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COMMUNICATIONS: GOVERNMENT AND BUSINESS PRACTICES IN THE ASIA PACIFIC REGION

BACKGROUND MATERIAL

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1 INTRODUCTION

Although users are generating more traffic, recent trends in the telecommunication industry have shown evidence of falling average revenue per user (ARPU). Much of the traffic generated utilizes IP and as a result is difficult to trace. This paper investigates this phenomenon in the Asia Pacific Region, and in particular, focuses on five countries: Hong Kong, South Korea, Japan, Australia, and China. These countries were chosen because they represent the diversity of the region in basic telecommunications demographics, such as size, population, infrastructure, etc. Each country is examined individually, in a case study and evaluated as to whether it is experiencing the decline in ARPU and how operators and the government are dealing with the situation. Also, any new technologies or business strategies which may affect revenues or usage are highlighted. Specifically, these are case study evaluations of voice services, falling ARPU, convergence, and how operators/governments are reacting. The goal of these studies is to evaluate whether the actions of the governments are effective. The countries are ordered from most effective to least effective. Also included are analysis and observations of each country's response as well as an analysis of the region as a whole.

The Asia Pacific region is an important region in which to examine communications. It includes Hong Kong which, although it is a part of China, operates essentially as a separate entity and offers one of the most advanced and competitive markets in the world. China, the most populous country in the world, is developing and offers huge market potential; however, it is the only country with an entirely state-controlled telecommunications market. South Korea is home to mobile handset manufacturers, Samsung and LG, and has an extremely technology savvy population due to the government's information technology training program. Japan has Tokyo, the largest metropolitan area in the world, as well as the third largest economy in the world by purchasing power parity and has implemented a plan, u-Japan, to create a single seamless communications network for fixed, mobile, and consumer electronics. Finally, Australia will be upgrading its fixed network to a broadband fiber one and must find a way to offer telecommunications as widely as possible despite its large landmass and highly dispersed rural population.

The first three countries examined in this study, Hong Kong, South Korea, and Japan, all share the characteristic of being first-movers in technology. While the remaining two, Australia and China, have been reactionary in their responses to change within the telecommunication industry. Of the five countries in the region, Hong Kong has been the most successful in adjusting to change in the telecommunications industry. Hong Kong's success can be attributed to the competitiveness of the market and the neutrality and independence of the regulator. The openness of its market and the clear market conditions allow competing operators to quickly react to changes in the industry and make it easier for these operators to launch new services. However, the business model of exclusive content being used by service providers in Hong Kong may be an unsustainable one. South Korea's success can be attributed to the commitment of the government and of the private sector to the creation of necessary infrastructure for the provision of converged services. This includes the creation and training of a technology savvy public. Although the country has accepted the new converged services, feuding among regulatory agencies could be a problem for the future of this market. Japan has a clearly defined vision of a ubiquitous society which is being implemented by the Japanese government and operators in the telecommunications market. There have been a great deal of mergers and acquisitions within the market, which could potentially benefit consumers and the market, but this also raises antitrust concerns with the vertical or horizontal consolidation of power that may result. Australia is working on developing the infrastructure needed for the new converged services, putting them behind countries in the region that already have the infrastructure built in. Australia has been slow in transitioning its full telecommunications industry and still has an incumbent who controls most of the fixed-line infrastructure as well as majority of the mobile market. The country's problems can be attributed to Australia's choice to not to focus on converged services and the indecision and confusion that has resulted from conflicting motives between the regulator and the Telstra, the incumbent, in whom the government had

a controlling share until November 2006. China shows huge potential because of the size of the population and potential size of its markets. These markets remain unexploited and may continue in that state as long as the Chinese government continues to interfere with market forces. The markets are still essentially closed as all telecommunications providers must be majority state-owned by law and the regulators are not independent. China has also banned convergence between the telecommunications and broadcasting industries which has caused bickering and competition between the regulators in each industry. Upon examination of these case studies, it is clear that the current state of the telecommunications market across the Asia Pacific region shows a great deal of variety from the point of view of government regulation and business strategy. Although there are challenges that must be dealt with, it is a region which shows a great deal of promise the emerging markets for converged services.

2 COUNTRY CASE STUDIES

2.1 Hong Kong

2.1.1 General Background



The designations employed and the representation of material in this map do not imply any opinion whatsoever on the part of ITU concerning the legal or other status of any country, territory or area or any endorsement or acceptance of any boundary.

Hong Kong, officially known as Hong Kong Special Administrative Region or Hong Kong SAR, is located in eastern Asia and shares a border with China. Including land and water, it covers a region of 1,092 sq. km.¹ Hong Kong is divided into three main land areas: Hong Kong Island, Kowloon, and the New Territories, and as of July 2006, has a population of approximately 6,940,432 with a growth rate of 0.59%.² With 6,482 people/km², Hong Kong is one of the most densely populated territories in the world.³ It is essentially one big city. Some 95% of the population lives in urbanized Kowloon, Hong Kong Island, or the new towns in the New Territories. Hong Kong's inhabited landscape is essentially vertical: 95% of the population lives in apartment buildings. Hong Kong's compactness makes it extremely easy to cover with a communications infrastructure.⁴ Politically, Hong Kong is a special administrative region of China, and it has what the CIA describes as a limited democracy.⁵ Hong Kong has a "mini-constitution" known as the Basic Law, which was approved by China's National People's Congress in March 1990.⁶ This constitution allows for the development of democratic processes. Beijing has the power to veto any changes to the political system; however, the Basic Law does guarantee a "high-degree of autonomy"

until 2047.⁷ The president of China is the head of state, but Hong Kong is presided over by the Chief Executive who is appointed by China and is assisted by the Executive Council, known as Exco. Exco is made up of both ex officio and non-official members and its role is to advise the Chief Executive.⁸ The legislative branch is the Legislative Council, Legco. A unicameral legislature consisting of thirty directly elected members and thirty members elected by functional constituencies.⁹ Hong Kong's next elections will be in March 2007 for Chief Executive and in 2008 for the Legco. The legal system has its basis in a combination of English law and the Basic Law. Apart from foreign affairs and defense which are under the control of China, Hong Kong has autonomy to determine all other issues.¹⁰

2.1.2 Economic Background

In 2006, Hong Kong was second in the International Institute for Management Development's ranking of the world's most competitive economies, behind only the United States.¹¹ Hong Kong has limited natural resources. Raw materials, as well as food, must be imported. Domestic demand is limited due to the size of the population.¹² As a result, the basis of Hong Kong's economy is trade.¹³ Gross imports and exports which include re-exports to and from third countries are both greater than the GDP in dollar value.¹⁴

The business of re-exporting to and from China is the major driver of economic growth. Hong Kong has always had close ties economically with China; however, since reverting to Chinese Administration in 1997, its economy has become increasingly integrated with that of China's as the cost of manufacturing in China has decreased and China has become more open to the global economy.¹⁵ Hong Kong has a per capita GDP of \$32,900 (2005 est.), which is close to that of the four big economies of Western Europe.¹⁶ Growth of GDP has been strong in the last fifteen years, averaging 5%; however, Hong Kong has had to deal with recessions in 1997-1998 and 2001-2002 as well as the Severe Acute Respiratory Syndrome (SARS) outbreak in 2003.¹⁷ The composition of Hong Kong's economy is based on their reliance on trade with agriculture accounting for 0.1% of GDP, industry accounting for 9.2% of GDP, and services accounting for 90.6% in 2005.¹⁸ Table 2.1 provides a quick look at the economy of Hong Kong since 2000.

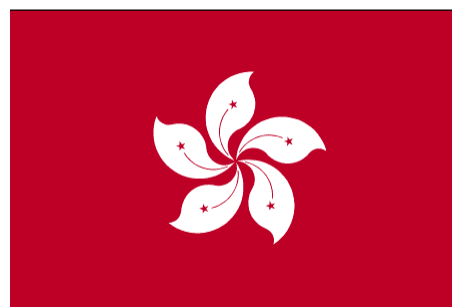


Table 2.1: Hong Kong - Economic Snapshot, 2000 to 2005

	2000	2001	2002	2003	2004	2005
GDP (current US\$)	\$168.754 billion	\$166.541 billion	\$163.709 billion	\$158.472 billion	\$165.841 billion	\$177.722 billion
GDP growth (annual %)	10.20%	0.64%	1.84%	3.20%	8.60%	7.27%
GNI, Atlas Method (current US\$)	\$179.845 billion	\$175.277 billion	167.483 billion	\$174.100 billion	\$186.748 billion	\$192.118 billion
GNI per capita, Atlas Method (current US\$)	\$26,980	\$26,060	\$24,680	\$25,590	\$27,130	\$27,670
Annual Telecommunication Investment (US\$)	\$0.900 billion	\$1.187 billion	\$1.065 billion	\$1.034 billion	\$0.99 billion	1.200 billion
Total Telecommunications Service Revenue (US\$)	\$7.488 billion	\$6.627 billion	\$6.255 billion	\$6.102 billion	\$6.322 billion	\$5.909 billion
Fixed Line Subscribers per 100 Inhabitants	58.90	57.96	56.47	55.89	54.42	53.89
Mobile Subscribers per 100 Inhabitants	81.73	85.90	94.25	107.92	118.77	122.65
Internet Users per 100 Inhabitants	27.83	38.68	43.01	47.18	50.32	50.08

Source: ITU World Telecommunication Indicators 2006; World Bank World Development Indicators 2006; OFTA

2.1.3 The Telecommunications Market & Telephony

“One country, two systems” is the approach that China and Hong Kong have taken in the management of Hong Kong’s telecommunication market, especially since deregulation in the early 1990s.¹⁹ This approach was proposed as a solution for the problems arising as a result of Hong Kong becoming part of China.²⁰ Hong Kong has one of the most sophisticated and competitive telecommunications markets in the world and it describes its regulatory regime as one that is “pro-competitive and pro-consumer.”²¹ Currently, there are no limits on foreign or external ownership, and since July 2001, all telecommunications services and infrastructures have been liberalized in practical terms.²² As a result, market entry conditions are clear and transparent. All operators are privately owned and have been this way since 1981 when Cable & Wireless was privatized in the United Kingdom.²³

The executive body responsible for overseeing Hong Kong’s telecommunications industry is the Office of Telecommunications Authority (OFTA). The applicable legislation is the *Telecommunications Ordinance*, and in addition, OFTA issues statements addressing specific aspects of telecommunication regulation.²⁴ OFTA falls within the Commerce, Industry, and Technology Bureau (CITB) and is the executive arm of the Telecommunications Authority (TA), which is the statutory body that oversees regulation of the telecommunications market.²⁵ OFTA was established in 1993 and its responsibilities include regulating public telecommunications services, enforcing fair competition in the sector, tracking down illegal telecommunications activities, managing the spectrum, advising the government on telecommunications issues, and representing Hong Kong in international telecommunication organizations and fora.²⁶ OFTA is an independent regulator. Its Director-General is appointed directly by the Chief Executive of Hong Kong. This allows the agency to operate without outside interference from other government agencies. OFTA is self-funded through the license fees it receives from operators; so it is not subject to budget controls. Also, OFTA’s employees are not allowed to hold shares in any telecommunications companies.²⁷ Its approach in regulating the market is the following: “whenever a market sector becomes competitive, OFTA will adopt a light-handed policy approach immediately and let market forces dominate. For interconnection between mobile networks and fixed networks owned by [non-Cable & Wireless HKT] operators, OFTA has adopted a hands-off approach, although it reserves the right to intervene if necessary in accordance with the *Telecommunication Ordinance*.”²⁸

As a result of convergence within its telecommunication industry, Hong Kong has been forced to explore a possible restructuring of its regulatory framework. In March of 2006, the Communications and Technology Branch of CITB began a three month consultation on the establishment of the Communications Authority (CA) as a single regulator for the entire electric communications industry. This new agency would be responsible for enforcing the Telecommunication Ordinance and the Broadcasting Ordinance.²⁹ Its powers would be those of the TA and the Broadcasting Authority (BA), which is also under the umbrella of CITB.³⁰ Both these agencies would cease to exist with the creation of the CA. In addition, there is a proposal to merge OFTA and the Broadcasting Division of the Television and Entertainment Licensing Authority to create the Office of the Communications Authority (OFCA), which would be the executive arm of the CA. As part of the consultation study on these possible mergers, operators were asked to give feedback. Five operators responded, and of these, three believed that convergence is occurring in their own business and operations, one replied with a neutral stance on convergence, and one disagreed. All of them disagreed with the statement that they have encountered problems because of the separate regulatory frameworks for telecommunications and broadcasting. Consequently, they also generally felt that merging TA and BA was not an urgent matter for their business. They did, however, feel that once TA and BA were merged, the new agency, CA, should remain politically and commercially neutral and independent. Finally, they all agreed that when dealing with innovative services enabled by emerging technologies, regulatory tolerance should take precedence over regulatory intervention as long as the public interest is safeguarded. Assuming the consultation went smoothly, it is expected that TA and BA will merge by the end of 2006.³¹

Until 1995, local fixed telecommunications service (FTNS) was a monopoly. Cable & Wireless HKT (CWHKT) held an exclusive franchise. In promoting deregulation, OFTA chose to take an aggressive

stance, and full liberalization in the FTNS market was achieved on January 1, 2003.³² Currently, there is no limit on the number of licenses that can be issued and no deadline has been set for applications to be submitted. In 2005, Hong Kong had 3,794,600 main lines in use.³³ As of August 2006, there were ten companies licensed to provide local wireline-based FTNS. They are PCCW-HKT Telephone Limited (PCCW-HKTC), New World Telecommunications Limited, Wharf T&T Limited, Hutchison Global Communications Limited, Hong Kong Broadband Network Limited, Towngas Telecommunications Fixed Network Limited, CM TEL (HK) Limited, TraxComm Limited, HKC Network Limited, and Hong Kong Cable Television Limited (HKCTV).³⁴ PCCW-HKT, formerly CWHKT, is the incumbent and has been categorized as dominant because it has 98% of the market in the local fixed network.³⁵ As a result, interconnection to PCCW-HKT's network is subject to regulation by OFTA through the *Industrial Code of Practice for the Interconnection*, which is fairly neutral due to OFTA's independent status.³⁶ PCCW-HKT also has a universal service obligation "to provide good, efficient, and continuous basic service, including the provision of public switched voice telephone services to consumers anywhere in Hong Kong within a reasonable period of time."³⁷

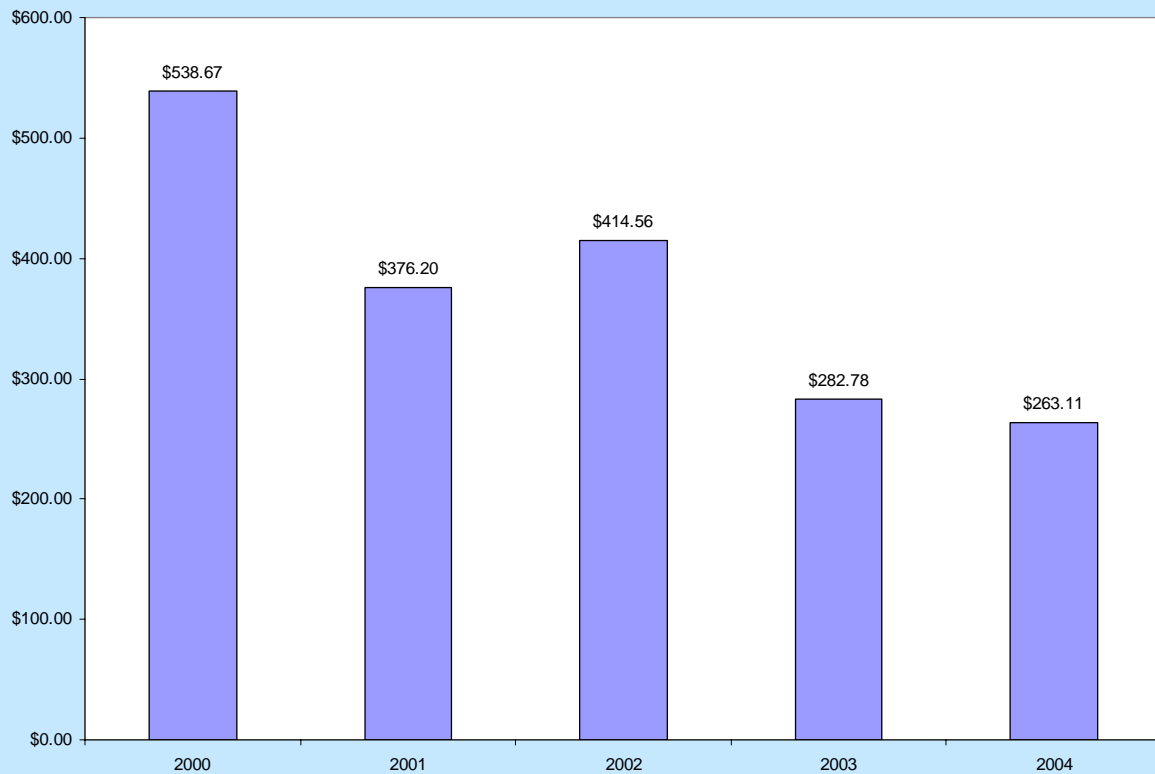
Until 1998, international telephone service was a monopoly held by CWHKT.³⁸ The market was fully liberalized on January 1, 1999 when the government and CWHKT reached an agreement to end that monopoly early.³⁹ The resulting competition has brought about a substantial reduction in call rates and improved the quality of services. As of August 2006, there were 242 carriers licensed to provide external service. International direct dialing (IDD) is available to most countries and regions. In the year between June 2005 and June 2006, the total volume of incoming calls was 2,161 million minutes and the total volume of outgoing calls was 6,097 million minutes.⁴⁰

The external facilities market was liberalized on January 1, 2000. As of August 2006, there were six companies licensed to operate satellite-based external FTNS and twenty companies licensed to operate cable-based FTNS facilities. Hong Kong has adopted the Open Sky Policy in regulating the provision of satellite services.⁴¹

Mobile Telephony

Hong Kong has an extremely competitive and vibrant mobile telephony market. In June 2006, there were fourteen digital networks operating in the 800/900 MHz bands (4 networks), 1,700-1,900 MHz (6 networks), and UNTS (4 networks). The number of mobile service subscribers has grown to 8.9 million, representing one of the highest penetration rates in the world (approximately 127%). Among these 8.9 million subscribers are 976,000 third generation (3G) customers.⁴² In addition to basic voice services, data services which include SMS (Short Message Service), mobile Internet, downloads, multimedia services, video call services, and mobile TV services are available to mobile customers. The 3G network is currently being upgraded with high speed downlink packet access (HSDPA) technology which will allow customers to use mobile data services at a speed up to 3.6 Mbps.⁴³ The addition of data services, also known as value-added services, is a strategy being used by mobile operators in Hong Kong in an effort to maximize the value of their investments and to generate extra revenue from current subscribers.⁴⁴ Figure 2.1 illustrates the fall in ARPU in the Hong Kong mobile telephony market.

