

**Telecommunication Services in China: Facing the Challenges of WTO
Accession**

by

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Despite opening up the Information Technology (IT) industry to foreign investment and deregulating much of the economy, China's telecommunications sector today remains the most restricted and regulated of all the major developing-country countries in the region. During the WTO negotiations, liberalization of this sector was a critical issue both because of its growth potential and because it was considered one of China's 'key national industries'¹.

China is projected to become the largest market for telecommunication services in the world by the end of the decade, creating a strong incentive for foreign players to enter the market². The obstacles faced include lack of clear and concise legislation governing the sector, regulatory implementation and enforcement, true competition, and regulatory independence. Thus far, the government has only allowed limited competition through the creation of a number of operators, mostly diversified components of its operational arm, China Telecom (CT), and all still state owned. While the regulatory environment governing the sector has been restructured to separate the regulatory and operational entities, the impartiality of the regulatory environment has been questioned.

WTO accession has led to the recognition by all these entities that they will need to be efficient to compete with new entrants once the market is opened up in a few years. However, it remains questionable how independent the existing operators are to make the reforms needed to transform themselves into globally competitive enterprises. Despite this, technological advances combined with the gradual commoditization of services³ and the accession commitments have catalyzed reform progress.

The challenges faced by China in developing its telecommunications services sector to service the needs of an efficient and competitive economy, and to achieve equity goals, are great.

¹ The United States, the European Commission and Japan all made opening up telecommunication services a major point of contention during their bilateral negotiations with China. China's rejection of FDI in telecommunication services was unusual relative to other economic sectors in China or to other countries at a similar level of development.

² About 40 foreign operators lost up to USD1.4 billion when the government cracked down on investments that circumvented the FDI ban in the sector. Yet despite all this, the US's AT&T has recently entered into a joint venture to form Shanghai Symphony Telecommunications, and all other major foreign operators remain in China, awaiting further entry opportunities.

³ A decline in average revenue/unit without increasing usage.

On the one hand the nature of the telecom industry is one of constant and rapid change. Furthermore with its accession to the WTO there is a number of obligations that China must meet. On the other hand the regulatory environment is still at an early stage of development. The key challenge for China is to ensure that regulatory reforms and greater competition will maximize the benefits for the Chinese economy as well as meet equity objectives.

This paper has two main goals. The first is to examine the pace and progress of change in China's telecommunications services sector, and to assess China's position at the beginning of the 5 year phase-in period under its WTO Accession agreement. The second is to analyze the impacts of greater efficiency, reduced costs and improved quality in the sector.

The remainder of the paper is divided into six sections. In the next two sections we discuss the regulatory and operational environment currently facing the sector, and outcomes to date. The regulatory environment itself has been further sub-divided into three categories: pre-1998 reforms, recent, and future reforms. We first consider basic telecommunications services that relate to telecommunications infrastructure operation and cover fixed-line services (eg long distance and domestic telephony services), and mobile telephony. Then we turn to value added services, such as internet and mobile data services, that utilize the core network infrastructure.

The third and fourth sections focus on the post-accession environment. Section four looks closely at China's WTO Accession commitments and analyzes the possible direct implications. Section five looks at the indirect impacts, including on distribution and equity. The paper ends with some policy recommendations.

I. THE REGULATORY ENVIRONMENT TO DATE

In anticipation of liberalization commitments of its accession to the WTO, China began to undertake reforms to increase competition in the telecommunications sector. Tentative first steps to introduce competition begun in 1994, but more major reforms were undertaken beginning in 1998.

Tentative first steps: constrained competition

Up to 1994, China Telecom was the sole basic telecommunications services provider. New market entry was absolutely prohibited, and the Ministry of Post and Telecommunications (MPT) not only regulated the sector but also operated telecommunication services.

In 1994, China United Telecommunications Corporation (Unicom) was created to improve service quality by introducing managed competition.⁴ Pricing policies, such as service fees remained under MPT, and individual operators were not able to compete through the price mechanism.

The Unicom Experience

Unicom faced an uphill battle in its early years.⁵ Its biggest problem was getting access to the backbone infrastructure. When the State Council first granted Unicom its fixed line service developments in Tianjin, Chongqing, and Chengdu, the local CT operators refused to allocate phone numbers to Unicom, which held up interconnection for over a year. At the time, the MPT was CT's largest shareholder and the two basically colluded to deny Unicom access to MPT's network. Another problem was securing accession to capital, which UNICOM did largely by using "grey-area" measures, the most well known of which was the Chinese-Chinese-Foreign joint venture enterprise structure (Zhong-zhong-wai or CCF), to circumvent the ban on foreign direct investment in the sector and attract foreign direct investment.

Restructuring the Regulatory Structure

Prior to restructuring, telecommunication services for all of China were not only regulated by the Ministry of Post and Telecommunications (MPT), but also operated directly by it. To separate these two functions, the Ministry of Information Industry (MII) was created as a regulatory body distinct. However, the independence of MPT and China Telecom was not convincingly demonstrated, in part because many of the senior staff from MII came from MPT.

⁴ See Appendix A

⁵ One can understand the lack of cooperation as Unicom was created by the rival Ministry of Electronics and an official in the State Council, and not by MPT. Unicom's original objective was to share 10 percent of the fixed line market and 30 percent of the mobile phone market with CT by 2000. (Asian Communications, September 1998).

Regulation 405: clamping down on CCF

In 1998 the government initiated an investigation into the legality of CCF ventures in light of the 1993 directive forbidding foreign investment in the sector. This resulted in restrictions on CCF arrangements, with a mandatory limit on agreements of 15 years, a 5 year limit on profit sharing, and 90 per cent of all network assets being transferred to the Chinese party.

The reforms undertaken up to 1998 were significant first steps, but competition remained constrained, service quality suffered and prices also remained uncompetitive by global standards. Prices were still set by the MPT, the State Pricing Board and the SDPC. The outcome was that as a response to the inefficiency in the telecommunications system to provide connection, rural communities began financing and establishing their own systems to provide basic service in their areas. These town and village enterprises (TVEs) merged into larger organizations providing wider coverage and eventually set up administrative relationships with the local MPT. In addition, various networks had also evolved within separate industries and institutions in order to compensate for the supply shortage in the public network maintained by the MPT. These included networks for the academic and research communities, the military, the railways and the oil industry.

Foreign Alliances in Equipment and Infrastructure

Whilst no foreign entry was allowed in telecommunication services, there were various alliances and cooperation with foreign partners to supply equipment and set up infrastructure. Unicom signed a long term strategic alliance with GTE in 1995; MPT entered into a venture with AT&T to lay a fiber optic cable trunk from Beijing to Kowloon; and joint ventures in switch manufacturing and land lines sectors were agreed on with foreign suppliers like AT&T, Alcatel, and Northern Telecom. In the mobile communications equipment sector joint ventures have been set up with all the major names such as Ericsson, Motorola, Nokia and NEC.

Regulatory Reforms since 1998

The MII's fear that the monopoly it enjoyed would be sacrificed as a "pawn" for China's accession to the WTO, and the conviction that national interests would be compromised if China's telecom industry did not survive the competition, galvanized the ministry into devising a survival plan beginning in 1998. This strategy involved creating a favorable policy environment for China Unicom and the breaking up the China Telecom monopoly.

Breaking up China Telcom

In 1999 the MII launched a major restructuring efforts to divide the basic telecom service industry into four state-owned enterprises (SOE), specializing in different types of service. The monopoly became China Telecom (fixed-line business), China Mobile Communications Corporation (China Mobile- to focus on mobile phone business), China Satellite (ChinaSat), and a reinvigorated Unicom, which also absorbed the paging business. ChinaNetCom (CNC) was also established to build a broadband IP network. The division of enterprises by sub sector reflected MII's plan to speed up the development of individual service sectors. It was also aware that division by sub sector would eventually be overridden by technological advancement and there would be increased integration between sub sectors, so that division by sub sectors would no longer be viable and issues of convergence will emerge. In 2000, a license was also given to Railcom, which was part of the Ministry of Railways, to provide all basic telecommunications services, except mobile.

This means that there are currently seven companies that dominate the basic operations of China's telecom market. In addition there are more than 3000 different enterprises engaged in Internet-related and other value-added businesses. The greater operational freedom enjoyed by the various network operators allowed for the introduction of market-oriented business practices, a push forward with respect to corporatization efforts, increased streamlining and focus on profits. In turn this has led to increased competition in the last few years. The MII also allowed these SOEs to obtain financing through the capital markets.

The seven operators currently licensed are briefly as follows. First is the incumbent China Telecom (CT) which was originally part of MPT and then spun out of the Ministry in the 1999 restructuring. It was formally established as a separate entity from MPT only in May 2000. MII only retains a small share and the rest of the shares are under the National Asset Management Bureau, which manages the large state owned companies in China and comes directly under the State Council. They have the license to provide fixed line, paging, VoIP, data and international gateways. They have not listed their shares in the capital market and have the mandate for universal service provision. China Telcom controls over 99 percent of China's main lines.

Second is the new entrant, China Unicom, which was set up in 1994. As already discussed Unicom faced an uphill start, but by 1997 MPT stepped in to resolve the problems with CT and in 1998 Unicom received a boost with the government decision to merge Great Wall, which had the right to operate the CDMA mobile phone system with Unicom.⁶ Unlike CT, Unicom was able to create a modern management structure since it did not inherit an existing state owned company structure and is managed by younger and professional managers. They have listed their shares in the HK stock market, putting pressure on corporatization. They were also given a preferential pricing policy compared with China Mobile and during the 1999-2001 period, growth has been around 20 percent, with mobile subscribers increasing from negligible numbers

⁶ The government forced the PLA to divest all of its business interests as part of the government crackdown on corruption and forced a handover of Great Wall to Unicom.

to around 25 million or around 25 percent of total mobile subscribers by 2001. The preferential pricing policy in favor of Unicom is expected to continue until the number of subscribers reaches 40 million. Unicom is the only operator with the license to operate all services, including fixed line within certain areas. Unicom finally moved forward with setting the CDMA network by awarding contracts to various foreign and domestic equipment vendors. It also signed a strategic alliance agreement with KDDI of Japan to provide technical support to China Unicom's CDMA network. Its market share will grow with CDMA services. In 1996 Unicom only had 2 percent of the market, but by the end of 2001 it had around one quarter of the market.

Third is China Mobile which has been in operation since 1987, as part of CT. It became a separate entity from CT in April 2000 and out of its most profitable subsidiaries, China Mobile Group (Hong Kong) Co. Ltd. was created. The latter company listed 24.4 percent of its shares in the Hong Kong and New York stock markets. The strategy of development for CMCC is to shift from traditional circuit-switched networks to broadband packet switched IP networks, and to diversify from pure wireless voice service to mobile image and data services. CMCC is the world's largest GSM network with a reported 110 million mobile users by the first quarter of 2002 (16 percent of the world total), most of which are pre paid customers. CMCC's competitive edge over Unicom in the mobile sector is its financial resources, geographical coverage and brand name. China Mobile (HK) entered into a partnership with Vodafone, with the latter obtaining a minority share of 2-3 percent.

Fourth is China Netcom Corp. (CNC) which was created in August 1999, by the Chinese Academy of Sciences (CASS), SARFT, Ministry of Railways and Shanghai Municipal Government. Its core business is providing Internet broad band access and integrated telecom services to residential and corporate customers.

Fifth is China Telecommunications Broadcast Satellite Corporation (ChinaSat), which was created in 1985 to manage telecom satellite business and providing satellite telecom broadcasting services for MPT. ChinaSat owns two satellites. It is currently being restructured and reorganized.

Sixth is Jitong, China's third largest telecom operator which focuses on IP based broadband network service and Internet solutions for the corporate sector. The company was created in 1994 as part of MII's golden bridge projects. Other than Internet services, Jitong began to provide VoIP beginning in 1999.

Last is China Railway Communications, which was given a license for fixed line, VoIP and data services. The backbone that it would use is the communications infrastructure that it had already created using rail infrastructure for its own communication networks. This infrastructure was a response in the past to the inability of CT to support its communication network needs. The potential of Railcom remains unclear because effective delivery of telecom services would depend on reaching connectivity agreement with CT and being able to streamline and corporatize the current state owned enterprise structure. Even though there has already been serious restructuring and down sizing, it will need a few more years before it can become viable competitor to CT.

Current operators are only granted licenses specifying the type of telecom service they may offer (Table 1). Only Unicom has a license to undertake all services except for satellite. Although mobile telephony is the most explosive sector in the industry, there are currently only two mobile phone licenses and there are no clear indications as to whether an additional license will be issued despite much speculation that CT will be awarded the coveted license. Licenses are granted based not on any particular system or procedure, but remains at the discretion of the central MII authorities.

**Table 1
Network Operators and Licensing**

	Licenses						
	<i>Fixed Line</i>	<i>Cellular</i>	<i>Paging</i>	<i>VoIP</i>	<i>Data</i>	<i>Int'l Gateways</i>	<i>Satellite</i>
Company							
CT	√		√	√	√	√	
Unicom	√	√	√	√	√	√	
CMCC		√		√	√ (a)	√	
CNC				√	√	√	
Jitong (b)				√	√	√	√(c)
Railcom (d)	√			√	√		√
China Sat							√

*Data includes fax and Internet transmission

- a) Only mobile data transmission
- b) Jitong only serves corporate clients
- c) Only VSAT
- d) Although Railcom is licensed to provide services other than fixed-line, it has yet to develop the capability to do so.

**Note: with the recent re-grouping of CT under the '5+1' program, CNC will be subsumed into the newly divided CT group.

Source: Compiled by authors, 2001

Table 2 Major Operators by Ownership and Universal Service Obligation

	Ownership			Universal Service Obligation*	
	<i>SOE</i>	<i>Hybrid[†]</i>	<i>State-operated</i>	<i>Yes</i>	<i>No</i>
Company					
CT	√			√	
Unicom		√			√
CMCC		√			√
CNC	√				√
Jitong	√				√
Railcom	√		√		√
China Sat	√		√		√

[†]Partial outside listing structure – see below

*USO is technically mandated for all operators under current telecom regulations, however, there is no implementing directive. As it is the primary owner of functional local end loops, it is believed that only CT would eventually have the USO burden to carry. CT is currently required to provide special telecom services to the CCP and other governmental organizations and emergency communications for the entire country.

Source: Compiled by authors, 2001

The sector is dominated by state ownership and operation, although two have listed part of their shares in the stock exchange. As for universal service obligations, whilst all are required to

provide USO, the implementing regulations do not exist yet. However, CT is already mandated to provide telecommunication services to government organizations and emergency services and has implicitly been the one tasked to provide USO and this role is likely to be continued.

