventures themselves have been subject to contradictory regulations from the Chinese government. In principle, the Chinese government encourages all foreign suppliers to set up joint venture production facilities as part of its eventual goal of shifting all telecom equipment purchases to local producers rather than importing equipment. However, the government has permitted certain companies to import equipment duty-free, while charging the joint ventures for importing the parts needed to assemble equipment in China. As a result, during 1994 and part of 1995, it was more expensive for customers to purchase from the joint ventures than to import equipment.

In addition, locally-designed switching and transmission equipment is beginning to take a significant share of China's telecom market. After years of unsuccessful experiments with locally-designed digital central office exchanges, several models have developed enough to become viable alternatives to foreign-designed switches in areas where price is of greater concern than 100% reliability. These models now make up over three million lines of China's installed public switching capacity, primarily in rural areas and smaller cities. On the transmission side, Chinese low-capacity microwave equipment is spreading rapidly, particularly in rural areas, although foreign suppliers maintain that the quality of the equipment is in no way comparable to that of imported technology.

Local manufacturers, which include both MEI- and MPT-affiliated factories as well as privately-held facilities, are being strongly encouraged by the Chinese government to raise production capacity and compete with foreign suppliers. Their aggressive stance has driven down overall market prices for public network equipment significantly over the past year, and will continue to keep prices low through the analysis period.

In addition, several consortia have been formed to foster cooperation among Chinese manufacturers and

keep prices from dropping to unprofitable levels. Eight state-run manufacturers have been grouped into the China Great Dragon Telecommunications Group Co., which was registered in March 1995. The group expects to produce 3.5 million lines in 1996. On the mobile front, the Golden Cellular consortium is a collection of mobile equipment manufacturers which aims to establish a foothold for Chinese suppliers in the mobile handset and, eventually, infrastructure markets.

Future Trends: Liberalization, Localization, and Low Prices

Looking ahead, several trends in the Chinese telecom market are likely to persist over the Ninth Five-Year plan period. Liberalization was slow to come to the Chinese market, but it is gradually taking place and will continue to move forward. Expect to see gradual, bottom-up change rather than any sweeping reforms implemented from the center. Quiet deals struck between foreign and local operators are likely to be the roots of more lasting change in the market, regardless of whether they are officially sanctioned.

The move toward localization of production—both through joint ventures and through the development of China's own telecom equipment models—is inevitable given the sheer size of market demand. A growing proportion of the equipment in both public and private networks will be locally manufactured. It will be some time, however, before the technical level and reliability of Chinese-designed equipment makes it a true competitor to foreign-designed central office switching and transmission equipment.

Localization, combined with continued competition, will have the attendant effect of exerting downward pressure on equipment prices. There has already been some backlash from foreign equipment suppliers tired of cutting prices and profit margins to unacceptably low levels; for example, several suppliers have begun bidding less aggressively on MPT SDH transmission contracts because the winning bids always came in at prices too low to turn a profit. Nevertheless, for most suppliers, the size of the Chinese market, and the prestige of being known as a leading vendor in China, will make winning worthwhile regardless of what is needed. **NTQ**

Authors' Note—Pyramid Research is a telecommunications market research and consulting firm based in Cambridge, Massachusetts and Singapore. The information in this article was drawn from the Pyramid Research study, Telecommunications Markets in China (February 1996).