Figure 2.1: Hong Kong - ARPU in the Mobile Telephony Market, 2000 to 2004



Source : ITU World Telecommunication Indicators 2006

The mobile telephony operators have chosen to pursue a “walled-garden” approach to their business. They request exclusive provision of content in an effort to gain an advantage over their competition. Interestingly, this approach is the opposite of the one used in China. The result of this business model has been an increase in the cost of content. The exclusivity of the content results in a limited amount of content which in turn results in the increase in cost of content. The final outcome of this is an increase in costs for subscribers and may ultimately make the business model difficult to maintain.⁴⁵

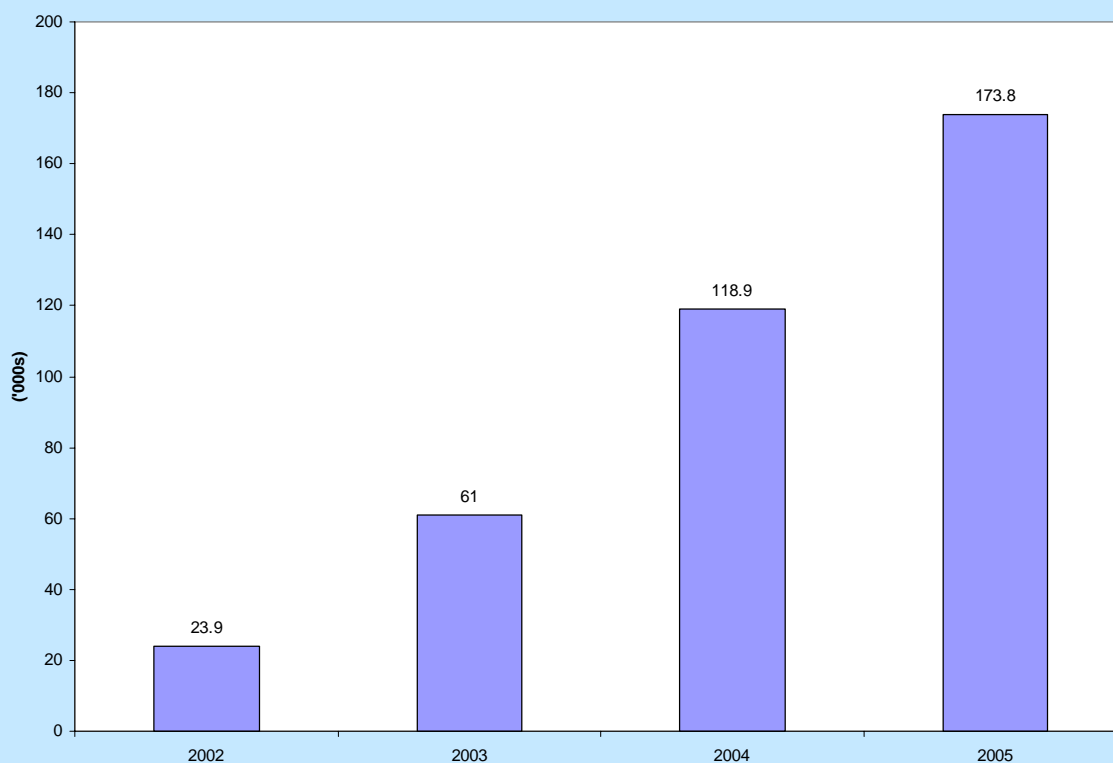
CONVERGENCE

Taking advantage of fixed-mobile convergence is also a part of the business model used by telecommunications operators in Hong Kong. Many mobile multimedia applications are being deployed with the same application being delivered through an integrated fixed and mobile platform.⁴⁶ An example of this is the partnership between SmarTone-Vodafone and Microsoft who announced the launch of Windows Mobile Email on April 17, 2006. This application enables customers to use a Direct Push email service in the format used by Microsoft whether at home or abroad.⁴⁷

DATA SERVICES

Relative to China, the growth of 2G data services has been slow.⁴⁸ From October to December 2005, Hong Kong Mobile users sent an average of 19.33 messages per person. In the same time period, Chinese customers sent out an average of 96.08 messages per person.⁴⁹ Figure 2.2 shows the growth in the SMS market in Hong Kong since 2002.

Figure 2.2: Hong Kong - The Number of SMS in December, 2002 to 2005



Source : ITU - The Regulatory Environment for the Future of Mobile Media Services: The Case of Hong Kong SAR and China

There are several possible reasons for the relatively slow growth of SMS usage in Hong Kong. These include the high penetration rate of the Internet, the low, flat monthly rate for mobile voice service, and the wide availability of alternative sources of information. The perception in Hong Kong is that the value of SMS is low and people consider it to be a secondary form of communication.⁵⁰

CURRENT STATE OF THE MARKET

The pro-competitive approach taken by Hong Kong towards mobile communication has been there from almost the beginning of the market.⁵¹ OFTA's main concerns are to ensure customers can easily move from one network to another while still having the ability to obtain comparable services and to maximize the ease and practicality of roaming services.⁵² Before 3G licenses were issued in 2001, there were six mobile operators who held eleven licenses. The six were CSL, Hutchison, New World, PEOPLES, SmarTone and SUNDAY (Mandarin).⁵³ The market breakdown is illustrated in table 2.2.

Table 2.2: Hong Kong - Mobile Telephone Market in Early 2005

	CSL	Hutchison	SmarTone	SUNDAY (Mandarin)	New World	PEOPLES
Number of Subscribers	1,300,000	2,195,000	1,033,000	684,000	1,300,000	1,130,000
ARPU (HKD)	309	156	196	180	171	156
Market Share	17.01%	28.72%	13.52%	8.95%	17.01%	14.79%
Technology	GSM, DAMP, PCS, WCDMA	GSM, DAMP, PCS, WCDMA	GSM, PCS, WCDMA	PCS, WCDMA	PCS	PCS

Source: ITU - The Regulatory Environment for the Future of Mobile Media Services: The Case of Hong Kong SAR and China

When 3G licenses were issued, there were only four licenses available. As a result, two operators did not receive licenses, PEOPLES and New World PCS. In March of 2006, PEOPLES became a wholly owned subsidiary of China Mobile (Hong Kong) and adopted a new legal name: “China Mobile Peoples Telephone Company Limited.” In April of 2006, New World formed a joint venture with CSL called CSL New World Mobility Limited. Telstra Corporation Ltd (Australia) owns 76.4% of the corporation and the other 23.6% is owned by New World Mobile Holding Limited. CSL had been owned by PCCW but was sold to Telstra to cover the debt PCCW incurred in acquiring CWHKT.⁵⁴ PCCW received its 3G license by acquiring SUNDAY which had been granted a license.⁵⁵ Currently, all four 3G licensees are using W-CDMA for 3G services.⁵⁶ The current mobile market is illustrated in Table 2.3.

Table 2.3: Hong Kong - Mobile Telephone Market in Early 2006

	CSL New World Mobility Limited	PCCW Mobile (SUNDAY)	3 Hong Kong	China Mobile Peoples Telephone Company Limited	SmarTone Vodafone
Networks	2G, 3G	2G, 3G	2G, 3G	2G	2G, 3G
# of 2G Users	2,080,000	738,000	1,674,000	1,287,000	1,054,000
# of 3G Users	60,000	100,000	521,000	N/A	100,000
Total # of Users	2,680,000	838,000	2,195,000	1,287,000	1,154,000
Market Share	31.0%	9.7%	24.4%	14.9%	13.4%

Source: ITU - The Regulatory Environment for the Future of Mobile Media Services: The Case of Hong Kong SAR and China

2.1.4 Internet

In Hong Kong, telephone service is basically ubiquitous. Wherever there is a phone, Internet can be made available. As a result, Internet access is available almost anywhere.⁵⁷ As of 2005, Hong Kong had 859,926 Internet hosts and 4,878,713 Internet users.⁵⁸ Table 2.4 shows the growth of Internet subscribers and users in Hong Kong.

Table 2.4: Hong Kong - Internet Penetration Rate, 2000 to 2005

	2000	2001	2002	2003	2004	2005
Internet Subscribers (Dial-up)	2,175,186	1,887,311	1,330,340	1,070,207	1,002,598	969,406
Internet Subscribers (Broadband)	444,450	716,435	1,038,995	1,267,966	1,519,837	1,659,098
Internet Subscribers (Total)	2,666,000	2,620,000	2,388,000	2,338,173	2,522,435	2,639,948
Internet Users (Estimate)	1,855,200	2,601,300	2,918,800	3,212,800	3,479,700	3,526,200
Population	6,665,000	6,724,900	6,786,100	6,810,100	6,915,700	7,041,000
Penetration Rate	27.83%	38.68%	43.01%	47.18%	50.32%	50.08%

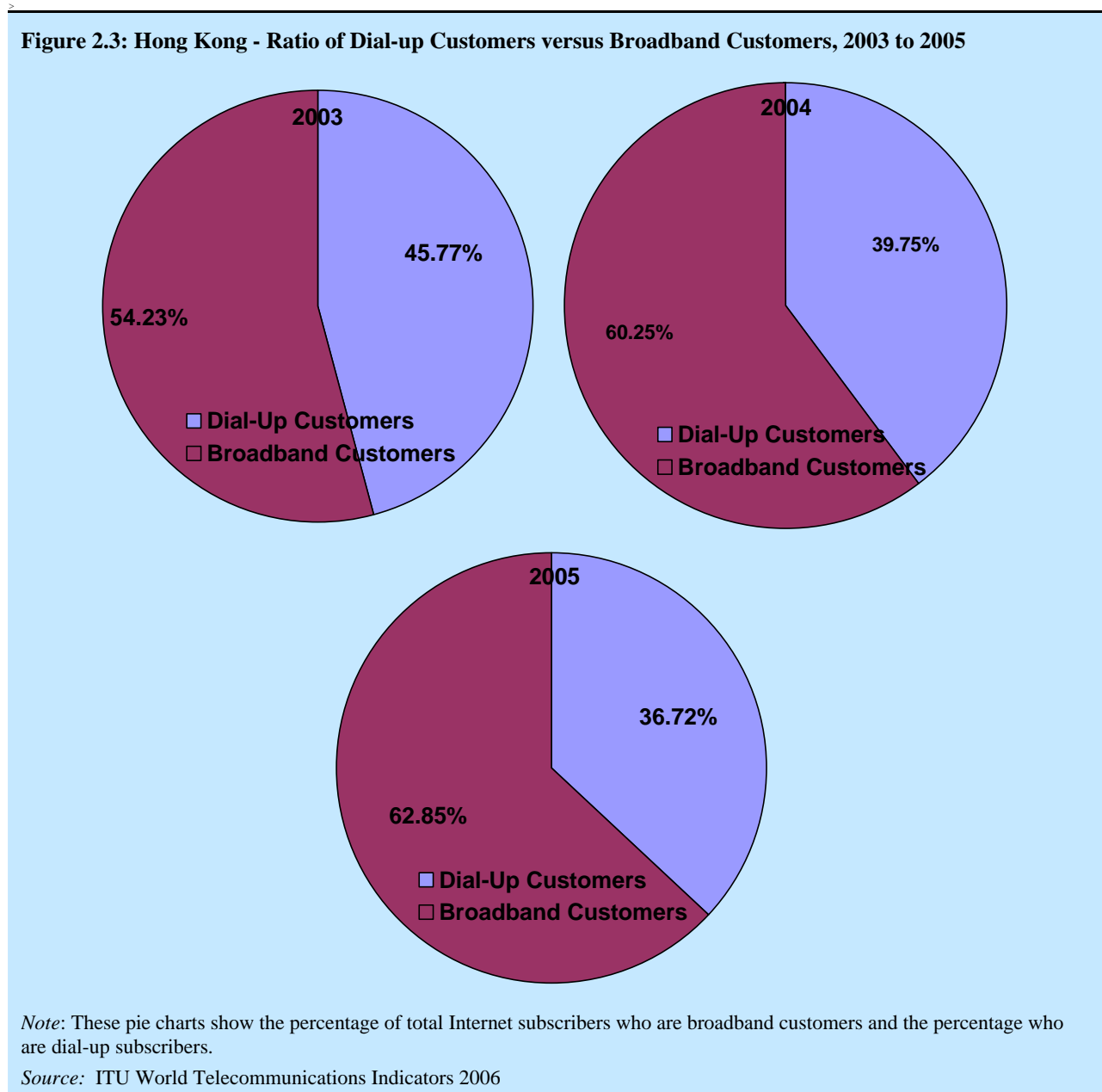
Note: Penetration rate is calculated using the estimated number of Internet users divided by the population.

Source: ITU World Telecommunication Indicators 2006

Because of its controlling market share in FTNS, PCCW is the leading Internet provider. Similar to other developed economies, Hong Kong has its own digital divide. In this case, availability and use of personal computers and the Internet is based on age, income, and education.⁵⁹ Of those that use the Internet, 87% access it at least once a week and 76% use it for communication purposes.⁶⁰

Broadband

Hong Kong was an early mover in broadband and one of the first economies to offer broadband, launching the service in May 1998.⁶¹ Dial-up subscriptions peaked in August of 2000 and have been declining since that time. In 2002, the number of broadband subscribers surpassed the number of dial-up subscribers. The majority of households in Hong Kong now report that they use broadband to connect to the Internet.⁶² Figure 2.3 shows the decline of dial-up and the rise of broadband.



As of June 2006, more than 1.68 million customers (24% of the total population) were using broadband with a speed up to 1000 Mbps.⁶³ The popularity of broadband has been beneficial for operators as the average revenue per user (ARPU) for broadband is twice that of dial-up.⁶⁴ The market for broadband is made up of a variety of operators. All of the local fixed network operators are able to provide service under their current licenses. Apart from network operators, there were 185 Internet service providers (ISPs) in June 2006 who were licensed to provide broadband services. Currently, there are fifteen companies providing retail broadband services. These include the four fixed-line operators, five fixed wireless operators, the cable television company, and five ISP resellers. The three main infrastructure-based providers account for 90% of the market. These providers are: PCCW (the incumbent), i-Cable (the cable TV company), and Hong

Kong Broadband Network (a subsidiary of City Telecom).⁶⁵ One factor which contributes to the diversity in the broadband market is the ease in which an operator can provide broadband services in Hong Kong. Generally, the provision of broadband involves only connecting a backbone connection to an apartment or office building and then using the existing copper or coaxial cable in-building wiring.⁶⁶

The market that has been created for broadband in Hong Kong has become a rival to the mobile Internet market. PCCW has installed approximately 150 hotspots around Hong Kong. Also, i-Cable has established over 1500 hotspots covering the major shopping malls. PCCW markets its service principally to customers of its NETVIGATOR broadband service, thereby making a conscious decision to associate WLAN with broadband and not with mobile.⁶⁷

OFTA has also been active in promoting the uptake of broadband by attempting to create a favorable regulatory environment for the upgrading of the infrastructure. According to OFTA, the following three elements are necessary for a favorable environment:

- (1) Market liberalization – the lowering of regulatory entry barriers so that investors are able to enter the market if they find business opportunities. Competition from new entrants will also spur the incumbents to invest and innovate in order to remain competitive;
- (2) A clear, transparent and predictable regulatory framework – will minimize the “regulatory risks” by setting out as clearly as possible the regulation, publishing full reasons for decisions, and conducting full consultation before changes are made; and
- (3) A level playing field where market forces can work effectively – operators should not expect regulation favoring or discriminating against a particular technology or class of operators.⁶⁸

Hong Kong remains at the forefront of broadband development. At the beginning of 2006, broadband penetration had reached approximately 65% of households. Around 98% of Hong Kong’s households are within the coverage of the DSL (digital subscriber line) network of the incumbent operator. Over 90% of Hong Kong’s households are also covered by the cable modem network of the cable television operator and another 71% are covered by at least one fiber-based customer access network of the other fixed network operators.⁶⁹

2.1.1 VoIP

In October 2004, the TA initiated a consultation to assess VoIP based on the principle of technology neutrality.⁷⁰ The result of this consultation was a statement released in June 2005 in which OFTA defined two classes of VoIP services and said it would allow existing licensees to operate VoIP services under their licenses regardless of whether they were facilities or services based. The first class (Class 1) of VoIP services corresponds to services with attributes similar to conventional telephony services. Class 1 services would be required to meet those license conditions that are applicable to fixed network operators operating conventional telephony services according to the terms of the Fixed Telecommunications Network Services of Fixed Carrier (FTNS/FC) licenses.⁷¹ These terms include the requirements of number portability, a printed directory listing, and quality of service on par with conventional telephony service.⁷² The second class (Class 2) of VoIP services is those which do not have all of the attributes of conventional telephony service and require a new kind of license. Class 2 services would be subject to minimal licensing obligations, mostly dealing with consumer protection. Further consultation was conducted on both the rights and obligations for Class 2 services, including what format of numbers should be used (8-digit, 10-digit, or some other alternative).⁷³ The resulting paper was the “Consultation Paper on the Creation of a New License for Services-Based Operators for the Provision of IP Telephony Services.”⁷⁴ As part of the number format discussion, it has been suggested that 8-digit numbers be used to differentiate nomadic VoIP services. One obligation that does apply to all Class 2 services is that they must advise their customers of the limitations of

the service. For both Class 1 and 2 services, the operators must provide free access to emergency services if they assign numbers from the Hong Kong Telephone Numbering Plan.⁷⁵ With regard to price of service, the conditions proposed by the consultation paper for VoIP services include an obligation to publish and to charge no more than the amount published. The incumbent carrier, PCCW-HKT, must also notify OFTA of any discounts it plans on offering at least one day prior to their implementation. The TA has the option of making these discounts public if it believes the release of the information is in the public interest. Cost accounting information must still be provided by the carrier to the TA in this new regime.⁷⁶

2.1.2 IPTV & Mobile TV

The broadband market is an extremely competitive one; therefore, in order to differentiate themselves from their competitors, broadband operators have been continually offering new services. One of these new services has been IPTV. The combination of a high penetration rate and the high bandwidth makes Hong Kong an ideal place for IPTV services.⁷⁷ IPTV has been well received by residents in Hong Kong and has proven to be a success.⁷⁸ IPTV has a household penetration rate over 25% (the highest in the world), and as of June 2006, there were over 700,000 subscribers to the service.⁷⁹ Some of the features which have contributed to the success of IPTV have been the a la carte menu, Chinese-language content, competitive pricing, and the bundling of the service with data and voice services.⁸⁰

In 1998, PCCW became the first operator in the world to launch an Interactive TV (Video-on-Demand) service commercially, and in 2003, it became the first to launch IPTV. In 2006, PCCW also launched a mobile real-time TV broadcasting service.⁸¹ PCCW has approximately 75% of the broadband market, and since IPTV's launch, PCCW has subscribed over two-thirds of its broadband customers to NOW TV, PCCW's IPTV service.⁸² The APRU has doubled from US\$7.30 (HK\$57) in 2003 to US\$14.7 (HK\$ 114) in 2005. Before the end of 2006 and by the time ITU TELECOM world 2006 is held in Hong Kong, PCCW planned to launch High-Definition Television (HDTV) using its IP platform. This is in an effort to stay ahead of the competition. Two of the local TV stations will be launching digital terrestrial television (DTTV) services.⁸³

As far as mobile TV, PCCW launched real-time television broadcast to 3G mobile phone using Cell Multimedia Broadcast (CMB) in May 2006. CMB is a Chinese technology that allows a broadcast to reach more users simultaneously than streaming to videoconference technology.⁸⁴ Its competition is 3 Hong Kong and CSL. 3 Hong Kong has created a partnership with local news providers to deliver 24-hour coverage of live streaming of local, international, finance and entertainment news to customers.⁸⁵ CSL was the first to introduce "3G Mobile TV" in February 2006 through its lifestyle mobile brand, One2Free. This service offers continuous infotainment programs on 3G mobile phones, basically turning each phone into a television set with more than twenty channels broadcasting news, dramas, entertainment, and movies.⁸⁶

2.1.3 Summing Up / Conclusions

Hong Kong is one the most advanced countries in the world in its telecommunications infrastructure, regulations, and services. With its high population density, the ease of creating infrastructure (the vertical structure of the housing), and the sophistication of the population, it offers an environment that is ideally situated for dealing with the falling revenues and usage of basic voice services. The government and OFTA have been successful in reacting to the change in voice services because of the independence of the regulator, the highly developed and competitive markets, lack of foreign ownership limits, and full liberalization of all markets. The operators have been able to react through offering a variety of new services based upon already existing infrastructure and have not been impeded in their business models because of Hong Kong's open markets and their clear and transparent entry conditions.

However, despite the success telecommunications operators have experienced, the business models being employed may give rise to concern in the future. Much of the content that is being offered, particularly through mobile devices, is contracted on an exclusive basis in an attempt to attract customers and exclude competitors. Although this may initially bring an increase in revenue, this may not be the most efficient way to handle content in the market and may eventually cause price increases both for the supply of the content to the operator as well as for use by the subscriber. This may make it necessary for operators to explore alternative methods of acquiring content to offer through their services.

2.2 South Korea

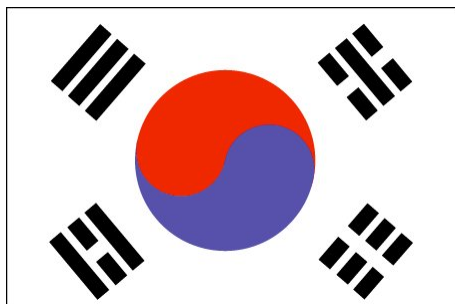
2.2.1 General Background

Officially known as the Republic of Korea, South Korea covers a total area of 98,480 km² and has a population of approximately 48.2 million people, which is growing at a rate of 0.42% per year.⁸⁷ It has a population density of 491 people/km². The country is situated on the Korean peninsula on the north eastern side of Asia and it shares its northern border with North Korea.⁸⁸ South Korea also includes some 3000 islands, most of which are uninhabited. Politically, South Korea is a republic.⁸⁹ The government is comprised of three branches: the executive, the legislative, and the judicial. The President is the head of the executive and is elected by popular vote for a single five-year term.⁹⁰ The next presidential election will be held in December 2007.⁹¹ Cabinet members answer to the President and are responsible for acting on policy issues. The President, with the approval of the National Assembly (the legislative branch) appoints the Prime Minister, whose responsibility it is to oversee the administrative functions of the ministries.⁹² The chief law is supplied by the Constitution, which was established in 1948. The National Assembly is comprised of 299 members, who are elected in four-year terms, with the next election scheduled for April 2008.⁹³ The country has a very high literacy level. Primary education is compulsory and compulsory secondary education is underway.



The designations employed and the representation of material in this map do not imply any opinion whatsoever on the part of ITU concerning the legal or other status of any country, territory or area or any endorsement or acceptance of any boundary.

