

Beyond the Mainland: Chinese Telecommunications Expansion

Robert C. Fonow

Overview

In most countries, expansion of the telecommunications network beyond national borders has followed diplomatic and business expansion. On this basis, an informed practitioner might be expecting the Chinese telecommunications system to spread beyond its borders sometime in the later part of this decade. However, Chinese authorities have been quick to act upon a series of unexpected opportunities for acquiring international telecommunications assets. This article discusses the international security implications of Chinese telecommunications expansion.

Since the telecommunications collapse of 2001, Chinese buyers have purchased several large telecommunications networks in Asia previously owned by U.S. investors. Among these are:

- PSINet, which was one of the early developers of the Internet. Hong Kong assets were purchased by CITIC, a company reported to have close relations with the People's Liberation Army.

- Level 3, which was sold to a joint venture including Pacific Century CyberWorks, a company run by Richard Li, the son of Hong Kong billionaire Li Ka Shing—both of whom maintain close contacts with central government authorities in Beijing.

- Asia Global Crossing assets, which was purchased by China Netcom, the newly renamed northern division of the incumbent carrier China Telecom.

- Global Crossing, Inc., which claims its own Asian assets in a highly publicized pending deal including a direct investment by Hutchinson Whampoa and Singapore Telemedia. Hutchinson eventually backed out, leaving Singapore Telemedia as the sole potential owner. But, as this paper argues, the deal still facilitates China's expanding network capability and influence.

These assets, previously paid for by American investors at a cost of up to \$20 billion, were bought for an average cost of as little as 3 cents on the dollar, representing a huge loss of American capital value.¹ Each company had extensive networks covering several Asian countries with large capacity circuits and direct connectivity into the United States.

It is unlikely that such a broad-based move into international telecommunications was simply a fortuitous consequence of China's transition to a free market economy. Several interesting questions arise. First, to what extent was the Beijing leadership behind this acquisition spree (even though most of the action took place in Hong Kong)? Second, and perhaps more importantly, how will this purchase of assets by national Chinese network services providers enable Chinese interests to control the telecommunications domain in Asia, and how this will impact U.S.-China relations in the areas of military competition and foreign policy? And, third, how will an expanding international telecommunications capability affect internal political and economic developments in China?

Background and Context

In terms of telecommunications, the world is moving beyond the traditional state system in which governments controlled their network assets. The new model, still developing, is an environment of transregional technical empires. Yet, most networks that describe themselves as global still depend for their core revenues, and hence their capability for international effectiveness, on national and regional economies. In a very real sense, networks mirror the national power aspirations, diplomatic influence, and technical capability of their dominant economy.²

International telecommunications networks operate on two aspirational levels. First, they follow national economic predominance. If China's economy continues to develop along recent growth rates, its power and influence will be facilitated and strengthened by ownership of telecommunications networks in its geographic region. Secondly, beyond the region, the network will develop according to the perceptions of core economy strength. Therefore, if America is economically preponderant in the arc of business that includes Frankfurt, London, New York, Hong Kong, and Singapore, the United States will find it easier to influence the telecom policies of Indonesia, Thailand, and other countries with small but financially attractive groups of network customers that U.S. network services companies might find as

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interesting commercial targets. In the same way, if China succeeds in becoming the Asia economic hegemon, it will find it easier to bend regulatory authorities to its requirements in the Middle East and Europe—imitating the models of the United States Trade Representative, Department of Commerce, and Federal Communications Commission (FCC), which work on behalf of the U.S. Government in promoting policies advantageous to American companies.

Historically, the term *telecommunications* means the international voice network, the Public Switched Telephone Network (PSTN). But the definition of telecommunications is expanding by the introduction of convergence technologies to incorporate data communications, including the Internet and cable television (CATV) networks. All major modern networks typically can carry voice, data, and video over a unified broadband architecture and infrastructure.

The Chinese telecommunications system parallels this development, but, unlike other developing countries, has an international political component. This is based on the underlying assumption that there is a relationship between overseas Chinese (*huaqiao*) investment in China and diplomatic and commercial support from Beijing for *huaqiao* interests in environments that are sometimes hostile.

China increasingly sees itself as responsible for its regional diaspora, in particular the emigration caused by 20th-century revolutionary spasms, and the benefits that derive from offering diplomatic security to a very wealthy ethnic clientele. Thus, the combined capabilities of transnational Chinese interests contribute to Chinese economic power in a way that is something more than mere economic interest. China's control of its own regional and eventually global telecommunications assets furthers its diplomatic and internal development agenda.