As expected the incumbent, China Telcom owns most of the backbone infrastructure and leases it out to the others. CT and CMCC which was originally part of the incumbent operate in all provinces. The others are operating in a number of areas, and Unicom's coverage appears to be quite extensive, with expansion plans in place.

Table 3 Network Operators: description of network and coverage

	Networks		Coverage	
	<i>Own</i>	<i>Lease*</i>	<i>Current</i>	<i>Expected 2001</i>
Company				
CT	√		All provinces	Add capacity for 18.5 m new telephone subscribers and 7.1 m datacom users
Unicom	√	√	180 cities, mobile: 322 cities	CDMA coverage to 200 cities
CMCC	√		All provinces, GPRS service in 25 cities and 16 provinces	GPRS for all provinces
CNC	√	√	18 major cities	Add 15000 km fibre-optic
Jitong	√	√	120 cities, 30 cities covered by city-area networks, 1000 VSAT stations	180 cities by 2002
Railcom	√		28 cities, 14 provinces	100 cities, all provinces
China Sat	√		All provinces [†]	n.a.

*While all operators have built their own backbone networks, CT still maintains a monopoly over end local loops throughout the country. Interconnection fees currently must be negotiated individually at every CT province administration.

[†]This includes 120 duplex remote stations providing access to remote regions such as Tibet, Qinghai, Guangxi, Yunnan, Inner Mongolia and Guizhou.

Source: Compiled by authors, 2001

Regulation of the Internet

MII is responsible for drafting policies of the whole information industry, including internet. Since the internet involves information flows to the public and there is the issue of censorship and security, other relevant authorities are the State Secrets Bureau (state secrets), Ministry of Public Security (network security), and the State Administration for Industry and Commerce which is responsible for registering ISPs and ICPs. The division between central and local governments is also not clear. Given the number of authorities involved it is often not clear who is in charge of the overall sector. In 1999 the State Council announced the formation of the National Information Leading Group (NILG) to improve coordination and other similar initiatives have been launched recently, however, it would seem that they have not alleviated the problem thus far.

Another general problem which is not just for regulation of the internet but more generally is the gap between national and local policies. Shanghai for instance has taken a lead in encouraging e-commerce, and local authorities have forged ahead without approval from the central government.

II. EFFECTS OF REFORMS: PRELIMINARY ASSESSMENT

General Effect on Prices and Structure of Industry

Other than licensing, the MII retains a considerable degree of control over the sector through determining the price range for basic telecommunication services. The MII justifies its control of prices as the desire to maintain stability in the market and to avoid disruptive price wars. In practice, the procedure for telecom rate changes begins with an operator submitting a proposal, followed by State Council departments and ministry discussions. Public hearings on the proposed prices must then be held before it is resubmitted again to the State Council for final approval and implementation.

In practice, basic telecommunication service fees have come down since 1999 mainly due to mandated price cuts rather than through competition. In 1999 the MII slashed service fees, in part to address consumer complaints, but also to increase consumer access to advanced technology and to rationalize the fee structure to conform to international practice in anticipation of China's WTO entry. It was also part of the strategy to provide universal service. The drastic cuts accelerated telephone popularization in rural areas, doubled the number of Chinese accessing the Internet, and enabling Chinese Internet service providers (ISP) to expand their business and telecom facilities, which in turn benefited Chinese Internet content providers (ICP). Reducing long-distance rates was intended to cut down on 'information smuggling'; i.e., calls to China being channeled through Hong Kong, where rates are cheaper for the identical call.

The MII, SDPC and the MOF also jointly announced massive cuts in telecommunications and Internet usage fees of up to 50 percent in early 2001, followed by a second round of cuts in July of 2001. As a result local phone charges/unit dropped from three to one minute, with the charge set at RMB0.10 (USD0.01) per minute. Monthly service fees for fixed-line telephones also dropped from RMB 24 (USD2.90) to RMB 18 (USD 2.17), and fixed-line phone installation fees were completely eliminated. Domestic long-distance charges have also been standardized at RMB 0.70 (USD0.08) per minute and additional charges on long-distance calls will no longer apply. Long-distance charges for calls to Hong Kong, Macao, and Taiwan were standardized at RMB 2 (USD0.24) per minute, while the rate for international calls was set at around RMB 8 (USD0.97) per minute. Initial installation fees have also been eliminated. The price to lease lines from CT was also lowered by a total of 72.8 percent.

Despite the mandated price range, several operators continued to announce further rate cuts of up to 40 percent for domestic long-distance rates while doubling the call rates for local calls to maintain their operational profits. At the local levels, the individual operators have under-priced slightly, when they felt that local conditions required it. Most competition in pricing takes place

through packaging mechanisms, which are not subject to the constraints of the established price ranges.

Prices for telephone line installation, mobile network access, Internet access fees, telephone charges for Internet uses, and data communication have also been cut a number of times over the past three years. The dramatic telephone popularization in rural areas doubled the number of Chinese ‘netizens’, and in turn catalyzed ISP and ICP business in those areas. Although telecom revenue suffered significantly due to these price slashes, it was hoped that telecom businesses would be prompted to explore more market-oriented channels for profit-earnings.

An example of price competition and its effect on reducing prices is evident with services which the government does not have price control such as IP telephony. There has been intense competition leading to reduction in prices of long distance calls. A price war on Internet Protocol (IP) telephony began on the first day of 2001 by China Netcom (CNC). A prepaid device for long-distance calling, IP phone cards have become very popular as they can save callers up to 70 percent on their long-distance call charges. CNC then further reduced their charges by another 50 percent, pricing IP domestic long-distance calls at RMB0.3 (USD 0.036) per minute and RMB2.4 (USD0.28) for overseas calls. The other operators, CT, Unicom, Jitong, and China Mobile followed suit and reduced their IP pre-paid cards, and the government had to in the end lower long distance rates that CT was charging in the face of such competition.

The following are the rates set by the government for CT and CMCC, encompassing basic services and showing recent decline in prices and fees.

Table 4: CT Domestic Long-distance Telephone Fee

Distance	Previous (RMB/minute)	Current Price (RMB /six seconds)
< 300 km within non-network area of intra-province	0.50	0.07
> 300 km within network area and non-network area of intra-province network	0.60	
< 800 kilometers inter-province	0.80	
> 800 kilometers inter-province	1.00	

Source: China Telecom, 2000

Table 5: CT International Long-distance rates

Destination Country	Previous (RMB/minute)	Current (RMB/minute)	Percentage Change (as result of latest reduction)
Australia	4.8	3.6	25%
Canada	4.8	2.4	50%
France	4.8	3.6	25%
Germany	4.8	3.6	25%
Great Britain	4.8	3.6	25%
Hong Kong	2.5	1.5	40%
Indonesia	4.8	3.6	25%
Italy	4.8	3.6	25%
Japan	4.8	3.6	25%
Macao	2.5	1.5	40%
Malaysia	4.8	3.6	25%
New Zealand	4.8	3.6	25%
Philippines	4.8	3.6	25%
USA	4.8	2.4	50%
Singapore	4.8	3.6	25%
South Korea	4.8	3.6	25%
Taiwan	2.5	1.5	40%
Thailand	4.8	3.6	25%
Other	4.8	4.6	4%

Source: China Telecom, 2000

Table 6: CT Domestic Telephone Line Leasing Fees (RMB/month)

Urban User Relay Line	Analog	RMB 100 (Commercial and Residential)								
	Digital	For telecom service RMB3000 (reduced from RMB 9000) For Internet service RMB 2000 (reduced from RMB4500)								
Domestic Lines Rental Fee	Range and Type	Local Network				Long-distance Network				
		Within District Line (Previous)	Current	Inter-district Line (Previous)	Current	Intra-province (Previous)	< 800 of inter-province (Previous)	>800 of inter-province (Previous)	Current	
	Frequency (bps)	200	200	1600	1000	2250	2800	3150	2500	
	DDN	9.6k	1200	1000	1800	1300	2250	2800	3150	2500
		19.2k	1330	1200	2000	1500	2700	3360	3780	2700
		64k	1680	1500	2520	2000	3640	4530	5350	3500
		128k	2540	2000	3240	2500	5350	6480	7610	5000
		256k	3290	2500	4940	3200	7630	10170	11860	5500
		384k	4520	3200	6430	4000	9940	13920	16310	6200
		512k	5900	3800	7820	5200	11480	17010	19840	7000
		768k	7900	4300	10060	6200	14920	22560	26190	8000
		1M	9300	5000	12500	7500	17570	26900	34710	9000
	Digital Lines	2M	14360	6000	18900	8000	27960	42590	50000	12000
		2M	5810	2000	10000	4000	14180	25340	31710	6000
		8M	20920	6000	36000	11000	51050	91220	114160	17000
		34M	75310	16000	129600	31000	183780	328390	410980	47000
		155M	271120	44000	466560	88000	661610	1182200	1479530	132000
622M			123000		247000				370000	
2.5G		344000		688000				1033000		

Source: China Telecom, 2000

Table 7: CT International Telephone Line Leasing Fees (RMB/month)

	Hong Kong, Macao, Taiwan		Other Asian countries		All other countries	
Type of Lines						
(Bps)	Previous	Current*	Previous	Current	Previous	Current
Normal Line	27400	2800	28900	14000	30800	15000
9.6k	28800	3000	30400	15000	32400	16000
19.2k	35700	3400	36800	17000	37800	18000
64k	56700	5200	58800	26000	60900	27000
128k	76700	6800	79800	34000	81900	34000
256k	95600	7800	99800	39000	102900	40000
384k	129200	9800	134400	49000	138600	50000
512k	161700	11400	167000	57000	173300	59000
768k	217400	13200	225800	66000	234200	68000
1M	274100	14800	284600	74000	295100	77000
1.5M	348600	17400	361200	87000	393800	95000
2M	400000	20000	414800	100000	431600	100000
8M		56000		280000		280000
34M		160000		780000		780000
45M		210000		900000		900000
155M		440000		2200000		2200000
622M		1230000		6150000		6150000
2.5G		3440000		17210000		17210000

*Current is as of latest reductions earlier in 2001.

Source: China Telecom, 2000

Table 8: CMCC rate schedules

Regular subscription and usage fees (Quanqitong)	
Connection fee (1)(2)	Varies from 100-800, depending on the various conditions of each individual province
Monthly fee	50
Base usage fee (per minute)	0.4
Domestic roaming charge (per minute)	0.6

(1) Operating subsidiaries offer different service packages with different connection fees. From time to time and in different regions in their respective provinces, subsidiaries may also offer promotional connection fee rates, which could be substantially lower than the upper limit indicated in the table.

(2) Connection fees have been cancelled with effect from 1 July, 2001.

Source: CMCC, 2000

Contract Service Tariff Package Scheme (RMB)				
Monthly fee	Minutes per month(1)	Usage charges during peak hours (2) for Each minute exceeding covered basic usage	Usage charges during off-peak hours (2) for Each minute exceeding covered basic usage	Free value-added services attached
98	170	0.60	0.30	A-C
168	330	0.50	0.25	A-D
268	600	0.45	0.22	A-E
388	1,000	0.40	0.20	A-F
568	1,700	0.35	0.18	A-G
788	2,588	0.30	0.15	A-I

(1) Not including inter-provincial and international roaming calls.

(2) Peak hours: from 07:00 to 23:00 of each day. Off-peak hours: from 23:00 to 07:00 of the next day.

(3) Value-added services: (A) Call forwarding, (B) Call holding, (C) Call waiting, (D) Caller number display, (E) Voice mail, (F) Conference calling, (G) mobile secretarial services, (H) Caller ID restriction,

(I) Preferential right to use new services. Operating companies can adjust the number of value-added services attached to each category according to their local economic conditions.

Contract and Non-contract Prepaid Card (RMB)	
Connection fee	None
Monthly fee	None
Base usage fee (per minute)	0.6
Domestic roaming charge (per minute)	0.8

Long Distance Services (RMB)	
Domestic long distance calls (1)	
Intra-provincial long distance calls	0.07 per six-second unit
Inter-provincial long distance calls	
International long distance calls (1)	0.80 per six-second unit
Hong Kong, Macao and Taiwan long distance calls (1)	0.20 per six-second unit

(1) There is also a 40% discount for all domestic long-distance calls and certain international long-distance calls made between midnight and 7.00 a.m.

IP Card Long-distance Rates (RMB per minute)	
Domestic long distance calls	0.30
Hong Kong, Macao and Taiwan	1.50 / 2.50
International long distance calls	
United States, Canada, Japan, Korea and Australia	4.80
Other countries and regions	4.80

Source: CMCC, 2000

Most of these rates are artificially low and will require significant rebalancing prior to the sector becoming fully competitive. IP card rates may be the only ones that closely reflect true costs of these services.

The resulting decline in prices for long distance calls impacted seriously on CT's overseas listing plans, since CT holds a franchise on fixed-line phone service and makes most of its money from long-distance calls. Whereas China Mobile (listed in Hong Kong), and Unicom should be able to benefit significantly from the changes, as both companies lease lines from CT for their voice and Internet businesses. On the other hand, CMCC, Unicom, Netcom and Jitong could be adversely affected by the changes in Internet protocol (IP) telephony. Last year, they were allowed to use the Internet to carry long-distance phone calls for about one-third of what CT charges for its regular long-distance phone service. With CT's rates falling, the discount margin people enjoyed for using IP telephony has been narrowed significantly, removing much of the attraction for using the service in the first place.

In the third quarter of 2001 China Mobile's average revenues per user fell by 35 percent leading to a fall in its and Unicom's share prices. The additional users of mobile are not the paying subscribers, they are using pre paid cards and thus the cost of administration and use is much lower.

It remains unclear how profitable each operator is under current conditions. While those operators who have partially listed must regularly reveal financial conditions for those listed sub-entities, a significant portion of their businesses remains undisclosed. Corporatization has not severed the state connection and it is not possible to discern exactly how much support they still receive from the shareholders and how many are actually sustained purely by generated revenues. Furthermore, many board members and top-level management remain closely connected with the authorities. The support that these relationships could continue to generate, in any terms, is utterly unquantifiable. CT, CMCC, Unicom, and CNC each have professed that they are no longer subsidized by the state and are able to run a stand-alone operation profitably.

Licensing and the forced divestiture of CT's mobile and paging components have at least, however, ensured that there is less inter-product subsidization, although this possibility has not been eliminated entirely.