2.2.2 Economic Background



In 1953 at the end of the Korean War, approximately 2.5 million people were dead (85% of which were civilians), 80% of industrial, transport, infrastructure, and public facilities were destroyed, and half of residential houses were destroyed. Since that time, South Korea has succeeded in rebuilding its economy. Currently, it has the tenth largest economy in the world and the third largest in Asia. The rebuilding process began in 1960 with the government's five-year economic development plan, which looked inward to import substitution for export promotion. During the Asian financial crises of 1997, South Korea's economic achievements were threatened but the government was able to weather the crisis through its resolve to reform the economy and with the assistance of the International Monetary Fund (IMF). In the 1980s, the country embarked on stabilization of these policies to control excess liquidity, realign credit priorities, and most especially promote competition.

The radical economic reformation in the country has been fuelled by high savings and investment rates and a strong emphasis on education. Over the past few decades, South Korea has enjoyed an economic growth rate of 8.6%, and it now ranks as one of the world's leading manufacturers of electronics, semiconductors, automobiles, and ships. Table 2.5 gives a summary of South Korea's economy from 2000 to 2005.

Table 2.5: South Korea - Economic Snapshot, 2000 to 2005

	2000	2001	2002	2003	2004	2005
GDP (current US\$)	\$511.658 billion	\$481.896 billion	\$546.934 billion	\$608.148 billion	\$679.676 billion	\$787.625 billion
GDP growth (annual %)	8.49%	3.84%	6.97%	3.10%	4.73%	3.96%
GNI, Atlas Method (current US\$)	\$460.394 billion	\$501.012 billion	\$508.296 billion	\$577.230 billion	\$674984 billion	\$764.684 billion
GNI per capita, Atlas Method (current US\$)	\$9,790	\$10,580	\$10,680	\$12,060	\$14,040	\$15,830
Annual Telecommunication Investment (US\$)	\$7.766 billion	\$6.372 billion	\$9.224 billion	\$5.169 billion	\$5.416 billion	..
Total Telecommunications Service Revenue (US\$)	\$20.740 billion	\$20.559 billion	\$23.067 billion	\$29.088 billion	\$33.359 billion	\$38.387 billion
Fixed Line Subscribers per 100 Inhabitants	58.90	57.96	56.47	55.89	54.42	53.89
Mobile Subscribers per 100 Inhabitants	81.73	85.90	94.25	107.92	118.77	122.65
Internet Users per 100 Inhabitants	27.83	38.68	43.01	47.18	50.32	50.08

Source: ITU World Telecommunication Indicators 2006; World Bank World Development Indicators 2006

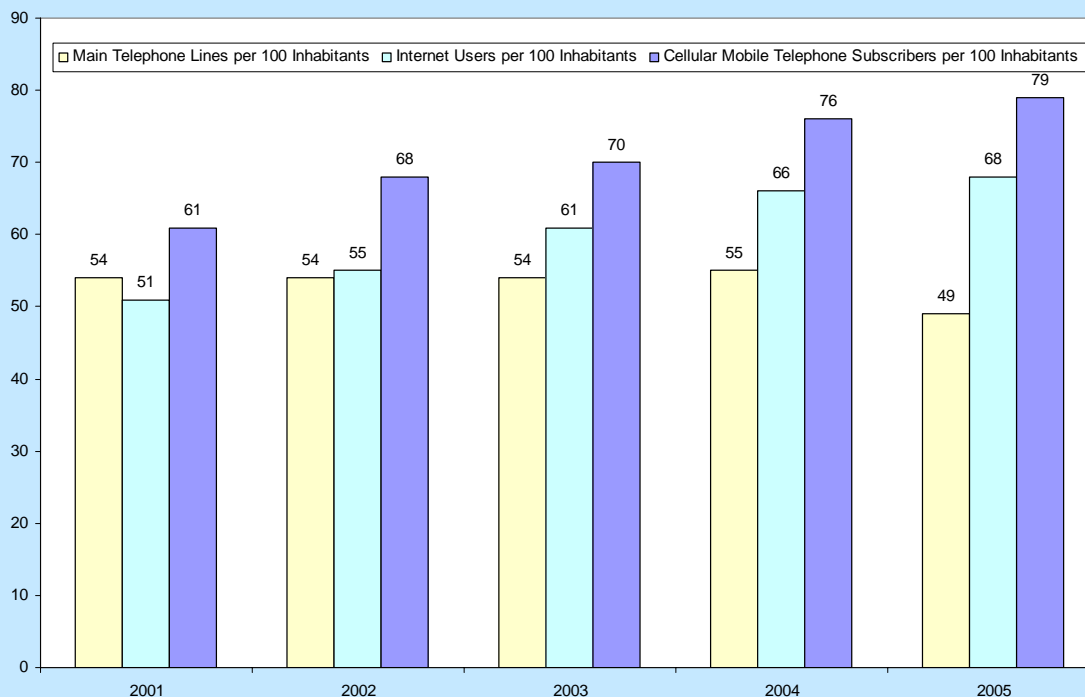
2.2.3 The Telecommunications Market & Telephony

In 1993, the government of South Korea determined that a nationwide backbone was essential to the economic development of the country. This was conducted under a ten year plan to cover the entire country. The project was partly funded by the government's contribution of US\$1 billion and completed by the private sector's contribution of US\$50 billion. The Korean government considered information and communications technologies (ICTs) as a way to overcome the financial crisis of 1997-98 and to build a more advanced economy.

As part of the reform and the shift to a knowledge-based society, the Korean government also began an information technology (IT) training program for its citizens. The goal of this program was to keep the unemployed occupied; however, the program proved more beneficial than anticipated. The free program was initially designed for 200,000 women but had to accommodate the three million women who registered and was gradually expanded to accommodate men. In total, ten million people were trained in IT. This yielded tremendous results as it made a majority of the populace technology savvy and more likely to use IT and contribute to the information economy.

As shown in Figure 2.4, South Korea has produced one of the most impressive information and communication technology (ICT) savvy populations in the world. In 1999, the mobile phone penetration overtook the fixed-line penetration. The country has a greater number of Internet and PC users than fixed telephone users.

Figure 2.4: South Korea - ICT and the South Korean Population, 2001 to 2005



Source: ITU World Telecommunication Indicators 2006

Government policy has contributed to the success of communication technology deployment throughout the country. The research collaboration of Korea's electronics and telecommunications institute (ETRI) and US-based Qualcomm brought about huge success in the CDMA technology deployment and subsequent mobile terminal manufacture. Qualcomm owns the patent for the CDMA technology.

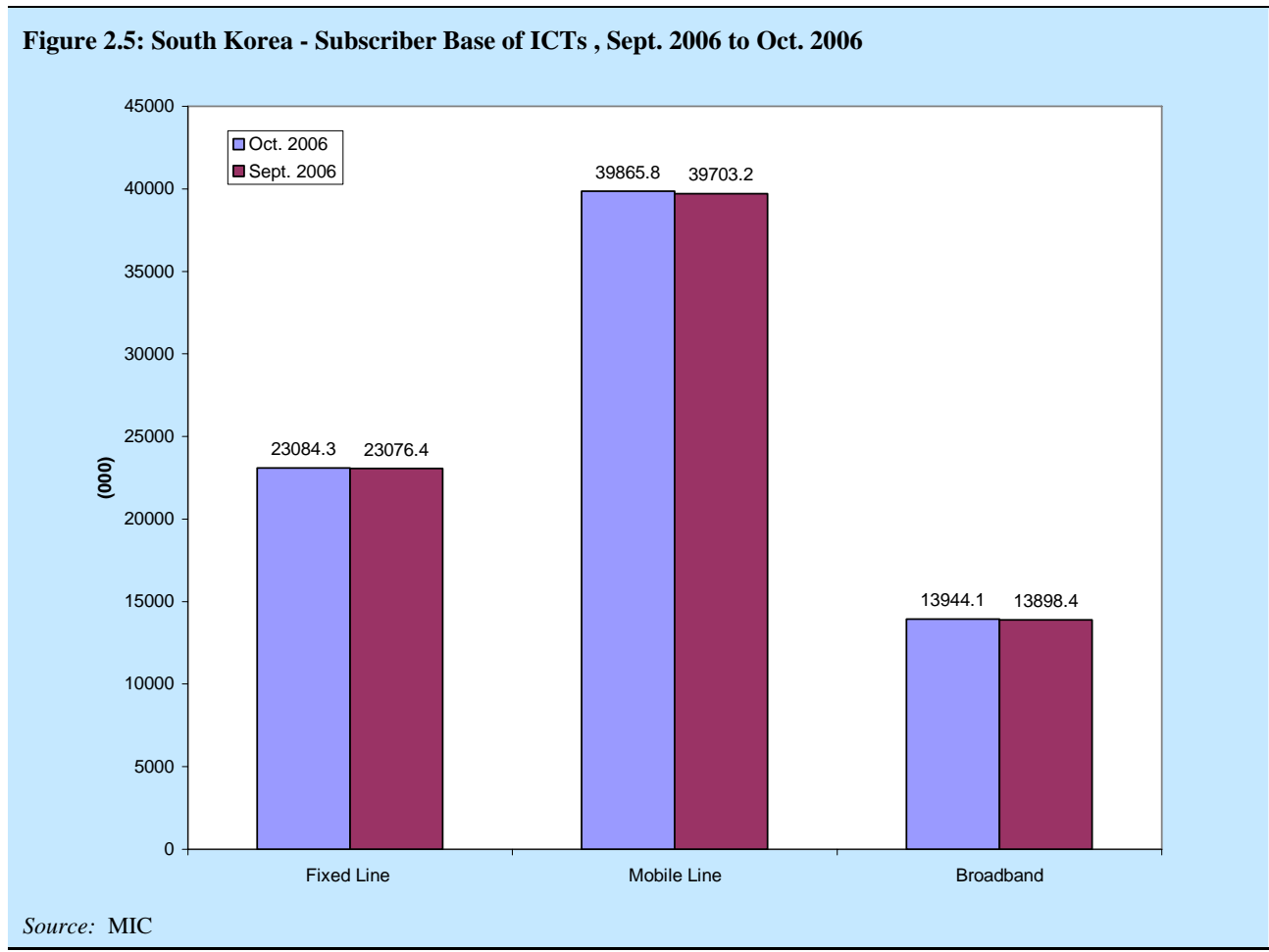
In addition, there is an existing relationship between the government, equipment manufacturers, and the mobile communication operators. This link has brought the parties into close relationship which has resulted in agreement on standards, policies, and business models. Mobile telephone subscribers are locked into a compulsory two-year contract since most Koreans can not afford to purchase the handsets outright. The government regulates the prices the subscribers are charged and ensures all parties are sufficiently compensated (the mobile operator for its services and the equipment manufacturer for its equipment).

The primary regulator of telecommunications in South Korea is the Ministry of Information and Communication (MIC). In addition, it is responsible for the development policy of ICT and broadcasting technology. The principal legislation guiding the telecommunications industry in South Korea is the *Framework Act on Telecommunication* and the *Telecommunications Business Act*. The *Framework Act on Telecommunications* provides the basic guiding principles for telecommunications: it promotes the advancement of technology, management of networks and the technical standards of telecommunications facilities. The *Telecommunications Business Act* sets out licensing criteria and reporting procedure for businesses, it includes competition safeguards, right of the service users, and construction and maintenance of telecommunications facilities.

Based on legislation and the MIC, businesses may provide telecommunication services as a facilities-based operator, special service provider, or a value-added service provider. Foreign investors entering the market to provide services, including voice service, are authorized either as facilities-based operators or special service providers. Value-added service providers must only notify the Regional Communication Office. MIC reinvests the revenue it generates from spectrum and licenses into the telecommunication industry and uses it on projects to upgrade infrastructure, pioneer research, and build and maintain internal government networks.

Telephony

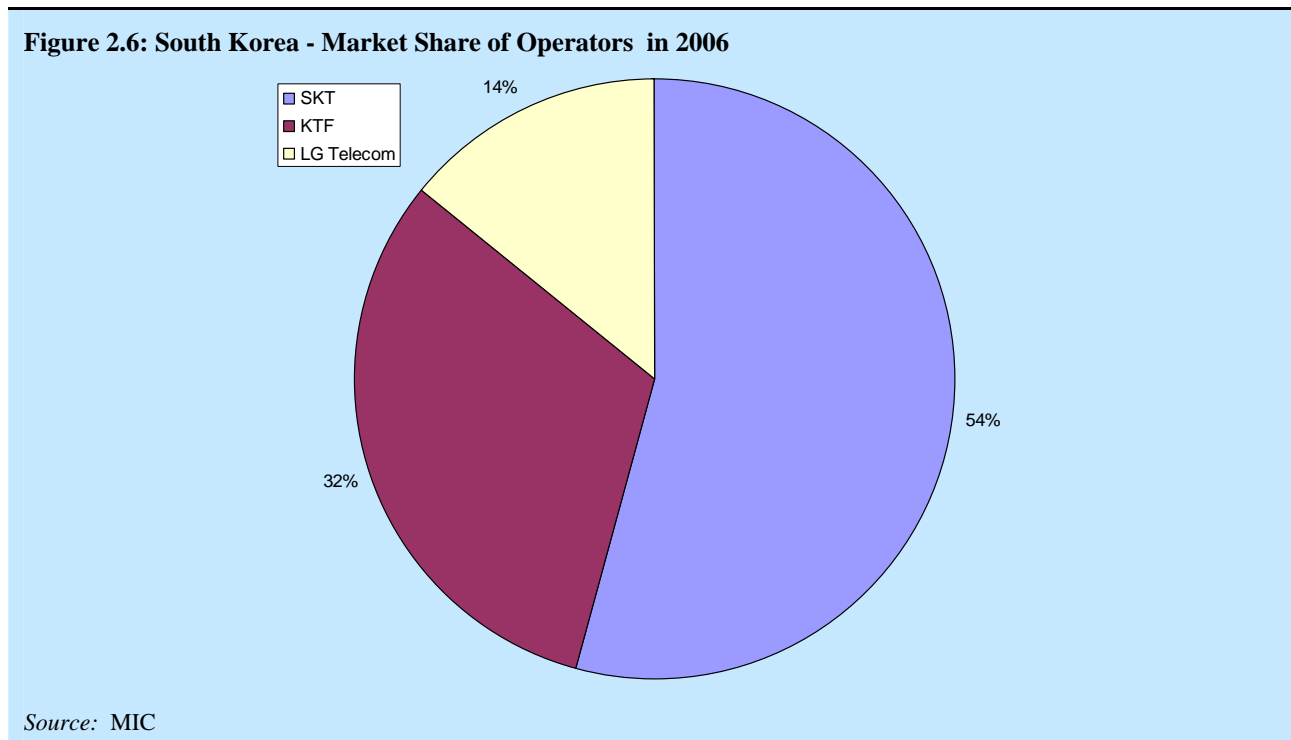
Since 1982, over one million telephone lines have been rolled out each year and the total teledensity has risen from 31.1 to 103.1. South Korea's fixed-line penetration has been enhanced by the government's provision of the basic infrastructure to be used as a platform for the launch of various services. However, fixed-line penetration has reached saturation with very few subscribers joining the networks



MOBILE TELEPHONY

Mobile communications began in South Korea in 1984. The service was provided by the Korean Mobile Telecommunications Service (KMTS). The company enjoyed a monopoly in the provision of analogue cellular services for eleven years. In 1995, the subscriber base of the service was two out of every one hundred citizens. As a result, KMTS was sold to the SK group and now does business under the name of SK Telecom. Digital voice service was launched in 1996 using CDMA (IS-95A) technology. The introduction

of the digital voice service saw the entrance of three new operators into this market, Korea Telecom Freetel (KTF), LG Telecom, and Hansol (later merged with KTF), in addition to the two existing operators. The resulting competition increased subscriber base to fifty lines for every one hundred citizens and also saw the launch of CDMA 2000. Mobile communication overtook fixed communication in 1999 and continued to grow. South Korea remains a world leader in CDMA technology, introducing it first with CDMA (IS-95A) and then continuing with CDMA 2000 and W-CDMA technologies. In May 2006, HSDPA commercial service was launched and now has 215,000 subscribers.⁹⁴ This service, which enables multimedia data transfer, video calling, and value-added services based on USIM (Universal Subscriber Identity Module), is an enhancement to the W-CDMA 3G technology that increases downlink speed. Figure 2.6 gives a breakdown of the current market distribution.



In 2004, MIC introduced asymmetric regulation into the mobile market. This regulation requires a dominant operator to make available to subscribers the Port Authorization Code (PAC) and allow migration to other providers, but non-dominant operators are not required to do the same for their customers. The rationale for this is to prevent dominant operators from using their large networks to encourage mass migration from other networks.

Over the past three years, the growth in mobile communication market has been slow. This may be a reflection of saturation within the market. The country presently has a mobile penetration of approximately 80%. In response to the slowing of growth in the market, Korean mobile operators are now concentrating on the development and provision of value-added services. For Koreans, the mobile phone has become a fundamental part of everyday life. It is not only used for voice communication but also for a variety of other services, such as quick information searches, mobile commerce, mobile banking, video services, gaming and music. For example, the average mobile user sends forty two SMS messages per week. Teenagers are the heaviest SMS users, while adults in their twenties make the most voice calls from their mobile phones.

2.2.4 Internet

There are seventy nine Internet service providers in South Korea. Some of these providers include KT (KORNET), Dacom (BORANET), and Hanaro Telecom (HANANET). In addition, 103 broadcasters have been approved for licenses as facilities-based operators for Internet services in an attempt to create greater competition and enhance consumer protection. One of the conditions for this license is that the broadcasters are prohibited from forcing bundled products on consumers, such as cable TV and high speed Internet, in their role as facilities based operators.⁹⁵ Table 2.6 shows the progression of Internet penetration in South Korea.

	2000	2001	2002	2003	2004	2005
Internet Subscribers (Dial-up)	1,018,160	622,880	479,840	259,060	46,820	..
Internet Subscribers (Broadband)	3,870,000	7,806,000	10,405,490	11,178,500	11,921,440	12,190,710
Internet Subscribers (Total)	5,122,564	8,559,390	10,990,450	11,541,790	12,028,520	12,190,710
Internet Users (Estimate)	19,040,000	24,380,000	26,270,000	29,220,000	31,580,000	33,010,000
Population	45,985,290	47,342,820	47,615,000	47,849,000	48,082,160	48,294,140
Penetration Rate	41.40%	51.50%	55.17%	61.07%	65.68%	68.35%

Note: Penetration rate is calculated using the estimated number of Internet users divided by the population.

Source: ITU World Telecommunications Indicators 2006

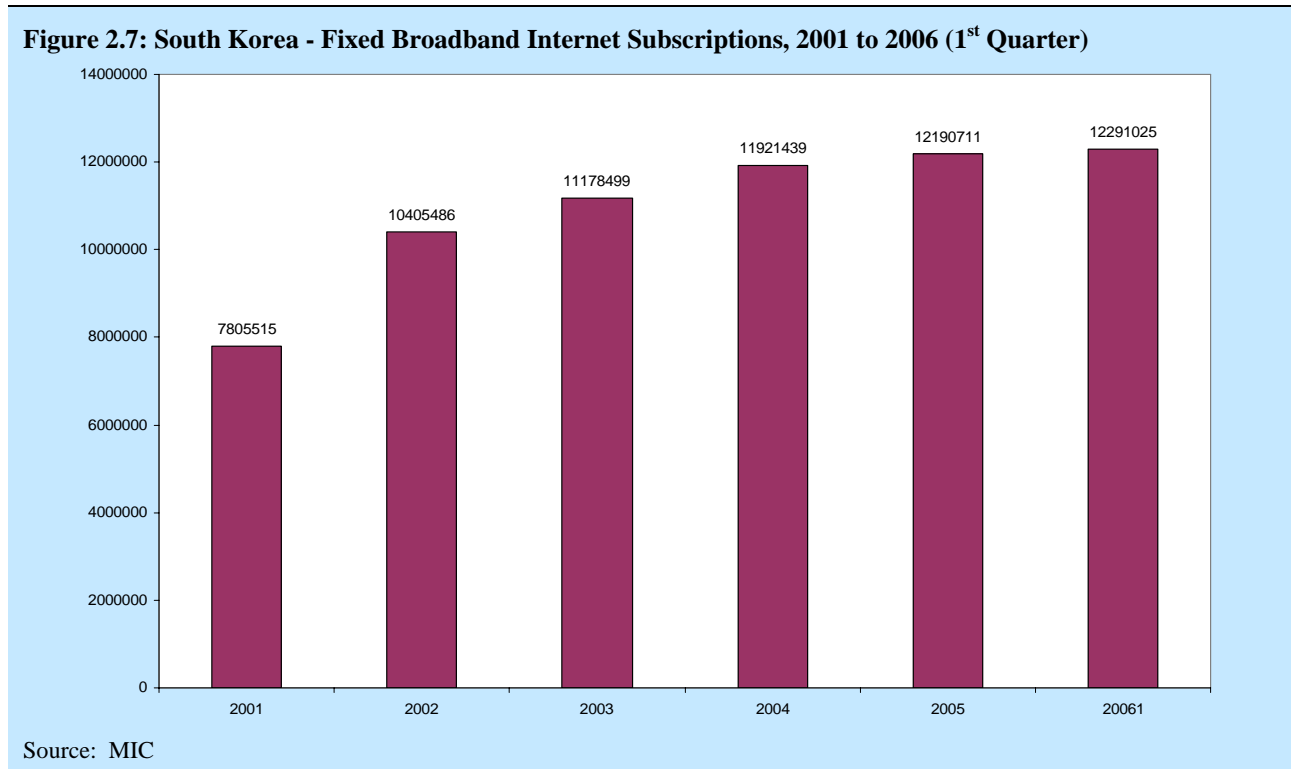
The high level of the Internet penetration rate is contributed to in part by the situation of subscribers in apartment blocks or multi-dwelling units. These living situations make it easier for the operators to establish connections for subscribers in the building. The operators have less “last mile” to travel from the exchange. They terminate their lines at the main distribution frame, which usually is privately owned by the apartment block. This system is now exploited by the operators to provide converged communication and broadcasting services.