This implies that Chinese business and cultural hegemony in Asia is growing and that the extension of Chinese-owned network assets is a part of the process since telecommunications development is a function of national capabilities. Previously, the major international telecommunications services companies were predominantly American, including AT&T, Worldcom, Sprint, and Infonet, initially following the expansion of U.S. multinational corporate development from the middle 1970s. However, in the last 5 years, AT&T's international expansion has been weakened by its association with British Telecom in Concert; Worldcom's by its financial and reporting problems; and Sprint's by its unhappy joint venture with Deutsche Telekom and France Telecom in Global One. British Telecom and Cable & Wireless until recently had pretensions of developing their own global networks but have retired in most part to their national markets. Only Infonet and Equant (which is owned by France Telecom) remain intact according to their original business plans. So by serendipity more than planning, Chinese telecommunications have been presented with, by any measure, a once-in-a-generation opportunity that they would be foolish to pass by. This strengthens Chinese capabilities while weakening U.S. technological and commercial capability. Moreover, on any scale of national and international telecommunications investments, Chinese companies and their proxies got these assets for free.

Robert C. Fonow is managing director of Revenue Growth International, Ltd. Mr. Fonow may be contacted at rcef@rgilt.com.

Telecommunications expansion has always been a synergism of technology development and the internationalization and then globalization of finance, manufacture, and services provision. Beginning with the Cold War, U.S. military interests in secure network technology have facilitated technical development. The obvious example is the underlying technology of the Internet, developed initially by the U.S. Department of Defense. The technology was commercialized, and today, military telecommunications depend to a large degree on commercial networks, including Chinese-owned and -operated networks, for long-range transport of telecommunications and data communications traffic.

In expanding its telecommunications capability, China is doing nothing more than following the example of its capitalist competitors. This is consistent with recent Chinese political developments. The current Chinese political system is best described as post-Marxist pragmatism. "Socialism with market characteristics" or "historical pragmatism" are other descriptions used by commentators in China and abroad. As aptly put by former premier Deng Xiaoping, "Whether a black cat or white cat, the one who catches the rat is best." These descriptors identify the dominant subtext of Chinese political activity: a desire to protect the national interest, based on a pragmatic awareness of the ebb and flow of Chinese history. And given the extremely rapid development of modern infrastructure in many parts of China, a renewed sense of capability provides the Chinese with evidence that they are in the flow of renewed historical greatness.

China's leaders and intelligentsia are concerned about competition with the United States, but they generally believe that history is on their side. This belief is based on a chronological historical viewpoint with a Marxist overlay—not just that China is the beneficiary of the Marxist doctrine of historical materialism, but that all countries with a long history are subjected to historical vicissitudes. At this time in history, despite the recent flush of a victorious military campaign, the United States is weakening itself without external assistance—as China did in its long history—by making damaging social, political, and foreign policy choices that are a result and function of its economic and social system. The ability to buy U.S. telecommunications interests on the cheap strengthens the Chinese argument that unfettered, free-market capitalism is dysfunctional and, without the beneficent guidance of a socialist component, contributes to the weakening of American commercial and economic power, which will weaken U.S. military capability. The smart thing for China to do is to take advantage of the situation.

Technology and Management

At the beginning of the 1990s, China's telecommunications system was rudimentary, based on voice service, telex, and telegraphy. Phone service was provided for fewer than 3 per 100 people—one of the lowest rates in the world. China had a small X.25 packet switching system for business and government data communications connecting only the major commercial centers. This network was interconnected to the outside world via one connection to Italcable (now part of Telecom Italia) and another to Sprint International, based in Reston, Virginia.

What happened in the 1990s in China was nothing short of a social miracle. In the space of 10 years, China has developed one of

the most advanced telecommunications infrastructures in the world. Within a few years, it is likely to have the single most advanced telecommunications infrastructure in the world.

Today, China boasts a sophisticated fiber optics manufacturing and installation capability that spans the country and is the second largest fiber network in the world. Even more impressive, at the end points of the fiber network is arguably the largest Internet network in the world; the largest commercial X.25, frame relay, and asynchronous network for business data communications services; the most highly developed voice over Internet protocol system in the world; the largest cellular phone network in the world using both the Global System for Mobile Communication (GSM—the European and international standard) and Code Division Multiple Access (CDMA—Qualcomm of the United States) technologies; and the largest CATV network in the world.

The system has grown at an exponential rate. Each year, China adds the equivalent of one of the regional Bell operating companies (RBOCs) to the national infrastructure, services that have taken decades to develop in the United States. This is not a just a measure of lines in services. It means the technical capability of an RBOC is added to China's telecommunications capability every year in terms of trained engineers, system management, customer care, billing systems, software development, and sophisticated convergence and broadband services—the information technology underpinnings of a modern telecommunications society.³

The Regulatory Apparatus

While the network infrastructure is large and—in Beijing, Shanghai, Guangdong, and the coastal regions—quite sophisticated, it is also messy, a consequence of rapid and in some ways uncontrolled expansion. This mess is endemic to the system. China remains today a command economy, albeit a decentralized one, at least in terms of telecommunications investment and development. The Ministry of Information Industry (MII), under the direction of the State Council, controls national investment policies. But much purchasing power was devolved to the provincial Post and Telecommunications Authorities (PTAs), at the expense of central control in the mid-1990s, to speed up infrastructure development when it became apparent that MII budgets would not be sufficient to fund accelerated and politically mandated network growth.