Growth and competition in the different sub sectors

Fixed Line

The number of fixed line subscribers increased substantially in the last few years, especially in the post 1998 reform era. In 1995 fixed line subscribers were 40 million and by 1998 it had doubled to 87.4 million. This number has more than doubled again to 190 million by the first quarter of 2002. As a result penetration rates of the population for fixed line telephony have gone up from 10 percent in 1998 to 14 percent.

Mobile phone

Mobile telephony began to increase significantly with the introduction of the GSM networks in 1995. Domestic and international roaming capability was introduced in 1996. The number of mobile subscribers in China has grown dramatically from 3.6 million in 1995, to 43.3 million in 1998, to 120.6 million as of July 2001⁷, surpassing the US, which has 120.1 million users and growing at a much faster rate than fixed-line users. By the first quarter of 2002, the number had gone up to 161 million and a penetration rate of 11.2 percent of the population, and is soon expected to surpass the number of fixed line users (China Daily). The increase has been due to the introduction of pre-paid cards, which do not require subscription and monthly user fees. If the number of mobile users grows at 20 per cent p.a. as expected in the 10th Five Year Plan, there will be more than 260 million users by 2005.

The targeted growth rates may not be achieved if there is a slowing down in growth as the market begins to saturate in the developed areas.⁸ As installation fees for fixed line have been eliminated, there is also now greater competition between the two sectors. The elimination of mobile access fees also means that sales agents will lose the commissions they previously received when signing up new numbers. Increased usage could come about if there was a reduction of monthly rental fees on phones or adoption of the 'calling party pays' (CPP) method of billing to lead to lowering of costs to individual mobile telephony users.

Additional mobile licenses are a subject of great debate and it remains unclear whether the government will issue new licenses. Recent comments from the Telecommunications Administration Bureau of the MII hinted that having only 2 mobile players in the sector did not create enough competition, and therefore, there will be a need to have new licenses issued to operators during the transition to third generation (3G) technology. This, however, leaves ample room for interpretation, as the technology changes are not completely within the control of the central authorities. Moreover, the MII has yet to decide exactly which 3G technology it wishes to adopt. A time-division synchronous code-division multiple access (TDS-CDMA) was recently created within China, with standards parallel to those of the WCDMA standard favored by European and Japanese companies. TDS-CDMA was also approved by the ITU's telecom

⁷ As reported in the China Daily, August 2001, statistic from CNNIC

⁸ For instance only 3.84 million new subscribers signed up in July 2001 despite the abolition of the network accessing fees, compared with over 5 million per month in the first half of the year.

division as one of the three international 3G standards. The CDMA2000 standard developed by Qualcomm is also in the running, and has recently been given further albeit unofficial support.

Internet

The number of Internet users⁹ in China has been doubling roughly every 5-6 months, with the latest count at 26.5 million in July 2001 comprising of 4.54 million who are connected through leased line connections, 17.93 million who are dial-up users and 4.03 million who use both. Aside from computer users, another 1.07 million access the Internet through mobile terminals and information electrical appliances. As of the beginning of 2001, there were 8.92 million computer hosts, of which 1.41 million are connected through leased lines and 7.51 through dial-up connections (CNNIC). Despite the high growth rates, China is a long way from being able to be considered as a 'wired' nation.

Furthermore, over 75 percent of all usage for the Internet is for information gathering and entertainment purposes, and with e-mail, search engines, and software down/uploading (CNNIC) as the main services being used. The chief bottlenecks for further internet usage is the high cost and slow speed of surfing the web incurred in most areas. On the average, the transmission rate of the common telephone line used by most people to access the net is only 56 kbps, making downloading and uploading very time-consuming. Although ISDN was launched back in 1998, allowing users to access the Internet and make calls simultaneously, and speeding up transmission rates to 128 kbps, it remains costly and is still insufficient bandwidth to allow for more sophisticated online usage and programs.

The Chinese government still retains control over the data networks that provide access to international internet and at present all telecom players can sell Internet access on commercial terms.

Shanghai however, has been able to benefit by more advanced technologies since the beginning of 2000 when it launched its Asynchronous Digital Subscriber Line (ADSL) service. By the end of the year, the city already had one of the world's leading broadband networks in place, far outpacing anything else available in China, both technologically and in terms of size. ADSL end offices now number over 160, covering over 4 million households, enabling over 50 'intelligent' areas ready for ADSL by the beginning of this year.¹⁰

ADSL is not the only broadband technology available. More mature technologies, include Hybrid Fiber Coax (HFC), Digital Subscriber Line access (DSLx), Local Multipoint Distribution Service (LMDS), and Fiber optic cable. Until recently, broadband in China consisted mainly of ADSL and the Ethernet, with HFC applied in only a few selected pilot project locations. Much of

⁹ CNNIC semi-annual survey defines Internet users as Chinese citizens who use the Internet at least one hour per week.

¹⁰ ADSL employs existing double twisted copper telephone lines to provide broadband network access, enabling a downstream rate of 8 Mbps and an upstream rate of 760 kbps. However, transmission quality can only be maintained within a distance of 5 km, thus requiring one base site every 5 km, and heavy initial investment by telecom operators in network construction. Costs have dropped noticeably since ADSL was first introduced from about RMB450-500 per month to about RMB130 per month.

the difficulty in getting this technology installed in a wider area arises from issues of convergence. The HFC broadband access technology is the Cable Modem, which works on the principle of using existing cable TV lines to transmit signals to a television set while transmitting data to a computer at the same time. SARFT needs to cooperate with the MII to get this technology approved on a nation-wide basis.

Perhaps one of the more interesting developments in the industry, and a step on the way to convergence is the evolution of the Voice over Internet Protocol (VoIP) services already mentioned above. Despite significant resistance from existing operators and the MII, the possibility of providing reduced long-distance costs, up to 70 per cent less than conventional long distance rates over the fixed line provided by CT, led to intense competition for the provision of this service as already mentioned. Knowing that it would be difficult to control such developments, MII legalized VoIP and incumbents such as CT have seen their revenues drop by USD130 million due directly to the increase in VoIP usage. This substantial price differential has thus far more than compensated for the inferior quality compared to fixed line. Mobile operators are also now also providing IP network access and subscribers can use VoIP services through their mobiles as well. In terms of expansion facility, IP networks can be built and deployed more rapidly than PSTN or local area networks (LAN).

As a result, the MII was forced to create a framework in order to facilitate the incumbents to engage in the provision of these services as well. Initially, a six-month pilot project was initiated. CT was the first carrier to launch the service in 25 cities. The project cost USD2 million and deployed 100 connections in just under 2 months.

Currently five of the seven telecommunication carriers are licensed to provide VoIP services. Foreign network providers and local paging companies have come together in alliances to try and get a share of the lucrative market. Companies such as AT&T and Edge2net Inc. have already entered the market. The latter has teamed up with China Motion Telecom, creating Shenzhen China Motion Telecom.

Some forecasts predict that the compounded annual growth rate (CAGR) for 2000-2006 in this service segment will reach 90 percent for minutes of usage (MOU) and 79 percent for average revenue per unit (ARPU), with an initial surge leading to a gradual decrease from 2003 onwards, when revenue growth will be lower than usage growth¹¹. Calculations based on the official user growth statistics give a more conservative CAGR of 33.45% over the period of 2002-2006.¹²

The Internet connection fee is now set at RMB 0.02 (USD 0.002) per minute. However, ISPs may offer services in either direct Internet connection packages or monthly services form. IP charges have also been adjusted, with particular focus on international calls and calls made to Hong Kong, Macao, and Taiwan. CT has continued to offer its special late night service package

¹¹ Overview of China Telecommunications Sector, Price Waterhouse Cooper, February 2001

¹² China Telecommunications Industry Development Guide 2002. Compare to user CAGR for fixed line and mobile sectors over the same period at 9.81% and 16.79%, respectively.

and has introduced further international discounts for selected countries.¹³ CT's IP service connects its customers to over 2000 counties and cities throughout the country, and 200 countries and regions worldwide.

The state also realizes that it risks losing its once captive audience as its people join the international community of the information society. As such, it has increased efforts to develop various administration and ministry networks. The People's Liberation Army (PLA), for example, has developed its own intranet, giving soldiers online access to libraries, lectures, mail and movies. In recent months, the government has increased funding for seven of its news organizations, including Xinhua News Agency, People's Daily and the English-language China Daily, to maintain their own web presence, and censorship on the net has actually turned out to be less stringent than in print and television.

Table 9: 2002-2006 Forecast Percentage User Growth by sector¹⁴

	2002	2003	2004	2005	2006
Fixed Line	15.6	12.1	10.4	9.1	7.7
Mobile	42.4	25.7	16.0	13.1	12.9
Internet	53.62	41.05	34.76	29.43	28.91

Competition and Improvements in Quality of Service

It is difficult to measure whether the limited increase in competition to date has led to improvements in quality. However, interviews do reveal that there has been a change in attitude of CT in servicing their customers better and the MII itself has also committed itself to regularly publicize service quality records from the various operators. In an effort to increase service quality further, the MII has also committed itself to regularly publicize service quality records from the various operators. Initially, the Telecom Consumer Complaints Handling Center under the MII makes public all complaints made against the telecom companies received in 2000, when the center was officially established and began to officially record consumer complaints. After this initial disclosure, complaints will be publicized on a regular basis.

Notices on complaints handling will be published every three months. Service quality reports that are submitted regularly by telecom agencies to the MII will be published every six months. The results on surveys and evaluations of customer satisfaction will be published annually, after the information is gathered and processed. All other information related to service quality will be published irregularly, and according to circumstance. Recently, telecom companies have been warned that if they do not provide good service, they will be given a warning by the MII or even face losing their licenses altogether. Minister Wu stressed that only through increased competition could the quality of service be guaranteed to improve.

The latest data reveals that the center received 1305 complaints and comments during the past quarter. Of the 92 that were investigated, 44 were related to service quality, while 38 were

¹³ See Pricing and Profitability section under Operator Summary below.
¹⁴ Chinese Telecommunications Industry Development Guide, June 2002

related to billing inquiries. CMCC received the largest number of complaints at 33, followed by CT at 32, Unicom at 19, and Jitong at 2. The MII did not, however, release the outcome of their investigations. (MII)

CT claims that it has a 93.51 per cent satisfaction rate for installation and relocation services, and 93.34 per cent for payment convenience and charging accuracy as of 1999. CMCC's official toll call completion rates for GSM rose to 61.14 per cent in 2000. Wireless completion rates were given as 99.06 per cent, with voice call completion at 60.09 per cent in that same period. Call drop rates were given as 1.25 per cent.

Other reports indicated that CMCC and Unicom's call quality ratings rank higher than some other operators in the region.¹⁵ These must be taken in the context in which they are given; only CMCC and Unicom's Hong Kong listed groups were analyzed, omitting the analysis for the majority of both company's majority assets in China, which remain undisclosed to the public.

In summary

There are three operators licensed to provide fixed line service, but China Telecom (CT) dominates and owns most of the back bone infrastructure, and is also the dominant player. In the mobile telephone sector, intense competition has flourished in the terminal equipment side, however, services are currently only offered by two operators – both of whom were spun off from (CT). Although the market shares for the two have slowly been moving towards parity with one another, China Mobile's share of the market is still dominant at around 60 percent. The mobile telephony market is a duopoly and there has been reluctance on the part of the two to work together. For instance not having number portability eliminates much of the incentive for consumers to switch service operators. Newly attained market share rarely comes at the expense of the incumbent; instead most of the uptake comes from new subscribers. In an effort to eliminate this type of 'arbitrage' opportunity between operators, the MII has started to standardize.¹⁶

Regulation for Internet service providers (ISPs) is yet to be as precisely defined as that for the fixed-line and mobile service sectors, and thus, there has been a major proliferation of ISPs throughout China, in tandem with the technology boom prior to the recent burst of the dot.com bubble.

¹⁵ Salomon Smith Barney Industry Report, November 2001.

¹⁶ Standardization in the mobile sector, the MII has also released a series of telecom industry standards, including the following eight: 1) The technical requirements for the 800MHz CDMA digital cellular mobile communications network interface between the mobile switching centers and base station sub-systems. Implemented April 2000; 2) Technical standard for 800 MHz CDMA mobile network equipment. Implemented December 1999, 3) Base stations, aerial interfaces, mobile applications, WDM (32x2.5GB/s), network access IDLC, and ADSL standards for 800MHz CDMA mobile, all implemented December 1999.

Impact of Reforms to date on Telecommunications Industry				
(all numbers in RMB)				
	1998	1999	Dec-01	May-02
Backbone optical cable line ('000 km)	180.8	194.1	340	
Fixed asset investment (bn)	168.1	151.8		
Telecom services business volume (10m)	226.49	313.24	350 (estd)	
Price			Jun-01	
Fixed (LAN) line installation (analog)	1010	725	free	
Domestic leased lines (digital) (per month)				
<i>for telecommunications services</i>		9000	3000	
<i>for Internet services</i>		4500	2000	
International Leased lines (per month)				
<i>HK, Macao and Taiwan</i>		27400	2800	
<i>Other Asia</i>		28900	14000	
<i>Other</i>		30800	15000	
Domestic long distance fee (per minute)		0.5-1.00 (depending on range)	0.7 (flat fee)	
Internet connection fee (per minute)			0.02	
Mobile network access fee	800	500	free	
Users (millions)			Jun-01	
Fixed line	87.4	108.8	166.8	190
<i>urban</i>	62.6	74.6		
<i>rural</i>	24.8	34.1		
Pagers	39.1	46.7		
Mobile phone*	23.9	43.2	120.6	161
Fixed line penetration (per 100 users)	10.5	13	13.6	13.9
Computers w/ Internet access	2	8.9	22.5	
Competition				
Number of players	2	5	7	7**
Mobile	2	2	2	2
Fixed line	2	2	3	3
Data	1	2	2	2
VoIP	0	1	5	5
Market share of CT mobile (%)	95	89	75	68
Market share of Unicom mobile (%)	5	11	25	32
* Various estimates have mobile phone use targeted to hit 300 million by 2005				
** Despite the break up of China Mobile into two, north and south and the incorporation of China Netcom to the northern part of CT to become China Netcom Communications Group.				
Source: various issues of China Daily and MII				

phenomenon has highlighted a lacunae in the necessary telecom regulations and it is only in response to perceived needs for new regulations that any legislation is drafted. The ISP market and consequently the Internet Content Providers (ICPs) have therefore enjoyed a much more

liberal market place in which to develop than the other two sectors. Both private and foreign ownership is allowed, although registration is now been required.