Broadband

Broadband became available in South Korea in 1998 and was provided by the cable provider, Thurnet. A year later, Hanaro entered the market and became the world’s first ADSL service provider. KT, the incumbent, began offering its ADSL service in June 1999.⁹⁶ Broadcast has become a very popular mode of Internet connection and there were 12.2 million subscriptions by the end of 2005. Korean operators offer some of the fastest and cheapest residential connections in the world. ADSL connections of 2Mbps are available for less than US\$ 25 per month, while VDSL broadband connections of 20-40 Mbps are available for less than US\$ 50. Residential subscribers to broadband have access to a variety of technologies and can choose or migrate between technologies. There is the cable network (available in more than 60% of homes), ADSL (available in 90% of homes), and apartment LAN connection, which can connect an apartment directly to an Internet service provider using fiber technology.

Previously, the incumbent, KT, was obligated to deliver universal broadband service to all villages in the country. This was the government’s condition for the sale of its shares in the company. The service was to be provided at a minimum speed of 1 Mbps. The question that remains, however, is - would the subscribers in villages have access to a variety of technologies providing broadband similar to the urban areas or be restricted to only a few, or one?

Connection speed for broadband is a priority for the Korean government which believes it is important for the deployment of converged services. The government has set out policies to facilitate the efficient use of existing infrastructure and the innovation of new infrastructure. Speeds of 50-100 Mbps are expected to be available in homes by 2010, and broadband service providers will offer their service on a variety of technologies allowing for consumer choice.

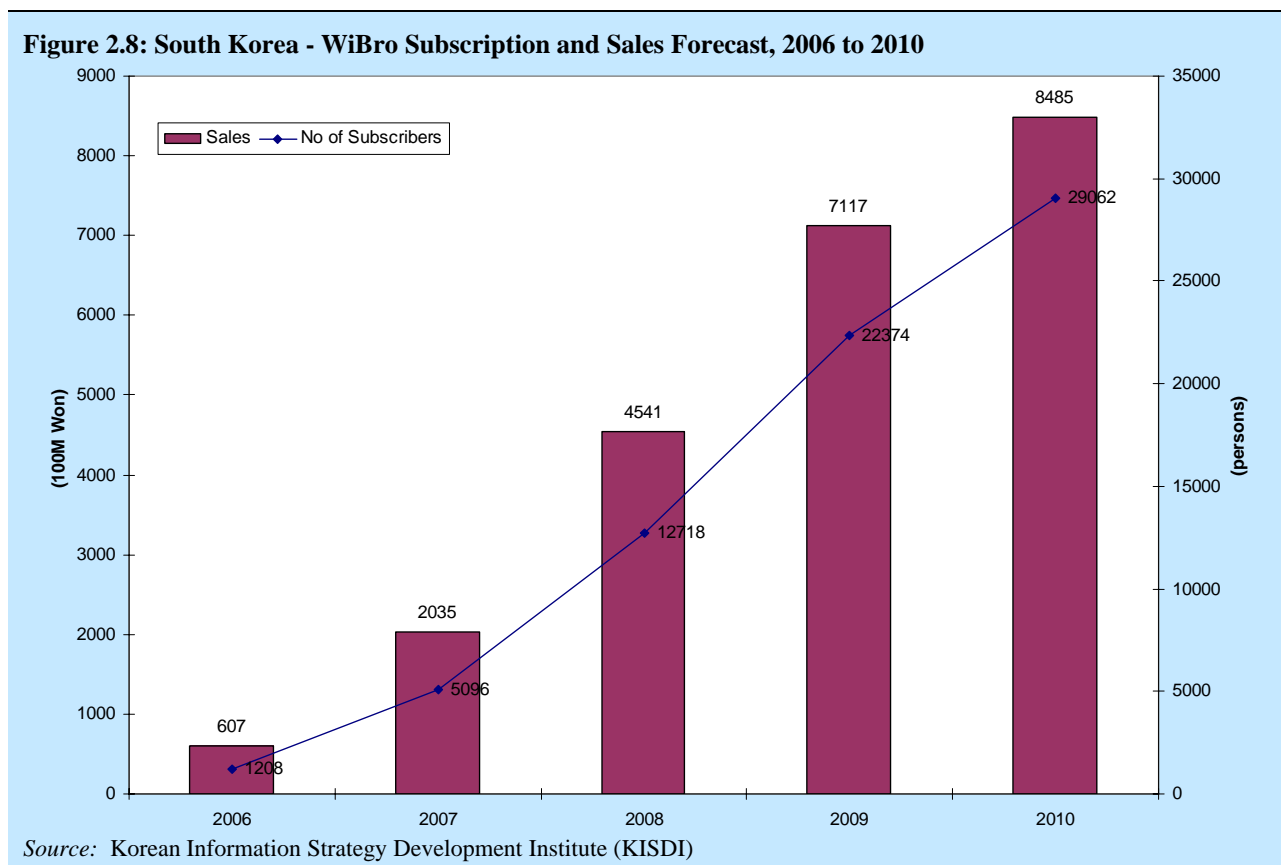


The success South Korea has achieved in broadband is the result of joint effort by the Korean government and the private sector investment. The broadband backbone was constructed by KT and Dacom at a time when the service was non-existent and was intended to provide connection for non-profit organizations, such as the government and educational institutions. At the same time, the government encouraged market entry by abolishing the stringent entry rules of registration and notification and by removing foreign ownership restrictions.⁹⁷ The penetration of broadband services can also be attributed to the use of entertainment-related content. IP telephony has also had an impact on broadband uptake and vice versa. However, the most obvious reason is the urban layout of dwelling houses in apartment buildings, which have a significant effect on consumer uptake of services as well as operators' ability to deliver services.

WiBro

Although many Koreans have broadband access at home, mobile Internet is still seen as a necessity. In 2005, WiBro (wireless broadband) licenses were issued. WiBro is a Korean variant of the international WiMax standard. This technology is somewhat of a hybrid between the mobile phone and the wireless LAN (fixed wireless). WiBro supports data application at 1 Mbps, which is higher than the average mobile phone. The most interesting feature, however, is mobility which can be achieved at 120 km/h with continuous access. WiBro also has a coverage area of about 1 km, which is same as the WiMax range. The introduction of WiBro licenses is part of the move from mobile telephony to value-added services. The WiBro licenses were won by the fixed-line operators, KT and Hanaro, and by the mobile operator, SK Telecom.

KT and SK Telecom started offering commercial mobile Internet service in June 2006. Their service supports notebook computers, PDAs, and mobile phones as terminals using a special purpose terminal either located within the device or as a card. This will gradually move to a specialized chip. Operators have high expectations as far as demand for the service with prospective subscriptions projected to generate approximately 8.5 million Won in 2010.⁹⁸ If these forecasts prove true, they will inspire the launch of other value-added services and spur growth in the content market where the Korean government has already put an equal network access program in place. Through the demand for compactable terminals and accessories, the equipment industry is also in a position to benefit from the roll out of the WiBro network. Figure 2.8 illustrates the projected WiBro subscription and sales forecasts for 2006 to 2010.



Convergence

The broadband converged network (BcN) is an integrated network that allows secure seamless access anywhere, at any time to quality multimedia services, including fixed and mobile telecommunication services, broadcast services, and Internet services. The BcN is a next generation integrated network. The implementation of this network will be completed in three phases and is scheduled for completion in 2010.

IPv6 is another next generation solution being looked at by South Korea. It solves the problem of the present shortage of Internet protocol addresses. Implementation of this technology has implications on other new technology deployment including WiBro, wireless Internet, VoIP, IPTV, and home networking. Under the IPv6 system, a domain name system (DNS) has been established.

ENUM, which stands for the E.164 number mapping, is used to convert telephone numbers to Internet addresses and should aid the new converged network system. This system serves as a bridge between the Public Switched Telephone Network (PSTN) numbering and the IP address systems. Research and tests are still being carried out on this project.

2.2.5 VoIP

The Korean government has assigned the special code 070 to designate VoIP service. This decision was made after considering certain characteristics of VoIP such as voice quality, connection fees, and mobility. Backbone providers have been assigned numbers by the millions in the “070 xxxx xxxx” range, and the resellers of this service have been assigned numbers by the hundred thousands in the “070 xxxx xxx” range. Currently, there are plans to increase the numbers available as VoIP subscriptions increase. Samsung networks and Anyuser began offering VoIP services with the identifier number in August 2005 while KT, Hanaro and SK Telink began their services in November 2005.

Skype, the Internet telephone giant, has begun providing VoIP services in South Korea. Standard features of Skype services include instant messaging, SMS to mobile phones, calls terminating on regular phones (SkypeOut), the option of a personal phone number (SkypeIn), and conference calls. Skype provides this service in conjunction with Daum Communication. However, there are some road blocks for Skype in South Korea. In February 2006, MIC ordered Skype to stop receiving new membership because of its violation of the e-business code and the provision of international telephone service without the approval of the MIC’s Director. In compliance with these orders, Skype will sublease the 070 numbers from Wintel.

2.2.6 [0]IPTV

The broadcasting industry in South Korea is vertically integrated. Production, programming, and distribution are usually handled by affiliate companies. Content is 75% the result of in-house production and 10% production by affiliate companies. Only a small percentage of the content is imported. The close nature of this industry will make it adverse to external competition, especially from major telecommunication companies.

Broadband in South Korea has reached maturity. The average broadband speed is between 20-40 Mbps, which is capable of supporting high speed applications comfortably. As a result, the network is ready to support the deployment of IPTV. The provision of Digital Media Broadcast (DMB) services began in 2005 and its subscriptions hit the one million mark in June 2006. However, the deployment of DMB service is burdened with the disadvantages of inefficient use of bandwidth.

In the move towards convergence of services, telecommunication providers are looking at IPTV as a potential product to offer subscribers in South Korea. In light of the fixed-line communication subscriber saturation and subsequent demand decline, this “broadcasting” market is becoming more attractive to telecommunication operators as a new revenue stream. The provision of IPTV services will increase broadband demand and the ARPU generated from broadband customers. It can also be seen as a reaction to cable providers moving into the broadband market. IPTV deployment, however, is encumbered by a lack of specific regulation and conflict in existing policy and regulation. Telecommunications companies have been banned from the provision of IPTV services until the regulatory are settled.

The two regulatory agencies that are in conflict over this issue are the Korean Broadcasting Commission (KBC), which regulates broadcasting content and its economic regulation, and the MIC, which regulates telecommunication, spectrum, and license allocation. The MIC has authority over frequency allocation and broadcasting facilities and technologies must conform to MIC’s regulation.⁹⁹ However, the licensing of a broadcast operator is done by the MIC upon the recommendation of the Director of the KBC. Also, DMB usually received by mobile phone terminals and is seen as an extension of traditional broadcasting, and is, therefore, subject to existing broadcasting rules and the regulation of the KBC.

The regulators have not yet resolved whether IPTV should be categorized as a “special category broadcasting service” with the KBC as the regulator for both the service and the service provider or whether it should be categorized as a value-added network service with MIC as the regulator, pending its effective regulation as a converged service. IPTV is not defined in the existing broadcasting framework; so cannot be effectively regulated in the current regime. On the other hand, categorizing IPTV as a value-added service raises issues of technical interconnection, rates, and tariff agreements. There are also concern over how public issues of universal service and competition be dealt with.¹⁰⁰ To address the various concerns, MIC and KBC have decided to work together in launching a pilot project to avoid duplication of work.

2.2.7 Summing Up / Conclusions

KT has aggressively called on other facilities-based operators to constitute a Telco 2.0 to incorporate value-added services into traditional telecommunications as a way to salvage the dwindling revenues. Broadband was initially used to plug the gap, but it is reaching a saturation point. Telco 2.0 could also see the telecommunications companies launching efforts to provide business customers with more support services in consulting and software. Telecommunications providers will assume the status of total solution providers under the proposed regime by taking advantage of converged services and bundling of products. Mobile operators are in a similar situation and are also looking for alternative means of revenue. They have turned to mobile Internet as a supplement to their decreasing income. WiBro service should influence this paradigm change, and in the case of fixed operators, existing infrastructure can be built on.

Since 2004, the telecommunication sector in South Korea has been experiencing subscriber saturation, especially in the facilities-based sector. This can be attributed to many factors ranging from the infrastructure’s high level of development and sophistication to the technically savvy subscribers as well as intense competition within the market. This means that operators must find new streams of income. They have turned to value-added services, which have been successful in providing this new revenue. Fixed service providers have looked to broadband but it is also approaching saturation. In South Korea, broadband prices are among the cheapest and fastest in the world and operators need to find fresh streams of revenue as well as build on the existing infrastructure, hence the introduction of IPTV and VoIP services. Although South Korea has achieved this level of success, it must still be wary of conflict between government agencies over the regulation of converged services as this feuding could hamper the market and affect ease of market entry.

2.3 Japan



2.3.1 General Background

Japan is an island country located in east Asia. It covers a total area of 377835 km² including both land and water. Japan consists of approximately 3000 islands. The four most prominent are Honshu, Hokkaido, Kyushu, Shikoku. The country’s population is 127,463,611 with a growth rate of 0.2%.¹⁰¹ With a population of 30 million residents, Tokyo, the capital city, is the largest metropolitan area in the world. The national territory is divided into nine geographical regions based on their economic and social characteristics. The regions with the highest population are the Kanto, Kinki, and Tokai regions accounting for 60% of the population. Politically, Japan is constitutional monarchy with a parliamentary government.¹⁰² The constitution of the country was adopted in May 1947. The parliamentary government is headed by the Emperor and the Prime Minister, who is chosen by the Diet. The Diet, which is a bicameral parliament

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consisting of the House of Chancellors and the House of Representatives, is elected and is one of the oldest legislative bodies in Asia. The next elections for the Diet will be held in July 2007 (House of Chancellors) and September 2009 (House of Representatives). The legal system is modeled after the European civil law system and shows English-American influence.¹⁰³

2.3.2 Economic Background

Japan has a free market economy and is the world's third largest economy by purchasing power parity, following the United States and China. Its citizens have a strong work ethic and a mastery of high technologies. This is in part the result of government efforts to produce an advanced economy. The country is inadequate in natural resources and productivity is low in agriculture. The economy earns foreign exchange through international trade. The Japanese economy experienced phenomenal growth, averaging 5% in the 1970s and 4% in the 1980s. In the 1990s, the economy experienced a recession, as did the economies of many other industrialized nations, and the average growth dropped to 1.5%. This was largely due to the after-effects of increased investments during the late 1980s and constrictive domestic policies intended to remove speculative excesses from the stock and real estate markets. In 2003, the economy picked up and by 2005 showed growth of 2.8%. The GDP (purchasing power parity) is at US\$ 4.018 trillion and the GDP per capita is US\$ 31,500. The labor force of the country is 66.4 million. Literacy levels in Japan are high with 99% literacy among people age 15 and over. Table 2.7 gives a summary of Japan's economy from 2000 to 2005.

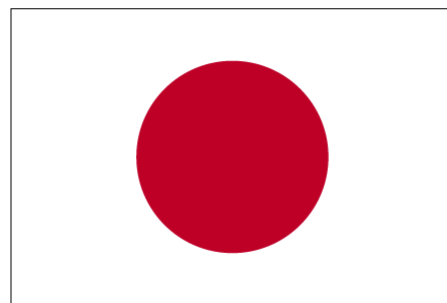


Table 2.7: Japan - Economic Snapshot, 2000 to 2005

	2000	2001	2002	2003	2004	2005
GDP (current US\$)	\$4.765 trillion	\$4.144 trillion	\$3.992 billion	\$4.291 trillion	\$4.623 trillion	\$4.506 trillion
GDP Growth (annual %)	2.39%	0.20%	-0.30%	1.31%	2.70%	2.70%
GNI, Atlas Method (current US\$)	\$4.459 trillion	\$4.536 trillion	\$4.285 trillion	\$4.320 trillion	\$4.734 trillion	\$4.988 trillion
GNI per Capita, Atlas Method (current US\$)	\$35,140	\$35,670	\$33,640	\$33,860	\$37,050	\$38,980
Annual Telecommunication Investment (US\$)	\$32.681 billion	\$24.618 billion	\$19.257 billion	\$20.422 billion	\$23.199 billion	\$24.061 billion
Total Telecommunications Service Revenue (US\$)	\$122.050 billion	\$117.970 billion	\$156.650 billion	\$169.400 billion	\$180.860 billion	..
Fixed Line Subscribers per 100 Inhabitants	48.82	48.18	47.69	47.19	46.64	45.89
Mobile Subscribers per 100 Inhabitants	52.62	58.78	63.66	67.90	71.58	73.97
Internet Users per 100 Inhabitants	29.94	38.42	46.47	48.30	50.20	66.59

Source: ITU World Telecommunication Indicators 2006; World Bank World Development Indicators 2006

2.3.3 The Telecommunications Market & Telephony

After the Second World War, the Ministry of Communications was split into the Ministry of Telecommunications and the Ministry of Posts. In 1952, the Ministry of Telecommunications became Nippon Telegraph and Telephone Public Corporation (NTT), the national operator for domestic traffic. The Ministry of Posts was renamed the Ministry of Posts and Telecommunications (MPT) and became the regulator of the telecommunications market. That same year, the *KDD Corporation Law* created the Kokusai Denshin Denwa (KDD) as the international traffic carrier. In 1970, the MPT set up study groups to examine the possibility of a reorganization of the NTT. The recommendations suggested a restructuring of the NTT and liberalizing its value-added services. In 1982, the second provisional council on administrative reforms announced a proposal to introduce competition in all aspects of telecommunication services and as well as privatize and reorganize the NTT.

The *Telecommunications Business Law*, the *NTT Law*, and the background law for the telecommunications law came into effect as reform laws in April 1985. At that time, NTT was privatized and NTT stock was openly tendered. This signaled Japan's launch of a liberalized telecommunication industry. Regulation, including service regulation, technical regulation as well as competition issues, became the role of the MPT. In the 1990s, the MPT liberalized the cable TV market. Later, the MPT was merged with two other ministries to form the Ministry of Public Management, Home Affairs, Post and Telecommunication (MPHPT). This was renamed the Ministry of Internal Affairs and Communication.

In 1999, NTT was restructured again. It was broken up into a holding company and subsidiaries: NTT East, NTT West, NTT Communications, and NTT-Me. These subsidiaries now provide various combinations of services that include local voice service, international and long distance voice service, and Internet service. In addition, KDDI was created through the merger of KDD, DDI, and IDO and now mainly provides international and long distance voice service as well as mobile communication.

There are other providers with significant roles in the industry. Softbank Telecom (Group), formerly Japan Telecom Group before its acquisition by Softbank, is the third largest provider of telecommunications services in Japan. In addition, ten of the regional electric companies each control their own nationwide telecommunications network and service provider.¹⁰⁴ Also, over 290 cable TV operators provide telecommunication service in limited areas.

When it was first passed, the *Telecommunications Business Law* became the principal legislation for regulating telecommunications companies. This law classifies telecommunications businesses into two categories based on their mode of operation. Type I businesses are the large telecommunication firms who provide the basic telecommunications infrastructure that is fundamental to the socio-economic well-being of the country. They are subjected to more stringent conditions than Type II businesses. Type II businesses are the small, value-added services providers who do not have their own circuit facilities. However, the Type II services are beginning to increase in value because they are now providing services fundamental to society such as Internet facilities, IP telephony and ADSL. As this has been occurring, the Type I category has accommodated smaller investors such as CATV and W-LAN.

In April 2004, changes were made to the Type I and Type II classifications. The distinctions between them were abolished as was the permit system for Type I business that had been established to regulate market entry. Also abolished were the tariff regulation for non-dominant operators and the ex-ante regulations dealing with interconnection (e.g. prior notification of interconnection agreement for non-dominant operators). However, these changes to the *Telecommunications Business Law* left in place the asymmetrical regulations for dominant operators.