For example, MII might decide that the most advanced digital fabric is required for a particular hierarchical element of the PSTN—perhaps transit switches that route long distance calls between major cities. The local PTA is permitted to make purchases from vendors of their choice at a level consistent with annual funding that is not only allocated for this purpose by the central government but is also in line with the local government's ability to generate loans from local or foreign banks or from preferential payment plans and vendor financing.

Each of the 27 regional PTAs has aggressive development targets based on numbers of additional customers added, new technology introduced, and so forth, rather than on revenue and profitability targets, as would be the case in an RBOC. During the 1990s, mainland manufacturing and software development was insufficient to meet growth targets, and no one or two major international manufacturers

of switching equipment were able to meet the demand. The result was a panoply of technologies from Lucent, Alcatel, Siemens, Ericsson, Nortel, Fujitsu, NEC, Daewoo, and others. Each system was built according to international standards, but with enough proprietary differentiation to give them unique selling propositions. This often led to interconnection and compatibility problems, especially in network management capability.

In my experience as the general manager of Scientific Atlanta Shanghai, which in the mid-1990s was the largest foreign manufacturer of CATV systems in China, the buying process was highly fragmented. CATV companies and regional telephone companies competed for investment from central funds and were never sure when the funds would be allocated. So a provisional order was placed and equipment purchased when money became available—often just before a major holiday to increase numbers of subscribers, thus proving the beneficence of the local party officials. At the time there was little sense that a regional or local services provider might get the funds for network development by charging customers. Typically, the CATV companies would buy head-end and transmission equipment and not bother with billing systems. Of course, this changed as China became more interested in developing a market economy, and the purchasing process today more closely approximates that within large American corporations and government agencies. This change coincides with improvements in engineering and network operations.

Management

In parallel with the advancements in technology and business processes has been a marked improvement in management and executive capability. This explains the ability of the Chinese telecommunications system to manage its enormous growth.

Until recently, the Chinese management class was bifurcated between older managers, whose technical educations were often interrupted during the Cultural Revolution, and younger, professionally educated managers, who see themselves as part of a global technological elite and management class. The older managers viewed decisionmaking as a political act, where power lies in party membership and control of staff. Connections were paramount, and the operating doctrine was to keep one's head down and push decisionmaking to the next higher level whenever possible. The group was served by a sales force from Western countries that was adept at manipulating the personal desires of the older managers, with trips, gifts, and a sense of style that was missing from their often boring and impoverished lives in bleak Chinese telecommunications facilities.

The younger managers make decisions on the basis of profit projections and financial management. They are often trained in American or European graduate programs after their undergraduate engineering degrees, which often are from one of the 13 posts and telecommunications universities or 30 Chinese universities that are considered to have excellent undergraduate information technology programs.⁴

The younger Chinese management class mirrors very closely the younger global management class in the sector of the telecommunications industry concerned with international telecommunications. They are bilingual, highly educated, and aggressive in their

pursuit of a lifestyle that is promoted in magazines, such as *Fortune* and *Business Week*, both of which have Asian versions. They are more likely to have a broader international outlook than many of their Western contemporaries, and they epitomize the spirit of the now-worn cliché, “China’s had a bad couple hundred years, but now we’re back.” This group of telecommunications professionals, trained at the same business schools as their American and European counterparts in the arts of mergers and acquisition as a tool of growth, is leading the international expansion of Chinese telecommunications beyond its traditional shores.

One sees the dynamic of this new generation of management class in action across Asia in conferences, seminars, and Asia Pacific Economic Cooperation Telecom working group meetings. Asian participants seem to me to be significantly younger than their Western counterparts. This reflects a particular management bias. In Western companies, foreign travel, particularly to conferences and government-sponsored meetings, is seen as a benefit of rank, whereas in Malaysia, Singapore, and China, it is seen as a learning or training experience, where the people attending should do the detailed work of negotiating. An American executive often views the same conference as a place to meet and greet and turns the real work over to a subordinate back at headquarters, who then has to deal with his counterparts by email. The result is that many countries around the world have young managers with a much better understanding of the dynamics of the international telecommunications system than do Americans, especially at the director of operations level of expertise. This experience gap has widened in the past 2 years due to travel cuts in virtually every American telecommunications company.

Technical Capability

One can assume that China is now on a path to restore its historical great power status throughout North, South, and East Asia. Why bet otherwise, given its economic performance in the last two decades? To assure its continuing development, China needs sophisticated telecommunications to support an increasingly dynamic technology trade strategy. This undergirds an accelerating and dynamic technical culture that potentially is capable of rivaling the United States in selected fields in a few years.⁵

China’s telecommunication trade policy is based on two pillars (in the Chinese idiom, “walking on two legs”): first, bring in new technology as quickly as possible, study it, imitate it, and improve it. Second, develop indigenous technology capabilities equal to the West’s and use them as a base to develop a greater capacity for technological innovation.