III. WTO ACCESSION, RECENT REFORMS AND PENDING ISSUES

After the major changes in 1998-99, there were significant price reductions and dramatic increases in teledensity. The resulting changes have mostly been due to controlled competition managed by the government, although there were instances of the influence of technological advancement overcoming government control such as in the case of VoIP. Much remains to be done to restructure the sector and have the sector function under the appropriate competition and market-based framework that is consistent with China's WTO Accession and the Basic Telecommunications Agreement (BAT). Prior to accession, some initial steps were taken towards the end of 2001, but they are still not sufficient.

WTO Accession Commitments

Many industry players are looking towards WTO membership to open up the telecom sector market to foreign participation, and bringing the domestic regulatory and business environment in line with international standards. The main commitments on telecommunications services will require partial removal of limitations on market access, especially with regard to the right of establishment; removal of limitations on national treatment; and compliance to the reference paper which covers definition and principles on the regulatory framework for basic telecommunications services. The working definition used in the schedule is that basic telecom service encompasses local, long distance, and international services for public and non public use; may be provided on facilities basis or by resale; and maybe serviced through any means of technology (e.g. cable, wireless, satellite).

Foreign investment is allowed to enter but initially at a lower ownership level and with geographical restrictions. Over a certain period of time, two years for value added, services, five years for mobile telephony and six years for domestic and international services, the geographical restrictions are removed and the foreign ownership is capped at 50 percent for value added services and 49 percent for mobile telephony and domestic and international services. Thus, foreign investment is not intended to have majority in the sector and the treatment for foreign entry is more liberal in value added services than for the other two sub sectors, as has been the case in practice to date.

Box 1 Summary of China's WTO Commitments

The main commitments are to open up for foreign entry, which is currently prohibited. The opening up is undertaken in phases with regard to geographical area and percentage of foreign ownership; and agreement to give national treatment to foreign firms. China also has to abide to the reference paper on telecommunications.

Value added services (*electronic mail, voice mail, on line information and database retrieval, electronic data interchange, enhanced facsimile services, code and protocol conversion, on line information and data*); **paging services**: no limitations on cross border supply except for right of establishment, no limitations on consumption abroad and no limitations on national treatment. On right of establishment: upon accession joint ventures with up to 30 percent foreign ownership will be allowed to provide services in Shanghai, Guangzhou, and Beijing. Within one year this will be expanded to Chengdu, Chongqing, Dalian, Fuzhou, Hangzhou, Nanjing, Ningbo, Qingdao, Shenyang, Shenzhen, Xiamen, Xian, Taiyuan and Wuhan. The amount of foreign investment is to be no more than 49 percent. Within two years there will be no geographic restriction and foreign ownership can be up to 50 percent. Unbound with respect to presence of natural persons.

Mobile Voice and data services (*analogue/digital/cellular services, personal communication services*): no limitation on cross border supply except under right of establishment, no limitations on consumption abroad, and no limitation on national treatment. On right of establishment upon accession joint ventures will be allowed in Shanghai, Guangzhou, and Beijing with foreign ownership of up to 25 percent, Within one year areas will be expanded to include services in Chengdu, Chongqing, Dalian, Fuzhou, Hangzhou, Nanjing, Ningbo, Qingdao, Shenyang, Shenzhen, Xiamen, Xian, Taiyuan and Wuhan with foreign investment allowed up to 35 percent. Within three years after accession foreign investment will be no more than 49 percent and within five years geographic restriction will be removed.

Domestic and international services (*voice, packet switched, circuit switched, facsimile, domestic private leased circuit services, international closed user group voice and data services*): no limitation on cross border supply except under right of establishment, no limitations on consumption abroad, and no limitation on national treatment. On right of establishment upon accession joint ventures will be allowed in Shanghai, Guangzhou, and Beijing with foreign ownership of up to 25 percent, Within five years areas will be expanded to include services in Chengdu, Chongqing, Dalian, Fuzhou, Hangzhou, Nanjing, Ningbo, Qingdao, Shenyang, Shenzhen, Xiamen, Xian, Taiyuan and Wuhan with foreign investment allowed up to 35 percent. Within six years after accession foreign investment will be no more than 49 percent and geographic restriction will be removed.

The BAT also includes a reference paper which contains the principles of pro competitive regulation and administration of the sector.

**Box 2 Summary of WTO Regulation Reference Paper
(Annex to Fourth Protocol of GATS Agreement, the Agreement on Basic Telecommunications, effective 1 January 1998)**

China's WTO Accession in telecommunications obliges it to also adhere to the principles of the WTO Regulation Reference Paper. The reference paper provides for pro competitive environment of policy and regulation.

Competitive Safeguards:

Prevention of anti competitive practices in telecommunications: appropriate measures shall be maintained for the purpose of preventing suppliers who alone or together, are a major supplier from engaging in or continuing anti competitive practices.

Safeguards: anti competitive practices include in particular engaging in anti competitive cross subsidization, using information obtained from competitors with anti competitive results, and not making available to other services suppliers on a timely basis technical information about essential facilities and commercially relevant information which are necessary for them to provide services.

Interconnections are to be provided under non discriminatory terms, conditions and rates; in a timely fashion and upon request at points in addition to the network termination points offered to the majority of uses. Procedures for interconnection to a major supplier will be made publicly available and major suppliers will make publicly available either its interconnection agreement or a reference interconnection offer. An independent domestic body will also resolve interconnection disputes.

Universal service: any member has a right to define the kind of universal service obligation it wishes to maintain. They would be considered not as anti competitive as long as they are administered in a transparent, non discriminatory and competitively neutral manner.

Licensing criteria: need to make publicly available all licensing criteria and period of time to process license, terms, and conditions of individual licenses, and reasons for denial of license.

Independent regulator: the regulatory body should be separate from and not accountable to any supplier of basic telecommunication services. The decision and procedures used by regulators shall be objective to all market participants.

Allocation and use of scarce resources: allocation of scarce resources such as frequencies, numbers and rights of way, will be carried out in an objective, timely, transparent and non discriminatory way. Current state of allocated frequency bands will be made publicly available.

Recent Steps to build A Regulatory Framework

The government is currently working on system reforms for the MII and introducing the necessary legislation to be in compliance with their WTO commitments, notably the Basic Agreement on Telecommunications. Work on a telecommunications law has been ongoing since 1986 and begun by the former MPT. Meanwhile, bureaucratic reforms that have gone on in tandem with industry reforms, which increased the number of new players, and rapid changes in technology, have forced revisions of the drafts before they were even issued. As a result the

telecom industry has been to date governed by an ad hoc set of regulations. While the law appears to be still several more years in the making, a long-awaited provisional Telecommunication Regulation was issued in September of 2001 in line with its WTO commitments in the Telecom sector.¹⁷ These regulations and some follow up regulations are a very important first step towards developing a comprehensive and pro competitive regulatory framework, but of course there remain many issues of interpretation, clarity and implementation, and some areas which have not been adequately addressed. Moreover, as they are only regulations, they do not have the full effectiveness that a true Telecommunications Law would have.

Defining Coverage

The regulations apply to all telecommunications and telecom-related activities in China. Telecom services refer to services provided by means of carrying, sending or receiving sound, data, images or any other information through a hard-wired or wireless system. This is intended to cover broadcast networks, the Internet, and related services so as provide the legal basis for the "convergence" of information technologies (Horsley, 2001).

These services are further divided into two categories: basic and value-added services. Basic telecommunication services include fixed or mobile local, long-distance and international phone calls, supplying infrastructure facilities, satellite communications, Internet and information transmission, sale or lease of bandwidth, wavelength, optical, channels or any other network elements, paging and reselling services. Value-added services refer to service which the supplier adds value to the information by enhancing its form or content or for providing storage and retrieval. This include e-mail, voice mail, online information database and retrieval, electronic data exchange, online data processing and transaction handling, value-added fax, Internet access service, Internet information service, and video conferencing.

The catalog of value-added telecom businesses has since been adjusted several times. New classifications and new services have been added. Value-added telecom businesses refer specifically to telecom and information services based on public network facilities. In addition to the nine items originally listed in the catalog in the Telecom Regulation issued in September, there are now the following five categories:

- Fixed line-based value-added telecom services, including telephone information, paging, message recording and restoring and video conferencing services
- Mobile phone-based value-added telecom services
- Satellite-based value-added telecom services
- Internet-based value-added telecom services, including Internet access, data center, information, analog private network, video-conferencing imaging and other Internet-based services
- Other data-transmission and network-based telecom services, including computer information, electronic data exchange, messaging, e-mail, fax restoring and forwarding and analog private network services.

¹⁷ The regulation has since been updated with a revised catalogue of value added services. See Appendix C

Foreign Investment

Foreign investment issues are not explicitly addressed in the regulation, although a schedule for phasing in foreign ownership has been set out in China's accession to the WTO. In addition the Regulations for the Administration of Foreign Invested Telecom Enterprises (FITE Regulations) were promulgated towards the end of 2001, and took effect as of 1 January 2002. An additional MII directive was issued also in early January 2002 for Administrative Measures for Telecommunications Business Operating Permits that defined changes in registered capital requirements, permit applications and approvals processes, as well as operating and annual auditing requirements.

Responding to requirements of Reference Paper

The telecom reference paper has specific requirements on creating pro competitive regulations and administration of these regulations and the Telecommunication Regulations incorporates many of the elements required. Implementation and interpretation of course remains to be seen.

Competitive safeguards are incorporated to prohibit unreasonable cross subsidization of other businesses, actions that limit subscribers from using services of other operators, and providing below cost services. In addition operators are not allowed to restrict subscribers to using only services or equipment set by the operator, refuse or delay service without justification, increase rates or items for which it charges fees without approval from regulator or customer, provide misleading information or refuse to carry out its commitment to subscribers.

Licensing: license issuance guidelines for basic telecommunication and VAS are spelled out in the regulations. Any new telecom service provider must obtain a license before it can legitimately provide any kind of services. To meet the transparency requirements, the criteria of eligibility for a license, a time limit for decisions to be made on licensing application and reasons for denial to be made available have also been set. In issuing the license, the impact on national security, network safety, sustainability of telecom resources, environmental protection and competition in the telcom market need to be considered. The pending issues here are the implementing regulations and details as to how MII and the provincial regulations will evaluate these factors and handle issues as auctions.

Domestic *interconnection* agreements need to be established if China is to have a multi operator system for delivery of telecommunication services. The uphill battle faced by Unicom demonstrates how lack of one led to initial anti competitive outcomes. The experience of other countries also demonstrates the crucial importance of fair and transparent interconnection policy in ensuring competition and promoting market entry.

The provisions related to interconnection in the telcom regulations are in line with the reference paper in requiring major operators not to refuse other operators request for interconnection to public networks and that there be non discriminatory and transparent interconnection procedures, including how disputes should be resolved. The operators must also "unbundle" network

elements they sell so that the supplier only pays for the network components or facilities that it requires. However, the issue of implementation is still a question mark since how the administration and regulation of the sector is to be undertaken, whether under MII, or with the creation of a new independent body, is still being debated. Furthermore there is no mandate on number portability from China Telecom. It is also not clear whether there is an obligation for CT to provide an operations support system which would be necessary for competitors in ordering, billing, marketing and providing efficient and quality services.

Universal service is to be provided in a transparent, non-discriminatory and competitively neutral way. The regulations do mention introduction of universal service by mentioning some form of subsidy or cost recovery without being specific and linking it to the competitive safeguards. There is also a requirement that operators carry out any relevant national provisions on universal services. At this point in time it is not clear how universal service will be designated or implemented.

Resource allocation of scarce resources such as frequencies are to be done in an objective, transparent, timely and nondiscriminatory way. The regulations in fact goes beyond the reference paper by referring to the establishment of an auction-based system of allocating telecom resources including frequencies and network numbers. Leading operators are required to ensure that such users can utilize their network resources. However, it is not clear what the implementing regulations will be like.

Restructuring of regulation and administration of telecom in line with the reference paper requirement to have an independent regulator has begun, but it is still unclear what the final outcome will be and how long the process will take. The reference paper calls for the regulator to be separate and not accountable to operators and suppliers, and be impartial and non-discriminatory in dealing with all market participants.

The restructuring of regulation and administration of the telecom sector has been the subject of debate for the last few years. Premier Zhu Rongji has openly criticized the redundant procedures amongst the various sectors in the telecom industry. Whilst the MII supervises the telecom network, SARFT presides over cable markets, and yet other different departments regulate the Internet. These redundant bureaucratic administrations are estimated add another RMB100 billion (USD12.08 billion) over the next few years alone (China Daily).

In the September regulations the MII is still designated "to oversee and control the telecommunications industry of China". But surveillance and control of the sector should also abide by the following principles: "the separation of administrative departments and enterprises; the break down of monopolies and the encouragement of competition, transparency, fairness and just practice". On paper there has already been the separation of MII from the operators since the 1998-2000 restructuring, although how objective and impartial MII can be vis a vis China Telecom and China Mobile is still questioned. The MII has now also been tasked to break down the monopolies of these operators. The implementation of this policy will be complex and is unlikely to be effective for some time and other options may still be considered before the final decision on how the sector should be regulated and administered.

One scenario is to eliminate the MII altogether within five years, turning the three areas in telecom and information network regulation over to the SDPC. Such a move would in fact have far reaching implications for regulatory independence for the industry. The MPT's other functions will then be outsourced to specially established professional firms that, instead of the government, will be responsible for managerial duties. If actually implemented, this plan could seriously affect current plans for fixed-line telephone operators such as CT, Jitong, and CNC to obtain public funding through Hong Kong market listing.

The decision on how the sector should be administered and regulated to ensure objective and independent outcomes will need to be made at a higher level and in a more coordinated way. In September of 2001 the government also set up a new commission to decide major policies for the telecommunications sector which will decide on major policies and laws for the sector, while MII will be in charge of implementing those rules and administering standards (Dow Jones Newswire, 9/20/01). Such a commission would be more impartial and more objective, compared with if the major changes in policy and laws are to be determined by MII since the large incumbents are still closely associated with MII.

Regulations on quality and greater transparency

Five regulations governing the quality of services have also been promulgated. The MII issued earlier this year the "Reporting System on the Quality of Telecommunications Service", which requires operators to report periodically to the relevant government authorities concerning the quality of their service.

Another notice, the "Public Notice System on the Quality of Telecommunications Service" regulates the frequency of publication. Additional regulations concerning service quality maintenance continue to be under review. These include the "Temporary Supervision and Management Methods on the Quality of Telecommunication Service", "Temporary Management Methods on Accepting Telecommunication Customers' Complaints", and "Appraisal System on Telecommunication Customer's Satisfaction".