Telephony

In Japan, as in many industrialized countries, the increase in teledensity has been characterized by rising use of mobile communications and a decline in traditional fixed-line usage. In 2000, mobile subscribers exceeded fixed-line subscribers for the first time, with the mobile operator reporting 66,784,000 subscribers and fixed-line subscribers at 61,957,000. Since then, there has been a steady decline in fixed-line telephone subscriptions and a continued increase in subscriptions to mobile service (see figures 2.9, 2.10, and 2.11 below).

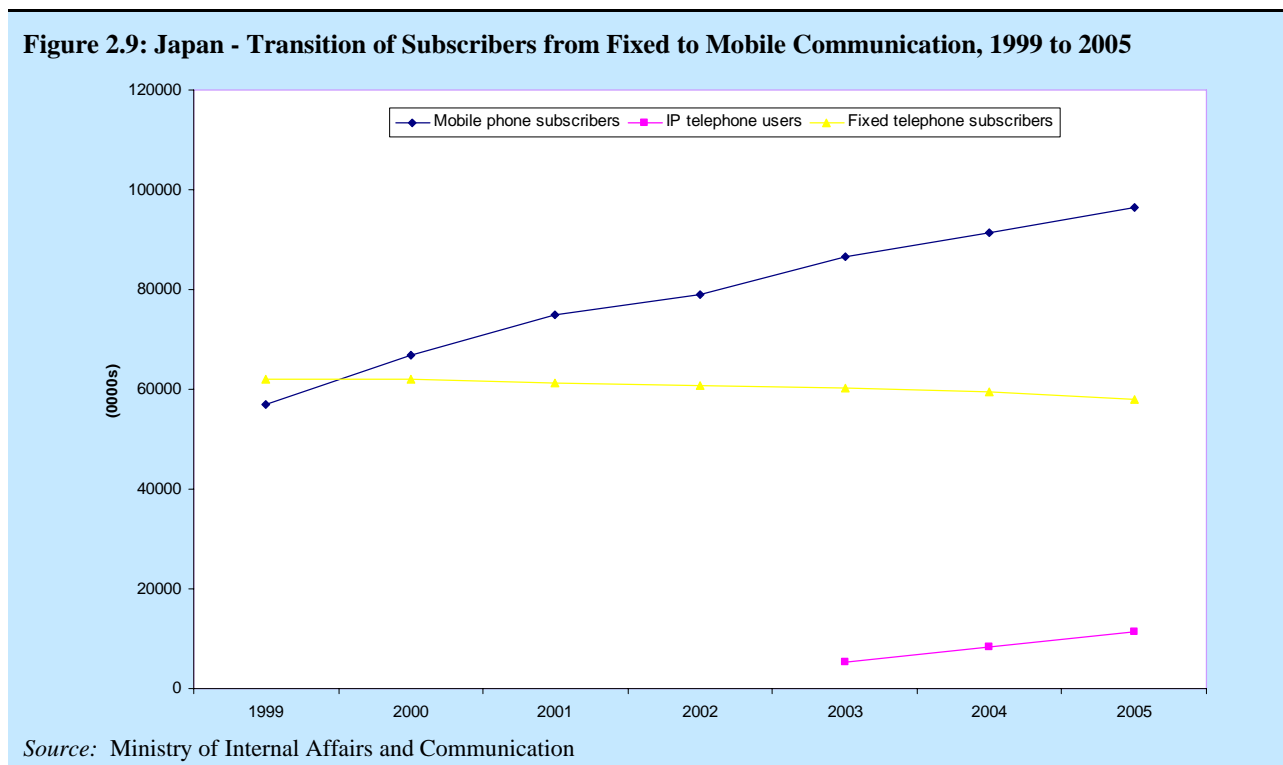
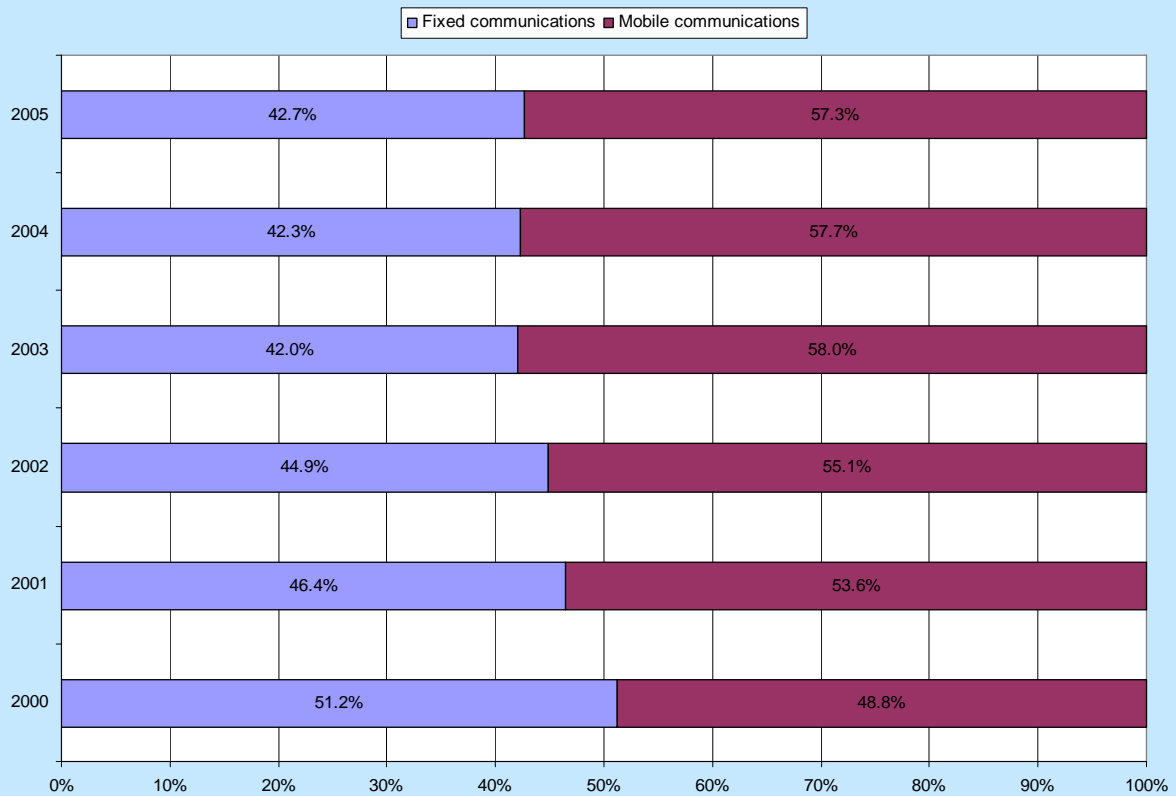
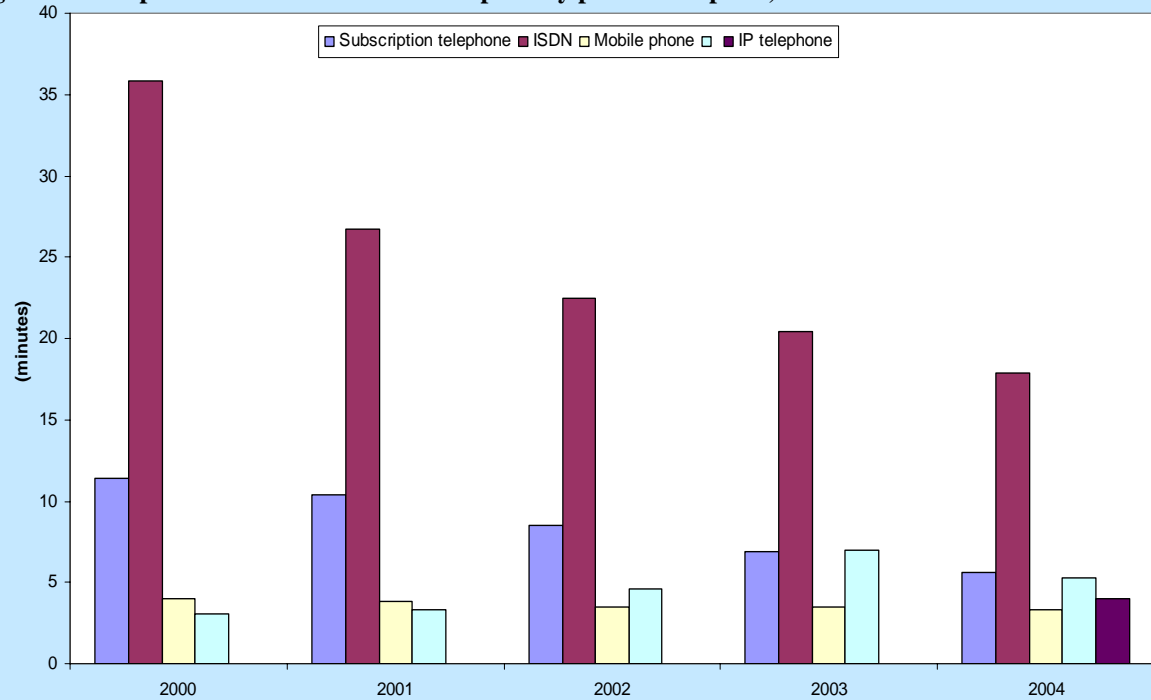


Figure 2.10: Japan - Sales Ratio between Fixed and Mobile Communication, 2000 to 2005



Source: Ministry of Internal Affairs and Communication

Figure 2.11: Japan - Transition in Call Time per Day per Subscription, 2000 to 2004



Source: Ministry of Internal Affairs and Communication

Mobile Telephony

Mobile communication is an integral part of the Japanese lifestyle. Japan operates mobile communication using digital mobile phone services and the Personal Handy Phone System (PHS). PHS was launched in 1995 as a low cost, high speed cordless telephone. There are three main mobile operators: KDDI, NTT DoCoMo, and Vodafone (now Softbank). Japan allocated 3G licenses in June 2000. Only these three operators applied and obtained the licenses. NTT DoCoMo was the first to launch its 3G service in October 2001, but did not initially receive the response it anticipated. KDDI, on the other hand, had immense success in its April 2002 launch and was able to infiltrate the market with high speed packet services (multimedia programs and other innovative services for the consumers). When deploying 3G services in Japan, operators are free to choose which interface to adopt. The choice is between Wideband CDMA (W-CDMA) and CDMA 2000 (CDMA2000 1x and CDMA 2000 1x EV-DO).

2.3.4 Internet

Broadband

Japan has over 22 million broadband subscribers. Table 2.8 shows the progression of Internet penetration in Japan. Broadband in Japan is available over ADSL, CATV, W-LAN and FTTH (Fiber to the Home). Figure 2.12 gives a breakdown of wireline subscriber services. Currently YahooBB (Softbank) with its ADSL broadband service leads all operators in terms of both subscriber base and price reduction. Most broadband subscribers receive service through ADSL with CATV coming in second in terms of penetration. FTTH is experiencing a steady rise in the provision of broadband service as the technology moves towards all-in-one voice and video services.

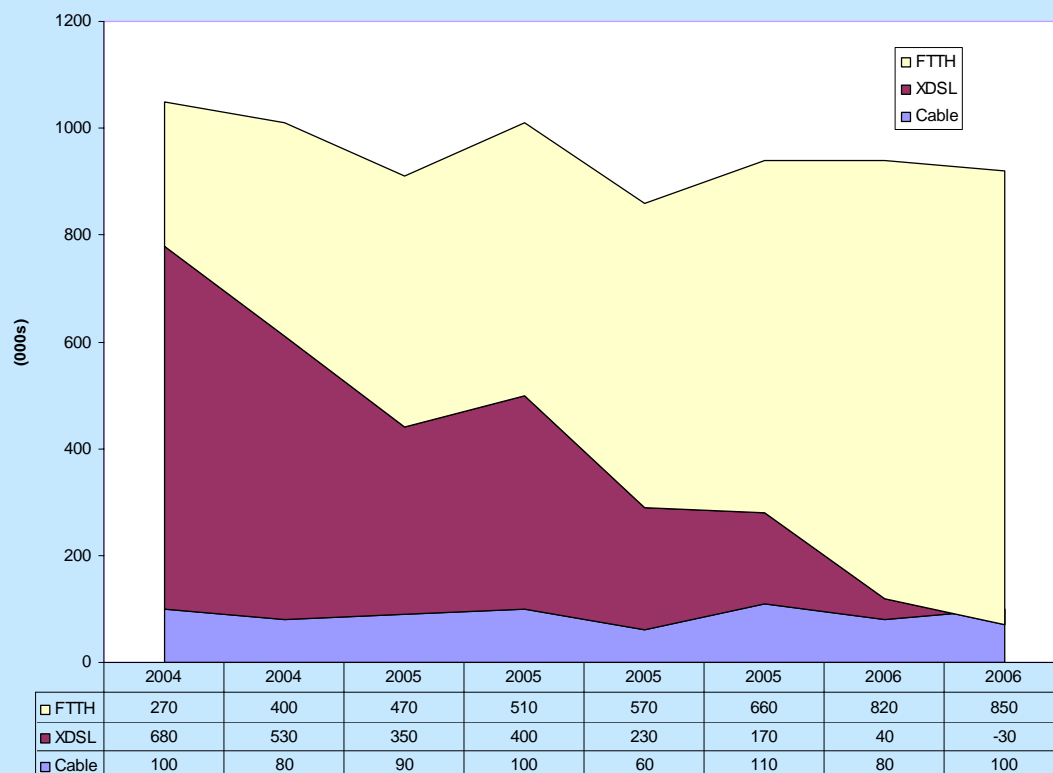
Table 2.8: Japan - Internet Penetration Rate, 2000 to 2005

	2000	2001	2002	2003	2004	2005
Internet Subscribers (Dial-up)	17,272,290	20,226,900	20,470,470	18,966,690	..	..
Internet Subscribers (Broadband)	854,655	3,835,000	9,397,426	14,917,170	19,557,150	22,365,150
Internet Subscribers (Total)	18,126,940	24,096,200	29,875,430	33,883,860	..	..
Internet Users (Estimate)	38,000,000	48,900,000	59,220,000	61,640,000	64,160,000	85,290,000
Population	126,920,000	127,291,000	127,435,000	127,619,000	127,799,000	128,084,000
Penetration Rate	29.94%	38.42%	46.47%	48.30%	50.20%	66.59%

Note: Penetration rate is calculated using the estimated number of Internet users divided by the population.

Source: ITU World Telecommunication Indicators 2006

Figure 2.12: Japan - Wireline Subscriber by Line Type, 2004 to 2006



Source: Ministry of Internal Affairs and Communication

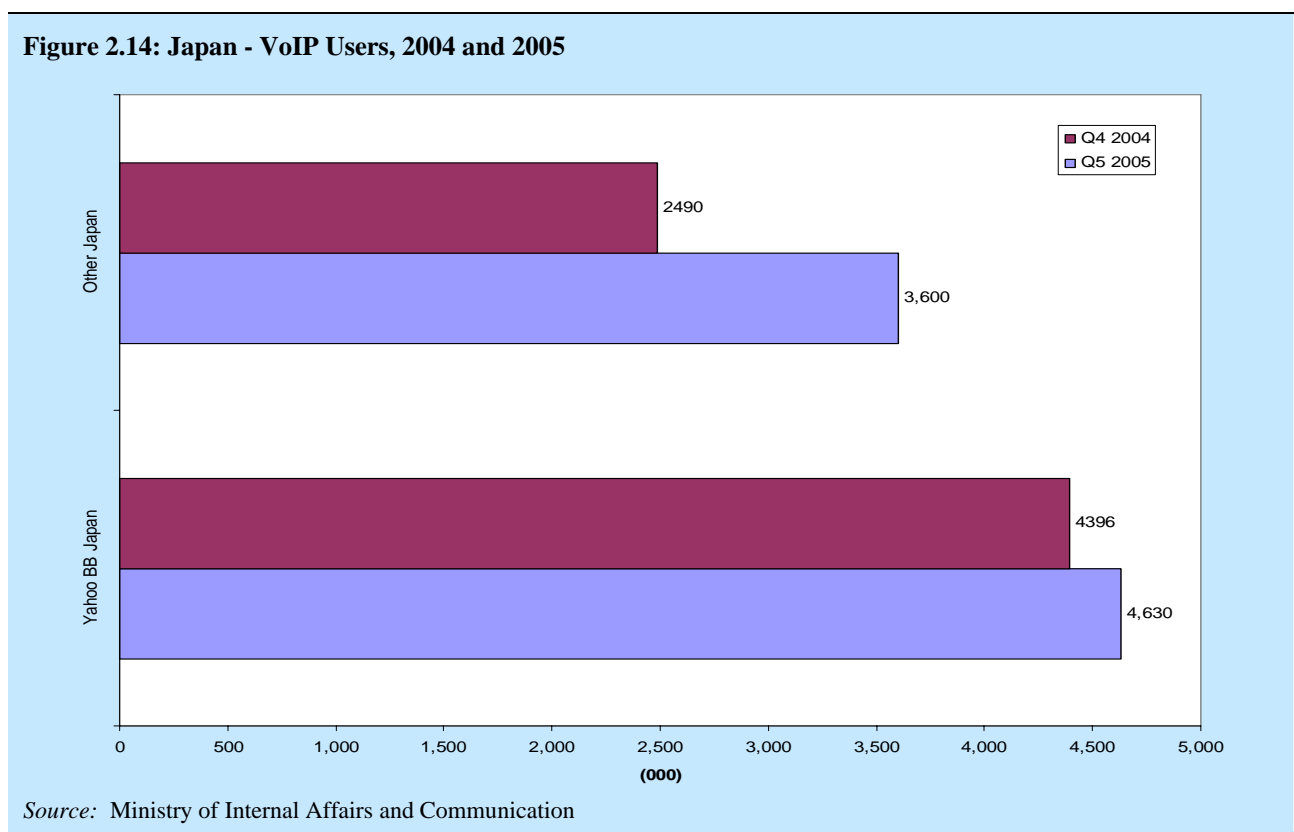
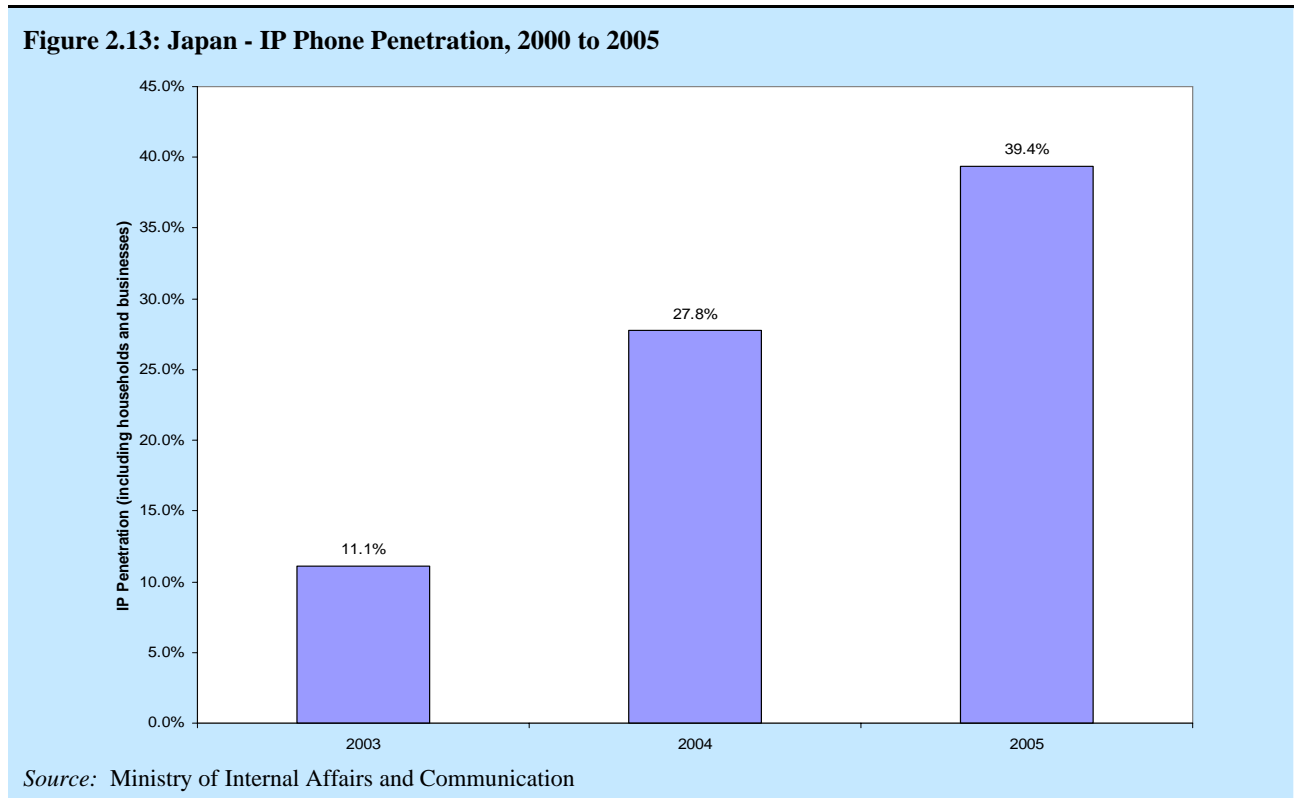
Wireless Internet Access

Wireless LAN (fixed wireless) services are widespread throughout Japan. NTT communication leads the market with 1600 hotspots in the principal cities (as of August 2004).¹⁰⁵ Freespot, another provider of wireless access, provides free access with a wider coverage. However, the non-profitability of wireless LAN service has lead companies to combine wireless Internet with 3G or PHS to provide high speed access and mobility to consumers.