Several features are notable in China’s technical policy, including import substitution to protect domestic industries by subsidizing local firms, financial support for indigenous technology products, and increasingly open policies designed to attract foreign investment and technology flows.

Chinese technical policy seems to be a modified replication of Japanese acquisition policies of the 1960s through the 1980s. It is not good policy simply to import; every effort must be made to assimilate, remold, and innovate using the imported technology in a *healthy cycle*. This cycle is considered a special case of developmental activity, which includes importing advanced technology, assimilating it

into national networks, and creating and eventually exporting advanced equipment in competition with global rivals. The state plays a special role in all of this and is needed to guide national interests. These include providing appropriate macro-economic policies and infrastructure, maintaining restrictions on imports and other industrial promotions, formulating long-term national plans for investment and industrial developments needed to guide markets, and controlling the context and pace of industrialization. The technological emphasis in China is to build sophisticated telecommunications systems with Chinese components, reducing both size and cost.

Rather than totally replicating supplier capabilities and displacing the supplier, China believes its best course is continuing engagement with external developers to stay in touch with global developments. Whereas the Western practice is to respond immediately to competitive threats across the broadest spectrum, Chinese officials think that developing countries may be better off acquiring partial competencies in specific high-tech fields, since replicating the entire Western (in particular, U.S.) production capability would be economically impossible. With this strategy, China can use its relatively limited resources to be the best in some, but not all, areas of technology. This explains the interest (discussed below) in asymmetric and information warfare.

In China, this means an increasing emphasis on the importation and replication of configuration technologies rather than a reliance on complete systems, which include proprietary knowledge that is more difficult to reengineer. Configuration technologies are modular and use open standards, which facilitate substitution of national components. They also extend the scope of developing countries’ technical innovation and provide the advantage of commodity pricing for many of the components. So the terms of foreign technology transfers must allow technology to be configured locally according to local criteria.

The development of the HJD-40 digital switch that began in the late 1980s is an example of all of the above. One of the two legs was a deal with Belgium and France for System 12 technology, a digital PSTN switch developed by ITT in Europe in the early 1980s. The other leg was a project financed by a research and development laboratory of the People’s Liberation Army to build an indigenous digital switch. At a time when China was still manufacturing cross-bar electromechanical PSTN switches, the HJD-40 project incorporated all aspects of the two legs model, made possible by selective purchase of foreign components, including cheap standardized microprocessors and design tools in combination with locally available expertise in computer design and knowledge of the Chinese telecommunications systems.

Using, operating, adapting, and learning the elements of System 12 and other switches, Chinese engineers began copying and eventually creating and innovating digital switch technologies. A technology leap of two generations to stored program control and out of band signal switching resulted. The HJD-40 was installed across China and exported to several countries.

The project had an important effect on coordination of large-scale project management in China. Until the late 1980s, there was little innovation in China, with poor links between research and

development institutes, producers, and customers (primarily Post and Telecommunications Authorities). The HJD-40 provided a transition project for market forces and government policies to combine. The project provided new avenues for these players to seek opportunities to develop new technologies, get involved in technology learning, and collaborate.⁶

An example of how this works occurred in Scientific Atlanta Shanghai in the mid 1990s. The joint venture's Chinese engineers repeatedly reengineered Scientific Atlanta products manufactured in the United States, reducing costs and increasing performance. In each step, the engineers, in consultation with research institutes in the Shanghai area, made a leap in technology, starting first with basic amplifiers and moving up the technology curve to sophisticated fiber optic receivers, each time reducing costs, improving performance, and adding to the technical knowledge and capability of the country using technology first developed elsewhere.

More recent development highlights the continued effectiveness of the two legs policy. In the late 1990s, Chinese companies installed CDMA mobile communications from the United States on a limited scale while joining Siemens in Germany on developing an updated Chinese version, td-scdma. Some commentators expect the Chinese version for mobile wireless to become the dominant preference of third-world network services providers, reestablishing China as a major player in this market.⁷

Perhaps even more important, Huawei Corporation is now producing routers, the central component of the Internet, at 50 percent of the price of U.S. competitors. Cisco Systems has challenged Huawei in U.S. courts, noting a remarkable similarity in their products. Huawei denies the allegation and proceeds to market worldwide, selling \$100 million of advanced telecommunications product to Russia alone in the last year.

The Foreign Policy Challenge

China's expansion into international telecommunications will make it more difficult for U.S. diplomats and trade negotiators to mold economic policies in Asia. Without stronger trade diplomacy, China will eventually usurp the advantages held by the United States in controlling the telecommunications environment in Asia and between the United States and Asia.