Meanwhile, the "Standard of Telecommunication Service," issued previously, has proven outdated, as disputes concerning telecom services have increased in recent years, forcing the MII to issue more detailed regulations to supervise the sector.

Current regulation mandates operators in the value-added business to be legal entities, with capital and professional staff corresponding to their level of operating activities, credibility or capability to provide long-term service. They must also be in conformity with other qualifications issued by the government, but they are not constrained by specific contribution ratios and ownership stipulations in the current draft regulation. Value-added services are the most liberalized in the sector.

Other provisions in the telecom regulations also address the provision and quality of telecom services, network construction and security. Requirements of greater transparency also implies

that there will be potentially a greater role for non government sector -- operators, users, and other relevant parties - to provide input to rates, as well as implementation of regulations, setting of standards and so on.

Internet regulation

China has over 300 ISPs, and over 600 ICPs. Regulations still need significant revision in terms of permits and registrations. Of the ISPs, 53 have MII permission to provide nation-wide services. The remainder received approvals for limited service by the local provincial telecom authorities (PTA).

New regulations are still needed for context approval for ICPs, but are expected to change shortly. The MII is also expected to unveil new revisions on the regulations for both ISP and ICP management. The latest regulations require ISPs to obtain permits to do business and require ICPs to register and record within the MII/PTA system currently in place. ISP businesses no longer require foreign investors to find a Chinese partner in order to get approval.

National legislation concerning Internet information services, electronic bulletin services and online news publishing was enacted at the end of last year. This April, national legislation concerning Internet cafes was issued. Even though the rules exist, local authorities have seen a need to reiterate the rules and in some cases extend deadlines for the necessary approvals.

In Beijing the Beijing Communications Administration (BCA) issued a circular requiring all ICPs and ISPs to apply for a license and carry out filing procedures in line with the recently issued national legislation. The deadline was extended to July 1 of 2001. ICPs that failed to meet the July deadline face BCA inspection and website closure. ISPs are forbidden to provide connection services to these ICPs. Electronic bulletin service also needs to apply or file for examination and approval by their local PTA or the MII. Those websites that have not yet gone through this procedure cannot establish bulletin board service columns (BBS).

In conjunction with the Ministry of Public Security (MPS), the Ministry of Culture and the State Administration for Industry and Commerce (SAIC), the MII issued recently new measures for the 'Administration of Places that Provide Internet Access Services' governing Internet cafes. Those that have already been approved by the relevant authorities are now required to apply for re-examination and approval. Internet cafes may not set up within a 200-meter radius of primary and middle schools and are forbidden from setting up in residential building.

E-commerce regulation

Current fiscal reform does not seem to be in favor of the new economy, but China still remains undecided on whether to tax e-commerce. Jin Renqing, the director of China's State Administration of Taxation (SAT) recently said that China will not forego the right to tax e-commerce. The SAT has set up a strategy and research group to specifically discuss the issue of e-commerce taxation, and will conduct research on the logistics of an e-commerce tax policy and plans to introduce a policy framework during the second half of 2000.

New e-commerce regulations are being drafted in an attempt to meet the requirements of China's Internet economic development, differentiate and standardize business activities on the Internet, enhance the government's role in the sector, protect the lawful rights and interests of enterprises and consumers, crack down on illegal business activities, maintain the socioeconomic order, and to establish an e-commerce operations registration system. Beijing has issued the Circular of Beijing Municipal Administration for Industry and Commerce Concerning E-commerce Activities Registration.

IV. EXPECTED DIRECT IMPACT ON THE TELECOMMUNICATIONS SECTOR

The structure and performance of the telecommunications sector will still be determined by the government in the near future since all the operators are state owned, and regulations are still under the management and control of the government. In the provision of basic telecommunications, the strategy appears to be to increase competitiveness of the different government owned operators. Foreign investment has already begun to play a role in value added services and is likely to continue to be more active in the higher value added services, or as a strategic alliance partner to develop areas and expertise which China is interested in. However, in basic telecommunications services, for now it seems clear that the desire is still to have government owned companies as the dominant players.

Other than increasing the competitiveness of the incumbent operators in anticipation of increased competition from new entrants and complying with the market oriented principles of the Telecommunications Reference paper, the government has prioritized the development of the telecommunications sector by setting several ambitious targets. The SDPC's 10th Five Year Plan (2001 –2005) targets the growth of the transportation, post and telecom sector to be 8.5 per cent p.a., or higher than the average GDP growth rate of 7 percent, and which will mean that the sub sector will account for 33 percent of GDP by 2005. Fixed asset investment in the sector will be increased by close to 9 percent per annum, and building a broad band network to support business development will be completed over the next 3-5 years. Moreover, convergence so that there is integration of the Internet, telecom networks and CATV networks was clearly stipulated as a goal.

The MII has also issued a draft of long-term goals to be achieved by 2010. This includes the "three vitalizations and one push" general guideline elaborated in the 10th Five Year Plan: vitalizing the communications, manufacture and software industries, and pushing the 'informatization' of the economy and society. Specifically, they have stipulated that it will strengthen the industry by building high-speed transfer networks, develop high-speed Internet capability, convergence technology and information resource applications, and finally, promote e-commerce and IT application in all sectors. Shanghai is taking the lead in a number of these areas, including the creation of the Shanghai Informatization Office, which has taken up many of the usual regional MII office responsibilities, pushing forward rather aggressively those projects that will integrate the city into the global information society.

The challenge to be competitive and efficient comes not only from the potential of entry of foreign investment due to its WTO commitments, but also in having to respond to the rapid changes in technology, increased pressures to meet customer satisfaction, and restructuring that is happening domestically. Meeting the challenges of greater competition and achieving these targets will necessitate restructuring of the sector, investments by both the government and private sector, and transfer and development of appropriate technology and infrastructure (hard and soft). In order to meet these challenges, the creation of an independent regulatory agency that can function effectively, and a sensible universal service provision policy will be crucial for China to build up an efficient and competitive telecommunications sector which will provide appropriately priced and quality service to other sectors and the population as a whole as targeted in their long term plans. Managing the evolution of the sector needs to be done carefully since there is the danger of over investment and over capacity.

New entrants and Regional Operators

It is unlikely that China would have opened up the telecommunications sector to foreign entry without the pressure from the need to bargain for the WTO accession (Mueller and Lovelock, 2000, Zhang 2001). Now even with the schedule to allow new entry and foreign investors to come in over the next few years under the WTO Commitments, it is unlikely that there will be a flux of new foreign entrants to give the existing operators competition. Foreign investors are likely to review and assess China's policy on foreign investment carefully given the CCF fiasco, the experience of ATT in Shanghai, and in light of recent comments made by industry officials that China need only grant foreign access 'in theory'. Due to the significant size of investment and the higher risks of an uncertain regulatory environment, it is likely that there will be limited foreign interest unless there is credible commitment from the regulators for implementation. The opening up of the sector also will not allow in any case foreign owned majority, capping foreign ownership at 49-50 percent. Foreign investor are likely to target services with lower capital requirements and high capital mobility such as call back, Internet access, content service etc.

Interviews with foreign telecom operators and industry people, hint that capping foreign ownership was not a major disincentive, lack of specificity on the regulations for foreign investors in the sector and the fact that most foreign telecom operators are also currently not in a position to undertake huge investments in China, are more important reasons as to why there will not be large foreign investments coming into the sector. The role of foreign investment will likely to be more in the high end or some special segment of basic telecom and value added services and as strategic partners or in alliance with existing operators as discussed below. Therefore it is unlikely that competition will flourish just because of accession. After all, there is no requirement that the licensing procedure currently used will need to be eliminated. Foreign entrants and their new ventures will still need to go through the licensing procedure, which will remain at the discretion of the MII.

Even if private ownership and operation of telecom services were not specifically forbidden, the monopolistic dominance of behemoths like CT make it prohibitive for new entrants to the market, despite the recent mandates requiring CT to lease its lines. In fact, it is because CT was so expensive in the past, that a number of other organizations developed their own internal

networks for communication purposes. This includes the PLA, which developed Great Wall Communications that was ultimately transferred over to Unicom, and the Ministry of Rail, whose Railcom has recently become operational and began offering services to the general public.

In addition to these, the State Power Commission, and other state ministries also have built their own internal networks throughout the decades and are eager to obtain licenses to enter the lucrative telecom service market. Many of these organizations realized that once the market opens up to foreign investment, they would be prime targets for capital injections that would facilitate their restructuring and reform processes, and create substantial potential for gains in the future if they were to become a viable network supporting telecom services. Early network investment in microwave installations, locally produced crossbar switching, and PBX equipment have been replaced with the purchase already of digital switching, microwave and fiber. The hardware is there; its only a question of financing the software.

One such governmental organization is SARFT, who is also building a major network that will connect all of its own existing networks. The bandwidth of this network is 2.5 Gbps. The total length is 14000 km and was completed at the end of last year. The government will upgrade the CATV network to make it a network that can also transmit Internet data. The first broadband services system using television cable was recently introduced in Daqing City in Heilongjiang province. The opening of the system on CATV represents a major breakthrough in the country's broadband progress. The benefits to the industry could be substantial, if only the government could come to a final decision on how fast it wants convergence to take place.

Potential Development of the different subsectors

Fixed line services

The most monopolistic of sub sectors remains fixed-line services and even this sector has experienced dramatic changes over the last few years and continue to do so, such that even after the clock starts ticking on the commitment schedule, we can expect less than monumental changes to occur in this segment. Not only have the number of fixed-line operators increased, but services have been unbundled significantly and the pricing for these services have seen drastic declines over the last two years. The only area in which further declines may be warranted, is in international long-distance fees. But even here, technology has dealt the fixed-line provider a blow. With the continual improvement in quality of alternative voice communications, such as VoIP, international rates are bound to continue to fall.

Although little of the price declines have occurred naturally as a result of competition, but rather as a direct result of mandates issued by the central authorities, they have fallen far enough to eliminate much of the room for arbitrage in which new entrants would have the most interest. With the elimination of installation fees altogether, in a sense the barrier to entry in this sub-sector has actually been raised. The amount of investment involved for a new entrant would be far too high given the commoditization¹⁸ of fixed line use. Nevertheless, there remains much room in the market itself to develop new services involving packaging various components of fixed line, innovations and improving quality, and that is where the foreign players will come in, as long as a level playing field is maintained.

The pressure to be competitive has dramatically increased for China Telcom and in anticipation of greater competition with the commitments under the WTO and other future reforms, the need to restructure is well recognized. Its monopoly rents have fallen drastically with the commoditization of fixed line usage. While it is difficult for CT to be competitive without licenses for the more lucrative business such as mobile, it has recently been announced that CT will be divided into northern and southern regions. Operations covering the northern 10 provinces will be merged with China Netcom and Jitong to form the China Netcom Communications Group Corporation. The other 20 southern operations will retain the CT name and operate as a separate entity

For this sub sector to be competitive, the issue will not so much be liberalization which now has a clear time frame of allowing new entrants nor is it privatization as for now the indications are that the preference is still for a state owned player. Rather the priority will be how to create the regulatory framework including the institution, to create the pro competitive operating environment and complete the corporatization process so that China Telcom and China Netcom will operate efficiently.

¹⁸ A decline in average revenue/unit without adequate increase in minutes of usage.

Mobile services

The rapid progress of technology in this sector, combined with declining costs and less infrastructure cost than fixed-line telephony makes this the most lucrative sector of all the telecom services in China. Yet the major barrier to entry here, obtaining a license, remains elusive. Licenses to operate mobile services, as with any other basic service, are issued at the discretion of the central authorities, yet there is no clear set of guidelines that detail who can get a license, what is the criteria, and how long it will take. Additional licensing to operate mobile services has so far been linked to technology and standards such as CDMA and Unicom, and it has been hinted that the next license will be linked to the 3G technology, although a decision on the technology standard has yet to be made.

Although there are now two major market players, and the new entrant, Unicom, is gradually taking market share away from the incumbent (its share is now close to 40 percent of the market), there is in reality still very little competition in this sub-sector. Backdoor attempts at entering the market, for example by mobiles that operate off of the fixed-line network within limited areas have been halted indeterminately.¹⁹ Moreover, as the applications for value-added services that will use the latest technology here do not yet exist, technology alone will not provide enough of a catalyst for users to switch. Another problematic issue for competition is that there is as yet no number portability, that is users cannot switch services without switching their numbers so that technology alone does not provide enough of an incentive to switch services. The attractiveness of mobile telephony is also reduced because roaming charges are based on caller pay party principle.

The mobile sector, is however, less encumbered by the lack of regulatory certainty as the fixed-line sector, as there is more potential for value-added services and innovations in revenue sharing models such as working in cooperation with ICP (e.g. Montro). This, combined with the huge untapped market, declining costs, lower investment costs than fixed line and technological progress makes the sub-sector much more attractive to new entrants than fixed-line.

Internet and data-communication services

Although certain barriers such as low credit card penetration and an underdeveloped distribution infrastructure will exist for some time still after accession, Internet usage and everything associated with it, including e-commerce and m-commerce are expected to continue on its current path of explosive growth. While foreign companies will be able to enter this market to provide value-added services, it remains unclear as to whether these companies will dominate the market, over domestic ones, but it will be most likely that partnerships between the two will become the order of the day. The foreign companies have the technology, brand-name reputation

¹⁹ After essentially being cut out of the mobile market with its divestiture of CMCC, CT tried to enter the mobile business by introducing a mobile phone that functioned essentially as extensions of its fixed-line networks. The mobiles only functioned within a limited geographical area around the line. Nevertheless, 2.5 million lines in about 50 cities were installed already when the MII ordered CT to cease such operations, after the two licensed mobile operators lobbied against it. The attraction for users was that handsets cost about half of what normal handsets cost. Moreover, roaming is not a big issue for a lot of users that the geographic delimitation would cause any concern.

and skills, while the Chinese companies will provide most importantly the local connections, language abilities, and legal foundations for the new venture's existence. Again, however, as the recent changes in regulations have demonstrated, the lack of regulatory certainty remains a trouble spot for the sub-sector.

Development of the New Economy

China does not yet have the appropriate infrastructure to take advantage of the new economy and the chief bottlenecks to such development are less in the technology area, but more in the finance and logistics sectors. While Internet security issues are gradually being addressed, the lack of a credit database and well-structured distribution system continues to plague all attempts to install a viable new economy. Much needs to be done in terms of developing these sectors of China's old economy before it can leapfrog its way into the global new economy. It also points to the need for a comprehensive approach in developing the services sector. Currently the only real possible use of new economy systems in China is by the foreign multinationals that have already implemented various supply chain management (SCM) and customer relations management (CRM) and other e-solutions systems throughout their global operations. In many cases, China continues to be the one country in which their operations cannot be fully implemented.