2.3.5 VoIP

Japan is one of the leading countries in the provision of VoIP services. Japan has positioned itself at the forefront of IP application technologies in its move towards the attainment of a ubiquitous network. This has been done by effectively regulating the industry to keep it flexible enough to accommodate new diverse technologies. Japan categorizes VoIP into three types using technical conditions. Generally, there is minimal regulation and there is no specific regulation as to charges and tariffs; however, interconnection charges are payable to the PSTN if the call is connected to a PSTN network. Certain conditions regarding quality of service (QoS) must be fulfilled for the service provider to be able to issue 050 phone numbers to subscribers. Most services do not qualify because the 050 number is only allocated to services that fall into the third category of VoIP, those services which provide voice quality almost indistinguishable from traditional telephony. Services in the third category are required to provide access to emergency services and a direct access for user and location information. As of December 2005, there were twenty eight service providers offering VoIP service and thirteen operators providing category three VoIP service. Also as of December 2005, 18.04 million 050 numbers had been distributed to operators, and 9,751,000 subscribers had 050 numbers.¹⁰⁶ The adoption of VoIP services has been steadily rising in the past year. Figure 2.13 shows

the growth of IP phone penetration since 2000 and figure 2.14 shows the growth of VoIP users in 2004 and 2005.



2.3.6 IPTV

As of September 2005, there were sixteen companies registered to provide IPTV services using either Quadrature Amplitude Modulation (QAM) or IP Multicast. The Ministry of Internal Affairs and Communication is responsible for the regulation of broadcasting and telecommunications in Japan. IPTV is regarded as a cable broadcast service not as a telecommunication service. There are already existing regulations concerning IPTV service as well as an integrated regulatory regime dealing with telecommunications and broadcasting, making it easier to address services based on convergence of technologies or markets. However, there is a conflict as to the precise definition of IPTV. Under the Laws concerning broadcast or telecommunications service, it can be described as a broadcasting service; whereas, under the copyright law, it is an interactive transmission.

e-Japan to u-Japan

The 2001 e-Japan strategy of the Japanese government was aimed at positioning Japan as the most advanced IT country in the world within five years. This strategy was launched as a solution to the social and economic challenges faced as a result of its aging population, falling birthrates, and rapid urban development.

e-Japan, the government's first series of policies on IT, set out five policy areas as priorities for government concentration. These were infrastructure, human resources, e-commerce, e-government, and network security. This strategy was expanded to include among its goals the provision of always-on, high speed Internet access at the lowest possible prices. The second phase of this strategy shifted focus to the application of ICTs in social, economic, and government services.

After achieving its e-Japan goals, the government has created a new vision for the future, u-Japan, with the goal of working towards a ubiquitous network society to make ICTs as seamless as possible and effectively integrate them into daily public life. The country's vision for a u-Japan aspires to connect fixed, mobile, and consumer electronics into a single network.

Broadcasting is seen as part of this ubiquitous network, Japan has launched terrestrial digital broadcasting and plans to switch to digital broadcasting by 2011. An IPTV forum has been launched, consisting of telecommunication carriers, broadcasters, manufacturers, and opinion leaders to deliberate and produce the rules for governing IPTV operations and the technical requirements for developing the receiving equipment. They will also evaluate user convenience and competition in the market.

2.3.7 Summing Up / Conclusions

Japan has a clear cut vision towards a ubiquitous society. The country has positioned itself through the formation of policies and provision of the right regulatory environment. In same way, the operators have made strategic moves using mergers and acquisitions. For example, Softbank, a leading broadband provider, now offers IP telephony over its network. BB Mobile, in which Softbank owns a majority share, has acquired mobile giant Vodafone Japan, giving it a share in mobile market. Infrastructure-wise, the operators have invested hugely in infrastructure deployment.

Although there not yet have been negative effects on competition or the market, Japan should be watchful of the amount of consolidation in its telecommunication industry. By merging or acquiring other operators, telecommunications companies are expanding their businesses into new markets or increasing their market strength. The result of this can help consumers by creating production and distribution efficiencies, and

thereby reducing the price of services. However, the risk of vertical or horizontal monopolies or oligopolies exists as well when a company becomes the producer and supplier at all levels until the service is offered to the consumer (vertical) or as market power becomes consolidated in a single or a few entities within one market (horizontal).

2.4 Australia

2.4.1 General Background

Established in 1901, the Commonwealth of Australia is the smallest of the world's continents, but is the six-largest country.¹⁰⁷ It is located in Oceania and, including Lord Howe Island and Macquarie Island, spans approximately 7,686,850 km².¹⁰⁸ The population estimate as of July 2006 was 20,264,082 and it is growing at a rate of 0.85%.¹⁰⁹ Most Australians live on the eastern coastal plain and on the south eastern coast. Australia is not densely populated, but it is highly urbanized. The urban population exceeds 90% of the total population.¹¹⁰ For the provision of communication services, this population distribution is both a disadvantage (i.e. highly dispersed rural population spread across a large land mass) and an advantage (i.e. high proportion of population in just a handful of urban centers, with around half the population in Sydney and Melbourne alone).¹¹¹ For example, cellular operators can achieve population coverage of 92% with landmass coverage of 3%.¹¹² In 1947, Australia began a mass immigration program which has resulted in a widespread cultural, social, and demographic change and has strengthened the country's ties with Asia.¹¹³ Politically, Australia is a federal democracy within the Commonwealth of Nations.¹¹⁴ The National Legislature is a bicameral institution with a 150-member House of Representatives, the lower house, and a 76-member Senate, the upper house.¹¹⁵ The electoral system is one of "compulsory universal direct suffrage over the age of 18."¹¹⁶ The next national election will occur by January 2008.¹¹⁷ The individual states of Australia each have their own legislatures, five of which are bicameral and one which is unicameral.¹¹⁸ The head of state remains the monarch in the United Kingdom, Queen Elizabeth II, who is represented in Australia by the Governor General.¹¹⁹ The national government also consists of a cabinet, which is appointed by the Governor General on the basis of party strength in the House of Representatives.¹²⁰ The cabinet is presided over by the Prime Minister.¹²¹



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2.4.2 Economic Background



Australia has a western-style capitalist economy with a per capita GDP of \$31,900 (2005 est.), which is close to that of the four dominant Western European economies.¹²² The economy is being pushed forward by rising domestic output, strong business and consumer confidence, and rising exports of raw materials and agricultural products.¹²³ Also contributing to the growth of the economy are reforms by the government, low inflation, and the increasing ties with China.¹²⁴ Although drought, weak foreign demand, and strong import demand have caused an increase in the trade deficit from US\$8 billion in 2002 to almost US\$17 billion in

2005, Australia has been able to maintain a budget surplus through the use of conservative fiscal policies.¹²⁵ Table 2.9 provides a quick view of the Australian economy since 2000.

Table 2.9: Australia - Economic Snapshot, 2000 to 2005

	2000	2001	2002	2003	2004	2005
GDP (current US\$)	\$387.538 billion	\$368.899 billion	\$411.902 billion	\$527.418 billion	\$637.327 billion	\$700.672 billion
GDP Growth (annual %)	2.06%	3.88%	3.21%	3.77%	3.00%	2.60%
GNI, Atlas Method (current US\$)	\$384.157 billion	\$385.456 billion	\$386.158 billion	\$439.076 billion	\$544.343 billion	\$654.645 billion
GNI per Capita, Atlas Method (current US\$)	\$20,060	\$19,860	\$19,660	\$22,090	\$27,070	\$32,220
Annual Telecommunication Investment (US\$)	\$3.669 billion	\$4.663 billion	\$6.471 billion	\$103.250 million	..	..
Total Telecommunications Service Revenue (US\$)	\$11.891 billion	\$11.445 billion	\$15.624 billion	\$19.34 billion	\$22.918 billion	\$41.515 billion
Fixed Line Subscribers per 100 Inhabitants	54.04	54.01	55.52	55.15	58.55	56.86
Mobile Subscribers per 100 Inhabitants	44.70	57.34	64.02	72.17	82.76	91.39
Internet Users per 100 Inhabitants	34.46	39.66	53.46	56.84	65.28	70.40

Source: ITU World Telecommunication Indicators 2006; World Bank World Development Indicators 2006

2.4.3 The Telecommunications Market & Telephony

Australia has the fourth largest telecommunications and IT market in the Asia Pacific region.¹²⁶ The current telecommunications sector has developed progressively from what was a centralized, controlled monopoly structure to an open, competitive market with an emphasis on industry self-regulation.¹²⁷

Until the introduction of limited competition in the late 1980s, telecommunications services in Australia were provided by various monopoly organizations. Operational and regulatory functions were the responsibility of the Postmaster-General's Department (PMG) until 1975, when they were moved to the newly created Telecom Australia. Telecom Australia was established as the monopoly domestic telecommunications carrier with exclusive rights to install, maintain, and operate the networks and supply basic service. The company was also the regulator of customer equipment, private networks, and value-added services. In 1946, the Overseas Telecommunications Commission (OTC) was established and given responsibility for the provision of international service. The government established AUSSAT in 1981 to operate a domestic satellite system.¹²⁸

In May 1988, the government announced a restructuring of the regulatory environment. The reforms were implemented in the *Telecommunications Act 1989* and related legislation. As part of the reforms, the basic monopolies of Telecom Australia, OTC, and AUSSAT were retained, but competition was permitted in the provision of value-added network services and customer premises cabling, and in the supply, installation, and maintenance of customer premises equipment. Reforms were applied to Telecom Australia, which were

designed to foster an increased commercial focus and to provide greater operational freedom, management independence and accountability. An important change from the old regulatory regime was the separation of the operational and regulatory functions that occurred with the establishment of the Australian Telecommunications Authority (AUSTEL) in July 1989. AUSTEL operated as an independent industry-specific regulator responsible for protecting the carrier's exclusive rights, protecting competitors from unfair carrier practices, protecting consumers' interests, and administering price control and universal service arrangements.¹²⁹

In 1990, the Australian government announced further reforms. A phased approach was adopted for the transition from monopoly to open competition in basic services. The second phase of deregulation was implemented in the *Telecommunications Act of 1991* and related legislation.¹³⁰ The most important components of the strategy were:

- Merging Telecom and OTC to become AOTC (later Telstra);
- Licensing Optus (now C&W Optus), after a competitive tender process, as a private sector national facilities-based network competitor – based, in part, on the purchase of AUSSAT's national satellite service;
- Fixing the period for the facilities-based duopoly (ending in 1997);
- Licensing three public mobile operators (Telstra, Optus, and Vodafone);
- Mandating open competition in the resale of telecommunications capacity and public access cordless telecommunications services; and
- Giving AUSTEL a stronger mandate to promote competition and protect consumers' interests, which included setting carrier service quality standards and monitoring performance, monitoring and reporting on price controls and competitive safeguards, and enforcing the Universal Service Obligation (USO) and carrier license conditions.¹³¹

Open competition was introduced into the entire market in July 1997, with the *Telecommunications Act 1997* and additional legislation. This brought the regulation of the telecommunications sector more in line with general competition law, as governed by the provisions of the *Trade Practices Act 1974*.¹³² The aim was to create a pro-competitive environment and provide user choice. Self-regulation within the industry was encouraged, particularly in technical regulations and through codes of practice. The Australian Communication Industry Forum (ACIF) became responsible for developing and administering these codes.¹³³

Currently, there is no restriction on entry into the telecommunications service market; therefore, there is no practical limit on the number of carrier licenses that can be issued. Any corporation or public body can apply for a license. However, there is a catch, as license conditions oblige carriers to contribute towards the cost of providing universal service, to fulfill industry development plans, and to comply with the telecommunications access regime.¹³⁴ This can present a challenge since there is an expectation for access to more than basic communication in Australia's regional and remote areas.¹³⁵ Telecommunications in rural Australia have become a "symbolic battleground."¹³⁶ A carrier, especially the incumbent, is subject to criticism if it offers services in the urban areas that cannot be offered in the rural areas. This creates an incentive to wait a longer time before offering new services.

The Department of Communications, Information Technology and the Arts (DCITA) is Australia's top policy body in the area of telecommunications and ICT and is in charge of developing the country's telecommunication regulatory frameworks, overseeing competition and consumer issues, including the USO and funding programs to improve telecommunication services, and policy development to position Australia to compete globally.¹³⁷

There are also two other regulatory bodies that have a role in the Australian telecommunications market: the Australian Media and Communications Authority (AMCA) and the Australian Competition and Consumer Commission (ACCC). The AMCA was formed July 1, 2005 by the merger of Australian Communication Authority (ACA) and the Australian Broadcasting Authority (ABA). It is an independent authority with a seven-member board and is administratively part of DCITA.¹³⁸ The ACA was a sector-specific technical regulator that had a consumer information function. It was responsible for monitoring performance and compliance with existing law and regulations and it acted in an advisory role to DCITA.¹³⁹ The ACA was formed from the merger of AUSTEL and the SMA (Spectrum Management Agency) and established under the *Australian Communication Authority Act 1997 (the ACA Act)*.¹⁴⁰ It exercised its powers under the *Radio Communications Act 1992*, the *Telecom Act*, and other related legislation.¹⁴¹

The ACCC, the competition regulator, was created in 1995 and is responsible for responding to market changes and liberalization trends in multiple sectors. One of these sectors is the telecommunications sector. The ACCC's Telecommunications Group has the principal responsibility for enforcing competition policy and economic regulation in the Australian telecommunications industry.¹⁴²

Liberalization has had significant effects on the Australian telecommunications market. One of these effects has been the increase in operators. In 1997, there were three, and by January of 2001, there were sixty licensed carriers. Liberalization has also caused divisions in the sector, each of which must be looked at independently, making it difficult to speak of a single telecommunication market.¹⁴³ The market for mobile telecommunications services is contested in most regions in Australia and the competition is more intense where terrestrial coverage is available.¹⁴⁴ In the fixed services market, Australians have access to alternate providers for certain services. In terms of competition in infrastructure, markets in large metropolitan areas are contestable, and a number of companies now compete in both residential and business markets.¹⁴⁵

Telephony

The Australian telephony market is dominated by Telstra, also known as Telecom Australia. Until November 2006 Telstra was 51% government-owned and 49% market controlled.¹⁴⁶ This created tension with the regulatory bodies. Because the government has the power to provide "direction" to the ACCC, certain actions could be interpreted as intended to help Telstra and not consumers.¹⁴⁷ In November 2006, the government floated almost half of its interest in Telstra, which should help relieve some of the tensions.¹⁴⁸ Telstra is vertically integrated, and as a result, the carrier has a lot of power in the telecommunications market.¹⁴⁹ Other competitors in the market are Optus, which is owned by Singapore Telecommunications; AAPT, owned by Telecom New Zealand, Primus Telecom, Soul, Vodafone, and Powertel.¹⁵⁰ In 2005, there were 11.46 million main lines in use and 18.42 million mobile telephony subscribers.¹⁵¹ Also, as of 2004-2005, there were twenty seven carriers providing telecommunications services to the public using the carrier network infrastructure. This number includes the four mobile carriers who operate their own networks.¹⁵²

MOBILE TELEPHONY

The four mobile service operators are Telstra (the incumbent), Optus, Vodafone, and Hutchison. Among them, they operate six mobile networks.¹⁵³ As of 2004-2005, Telstra held 44% of the market, Optus held 35% of the market, Vodafone had 16%, and Hutchison held the remaining 5%.¹⁵⁴ Currently, the mobile telephony sector is a major contributor to the economy, offering a financial contribution greater than that of newspaper and publishing industry, and since 1997, an estimated AUS\$10 billion has been invested as capital expenditure.¹⁵⁵ The sector returned revenue of AUS\$9.9 billion in 2004-2005 and it is estimated to have returned revenue of AUS\$11.9 billion in 2005-2006.¹⁵⁶ Over the past five years, the sector's revenue has grown at an average of 14% per year.¹⁵⁷ However, the percent growth of mobile revenue peaked in 2000-2001 and has been declining since.¹⁵⁸ Despite this, mobile telecommunications revenue is expected to continue to grow as a proportion of total telecommunications revenue.¹⁵⁹ Table 2.10 illustrates the decline in revenue growth.

Table 2.10: Australia - Mobile Telecommunications Industry Revenue, 2000-2001 to 2005-2006

	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006F
Total Revenue (Bill AU\$)	6.1	7.3	8.1	8.8	9.9	11.0
Growth (Year-on-Year)	20.7%	19.3%	11.0%	8.4%	12.7%	11.5%

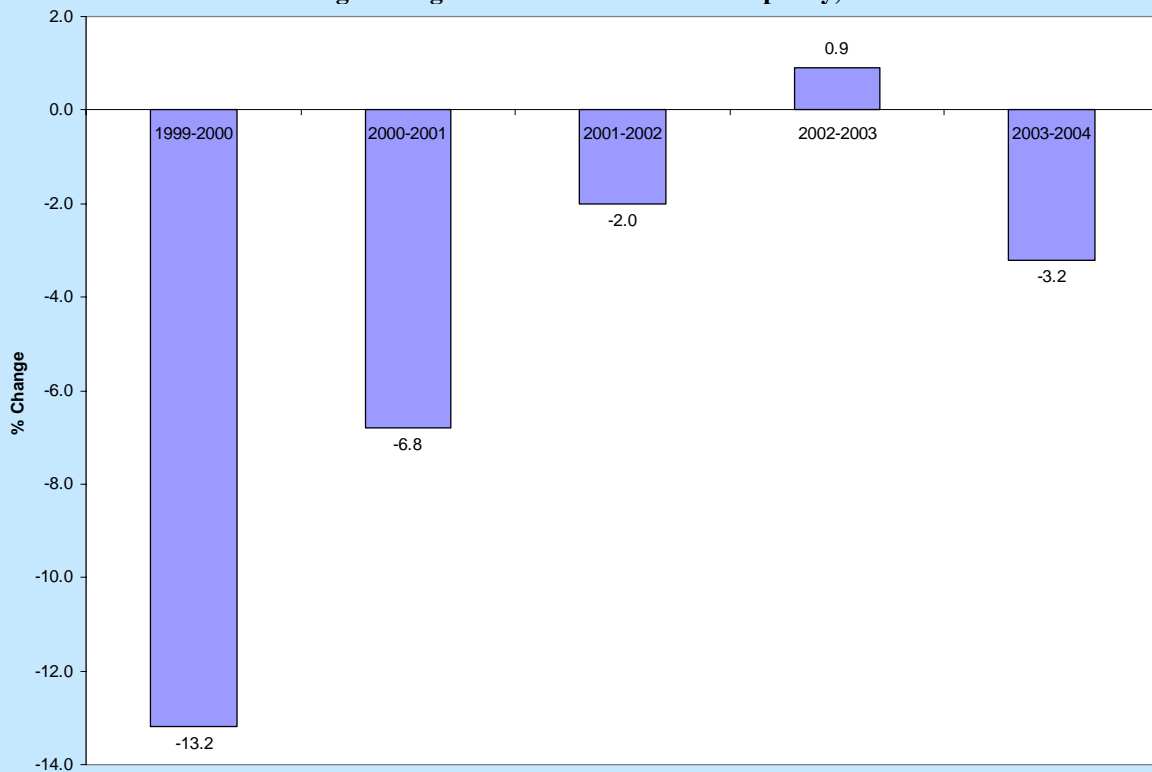
Note: F indicates forecast values

Source: Australian Mobile Telecommunications Association – Australian Mobile Telecommunications Industry: Economic Significance

In 2000-2001, the number of mobile service subscribers surpassed the number of fixed services subscribers.¹⁶⁰ The number of mobile subscribers has been showing strong growth, increasing 13.4% from 2004-2005 to 2005-2006. The peaks in growth appear to be associated with the introduction of new networks, although the full effects of the 3G network, first introduced in 2003, have not been fully realized.¹⁶¹ Approximately 94% of the population in Australia is subscribed to mobile telephony service and the terrestrial mobile phone networks now reach over 98% of the population and cover 20% of the Australian landmass.¹⁶² The mobile penetration rate grew from 58% in 2001-2002 to 81% in 2004-2005. It is estimated that Australia will surpass a 100% penetration rate by the end of 2008.¹⁶³ The driving force in the growth of subscriber numbers is prepaid customers. In 2004-2005, 43% of all mobile phone services were prepaid and this is expected to grow to 47% in 2005-2006. Prepaid services are advantageous to the customer in that they provide an inexpensive way to enter the market and make it easy to control expenditure on the service. The increase in prepaid numbers suggests that customers value choice and flexibility.¹⁶⁴ However, it should be noted that although the growth in the market has occurred in both the regional and metropolitan markets, this growth has occurred at different rates. In 2004-2005, the metropolitan market was responsible for over 89% of the revenue and the growth rates have been relatively smooth since 2002-2003 at rate in the mid-teens. The regional market, however, spiked up to 55.2% in 2001-2002. For 2005-2006 the estimated growth rates are about 20% for the regional markets and 16.5% for the metropolitan markets.¹⁶⁵

Compared to other OECD countries, the Australian mobile telecommunication market offers a high degree of competition. According to the OECD, Australia ranked fifth among twenty-seven countries in the level of pricing competitiveness for business mobile services and third for residential mobile services in 2002.¹⁶⁶ The growth in the number of subscribers has been accompanied by a significant decrease in the price of mobile service. Between 1997-1998 and 2001-2002, the price decreased by approximately 27%. In recent years, percent decrease has become smaller. In 2002-2003, there was an increase of 1% followed by a decrease of 3.2% in 2003-2004.¹⁶⁷ Figure 2.15 illustrates the decrease in the price of service.