Already there is more than a little truth to the claim that the United States makes weapons and China makes the things people want to buy. This is a national security problem, since China's commercial strength, based on current growth rates, will eventually lead to a Chinese economy larger than that of the United States. This accumulating wealth, argues John Mearsheimer, will be used to purchase weapons to prohibit the United States from interfering with Chinese hegemony in Asia and eventually will lead to conflict, perhaps in less than 20 years. Such a scenario is clearly contrary to recent formulations of U.S. grand strategy.⁸

In the last 20 years, as American corporations and military facilities have expanded abroad, trade diplomacy has risen from low to high politics, with its own summitry. But unless addressed at a high level more consistently, problematic internal and external dimensions of America foreign policy will arise from China's growing telecommunications and technological sophistication.

The first part of the external problem also has an internal dimension: the American telecommunications manufacturing industry has already moved to China. Even Cisco and Dell, two industry leaders in networking and information technology, are often described as the marketing agents of Chinese manufacturers and, increasingly, software developers.⁹

The move to China also includes telecommunications services companies. Call centers, for example, until now a mainstay of employment in the Plains states, are moving offshore to a number of countries, including China. More significantly, Asian- and European-funded telecommunications business plans are purposely avoiding the United States, now considered a high-cost country, for anything other than sales and marketing. Any function performed by any U.S. telecommunications company can be done in China for a fraction of the cost. Verizon could run its entire back office systems in China if it chose to do so. Only the face-to-face salesperson and customer engineer need to be in the United States. Is this a national security problem? Only if one considers economic security to be part of national security.

The foreign policy options are complex in such an environment. U.S. trade diplomats and commercial service officials must persist in challenging China to level the playing field. For example, sure to become an increasing problem for American network services providers is the disparity of market access between China and the United States. No U.S.-based carrier or value-added service provider can offer services in China without constraint. The conditions under the World Trade Organization (WTO) agreements are entirely preferential to Chinese interests. Services joint ventures are prohibited or so severely constrained as to be untenable.

The Shanghai Symphony (UNISITI) joint venture is often touted as an example of a successful undertaking between AT&T and Shanghai Telecom. However, the Chinese regulatory process resulted in 7 years of negotiations before a license was granted, limiting the company to Pudong, across the Huangpu River from the main Shanghai commercial areas. Pudong is a purpose-built area that houses, among other things, a financial district with wired and intelligent high-rise buildings. But Pudong is considered somewhat of a backwater by many Shanghainese and has a very low occupancy rate. This may change in time if the government forces businesses to move there and opinions of Pudong's attractiveness change. At present, it has the same allure to Shanghainese and many Western companies that Secaucus, New Jersey, has to Manhattan dwellers and Wall Street bankers. The point is that the only functional services joint venture between a Western company and Chinese company is a political artifact to support Pudong development policy, rather than an attempt to promote market economics in the telecommunications industry or adhere to competition principles outlined in WTO agreements.¹⁰

This disparity is unfair for another reason that furthers the hollowing out of the American telecom services industry. China Telecom is permitted unfettered market access in the United States. It has several switches and fiber optic leases in the United States and a license from the FCC to provide both domestic and international services to business customers. As more and more American companies move manufacturing and customer service operations to China, American telecom services providers are at a tremendous disadvantage.

China Telecom almost certainly will undertake an aggressive commercial policy to convince American companies doing business in China that they will be better off using China Telecom as their service provider, to assure seamless services between their U.S. headquarters and China operations. Any China Telecom sales manager, most likely American, who does not use this strategy would be remiss under present winner-take-all Western marketing methods, which take their imperative from Sun Tzu, Machiavelli, and Clausewitz—not necessarily in that order.

China Telecom will be imitating American services providers who also market seamless international services over their own global networks. It is a safe bet that multinational companies will at least divide their telecommunications applications requirements to assure a certain percentage to China Telecom, which will cause American companies to lose revenue and jobs.

U.S. diplomatic and trade negotiators have been stonewalled repeatedly by their Chinese counterparts. Even a cursory reading of the results of the WTO and other bilateral telecommunications negotiations indicates that U.S. negotiating teams have been less than successful in prying open Chinese markets. A stronger effort is needed to assure the United States is positioned to maintain at least parity with Chinese telecommunications resources and personnel trained in global network management and development.¹¹

Five years ago the argument might have been that Chinese companies could not compete with Western companies in China on equal terms or that massed Western capital would install a modern telecommunications system that would be technically superior and steal millions of customers from the incumbent carrier. This is no longer the case. Chinese telecommunications are technically equal to the public network in the United States. China has the same hardware and software as any American company. Their people are trained to equally high standards.