Other than the old economy constraints in China that create bottlenecks in continued e-commerce development, the recent slowdown in the global economy fuelled by the burst of the Internet bubble shows that there remains no viable e-commerce paradigm even in the most wired and intelligently networked economies of the world. While some companies have been able to implement relatively successful forms of business-to-business (B2B) e-commerce applications, most have yet to prove profitable, as margins remain extremely tight. And aside from some auction sites, business-to-consumer (B2C) sites face similar if not tighter constraints. In China, where the plethora of consumer goods have only become available to consumers in the last decade, there is even less of an inclination for people to shop online. One of the few possibly successful uses of the Internet is expected to be in the form of online payments. As there has been some initial success with this, the Chinese government is now experimenting with it in a number of pilot projects, most notably in Shanghai.

One other major obstacle to overcome is the legislative aspect to e-commerce. As is the case for many other more 'wired' countries, there remain many contentious issues for legislation to resolve involving cross-border taxation, security and content registration. Some regulations and directives have already been issued in a piecemeal way as already discussed above, however, with the pace of change far exceeding the pace of legislation, it remains to be seen when feasible e-commerce legislation will finally be promulgated.

With mobile telephony expected to rival that of fixed-line usage, particularly with the introduction of new broadband access technologies for mobile phones, market players are now looking towards the development of mobile commerce instead of e-commerce. However, given the same old economy constraints as those mentioned above for the development of e-commerce in China, value-added mobile service providers are targeting less commerce and more other revenue-generating applications that are best suited to the mobile platform. This primarily

includes entertainment, games and chatting. Online payment services will also be developed in the near future for use with mobile platforms. The main challenge facing the mobile industry in China as it is everywhere else is the commoditization of call fees as ARPU continues to decline. Mobile operators need to seek out new partnerships with value-added service providers in order to find new revenue generation streams.

Managing Policy Reforms and Increased Competition

Cable and convergence issues

The cable television network now reaches about 90 million subscribers throughout China and is expected to also be the largest in the world. The MII recently gave a green light for convergence between Internet and cable business. The main focus was to enable fixed line operators such as CT, Unicom, CNC and Railcom to offer cable television over their broadband networks. Cable TV companies are now owned by SARFT and were also looking forward to being able to deliver Internet and voice services over their network. However, until there is an implementation schedule on convergence, explicitly indicating what is or is not permissible for cable operators, the cable industry remains reluctant to see convergence as it fears broadband would significantly erode its current subscriber base. Moreover, while telecom will be opened to foreign investment upon accession, the cable TV industry will remain closed, although the prediction is that it will be opened up sooner or later since convergence has already been addressed in the 10th Five Year Plan.

It will take the relevant agencies at least until 2003 to create the necessary framework for convergence across the country. A recent notice issued by the MII requiring the local telecom partner in a JV to control at least 51% however, may slow down the process. Those JVs not satisfying this requirement, must reapply for telecom licenses in order to offer the services. The procedure varies depending on the percentage of ownership by the telecom partner. If the telecom partner owns 51% or more, the JV simply needs to file with the MII to obtain the new license. If the telecom operator has a minority control, the new entity must reapply for a telecom license as it would from the very beginning, which remains a very time-consuming affair.

The notice also stipulates that JVs need to adhere strictly to the business category and geographical area of operation specified by the telecom license already in hand. For example, a licensee is not allowed to set up another JV and provide services in an area in which it already operates and offers similar services.

This does not bode well in particular for companies controlled by SARFT, which will have a tougher time entering the telecom sector if they do so by partnering with one of the seven existing telecom providers. In fact, the issuance of this notice was intended to prevent SARFT and 'other powers' from entering the telecom market in indirect ways.

Nevertheless in early 2001, a comprehensive broadband information network was created using the cable network. This effort resulted in a hybrid Internet/telecom network that was put into operation in the Wuhou area of Chengdu, where local authorities were able to work around the

SARFT bottleneck. But when a county in Shandong province implemented a similar network, the MII decided to end such usage, reiterating that such integration was not permissible under current regulatory framework. Meanwhile, many companies have continued to promote the potential of such 3-in-1 networks, and pilot projects in Shanghai continue to integrate cable television, computer networks and the telephone system into a single platform. The Shanghai cable television station now provides telecom services, Internet and IP telephony services. China has also put the CNCNET network (a broadband network) into operation, linking 17 cities, primarily along the developed eastern seaboard. Thus, it would appear that convergence will take place, it is just a matter of time.

Government driven restructuring and consolidation

The main changes that have to be made in the telecom sector in anticipation of greater competition with potential new and foreign entry, is several rounds of consolidating and restructuring the existing operators so that they are efficient and competitive. Although both CMCC and Unicom have partially listed on overseas exchanges, and there have been ongoing corporatization efforts, the reality is that the majority of the equity and control still remains in the hands of the state and the government.

As already discussed a degree of managed competition has been introduced into the market, but much more needs to be done. The process will be still government driven in the foreseeable future. In line with the overall thrust of reforms of state owned enterprises, the approach will be corporatization rather than privatization of state ownership. This will require further restructuring and consolidation of the existing operators, and hiring of professional personnel. The issue of how to restructure the sector has been debated and various scenarios recommended. However, as expected the process remains driven by the government. There had been considerable debate as to how to break up the CT monopoly, whether by regional lines or by vertical division of provision of services (e.g. local, long distance, and data transmission). At the end of 2001, finally the government announced that the CT monopoly in fixed line will be broken up along regional lines, following the model of the breakup of the state owned oil company. CT will now be divided into two operators by region: north and south. The south, will keep the CT name, while the northern units of CT will be merged with China Net Com and be called China Netcom Communications Group Corporation, with some continued local level facility sharing.

Mergers and consolidations have become a necessity because there is a real need to consolidate with the decline in revenues as rates and fees have fallen. Thus far the mergers have been government driven as with the case of Great Wall and Unicom, and the recent break up of CT along regional lines. CT and China Netcom will need to consolidate and streamline. Prior to the regional breakup CT employed around 650,000 people and there is a plan to halve the number over the next three years. Earlier hints at mergers between Jitong and Railcom have been dismissed since the confirmation of the CT regional split has now eliminated the possibility of Jitong's partnering with any other telecom group. Recent announcements in conjunction with the announcement of the CT break up that four operators is thought to be the optimal number.

Mergers and consolidations would also include the regional and ministry networks that already exist. It is a question of how to raise capital and access the right technology, whether through public listing, cooperative arrangements or strategic alliances with foreign partners to utilize existing hardware and develop the necessary software in terms of human resources and management.

Towards a Pro Competitive Regulatory Framework and Institutions

Domestic regulation has been manipulated in the past to protect incumbent players and as is well known non transparent regulations are the main barriers to entry protecting the incumbent in the services sector. It seems that privatization will flow from the introduction of competition, but the reverse is not true that privatization would necessarily lead to greater competition (Petrazzini (1996), Fink, Mattoo and Rathindran (2000)). Inefficiency was not caused by government ownership per se but was the lack of competition and ineffective government regulation (Stiglitz, 1998). Given that the major operators in basic telecom are state owned, and that the situation is unlikely to change even in the short term despite the liberalization of the sector through WTO accession as already outlined, the key challenge for the telecom sector in China is to ensure that the few and predominantly state owned players will be competing in a pro competitive environment.

As already discussed China is obliged to meet the requirements of having a pro competitive regulatory framework. The regulations announced last year go some way to answering some of the obligations in the Reference paper, but there are still areas of uncertainty, issues of implementation and no time table for the introduction of the comprehensive telecommunications law as already discussed above. Given the past experience with foreign investment in the telecommunications sector where ambivalence and lack of clarity and protection was the order of the day, foreign investors would be wary of entering the Chinese market without the legal certainty and protection. This would come from the passing of a comprehensive and clear telecommunications law, and the setting up of supporting institutions needed to implement these laws fairly. The telecommunications law should be based on the current telecom regulations as well as related regulations on foreign investment, the Internet, e-commerce and other matters. At the March 2001 National People's Congress, the head of MII, Mr. Wu predicted that it would take another two to four years before the telecommunications law would be passed, the reasoning being that time will be needed to design the law to be in line with best practices and suited for China's conditions.

As already elaborated above, the telecommunications regulations issued in September 2001 go some way to meeting the requirements of the reference paper, at least by way of introducing the regulations and principles. However, implementation cannot be taken as given and the most difficult task for China will be to develop an independent regulatory agency. Regulatory intervention is needed to issue and oversee the issuance of licenses, interconnection between new entrants with the incumbent operator so as not repeat the issues faced by Unicom in the past, and how even with competitive markets, the needs of the low income and isolated area subscribers are met.

For now the September 2001 regulations still has MII in charge. Other options have however, have been debated. One option is to streamline the bureaucracy by consolidating the MII, SARFT which now oversees the cable TV industry, and the different departments overseeing the internet into one government body. Then over a period of time build up the institution to be managed in a more transparent and independent way, and let it evolve to become the regulatory body. A second option which would sever the ties between former MPT officials sitting in the regulatory and management of the sector and the operators, is to take out the regulatory function from MII and have telecommunications and the information network be regulated by the SDPC or a newly created body.

At this stage of the debate it is not clear which direction the government will take, but given the situation it will take time for any kind of independent regulatory agency to emerge. The regulatory stance up to now has been of managed competition rather than open competition and this is likely to prevail in the fixed line and possibly mobile sub sectors. Furthermore implementation of WTO principles and rules in the spirit they have been created is in turn dependent on the institutional stance of the domestic administrations (Zhang 2001). Therefore without the proper institutional set up that can be independent and impartial,

".. the WTO would have some impact on China's telecommunications regulatory reform and liberalization in the short term, but would be rather limited in the long run without significant changes occurring in the institutional regulatory endowment and domestic policy attitudes in which the telecommunications sector operates" Zhang (2001:468).

As is well known in the services sector the form and implementation of domestic regulations can be a serious barrier to entry for foreign firms. The implementation of its commitments and what is on paper already in the telecom regulations depends on the institutional environment and in particular the stance of MII. Given the current political institutions and structure in China, it is unrealistic to expect regulatory independence from politicians, government and the regulated industry can be achieved in the near term. The party is responsible for social economic policy and controls the political and economic reform process. All government agencies cannot deviate from the party guidelines, and also has the power to appoint and remove officials including in the MII. MII still has a strong and complex relationship with the major operators, which was formerly from MPT, and has been known to also appoint, promote and dismiss key officials in the various carriers, although these actions officially fall under the jurisdiction of the SETC. The concept of MII being independent from the telecommunications firms is currently not realistic given this context. This gives rise to specific and major challenges to the creation of a truly independent regulator. Zhang 2001:478)

The regulatory barriers and conservative regulatory stance imply that there will not be a dramatic impact on liberalization of China's telecommunications market with WTO accession. Much has already been done to prepare and defend against foreign entry, rather than to facilitate greater competition whether from domestic or foreign entrants.

Therefore, one should think more carefully about sequencing the development of such an institution with the first steps of transparency and adequate training of human resources, as well as setting administrative guidelines as to just what constitutes an "independent" agency. This can be followed by a step by step phase in of a more independent regulatory agency. Careful thought also needs to be put forth regarding a number of issues which have also been faced by other countries in introducing an independent regulatory agency.

The most difficult task ahead is the creation of the regulatory agency and there is much speculation as whether MII will maintain its control, whether the regulatory agency should be under the State Council, or will it be transformed into a true regulatory agency. Having spun off the telecom operations arm in recent years, the tendency appears to be towards regulatory independence. MOFTEC and the SPB's withdrawal from the industry is also indicative of the trend towards allowing market forces more room to operate. This is further supported by the willingness of the authorities to allow more shares to be issued to the public, as in the case of CMCC.

Yet this recent new issue has occurred despite the lack of domestic legislation on foreign equity rights. Furthermore, current management and directorial positions in a number of the operators, force us to question exactly how independent they are of the MII and how much weight the MII still has over each of them. On the one hand, these connections do facilitate the implementation of new processes. On the other hand, it does not provide the stable environment that businesses need.

There is indeed a tentative plan already to do away with the MII within five years and turn over the management of telecommunications and information networks to the SDPC in order to reduce expenses on repetitive constructions. Premier Zhu has often remarked on his displeasure over the lack of industry convergence that is proliferated by the segmented policies of the MII. If convergence does indeed proceed as stipulated in the Five-Year plan, dismantling the MII, may in fact be much more possible. The powerful Shanghai Informatization Office is also indicative of the move towards eliminating a centralized ministry governing the industry.²⁰

V. INDIRECT IMPACT

The telecom sector in China has been growing at more than double digit growth, or higher than the GDP growth and its share out of GDP is relatively high at .. percent. However, the indirect impact is often more important because of the central role that the telecom sector for the rest of the economy.

Impact on other sectors and economy

²⁰ The Shanghai Informatization Office has effectively taken over typical MII competencies on a regional level, and has allowed for experimental projects in areas such as convergence, which have been successful thus far. See Appendix F for further details on the tasks and responsibilities for the Office.

At the macro level, improving telecommunications is widely believed to have a positive impact on overall economic development. Production activities and services provision can be more efficient and less costly, and market information delivered in a timely way with efficient telecom services. A study in Yemen found that 10-25 percent of all transportation could be avoided if good and reliable telecommunications were available. Research on rural satellite networks in Peru estimates that each telephone call produced an average savings of \$7.30 compared with other alternative means of communications (Petrazinni:44).

The telcom sector no doubt has an important contribution to growth, but an important outcome is that the greatest benefit of an efficient telcom sector is the boost it gives to least developed sectors and can help poorer regions access basic human needs such as education and health (Petrazinni:42). Tele-medicine, tele-health and tele-education initiatives to reach poorer regions need efficient and low cost telecom infrastructure to be effective. An increasingly innovative way to cater to basic social and commercial needs in developing countries is establishing Community Teleservice Centers (CTC) which bring together in a publicly accessible location basic communications equipment such as computers, modem, printers, fax machines, video equipment and telephones which can in turn be used for education, training, and cultural and social activities. (Petrazinni:44)

Evidence also suggests that more liberalized telecommunications markets were growing and innovating faster and serving customers better. Technological progress and the growth of the internet means that data traffic has overtaken voice traffic in many countries, and led to the introduction of many new service providers.