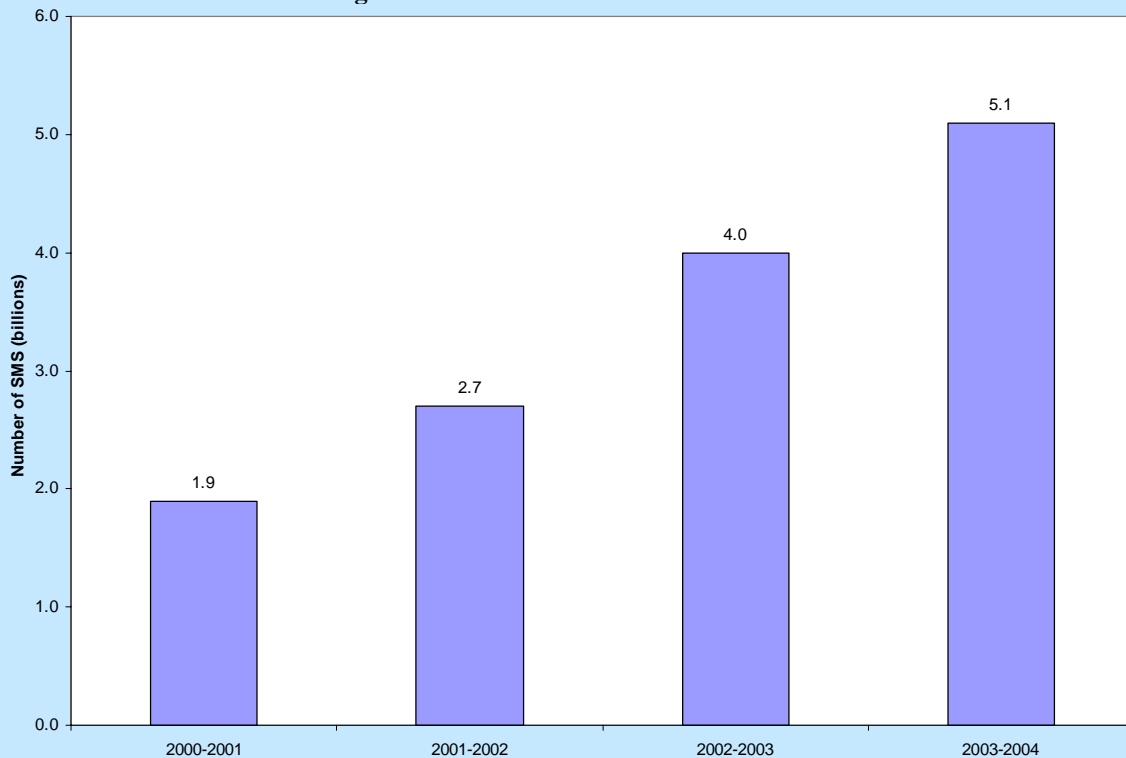
Figure 2.15: Australia - Percentage Change in the Price of Mobile Telephony, 1999 to 2004



Source: Australian Mobile Telecommunications Association – Australian Mobile Telecommunications Industry: Economic Significance

As in other countries in the Asia-Pacific region, Australia has experienced a decrease in the ARPU as a reflection of decreased cost of services and lower spending customers. This trend is expected to continue. To counteract it, the industry is turning to value-added services and mobile data.¹⁶⁸ For example, data revenue for Vodafone increased by 29.3% in the year ending March 31, 2004 and the monthly average non-voice revenue per user for Hutchison grew from AUS\$12 to AUS\$16 in 2004-2005 while non-SMS revenue grew from AUS\$4 to AUS\$7 in the same period.¹⁶⁹ In the market of value-added services, SMS has been a major source of growth in the mobile telecommunications industry. During 2003-2004, almost 5.1 billion SMS messages were sent, which was a 28% increase from the previous year.¹⁷⁰ Figure 2.16 illustrates the growth of SMS messages from 2000 to 2004.

Figure 2.16: Australia - SMS Messages Sent from 2000-2001 to 2003-2004



Source: Australian Mobile Telecommunications Association – Australian Mobile Telecommunications Industry: Economic Significance

Around certain holidays or significant times in the community, such as Christmas, New Year’s Day, and Valentine’s Day, the number of SMS messages sent experiences huge peaks. Also, the industry has centered many of its innovations around SMS use. The use of multimedia message service (MMS) is increasing in the market with 13.7 million MMS messages sent in 2003-2004.¹⁷¹ In 2003, Optus, Telstra, and Vodafone launched premium SMS services. Initially, these services were related to media competitions and reality television shows, but they have since been expanded. Big Brother was the first reality show to use premium SMS, but other shows, such as Australian Idol and Dancing with the Stars, now also generate high levels of premium SMS. The growth of the premium SMS and MMS markets has been promising and the ACA (now the ACMA) released new number ranges for these services to allow for the increase in offerings in the expectation of continued growth.¹⁷²

CONVERGENCE

Convergence has played an important role in the Australian mobile market. In the past few years, there have been significant advances in linking mobile phones to other forms of technology, in particular media and information technologies, to create value-added services. These advances now allow users to have immediate access to news, sports information, stock prices, news and music radio broadcasts, and television broadcasts; to send and receive emails in a form that can be synchronized with business software; and to hold video conference calls, send SMS to fixed-line phones and take digital quality photographs.¹⁷³ Specific examples within the Australian mobile telecommunications market include Telstra’s i-mode, which provides customers with the ability to bid on E-bay, view local news from the Australian Broadcasting Corporation, listen to music and new from radio station Triple-J, and access international news from CNN. Another service, Vodafone Live! allows customers to download, listen to, and watch over 500,000 music videos and also provides the capability of viewing live performances from the handset.¹⁷⁴

Recently, there has also been convergence among different modes of telecommunications. Telstra has introduced a service that enables fixed-line telephones to send and receive SMS and has introduced SMS-enabled cordless phones. The ability to send SMS messages to mobile phones has also been expanded to public payphones and desktop computers; more than 80% of pay phones can now be used to send SMS messages.¹⁷⁵

3G

In 2003, Hutchison launched “3”, the first commercial 3G network in Australia. It uses the Wideband CDMA standard. This network allows for the high speed delivery of multimedia services. As of 2005, 3 was available in the five mainland capitals, as well as Canberra and the Gold Coast, and the service had attracted over 500,000 customers.¹⁷⁶ The other competitors in Australia’s 3G market include Optus, Vodafone, and Telstra. Optus launched its network in Canberra in April 2005 and is projected to be fully deployed by March 2007. In the meantime it has a 2.5G network, Optus Zoo, which offers services similar to 3G. In July 2005, Vodafone ran a trial for its 3G network with the intention of rolling out the full network by the end of the year. Also, like Optus, Vodafone has a 2.5G network with 3G-like services. Telstra started selling its 3G handset in September 2005 and has an operational network in the five mainland capitals and Canberra. Telstra operates jointly with Hutchison. This illustrates one of the important innovations of 3G: the sharing of networks and radio infrastructure by carriers. This innovation can significantly reduce network costs and enable carriers to establish their services faster while providing efficiencies for all those carriers sharing the network.¹⁷⁷

Although there was a pre-existing relationship between the mobile network operators and the content service providers, the introduction of 3G and its related services has redefined this relationship. The content that is available through 3G network is an important feature which distinguishes it from prior technologies. Currently, there are more than 300 content providers in the Australian mobile telecommunications industry. The partnerships that have formed between the operators and the content providers allow customers access to the latest entertainment services.¹⁷⁸ For example, the content providers who work with Hutchison make the following content available through the service: news supplied by ABC, Reuters, Sky News, and WeatherZone; sports provided by Fox Sports, Essendon, Cricket Australia, and Sportal; comedy made available by the Comedy Channel; music supplied by Sony, BMG, and Warner; and general entertainment information provided by HWW.¹⁷⁹ Another partnership that has been announced is one between Optus and Ninemsn. The goal of this partnership is the provision of a blend of Internet and mobile services: “Optus mobile and Internet customers will enjoy a convergent information and communications experience, benefiting from Publishing and Broadcasting Limited (PBL) content and MSN services combined with high speed access via Optus Broadband and 3G.”¹⁸⁰ Services available as result of the partnership are unified personal information and messages (customers will be able to access email and instant messaging through personal computer or telephone and unified messaging through SMS, voicemail, or email), personal data management (customers will be able to synchronize their calendars and contact lists between email and MSN Messenger on their phone or personal computer), and exclusive content events (Optus and Ninemsn will use PBL’s rich resources to develop unique content).¹⁸¹

2.4.4 Internet

At the end of 2005, there were 5,351,622 Internet hosts and 14,189,544 Internet users in Australia.¹⁸² Currently, a majority of the users are accessing the Internet through large ISPs, who provide non-dial-up access. At the end of June 2006, non-dial-up subscribers represented 53% of all Internet subscribers in Australia, compared with 31% at the end of March 2005.¹⁸³ Table 2.11 demonstrates the growth in the Internet penetration rate in Australia since 2000.

Table 2.11: Australia - Internet Penetration Rate 2000 to 2005

	2000	2001	2002	2003	2004	2005
Internet Subscribers (Dial-up)	..	4,000,000	4,200,000	4,510,000	4,360,000	3,877,200
Internet Subscribers (Broadband)	74,000	122,800	258,100	516,800	1,025,500	2,102,800
Internet Subscribers (Total)	3,921,000	4,285,000	4,555,000	4,800,000	5,220,000	5,980,000
Internet Users (Estimate)	6,600,000	7,700,000	10,500,000	11,300,000	13,000,000	14,190,000
Population	19,153,400	19,413,200	19,641,000	19,880,600	19,913,000	20,155,000
Penetration Rate	34.46%	39.66%	53.46%	56.84%	65.28%	70.40%

Note: Penetration rate is calculated using the estimated number of Internet users divided by the population.

Source: ITU World Telecommunications Indicators 2006

One of the factors contributing to Australia's high take-up of Internet services is that dial-up access is relatively cost effective, because of the availability of untimed local calls. The growth in the demand for Internet services has also led to an increase in the demand for content in wireless data access and data transfer capabilities in mobile telephony. This has resulted in convergence between Internet technology and mobile telephony.¹⁸⁴ In response to this, Telstra has invested in a network that will provide access to wireless services using WiFi access points it is calling "Telstra Hotspots." They are creating partnerships with corporations such as Starbucks and Qantas that will allow certain customers to access localized Internet or broadband services at these hotspots. 3 has a similar business model. Their Net connect card provides wireless broadband Internet whenever a customer is in a "3 Zone", which allows that customer to send or receive emails with any mobile in real time.¹⁸⁵

Broadband

Because of the population distribution and Australia's geography, broadband wireless access networks offer an attractive solution for providing Internet throughout Australia.¹⁸⁶ After deregulation, competition was initially concentrated in the large markets on the east coast. Although Internet service and broadband are an area of high competition, Telstra still controls a majority of the network.¹⁸⁷ Pay television operators also offer broadband services. The major players in that market are Foxtel (jointly owned by Telstra, PBL, and News Corporation) and Optus Television (controlled by C&W Optus).¹⁸⁸

Household subscribers are the majority of the subscribers to broadband service although high speed connections are also popular with business and government subscribers.¹⁸⁹ Currently, DSL is the predominant access technology used for broadband Internet services. Almost 76% of the broadband customers subscribe to this technology.¹⁹⁰

Because of its position within the Australian telecommunications market, Telstra's facilities are a key element for competition not only in voice, but also in broadband. Australia lacks alternate facilities to provide competing services to residential customers; therefore, competitors must have access to Telstra's infrastructure.¹⁹¹ As a result, there have been discussions within the government to introduce operational separation of Telstra as a way to ensure that Telstra customers will receive the same treatment from Telstra Wholesale as that given to Telstra retail sector.¹⁹²

2.4.5 VoIP

Concerning VoIP regulation in Australia, ACMA is in charge of the government's consultations on VoIP while the ACCC has the responsibility of assessing the impact that VoIP will have on competition in the

telecommunications sector. In addition, the ACCC is also responsible for reviewing the price controls that are applicable to Telstra, which for years has been subject to a price cap regime for its retail services and for its wholesale services to competitors. In October 2004, the ACA published “Regulatory Issues Associated with the Provision of Voice Services Using Internet Protocol in Australia,” a discussion paper which states that VoIP services will generally be viewed as “carriage services” and “standard telephony services,” meaning that the standard definitions used in conventional telephony would be applied.¹⁹³ The paper itself focuses on issues related to numbering, customer equipment regulations, QoS requirements, access to emergency services, and consumer protection requirements. One issue the paper did not address is the economic regulation of VoIP. This issue was left to the ACCC.¹⁹⁴ During this time, DCITA stated that there were three main approaches to the development of a VoIP regulatory framework. The first approach is a uniform regulatory framework which would be applied to all voice services, the second is a two or multi-tiered regulatory framework with uniform regulation within a tier, and the third is the Next Generation Networks (NGN) approach where the goal is to address the “significant changes expected in the operation of networks and provision of services.”¹⁹⁵ However, as of 2004, the NGN approach was “not considered a viable approach in the short term,” but something to be looked at over the long term.¹⁹⁶ At that time, DCITA had indicated that it wanted to continue to examine the approaches being taken to VoIP by other countries, and it did not issue a decision based on the VoIP consultation.¹⁹⁷

In November 2005, the Australian government announced the policy framework which would be applied to VoIP.¹⁹⁸ This included support for the introduction of a new, non-geographic number range to facilitate in the development of VoIP services. In addition to the announcement, the Minister for Communications, Information Technology, and the Arts released a government report on the policy and regulatory implications of VoIP services. The report included recommendations regarding VoIP, all of which were accepted for implementation by the government. The basic findings of the report were that there was no immediate need for any changes to the regulatory framework to accommodate VoIP and only a need for small changes to existing numbering, emergency services, and customer service regulation.¹⁹⁹ During the last election, the Australian Government committed to reviewing next generation services, including VoIP and, if necessary, to create legislation to remove barriers to entry in the market.²⁰⁰ Also, to make sure that consumers are aware of the choice VoIP offers and how VoIP is different from traditional telephony, public information will be developed with the help of the industry.²⁰¹ Under the current telecommunications regulatory regime, voice services generally fall under the *Telecommunications Act*, the *Telecommunications (Consumer Protections and Service Standards) Act 1999*, and Parts XIB and XIC of the *Trade Practices Act 1974* in addition to other regulatory and industry codes and guidelines.²⁰²

2.4.6 IPTV & Mobile TV

Although the technology is not yet well developed in the country, Australia shows a great deal of potential for IPTV once the network upgrades are complete. Australia currently has low average broadband download speeds, which are not fast enough for real-time IPTV for many users, but it also has relatively low prices for its services.²⁰³ Australia has a “British-style” public service broadcasting tradition; therefore, regulatory discussions concerning IPTV are closely linked to the debates relating to traditional broadcasting and the public interest.²⁰⁴ Telstra, the incumbent, had been involved in an IPTV trial using Microsoft technology; however, this trial never became a commercial venture. However, one result of it was the creation of documentation that telecommunication operators are interested in the technology. There are a good deal of Internet sites that do currently offer video content, most of which are traditional broadcasters offering downloads of their programs, but very little real-time Australian television is available on the Internet. However, this may change soon. In August 2006, an announcement was made that the first commercial IPTV channel, Geelong’s Own Television Content (GOTV) would start operating.²⁰⁵

For a few years now, the Australian government has taken into account the convergence occurring within the telecommunications sector. This has been reflected through the consolidation and changes that have occurred within the regulatory structure, such as the merger between the ACA and the ABA to create the ACMA, a single agency for regulating the technical aspects and content issues of telecommunication and

broadcasting. This merger makes the ACMA the chief agency to look to as far as issues of IPTV are concerned, although the ACCC is also involved because of its role as the general competition authority.²⁰⁶

Prior to its merger with the ACA in 2005, the ABA was the agency responsible for regulating the broadcasting sector. Similar to the ACA, the ABA was an independent regulator with a legal identity that was separate from the Australian Government. Its responsibilities included planning the availability of segments of the broadcasting services bands for analogue and digital broadcasting, managing broadcasting licenses, collecting license fees, allocating pay TV licenses, and administering the class license regime for subscription radio broadcasting, open and subscription narrowcasting services.²⁰⁷ After the merger with the ACA, all of these responsibilities fell to the ACMA.

Currently, the ongoing public discussions regarding IPTV regulation are related to the government's media reform package, "Meeting the Challenge: Reforming Australia's Media in the Digital Age – Discussion Paper on Media Reform Options," that was presented in March 2006. This package includes a broad number of initiatives in the media and communications areas, but the package is based in the development of digital television and media ownership regulations in Australia.²⁰⁸ Because of the focus on digital television, IPTV only occupies a small part of the discussion. Digital television has not developed as quickly as was expected in Australia. The digital switchover date of 2008 will not be met and there is a proposal to move it to 2010-2012. In this setting, IPTV is viewed as part of the "new services on other platforms." Currently, there is a moratorium on the licensing of new commercial broadcast services, and this is extended to "new commercial FTW (Free to Air) broadcast services delivered over platforms other than normal BSB (broadcasting Services Band) channels, such as wireless, satellite, and broadband networks" by the discussion paper.²⁰⁹ IPTV is included in the broadband networks definition. The moratorium is scheduled to end at the close of 2006 and if there is no change in legislation, licensing on these new services can begin.²¹⁰

Although the overall intentions of the media reforms are to open up the sector for better competition, there is some concern, in particular by Australia's Interactive Media Industry Association (AIMIA), that the Australian Government is proposing to legislate in a manner which will transfer the power to allocate new commercial TV licenses outside the BSB spectrum from the AMCA to the government.²¹¹ Also, part of this proposed change in legislation is that "in considering applications for [these] licenses after December 31, 2006 the Government will consider whether the allocation is in the public interest." The major concern is that this will politicize the licensing process, which is currently not much of a concern as the ACMA is independent.²¹²

Mobile Television

With the introduction of 3G, mobile television is in a more advanced state than IPTV. It is already a commercial reality and several telecommunications operators offer services which include this technology. The first mobile TV trial in Australia was in 2005 and it was a joint operation between Nokia and the Bridge Networks.²¹³ Shortly thereafter, Australian operators began to offer commercial services. Some of the services that are now available include a partnership between Ericsson and Milia TV that offers interactive mobile television and the first mobile soap opera which is sponsored by Vodafone. Vodafone's mobile soap opera is called *Random Place*. It was launched in May 2005 and subscribers to the service can receive up to two "mobisodes" a day, five days a week.²¹⁴ Ericsson and Milia TV's service allows viewers to interact with mobile television shows through voting or greeting (SMS or MMS-to-television) simply by pressing a response key. This service also allows viewers to access other services including shopping. The benefits for the television networks from this business model are that it allows them to profit from content fees, raise additional advertising revenue, and collect more from paid interactions (voting, greeting, shopping, etc.). Also, this type of service opens the way to new television formats which widens target groups and builds customer loyalty.²¹⁵

2.4.7 Summing Up / Conclusions

The mobile telecommunications market is where Australia has experienced success. Penetration rates are high in part because of the concentration of population in urban areas. Competition in the market is highly developed due to liberalization as well as a relatively small amount of regulation. Mobile operators have embraced convergence of services and technologies and offer a variety of value-added services. As far as convergence in other parts of the telecommunications industry (IPTV), this will depend on the success of the network upgrade (a \$3 billion broadband fiber network), the rate at which subscribers migrate from dial-up to the new network, and whether it becomes a priority for the Australian government.²¹⁶

Although some sectors of the telecommunications market are doing well, Australia has been slow in transitioning its full telecommunications industry, and may be five years behind in its telecommunications market.²¹⁷ Recently, Deutsche Bank did an analysis of Telstra and found that although the company's returns remain good, despite some decline, the operator experienced the most success in unregulated or lightly regulated business (e.g., telephone directories, mobile services, and new products such as broadband access). Telstra has been seeing a sharp decline in its old copper-wire, fixed-line network and Deutsche Bank estimates the network will earn only an 8% return by 2007, which is below Telstra's cost of capital.²¹⁸

Finally, "a mish-mash of rule-setting bodies has led to lots of regulation and uncertainty."²¹⁹ There were complications between the regulatory agencies and Telstra, the incumbent that were a result of the government's majority holding (51%) in the telecommunications company. Despite the regulators' independence, this controlling share brought into question any moves they made in regards to Telstra, especially where their action appeared to benefit the company more than consumers or the market. This issue may have been resolved with the government's public sale of almost half its interest. There is also an issue regarding Telstra's market control. They are the incumbent in all major telecommunications services. The combination of this and any complications that may have been created while Telstra was under government control may be an impediment to the type of market with open competition and transparent market entry which Australia is striving for.