The future of the global telecommunications business is in converged, value-added services, which offer business and other organizations useful combinations of voice, data, and video services. Perhaps in its current state of economic development, China will not support an RBOC-sized investment. But it will support smaller value-added services companies specializing in new and innovative mobile and fixed-line services, which are typically focused on specific industry applications. Perhaps Chinese policymakers would like to keep this development to themselves. A stated policy of China's national economic policy is to lead in Internet and Internet protocol (IP) services development.¹² This is precisely where diplomatic initiatives demanding pro-competitive policies are important to U.S. interests. In this area, it is also important to keep a close watch on the contribution that American allies make to Chinese technical capability. For example, Internet telephony and much IP innovation come from Israel. China has embraced these services and the technology that comes with them.

Strategic and Military Issues

Recent advances in Chinese commercial technology development indicate a capability for similar military advances. This is not to say that an expanded telecommunications network becomes a direct military asset, any more than the U.S. network could be used

by the military in a national emergency. But in China, national security is viewed through a panoramic lens and includes a wide range of economic factors that the United States has only recently begun to consider. For example, national economic development above 7 percent per year is considered a national security objective, since that is the level considered necessary to maintain employment at a level that will prevent public disorder. Telecommunications is a facilitator of economic growth. It is a necessary ingredient in attracting foreign direct investment, which enables the development of the technologies that will be the basis of a new Chinese initiative in warfare that includes telecommunications technologies.¹³

The purchase of previously U.S.-owned telecommunications assets by Chinese companies creates potential military threats in the interception of military communications, coercive diplomacy, and information warfare.

The operational dynamic of U.S. war planning should be to assume that China has information and telecommunications warfare capability equal to that of the United States and would be the most capable military competitor the United States has faced since World War II and therefore is not to be underestimated in any way.

Telecommunications and Information Warfare

Telecommunications networks are the delivery systems for information and data communications-based weapons. Information warfare involves information technology and computer science as much as telecommunications. Most literature discusses Chinese capability from a China-centric perspective (for example, the response if U.S. forces, following an attack on Taiwan, targeted the Chinese mainland). While this aspect is important, it misses that wider implication of emerging information warfare threats to U.S. interests. There are both national and international dimensions of potential Chinese network capabilities.

The first question is to what degree can the former assets of Global Crossing, Asia Global Crossing, Level 3, and PSINet be used to control the Asian international telecom system or provide the capability for espionage and network warfare (netware). The answer is that these assets enhance China's capability to monitor and interdict communications that travel across its network. Up to 95 percent of Department of Defense telecommunications traffic uses the international telecommunications system.¹⁴ Most diplomatic or military traffic destined for North, East, and South Asia will traverse networks now owned by Chinese interests. Indeed, some of this traffic passes through facilities on the Chinese mainland.¹⁵

Is this traffic secure? Encryption systems are very powerful and may indeed be indecipherable. But that assumes that the encrypted information can reach its destination on a network or that a network rerouting capability exists. Networks mimic the human organism. One expects the network and information warfare equivalent of a human stroke to be the weapon of choice for asymmetrical and information-based warfare in the future.

Planners, whether in business or the military, base policies on worst-case scenarios and work backward on the basis of existing or projected resources. Because of its purchase of American assets, China will have a sophisticated international network capable of projecting information or netwar capabilities beyond its border.

An even more important question for information warfare planners is what can China do in association with other countries that might have an interest in limiting the forward projection of American military power. The prevailing attitude in the United Nations forces this question to be asked. Planners sitting in Beijing, Moscow, New Delhi, or even Western Europe, aware that their governments are opposed to the unilateral projection of force, will be looking at U.S. capabilities very closely.¹⁶

A sophisticated information warfare program might not involve a confrontation of forces as much as the political coercion via networked public diplomacy, quarantine of resupply, or prevention of use of satellite positioning systems, by hacking into their information control systems or interfering with the international telecommunications switching architecture. Without an uninterrupted supply line, troops would be vulnerable very quickly. Without global positioning systems and other battlefield information resources, U.S. forces would find themselves facing formidable enemies with close-in supply capabilities. For this reason, telecommunications and the information systems controlling them become important elements in coercive diplomacy, and possible use of force, if concern about projection of U.S. forces becomes severe enough to force a counteralliance.

Such an attack on U.S. interests may seem unlikely, but it is useful for planners to think of the worst-case scenario. In a situation where opponents have limited force projection options, information warfare becomes a major component of asymmetric warfare and the mysterious and proverbial assassin's mace.¹⁷

Telecommunications and data communications are the heart of the revolution in military affairs. Based on China's prodigious engineering education capability—almost equal that of the United States at undergraduate level—China will become equal to the United States in certain aspects of warfare. American planners must assume that China possesses a sophisticated command and control and information resource capability. China will not compete against the United States in the projection of forces, but it will compete in information warfare, using its capability to exploit asymmetric differences in force structure, assessing and attacking the maximum point of vulnerability in a model not much different, from a Chinese point of view, than attacking the imperial Death Star in the first *Star Wars* movie, finding the one soft spot in an otherwise invulnerable foe.¹⁸

Impact on Governance of China

The functionalist school of international relations argues that services such as telecommunications contribute to democratic processes. The more people can communicate freely, both nationally and internationally, the more likely they are to engage in commerce and the development of liberal democratic ideals.¹⁹

Today, penetration of telecommunications services in China is estimated to be between 26 and 29 percent of the general population, with up to 70 percent having direct phone service in major metropolitan areas. But this underestimates the communal use of phone systems, a pattern seen in many developing countries. In a village or small town, which in China can be 1,000,000 people, fixed and mobile phones and Internet access are often shared assets. In today's China,

everyone in the country, with the exception perhaps of those in remote mountain regions, has access to phone services and information resources.