Improving Telecommunications Access in Rural and Isolated Areas

China Telecom is the only operator with mandatory obligation for providing universal service and it has in the past been responsible for the national telcom network rollout and operations nationwide. The model adopted for CT is the traditional cross subsidization model of subsidization from the eastern and more developed coastal areas to the western provinces of China, and from wireless and long distance services to local services. Provision of telecommunications to all households and small firms has been used to defend monopolistic telecom companies. Furthermore it is believed that profit maximizing private firms will not go to the unprofitable areas. However experience with protected state monopolies show that the outcome of inefficiency and under investment, and little or no service to the poor areas. Many developing countries were paying a capital cost of \$4000 per line or three to four times the achievable cost (Stiglitz, 1998). Evidence also suggests that liberalization in the form of greater competition or privatization will actually increase network availability (Petrazinni, 1996:37). Competition in cellular services has also impacted significantly on teledensity.

Given the restructuring of China Telecom and the dramatic decline of long distance rates, the provision of universal service needs to be reconsidered. The reference paper does not provide guidelines on this, although it makes clear that it should be implemented in an anti competitive way and should be administered in a transparent, non discriminatory and competitively neutral

manner, and are not more burdensome than necessary for the kind of universal service defined by the member.

The objective of universal service obligation (USO) is to ensure affordable telecommunications services to the public. This includes servicing those in high cost service areas such as rural and remote regions as well as low-income groups. Other than the overall development objective, given the strong relationship between national telephone penetration rate and per capita GDP, there are also the equity and distribution objectives of reducing disparity between rural and urban areas. In the case of China it would also mean having better interconnection for the western provinces with the coastal region as well as with the international market place. Today, the objective of reducing the digital divide within the country since telecommunications delivers information, goods and services to the public, is also seen as important.

Officially, the current rate of fixed-line phone ownership for China on average is still barely over 20 percent of the population, while mobile is only 10 percent of the population. As can be expected, indicators point towards a much lower rate of teledensity in rural areas or around 6 percent (MII statistics). The MII has recently been noted for reiterating its stance in providing this public good to all its citizens, although no explicit definition of universal service or universal access has been offered. Moreover, with the uneven pace of development in China, the authorities must consider a dual-level policy that creates universal service targets in the further developed sectors and access targets in the lagging regions. In an official press statement, Minister Wu stressed that as telecom companies face the challenges of the market, they must not sacrifice the legal rights and interests of users in the under-developed areas. Teledensity in the rural and western areas remains very low and there is much room to increase it.

Most recent efforts towards reaching universality, however, have kept into consideration that the domestic service operators were spun off from the central authorities in a bid to enable them to do what they needed to become profitable and competitive compared to their global counterparts. As such, while universality of service provision and economic development to which it contributes, remains a goal, authorities appear to date to have given no explicit universal service mandate to either of the two market leaders. The authorities are more concerned at this point with creating a globally competitive industry than with providing universal service.

Instead, the authorities have developed a mandate to popularize the services, primarily through significant price reductions for both calling and connection fees, as well as eliminating installation costs altogether. Through such actions, it is hoped that telecom services will gradually become more accessible, despite the lack of an explicit universality mandate.

Yet, while such popularization schemes will likely enable more people to access telecom services, there remain large areas of the country in which the basic infrastructure for telecommunication connectivity still do not exist. In many remote areas out west, telephone poles have been set up along side roads, but remain unconnected. At the same time, mobile stations are limited to serving only the large cities. And while Internet can be very reasonably priced in the cities (averaging about RMB4 per hour in internet cafes in western cities) illiteracy

remains the chief obstacle to their uptake in many of the western regions where Chinese is still the second language.

Based on experience and lessons from other countries in implementing universal service programs, there are a number of caveats and models that China can consider (World Bank, 2000). First it is important to make the definition of the universality target clear and link it to realistic implementation measures, including how it should be funded. The universality target differs from country to country depending on local economic and sector conditions, the distribution of the population, geographic considerations, and security issues. Universal service refers to individual or private access, whereas universal access refers to community or public (shared) access (e.g. a phone booth in every village), and in developing countries the latter is more important.

There are several common models of achieving universal access: market based reforms through privatization, competition and cost based pricing; mandatory service obligations to the operator, including new entrants; cross subsidies between and within services provided by incumbent operators; access deficit charges (ADC) paid by telecommunications operators to subsidize the access deficit of incumbents; and universality funds (World Bank, 2000). There are other models and combinations of these approaches, and the choice depends on country specific issues and conditions. Cross subsidization has been the traditional method when there is normally one state dominant provider and the disadvantages are by now well known such as inefficiency and not reaching the target group. This is also the model that China has used in the past and it now will have to rethink how to deliver universal access.

The MII has plans to set up a universal service fund that will be used for developing the western and rural regions that currently lag far behind its eastern coastal counterparts. The fund's purpose is to separate government administration from enterprise management in the sector, shifting responsibility for infrastructure, operations and fund raising to the telecom companies themselves. As the costs for these activities are high and have low returns, the MII is proposing tax incentives, investment, financing, and human resource policy for the industry in tandem with the continued opening of pricing issues towards full market force management. However, it is early days and the plan is still under discussion, and it remains unclear who and how contributions to the fund will be made, and how they will in turn be disbursed.

The approach of using universal funds has the advantages of being most effective in providing targeted subsidies to expand or support uneconomic services such as could be the case for providing basic telecommunication services in the underdeveloped Western provinces and rural areas. It is potentially the most efficient and transparent, depending on how it is structured and administered. Indeed the scheme can be administratively complex so that the transactions cost could be higher than the subsidy, and there is the potential for bad governance if accountability and monitoring mechanisms are not built in and implemented. Furthermore, it is often difficult to predict what the associated costs and revenues will be.

Based on experience there are a number of important lessons with regard to using the universal funds approach to provide universal access. First is having the target clearly specified (e.g.

high cost regions such as the Western provinces of China, rural areas without any access, low income population). Second transparent financing be it from direct government funding, contributions from operators or proceeds from privatization. Third in terms of administration and disbursement of the funds, it must be done by a body that is independent from the operators. It should also be market neutral in that it does not favor the incumbent vis a vis new entrants, and be subject to competitive bidding. Fourth the subsidies (i.e. which could be in the form of a fiscal or investment incentive) given should only cover the uneconomic portion of the cost of providing the services and the operators, be they private or government, finance the rest of the cost from their revenue proceeds.

This scheme could be combined with roll out requirements for new and foreign entrants to provide services to rural and western areas before they compete in the larger and more developed Eastern provinces. It can also incorporate a strategy that allows for operators to tailor the service and technical choices to meet the needs of the rural areas. For instance rural payphones and franchising telephone shops that provide telecommunication services. The service should be charged on a cost basis and not on a geographical average basis since the type of service offered can be priced lower by offering alternatives to the standard service to meet the needs of the rural area population at an affordable rate. Options can be differentiated by service quality and price, and customers can decide which option is the most suitable. To cater for the needs of the rural areas, some effective packages would be low up front charges, low fixed recurrent charges, and ability to pay in small, frequent and regular payments.

Box Experience of Chile and Peru

Chile: after market opening and privatization introduced policy to provide access to the low income and rural areas. The focus was on providing universal access to the public in these areas. The funds came from the central government budget and was in the form of targeted subsidies to provide public telephone access to the low income and rural regions. The funds were provided to private operators to subsidize installation of public telephones in unserved, low income and rural areas through a competitive bidding process, and not to used as part of rollout obligations of operators. Over the 1993-99 period a total of 183 projects to serve almost 6000 localities were approved. Competition between bidders reduced the actual subsidies paid. Although there were some delays in installation. The targets are now to finance community Telecenters with a ccess to the internet and other new information and communications technology.

Peru: roll out obligations imposed as part of privatization and on top of that established universal access telecommunications funds which obtained its revenues out of 1 percent of the gross revenues from the telecommunications sector. The funds were used to serve the target of extending services to five thousand unserved localities by the year 2003. Universal access was defined as services provided by public operators and available to majority of users, including voice telephony, low speed fax and data, and free emergency calls. Criteria for selection of localities was set as rural towns (300-400,000 population), district capitals, and towns in high social interest areas. Several innovations were introduced in the bidding process such as allowing economies of scale by allowing a single operator to bid simultaneously on three

projects and permitted bidders to bid on any combination of three projects. In 2000 modified target to fund access to the internet and other advanced services, and allow for funding of operation and maintenance of designated services, not just installation.

South Africa: rollout obligations imposed on operators in under served areas and combined with universal service fund. The fund is funded from annual contributions by all telecommunications licensees and used to provide direct subsidies to targeted priority persons to subsidize higher cost and subsidize the cost of network rollout to under served areas by operators. The network rollout, service quality targets and pricing are closely monitored by the responsible agency. The funds have been used to prioritize the setting up of telecenters in partnership with communities and donor agencies and they typically contain a number of telephones, fax and photocopy machines, PCs and access to the internet.

Hong Kong: cost based universal service regime funded through charges on external (i.e. international traffic). The designated service provider has the obligation to provide PSTN access service in Hong Kong and receives fair contribution from other licensees towards the net cost of serving customers and providing public telephones. The funds accounted for about one percent of total sector revenues.

Source: World Bank (2001)

VI. CONCLUSIONS

The telecommunications sector has undergone rapid changes from being one that is considered to be a natural monopoly with large fixed costs. The introduction of new technologies and increasing economies of scale has lowered the unit price and made telecommunications a cost declining industry. Since the mid 1990s there has been an acceleration of convergence between telecommunications, computing and broadcasting. The emergence of new and advanced technologies has also continued at an exponential rate. These new services such as the Internet, mobile and wireless telecom services, use different platforms and transmit through various media with the result of providing alternatives to traditional wire line telephony at a much lower cost. They have developed beyond the regulators control and can by pass the public switched network and control of the incumbent. These changes have also meant moving away from traditional forms of ownership and market structure of state monopoly to one of joint ventures, strategic alliances, and new and foreign entrants (Petrazzini, 1996:24).

These are the challenges ahead for China and it will have to meet them given the current conditions and starting point. Reforms in the last few years have been quite dramatic, compared with what other countries have gone through, and currently the telecom service sector in China is moving in the right direction. There are of course still many challenges, particularly in an environment where domestic politics will continue to compromise the pace of change despite the economic gains that are to be had. Nevertheless, considering the dramatic changes that the sector has witnessed since 1998, and combined with the unstoppable pace of global technological

change that continues to proceed regardless of policy, it is fair to expect that the sector will continue to liberalize, albeit at a controlled pace given the difficulties already outlined.

Policy Recommendations

Despite the drastic changes that have taken place in the industry, all the potential and anticipated changes in the above come, with one major caveat: they depend on the ability of the authorities to come up with a solid legislative framework that fosters a stable business environment by ensuring and enforcing a level industry playing field and private property rights. The MII once issued a statement that a Telecom Law will be finished prior to accession. Nevertheless, members of the MII, the SDPC and representatives from the State Council are all involved in drafting the law that should provide the much needed clarity and regulatory certainty that has eluded the industry thus far. Given that even the US, considered the most wired nation, still has considerable difficulty with creating feasible regulations on various sub-sectors of the telecom industry, it is hard to demand that China be ready to provide a full set of hard and fast rules for its nascent industry prior to WTO accession. The following basic issues need to be addressed:

- The need to regulate and enforce level playing fields for private and foreign investment. While hedging against risk is an inherent part of good business practice, the current environment creates a major disincentive for foreign and private money needed to fund the industry.
- Guaranteeing a level playing field in interconnectivity: Currently, new operators need to negotiate with each individual local CT branch agreements on interconnection. This process occurs despite the fact that CT signs interconnectivity agreements at its central headquarters. But as long as CT's structure remains decentralized, and there are no enforcement proceedings available, the current system will remain unchanged, thereby increasing the costs of market.
- Develop clear universality policies. The current lack of clarity in this area hinders operators from being able to anticipate true costs of their future activities, thereby reducing their ability to compete with further marketization.
- Consider implementation of less interventionist price regulation mechanisms such as price caps that incorporate quality and other self-regulating factors, integrating flexibility components in the face of increased competition. Current prices reflect a popularization objective that will require significant sector and geographic rebalancing, respectively, that will impact cross-subsidization ability and again not reflect true costs.
- Like everyone else, China needs to also decide which 3G technology standard it will adopt. The debate on what 3G technology will be used contributes to the environment uncertainty and has the potential to hold back investments.
- Clear and concise, but flexible, framework for regulation of value-added services, including e- and m-commerce platforms

- Develop information society further to create a complementary market to sustain telecom services
- With the current speculation on future mergers on the horizon between the current major market players, the authorities need also to ensure that there are anti-collusion mechanisms in place as well. This becomes particularly important once the MII is relieved of its control over the industry and pricing issues are left to market forces.
- Finally, the authorities need to establish a clear and transparent scheme within which licenses can be allocated. Current allocation procedures are conducted behind closed doors at the discretion of the MII. This will necessarily change as an independent regulator, the MII itself will be either eliminated or subsumed under another government body.

? DISCUSSANT:

First of all, I would say it's my great pleasure to attend this seminar discussing the topic "telecommunication service in CHINA: facing the challenges of WTO accession".

Personally, I think this research paper is very interesting and useful for the government of CHINA,

From my point of view, I would like give some suggestions to this paper:

First one is that there are some changes in telecom reforms in CHINA, The china telecom has already been split by region between south and north. The south part keeps the china telecom name, and the northern units has been merged with china Netcom and Ji Tong Company. Be called china Netcom communication Group Corporation.

The second is about 3G mobile license and technology standard, as I know, Unicom has not obtain the 3G mobile license, and the TD-SCDMA standard is also one of the 3G international standards in ITU recommendation.

The third one is some information and reference useful for this research paper. A book named "the development direction of telecom service in china" has been published in public. You can buy it in post & telecommunications bookstore. It is launched by the bureau of general planning, MII. In this book, it analyzes the development of telecom service in 2001, china. And some changes about the development environment, it also give some mainly forecast about telecom service indicator of CHINA from 2002 to 2006, such as the total business volume of telecom service? Subscriber growth? the capital asserts investment ? annual growth rate (CAGR) for 2002-2006 and so on. It also point out the direction of regulatory reform, including telecom law aspect, improvement and restructuring regulatory agency, management of telecom operation permit, Guaranteeing interconnectivity, reform of price regulation mechanisms, implementation of universal service? allocation telecom resources and so on.