Telecommunications promotes communications capability, but this is different from communications efficiency. For example, China has the internal network capability to support epidemiological reporting of the severe acute respiratory syndrome (SARS) outbreak, but bureaucratic inertia and pervasive fear of reporting bad news neutralized the benefits of years of massive investment. Telecommunications is an instrument for information dissemination that supports commerce, economic development, and diverse political expression. Telecommunications is also an instrument of political control, keeping the existing regime firmly in charge. The balance is carefully monitored in today's China. The negative economic impact of underreporting the SARS epidemic is likely to lead to greater openness and personal responsibility and less authoritative control from the center.²⁰

Predictions that the Internet, a subset of the telecommunications infrastructure, would bring revolutionary political change to China have proven exaggerated, at least so far. In a telecommunications infrastructure as large as China's, the government cannot control all Internet or telecommunications usage, but it can selectively punish those who use the Internet for downloading politically contentious materials, especially those deemed threatening to the stability of the Communist Party. Internet cafes in China are required to report client visits to subversive sites. Periodically, a known dissident or unlucky surfer is arrested, tried, and imprisoned for a lengthy term for downloading contentious material. This promotes self-censorship. Is reading information deemed subversive worth the risk of imprisonment? As a result, the Internet is likely to support change, but it will probably be evolutionary.²¹

China is no longer a Maoist tyranny. The most recent leadership changes have placed people with no direct association with the Revolution or military campaigns in charge. They are essentially technocrats, many educated at Qinghua and Beijing universities, engineers more concerned with internal economic development than international adventures. One can argue that China will evolve into a type of European socialist model. More likely is a modified Japanese model where the central government is firmly in control of ministries, the ministries are filled with officials obsequious to the government, and one party controls the government.

A recent restructuring of Chinese telecommunications companies has left China Telecom administratively in control of the country's telecommunications assets roughly south of the Yangtze River, with Shanghai Telecom virtually in control of its own assets and New China Netcom in control of the North. It has been argued that China could break up into three countries, with Taiwan, Hong Kong, Fujian, and Guangdong provinces providing the economic engine for southern China; Shanghai and the Yangtze River basin for central China; and Beijing and Tianjin for the north. The telecommunications network could be easily divided among these new state entities. But it is hard to envision such a break-up short of a catastrophic event.²²

Improving the U.S. Position

The United States is in the unfortunate position of trying to close the barn door 10 years after many of its thoroughbred networking and

telecommunications technologies bolted to China. Still, several steps can be taken to improve the situation in the future.

First, a favorable competitive climate should be ensured within the United States to accelerate technical innovation. The United States has fallen behind Korea, Japan, and, in certain instances, China in the societal use of advanced telecommunications technologies. It is noteworthy that each of these countries has government policies that protect indigenous industries while promoting extreme competition within its borders. The disappearance of investment capital following the bursting of the technology bubble and the aggregation of telecommunications services in the United States by a handful of large corporations raises concerns that the United States will fall further behind. The FCC must begin to recognize that it is now an instrument of national security.

Second, in parallel with the acceleration of technical innovation should be a review of the geopolitical assumptions of the Committee on Foreign Investment in the United States (CFIUS). Because it was perceived as being close to the Chinese government, Hutchinson Whampoa was forced to back out of the Global Crossing deal under CFIUS pressure, leaving Singapore Telemedia in full control. This is still a suspect deal under Exon-Florio provisions since Telemedia is involved in joint ventures and cross directorships with Asia Netcom, the Chinese incumbent carrier, through its recent purchase of Asia Global Crossing. The international telecommunications industry is typified by complex partnering agreements. The majority of these present no security problems, but if a standard is set, as it was with Hutchinson Whampoa, then policymakers must become more aware of the complexities and interlocking ownership of the international telecommunications infrastructure.²³

Finally, there seems to be little that the United States can do to influence China's internal political dynamic, which is based on the necessity of keeping order in a country of 1.4 billion people, a plight difficult for Americans to conceptualize. Since order is the primary value in international affairs, it is in U.S. interests to continue to assist the development of the civil telecommunications infrastructure in China. At the same time, it is necessary to monitor and understand in greater depth Chinese innovations in telecommunications and the evolving relationships between civil uses and military potential.

Notes

¹ The sequence of acquisitions and attempted acquisitions is reported in the *Financial Times*, *The Wall Street Journal*, and telecommunications industry Web sites, such as <www.carriersworld.com>, <www.americasnetwork.com>, <www.telecomasia.net>, and <www.cpenet-hk.com>. See James C. Mulvenon, *Soldiers of Fortune: The Rise and Fall of the Chinese Military Business Complex 1978–1998* (Armonk, NY: M.E. Sharpe, 2001), for a historical analysis of the relationship between Chinese business and the People's Liberation Army.

² Kenichi Ohmae, *The End of the Nation State* (New York: McKinsey and Company and The Free Press, 1995), discusses the rise of regional economies.

³ See Pyramid Research, "Telecommunications Markets in China 2002" (Cambridge, MA, 2002) and "The Dynamic Dialogue: A China Case Study" (International Institute for Strategic Studies Discussion, January 25, 2002), presented by APCO, a telecommunications consulting firm based in Beijing.

⁴ Lin Jintong, *Telecommunications in China: Development and Prospects* (Huntington, NY: Nova Science Publications, 2001).

⁵ Barry C. Lynn, "Trading with a Low-Wage Tiger: What Happens to Everyone Else When China Sucks Up So Much of the World's Economic Growth?" *The American Prospect* 14, no. 2 (February 1, 2003). For a view questioning the strength of the Chinese

economy, see Joshua Kurlantzick, "Is China's Economic Boom a Myth?" *The New Republic* (December 16, 2002).

⁶ This discussion of Chinese industrial policy relies heavily on Shen Xiaobai, *The Chinese Road to High Technology: A Study of Telecom Switching in the Economic Transition* (London: St. Martin's Press, 1999).

⁷ Todd W. John, "The Next Generation: Will China Connect?" *Asia Times Online*, November 7, 2002, accessed at <http://www.atimes.com/atimes/China/DK07Ad05.html>.

⁸ John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York: Norton, 2001).

⁹ Barry Lynn, "Unmade in America: The True Cost of the Global Assembly Line," *Harpers*, June 2002, 33–41; Bruce Einhorn, "High Tech in China: Is It a Threat to Silicon Valley?" *Business Week*, October 28, 2002, 80–88.

¹⁰ "Telcos Steer Clear of China," Reuters, September 12, 2002, accessed at <http://www.telecomasia.net/telecomasia/article/articleDetail.jsp?id=40583>.

¹¹ "China's WTO Status Fails to Draw Telecoms Services Investment: MII," Reuters, August 21, 2002, accessed at <www.telecomasia.net/telecomasia/article/articleDetail.jsp?id=28468>; "Telcos Steer Clear of China."

¹² Internet protocol (IP) refers to the sets of rules that govern the transfer of information across the Internet. Innovations in IP can be in either hardware or software elements of the Internet.

¹³ Howard M. Krawitz, "China's Trade Opening: Implications for Regional Stability," *Strategic Forum* 193 (Washington, DC: National Defense University Press, August 2002).

¹⁴ Lawrence Greenberg, "Danger.com: National Security in a Wired World," in *Economic Strategy and National Security: A Next Generation Approach*, ed. Patrick J. DeSouza (Boulder, CO: Westview Press, 2000).

¹⁵ Discussion with undersea cable executive who requested anonymity, April 21, 2003.

¹⁶ Philip Andrews-Speed, Liao Xuanli, and Roland Dannreuther, "The Strategic Implications of China's Energy Needs," Adelphi Paper 346, The International Institute for Strategic Studies (Oxford: Oxford University Press, July 2002).

¹⁷ Michael Pillsbury and Larry Wortzel, testimony at the U.S.-China Security Review Commission, Washington, DC, July 2002. For an apocalyptic view of China's potential, see Edward Timperlake and William C. Triplett II, *Red Dragon Rising* (Washington, DC: Regnery, 1999).

¹⁸ John Arquilla and David Ronfeldt, eds., *In Athena's Camp: Preparing for Conflict in the Information Age* (Santa Monica: RAND, 1997). Also, Arquilla and Ronfeldt, *Networks and Networks* (Santa Monica: RAND, 2001).

¹⁹ David Mitrany, *The Functionalist Theory of Politics* (London: St. Martin's Press, 1976).

²⁰ Joan Kaufman, "Can China Cure Its Severe Acute Reluctance to Speak?" *The Washington Post*, April 27, 2003, B1–B2.

²¹ Michael S. Chase and James C. Mulvenon, *You've Got Dissent! Chinese Dissident Use of the Internet and Beijing's Counter Strategies* (Santa Monica, CA: RAND, 2002).

²² *Ibid.* Also, see Ohmae.

²³ For an explanation of CFIUS, see <http://www.ustreas.gov/offices/international-affairs/exon-florio/>.

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Center for Technology and National Security Policy

Hans Binnendijk
Director