Finally, I would say Reforms in the last few years have been quite dramatic in china, compared with what other countries have gone through, and currently the telecom service sector in China is moving in the right direction. There are of course still many challenges, but it is moving to the direction of WTO Accession Commitments.

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Appendix

Basic Telecom Services Indicators

Table 1: Growth in long -distance calls

Year	Number of Long-distance Calls	% Growth
1991	172921	
1992	287380	66.19
1993	506853	76.37
1994	757639	49.48
1995	1013966	33.83
1996	1273951	25.64
1997	1554026	21.98
1998	1825941	17.50
1999	1782532	-2.38

Source: China Statistics Yearbook 2000, MII

Table 2: Subscriber growth

Number of Subscribers (millions)	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Local Telephone Subscribers	8.4	11.5	17.3	27.3	40.7	55.0	70.3	87.4	108.7	144.0
Urban Fixed-line	6.7	9.2	14.1	22.5	32.6	42.8	52.4	62.6	74.6	
Residential (urban)	2.4	4.1	8.0	14.9	23.6	32.2	40.6	49.1	58.9	
Rural	1.7	2.3	3.3	4.8	8.1	12.2	17.9	24.8	34.1	
Pager	0.9	2.2	5.6	10.3	17.4	25.4	29.7	39.1	46.7	
Mobile	4.75	0.2	0.6	1.6	3.6	6.9	13.2	23.9	43.3	85

Source: China Statistics Yearbook 2000, MII

Table 3: Line and Capacity Growth

	1991	1992	1993	1994	1995	1996	1997	1998	1999	%CAGR
Long-distance Telephone Lines (line)	151779	234276	420323	615809	735545	998287	1146121	1576483	2299447	40.46
Capacity of Local Office Telephone Exchanges (10000 lines)	1492.18	1915.06	3040.78	4926.24	7203.59	9291.23	11269.17	13823.66	15346.13	33.80
Central State-owned (10000 lines)	1033.14	1355.50	2210.25	3723.39	5456.35	6923.67	8406.8	9951.35	11094.08	34.50
Local State-owned (10000 lines)	459.03	559.56	830.53	1202.86	1747.24	2367.56	2862.37	3872.31	4252.05	32.10

Source: China Statistics Yearbook 2000, MII

Table 4: State Terminal Equipment Growth

	1991	1992	1993	1994	1995	1996	1997	1998	1999	%CAGR
Number of Telephone Sets (10000)	1459.18	1863.65	2631.28	3958.64	5762.26	7732.03	10111.12	13123.43	17567.44	36.50
Central State-owned (10000)	1215.68	1544.94	2147.51	3148.11	4346.32	5537.78	6745.23	7963.28	9505.43	29.30
Local State-owned (10000)	238.74	301.02	419.94	653.75	1152.06	1508.97	2042.61	2773.86	3732.41	41.00
Public Telephone (10000)	5.38	8.41	15.84	38.66	84.98	138.04	193.94	259.48	297.40	65.10

Source: China Statistics Yearbook 2000, MII

Table 5: Connectivity

Year	Number of Telephone Sets Owned per 100 Persons	Townships with Telephone Communications (%)	Townships Connected with Long Distance Autoexchange Net (%)
1991	n.a.	n.a.	n.a.
1992	n.a.	n.a.	n.a.
1993	n.a.	n.a.	n.a.
1994	3.20	n.a.	n.a.
1995	4.66	n.a.	n.a.
1996	6.33	95.7	71.2
1997	8.11	89.2	81.7
1998	10.53	92.9	87.5
1999	13.00	97.7	NA

Source: China Statistics Yearbook 2000, MII

Table 6: Growth in Facilities

Year	Optical Cable Lines (# of lines)	Digital Lines (# of lines)	Length of Long Distance Optical Cable Lines (km)	Length of Long Distance Microwave Lines (km)
1991	23613	NA	6490	39282
1992	51352	109300	14388	54418
1993	162861	298045	38666	64368
1994	330359	518915	73290	n.a.
1995	484231	677672	106882	79634
1996	754143	965263	130159	71503
1997	935835	1139476	150754	65013
1998	1351665	1560201	194100	66518
1999	NA	NA	239735	65228

Source: China Statistics Yearbook 2000, MII

Table 6a: Facilities by Province, 1998

Region	Long Distance Telephone Lines (line)	No. of Optical Cable Lines	No. of Digital Lines	Length of Long Distance Cable Lines (km)	Length of Long Distance Microwave Lines (km)
Beijing	96437	82352	96205	1626	241
Chongqing	19297	17943	19293	3495	653
Shanghai	84357	73286	84357	1468	152
Tianjin	48116	39330	41974	1252	437
Anhui	56645	51456	56645	5545	948
Fujian	88937	78483	88937	7389	1789
Gansu	30742	24963	30740	8336	2723
Guangdong	271932	215764	266668	11489	5984
Guangxi	41622	39638	41622	11757	2234
Guizhou	21697	20647	21697	7191	1091
Hainan	18346	15286	18346	1750	1235
Hebei	70111	64381	70111	6677	2910
Heilongjiang	54941	49699	54844	11265	6077
Henan	92054	91274	92054	11142	2692
Hubei	92716	73608	83689	7482	2992
Hunan	76925	68640	76925	9682	3535
Inner Mongolia	30569	27320	30559	11416	1338
Jiangsu	180319	156488	180319	6351	1842
Jiangxi	45482	33565	45238	4739	4393
Jilin	53504	45734	53504	4702	2701
Liaoning	130914	107922	130908	4537	2721
Ningxia	10521	9069	10521	1501	1097
Qinghai	12478	10211	12345	6038	963
Shaanxi	50982	35091	50982	6759	4145
Shandong	98760	89598	98760	4372	1132
Shanxi	38323	34456	38319	6656	1731
Sichuan	98855	86555	98738	7140	2267
Tibet	5245	2469	5243	1406	n.a.
Xinjiang	29408	24557	28029	9450	2637
Yunnan	32454	25323	32356	6111	3081
Zhejiang	115036	107395	115036	5374	777

Source: China Statistics Yearbook 2000, MII

Table 6b: Facilities and capacity by Province, 1998

Region	Long-distance Telephone Exchange (circuits)	Local Telephone Exchanges (10000units)	Local Telephone Exchanges (Central state-owned, 10000 lines)	Local Telephone Exchanges (Local state-owned, 10000 lines)	Number of Telephones (1000 units)	Number of Telephones (State-owned, 10000 units)	Number of Telephones (Local state-owned, 10000 units)
Beijing	108400	504.05	504.05	NA	522.5	423.14	NA
Chongqing	40500	266.21	198.04	68.17	204.36	135.99	31.14
Shanghai	113000	618.42	618.42	NA	753.41	627.44	NA
Tianjin	65000	244.76	228.6	16.17	259.58	202.07	9.91
Anhui	121000	430.42	276.41	154.01	355.54	212.19	85.04
Fujian	196860	546.95	312.98	233.97	550.56	247.52	156.57
Gansu	46365	159.28	133.54	25.73	124.85	100.69	9.95
Guangdong	541150	1393.84	823.65	570.2	1507.88	709.01	436.17
Guangxi	148120	289.48	216.7	72.78	246.2	162.14	33.32
Guizhou	53120	151.51	134.48	17.03	112.7	85.02	8.94
Hainan	42420	66.79	53.29	13.5	70.65	42.91	8.25
Hebei	163770	621.11	420.24	200.87	538.37	316.67	130.13
Heilongjiang	111665	510.56	410.39	100.17	485.9	318.57	62.13
Henan	171450	723.2	521.24	201.96	616.82	395.86	102.32
Hubei	175060	601.71	418.18	183.53	533.4	325.64	124.52
Hunan	211530	449.65	315.37	134.29	413.33	246.54	91.49
Inner Mongolia	92200	188.97	188.97	NA	175.96	150.07	NA
Jiangsu	331626	1292.37	772.35	520.02	1300.52	601.22	559.2
Jiangxi	136880	322.73	228.62	94.11	247.91	155.95	48.69
Jilin	141024	365.63	279.36	86.28	337.41	224.14	53.28
Liaoning	246260	681.79	516.31	165.48	688.1	445.49	113.83
Ningxia	27290	67.3	55.91	11.39	48.35	39.17	4.19
Qinghai	29820	31.18	29.67	1.51	28.09	23.62	0.94
Shaanxi	92380	285.08	221.97	63.11	241.46	169.75	34.53
Shandong	311534	854.43	532.45	321.99	812.26	462.53	200.37
Shanxi	86820	259.09	208.08	51.01	228.99	160.63	26.22
Sichuan	192670	513.06	403.82	109.23	396.85	253.71	57.94
Tibet	7800	14.93	14.93	NA	8.03	6.85	0.03
Xinjiang	114234	221.6	221.45	0.15	163.24	147.53	0.06
Yunnan	128094	313.06	242.96	70.1	248.46	165.96	38.92
Zhejiang	243553	834.48	448.94	385.55	901.78	405.31	345.76

Source: China Statistics Yearbook 2000, MII

Table 7a: Telecom Services Business Volume (RMB100 million, Calculated in 1990 constant prices)

Year	Volume Amount	YOY Growth (%)
1991	151.63	
1992	226.57	49.42
1993	382.45	68.80
1994	592.30	54.87
1995	875.51	47.82
1996	1208.75	38.06
1997	1628.95	34.76
1998	2264.94	39.04
1999	3132.38	38.30

Source: China Statistics Yearbook 2000, MII

Table 7b: 1998 Business Volume by Province (RMB 100 million)

Region	Volume
Beijing	118.4
Chongqing	31.06
Shanghai	124.84
Tianjin	44.5
Anhui	51.79
Fujian	116.27
Gansu	17.61
Guangdong	405.22
Guangxi	49.72
Guizhou	18.77
Hainan	17.04
Hebei	78.62
Heilongjiang	76.62
Henan	96.88
Hubei	76.76
Hunan	69.34
Inner Mongolia	21.88
Jiangsu	153.58
Jiangxi	35.95
Jilin	51.3
Liaoning	117.65
Ningxia	6.01
Qinghai	4.21
Shaanxi	35.86
Shandong	123.43
Shanxi	35.79
Sichuan	70.31
Tibet	1.41
Xinjiang	22.49
Yunnan	41.64
Zhejiang	150.96

Source: China Statistics Yearbook 2000, MII

Table 8a: Service Usage by Province, 1998

Region	Number of Long-distance Calls (1000)	Paging Subscribers (10000)	Mobile Phone Subscribers (10000)	Email Subscribers	Internet Subscribers
Beijing	71769	23.82	99.37	3845	33002
Chongqing	23912	71.24	37.22	NA	5871
Shanghai	70966	78.17	125.97	2100	102404
Tianjin	28796	43.96	47.56	97	14271
Hebei	66027	217.73	91.56	255	16675
Anhui	43951	147.61	58.3	1112	6573
Fujian	67906	0.13	146.47	1220	30973
Gansu	16850	45.65	14.21	47	3183
Guangdong	412657	370.03	362.69	1721	128323
Guangxi	42261	161.82	50.74	84	10564
Guizhou	18043	63.22	18.74	61	972
Hainan	11723	56.05	19.49	20	9163
Heilongjiang	46182	146.03	105.2	NA	11044
Henan	80328	197.95	118.64	248	43153
Hubei	59929	198.06	83.24	1616	33756
Hunan	48541	202.69	75.3	1933	13598
Inner Mongolia	17429	42.01	25.89	70	1454
Jiangsu	133904	303.95	140.1	3255	69856
Jiangxi	27436	116.54	43.27	39	7711
Jilin	31660	112.56	59.99	124	6316
Liaoning	88136	342.78	128.79	1054	23090
Ningxia	5990	18.75	5	NA	613
Qinghai	6110	5.81	3.53	NA	419
Shaanxi	33053	74.27	37.18	170	13940
Shandong	97077	242.28	149.36	1381	39903
Shanxi	35505	68.52	42.14	NA	4136
Sichuan	63826	195.55	85.21	74	2440
Tibet	2204	1.58	1.15	12	145
Xinjiang	29999	42.84	15.65	NA	1401
Yunnan	33784	130.97	43.57	135	4077
Zhejiang	109989	185.56	150.72	286	37729

Source: China Statistics Yearbook 2000, MII

Table 8b: Service Usage by Province, 1998

Region	Number of Subscribers of Local Telephone	Number of Urban Telephone Subscribers	Urban Residential Telephone Subscribers	Rural Telephone Subscribers	Rural Residential Telephone Subscribers	Public Telephone Subscribers
Beijing	3132642	2825666	1912082	307416	261220	53575
Chongqing	1542516	1214929	933154	327587	276630	37139
Shanghai	4311209	3409720	2515096	901489	657467	59079
Tianjin	1657248	1536488	1226126	120760	104391	37037
Anhui	2744040	1908910	1626184	835130	709311	70466
Fujian	3474637	2050247	1600507	1424390	1219937	138434
Gansu	952252	854756	703621	97498	66674	25190
Guangdong	9584542	6289063	4734330	3295479	2749452	189155
Guangxi	1666776	1350757	1052838	316019	224355	66882
Guizhou	798928	705392	560005	93536	65804	28049
Hainan	434038	360038	230593	74000	44295	26128
Hebei	4034731	2762731	2196220	1272000	972241	104643
Heilongjiang	3410653	2846070	2456378	564583	512432	76423
Henan	4427626	3159662	2540864	1267964	1082441	138725
Hubei	4049359	2827679	2286183	1221680	1031673	162367
Hunan	3156375	2252207	1858351	904168	808202	164255
Inner Mongolia	1254382	1040109	845015	214273	172736	32451
Jiangsu	7495884	3861072	3114595	3634812	3299062	197649
Jiangxi	1925170	1457639	1179990	467531	394012	58799
Jilin	2416222	1925546	1606224	490676	433409	57024
Liaoning	4767833	3663494	2958489	1104339	929676	194727
Ningxia	374461	335678	266178	38783	33816	10274
Qinghai	222612	207967	160319	14645	5720	6077
Shaanxi	1818765	1507041	1144873	311724	237479	51392
Shandong	5262761	3480208	2800184	1782553	1393240	172993
Shanxi	1550720	1243159	1005761	307561	247793	42241
Sichuan	2797403	2266890	1667253	530513	357707	149818
Tibet	59166	58867	30261	299	20	3089
Xinjiang	1193631	881020	653079	312611	266253	37879
Yunnan	1880992	1506085	1129568	374907	277961	57688
Zhejiang	5023361	2809471	2116484	2213890	1872079	145250

Source: China Statistics Yearbook 2000, MII