2.5 China

2.5.1 General Background



The designations employed and the representation of material in this map do not imply any opinion whatsoever on the part of ITU concerning the legal or other status of any country, territory or area or any endorsement or acceptance of any boundary.

Officially known as the People's Republic of China, China is located in south eastern Asia. It is the world's fourth largest country after Russia, Canada and the United States, and it spans an area of 9,496,960 km².²²⁰ As of July 2006, the population was estimated to be 1,313,973,713 and growing at a rate of 0.59%.²²¹ Although the China has a population density of 131 people/km², harsh geographic conditions mean that almost one-third of the country is sparsely populated. The result is that China suffers high population pressure in its other regions and this pressure affects China's markets. For example, universal access for telecommunication services in remote and less populated areas has been a challenge for both the government and the

telecommunications operators.²²² The current political structure is one-party rule by the Chinese Communist Party (CCP). The CCP's political bureau, known as the politburo, determines policy and makes legal,

administrative, and executive appointments. The executive is a state council, which is approved by the National People's Congress (NPC), a unicameral national legislature. The head of state is the President who, along with the Vice-President, is approved by the NPC.²²³ At the regional level, there are twenty two provinces, four municipalities directly under the national government's control, and five autonomous regions; all of which are governed by local people's governments and elect local people's congresses.²²⁴ The next national government will be approved in 2008.²²⁵

2.5.2 Economic Background

Since introducing market reform in the 1980s, China has reduced the percentage of the economy that is state-controlled to approximately 33%.²²⁶ In 1998, China was removed from the World Bank's low-income classification and placed into the lower-middle income category.²²⁷ In 2001, it became a member of the World Trade Organization (WTO). Since that time, its economy has been growing rapidly, making China a "global economic force."²²⁸ There has been a boom in the commodities market and the rise of a large middle class.²²⁹ In 2004, China surpassed the United States to become the world's largest exporter of information and communication technology goods.²³⁰ In 2005, the decision was made to separate the Chinese Yuan from the United States Dollar and the GDP rose to US\$2.229 trillion with an annual growth rate of 9.9%.²³¹ Of the 2005 GDP, 12.5 % is estimated to come from agriculture, 47.3% from industry (including construction), and 40.3% from services.²³² Table 2.12 gives a view of the Chinese economy from 2000 to 2005.



Table 2.12: China - Economic Snapshot, 2000 to 2005

	2000	2001	2002	2003	2004	2005
GDP (current US\$)	\$1.198 trillion	\$1.324 trillion	\$1.453 trillion	\$1.641 trillion	1.932 trillion	\$2.229 trillion
GDP Growth (annual %)	8.4%	8.3%	9.1%	10.0%	10.1%	9.9%
GNI, Atlas Method (current US\$)	\$1.169 trillion	\$1.273 trillion	\$1.407 trillion	\$1.631 trillion	\$1.938 trillion	\$2.264 trillion
GNI per Capita, Atlas Method (current US\$)	\$930	\$1,000	\$1,100	\$1,270	\$1,500	\$1,740
Annual Telecommunication Investment (US\$)	\$26.858 billion	\$30.836 billion	\$25.040 billion	\$26.782 billion	\$26.559 billion	\$25.220 billion
Total Telecommunications Service Revenue (US\$)	\$38.489 billion	\$44.917 billion	\$50.994 billion	\$55.527 billion	\$63.709 billion	\$71.930 billion
Fixed Line Subscribers per 100 Inhabitants	11.18	13.74	16.68	20.33	23.98	26.63
Mobile Subscribers per 100 Inhabitants	6.58	11.03	16.04	20.89	25.76	29.90
Internet Users per 100 Inhabitants	1.74	2.57	4.60	6.15	7.23	8.44

Source: ITU World Telecommunication Indicators 2006; World Bank World Development Indicators 2006; China Telecom;

China's economic numbers over the five-year period of 2000 to 2005 demonstrate the steady and consistent progress that the economy has been making. However, this growth is not consistent throughout all of China. It has been much slower in the rural areas and China must still deal with issues such as pollution, health care, and underdeveloped markets.²³³

2.5.3 The Telecommunications Market & Telephony

Like many of the other Chinese industries, telecommunications was slow to develop prior to the late 1970s.²³⁴ China viewed telecommunications as a tool for military and government use and not as a commodity.²³⁵ This approach resulted in low revenue and the government made the decision to use postal services to subsidize telecommunications. These services were operated jointly by the Ministry of Posts and Telecommunications (MPT), which is now known as the Ministry of Information Industry (MII).²³⁶ In 1978, the government chose to implement economic reforms which included reforms of the telecommunications sector. Because of the poor development of telecommunications, China granted several preferential policies to the MPT which gave priority to the development of telecommunications.²³⁷ The Chinese reforms were successful, and by 1994, Chinese telecommunications were sufficiently developed to handle the basic demands of the public.²³⁸ Figure 2.17 and table 2.13 below demonstrate the commitment China has made to developing its telecommunications over the last twenty five years.

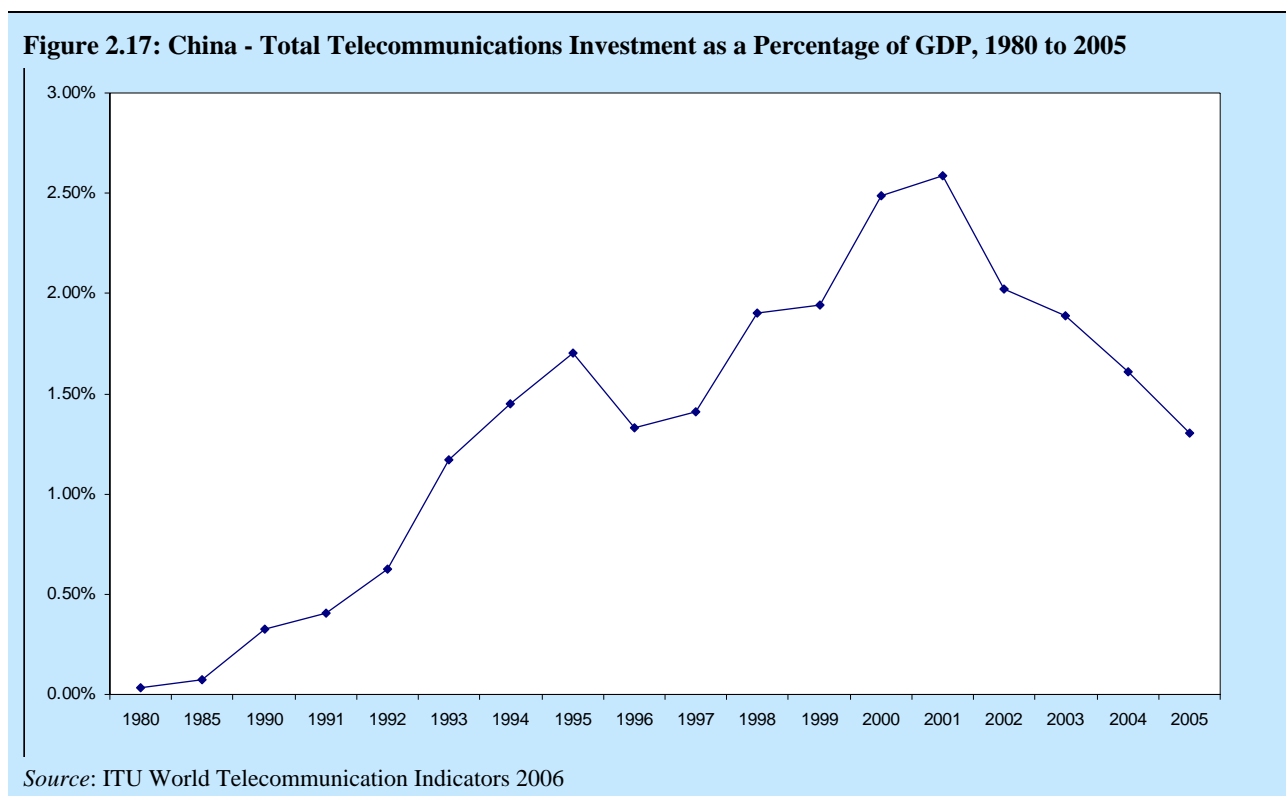


Table 2.13: China – Total Telecommunications Investment, 1980 to 2005

	1980	1985	1990	1995	2000	2001	2002	2003	2004	2005
Annual Telecommunication Investment (US\$ bill)	0.141	0.284	1.250	11.917	26.858	30.836	25.040	26.782	26.559	25.220

Source: ITU World Telecommunication Indicators 2006

The goal of the market reforms was to transition the telecommunications market from one which was support-driven to one that would be market-driven in its growth. To make this transition easier, the government has slowly withdrawn the preferential policies and deregulated the market.²³⁹ China Unicom, a competitor to the incumbent, China Telecom, was established in 1994.²⁴⁰

Despite the success of the reforms, subscribers are still unable to benefit fully from competition due to the existence of an ineffective regulatory network. Although China Telecom, which had once been the Department of Directorate General of Telecommunications of the MPT, was the operational arm of the MPT, it was designated as the regulator for national telecommunications. Because China Telecom was both the regulator and an operator, its competition, China Unicom was at a great disadvantage, particularly with respect to network connection.²⁴¹ In 1998, the MII was established. It was created from a merger of the MPT and the Ministry of Electronic Industry and has the ability to regulate all networks and IT manufacturing industries, making it a powerful ministry.²⁴²

In 1999, MII took steps to address some of the barriers to competition in the Chinese telecommunications industry. The ministry split China Telecom into four financially and operationally independent companies: (1) China Telecom for fixed services, (2) China Mobile for mobile services, (3) China Satellite for satellite services, and (4) Guo Xin Paging Company for paging services.²⁴³ Later, Guo Xin was merged with China Unicom in an attempt to strengthen China Unicom.²⁴⁴ MII also issued operating licenses to China Netcom and China Railcom (now known as Tie Tong), allowing them to compete in all telecommunications sectors except mobile service.²⁴⁵

China became a member of the WTO in December 2001. A significant part of the negotiations for China's membership required that it allow some foreign direct investment in its telecommunications operators.²⁴⁶ A cap of 49% foreign ownership was set which has allowed the Chinese government to maintain a controlling share in its telecommunications operators.²⁴⁷ A detailed list of China's commitments is shown in Table 2.14 below.

Table 2.14: China - Commitment under its WTO Service Schedule

Type of Service	Percentage of Foreign Direct Investment					
	Upon WTO Accession	One Year from Accession	Two Years from Accession	Three Years from Accession	Five Years from Accession	Six Years from Accession
Value-Added Services and Paging Services	30% in Beijing, Shanghai, and Guangzhou	49% in 17 cities	50% with no geographic restrictions	No change	No change	No change
Basic Telecom Services – Mobile	25% in Beijing, Shanghai, and Guangzhou	35% in 17 cities	No change	49% with no geographic restrictions	No change	No change
Basic Telecom Services – Fixed	0%	0%	0%	25% in Beijing, Shanghai, and Guangzhou	35% in 17 cities	49% with no geographic restrictions

Source: ITU – The Regulatory Environment for Future Mobile Multimedia Services: The Case of Hong Kong SAR and China; WTO

To prepare for the increased competition resulting from WTO membership, the State Council took further steps in restructuring the telecommunications sector. China Telecom was divided a second time into competing northern and southern companies. The State Council has implemented what it calls a “5 + 1” approach.²⁴⁸ China Netcom merged with the northern division of China Telecom to form a single entity, China Netcom, which serves the northern ten provinces formerly belonging to China Telecom. China Telecom now serves the twenty southern provinces. The remaining firms, China Mobile, China Unicom, and China Railcom (Tie Tong), operate independently, and China Satcom is the “plus one.”²⁴⁹ The current structure of the market is described in Table 2.15 below.

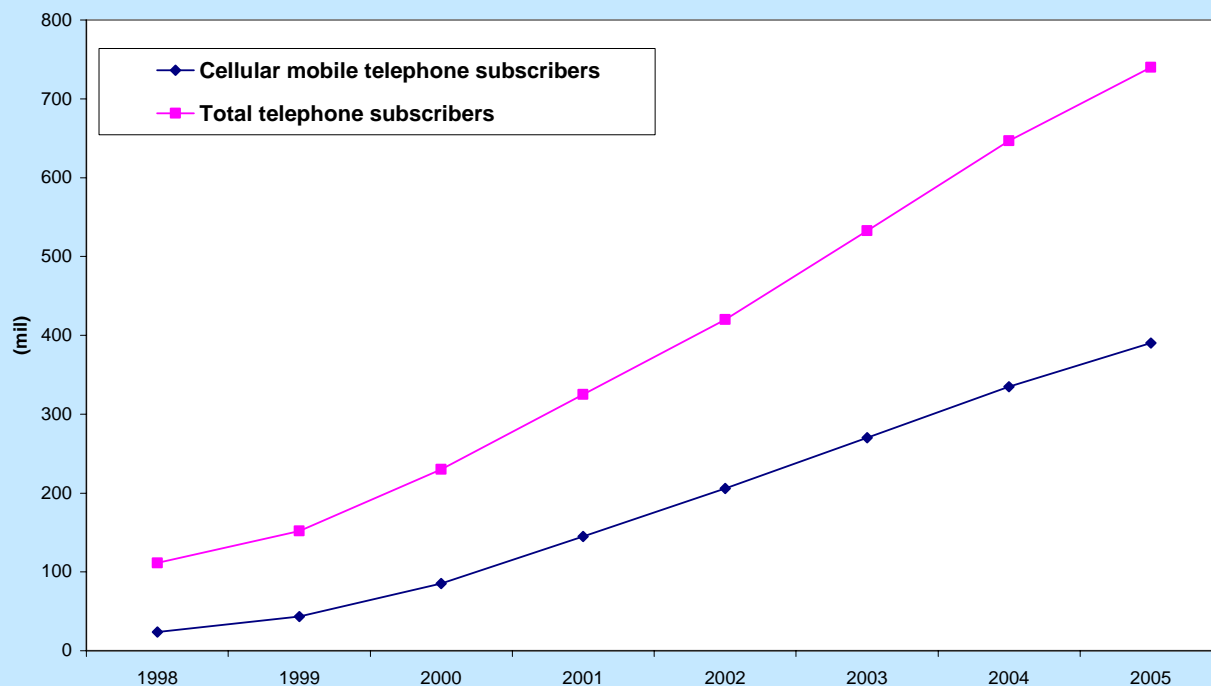
Table 2.15: China - The Telecommunications Market after Restructuring

	Fixed Local	Fixed Long Distance	Mobile Cellular	Satellite Transmission
China Telecom	*	*		
China Unicom	*	*	*	
China Mobile			*	
China Netcom	*	*		
China Railcom (Tie Tong)	*	*		
China Satcom				*

Source: ITU - The Regulatory Environment for Future Mobile Multimedia Services: The Case of Hong Kong SAR and China

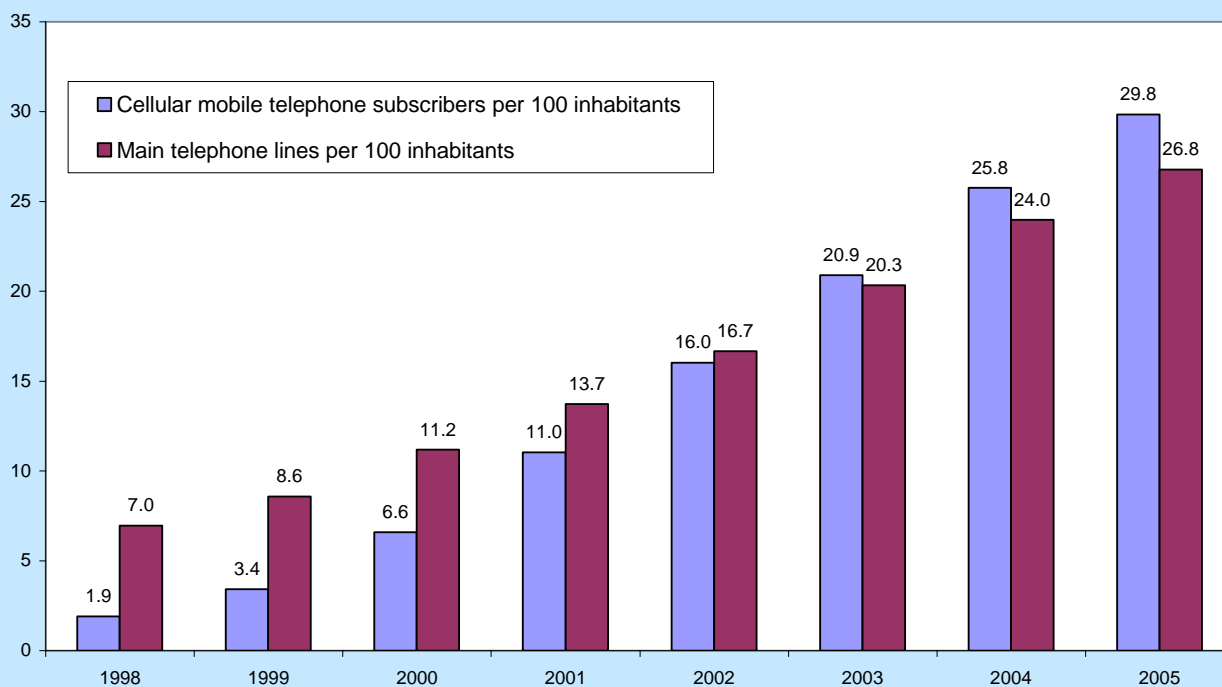
In the current market, China Netcom is the number two fixed-line operator in China. In addition to offering fixed local and long distance service, China Netcom provides broadband and Internet access, data, and business communications.²⁵⁰ China Unicom is the dominant paging company and the number two mobile phone operator.²⁵¹ China Mobile has approximately two-thirds of the mobile subscribers in China (more than 215 million). Currently both China Mobile Communications and Vodafone have stakes in the company with shares of 76% and 3% respectively.²⁵² As of May 2006, the incumbent, China Telecom, owns the world’s largest fixed telephone network (total capacity of 215.18 million mainlines) and China Mobile owns the world’s largest mobile phone network (total capacity of 260.64 million).²⁵³ Figures 2.18 and 2.19 illustrate the growth of the Chinese telecommunications market since 1998.

Figure 2.18: China - Total Telephone Subscribers, 1998 to 2005



Source: ITU World Telecommunications Indicators 2006

Figure 2.19: China - Telephone Subscribers per 100 People, 1998 to 2005



Note: The number of mobile subscribers surpassed the number of main line subscribers in 2003.

Source: ITU World Telecommunications Indicators Database 2006

In the current Chinese telecommunications market, the operational functions of China Telecom have been separated from MII's regulatory work; however, MII remains a government agency and is not independent in a real sense.²⁵⁴ All of the telecommunications operators are defined as part of the top 100 large-scale state-owned-enterprises in China and are under the regulatory supervision of the State-Owned Assets Supervision and Administration Commission of the State Council.²⁵⁵ Although state ownership has led to many controversies, experience in past years has shown that the largest barrier for subscribers to fully explore the benefits of competition comes from an ineffective regulatory framework.

China does not yet have a telecommunications act although there are telecommunications regulations and regulations on foreign investment that have been disseminated by MII.²⁵⁶ Because these are regulations, they do not carry the same weight as laws, and MII feels that it is necessary for China to create a legal framework for the telecommunication sector to operate in.²⁵⁷ In 2004, MII submitted its draft of China's first telecommunications law to the State Council for review.²⁵⁸ In 2005, MII continued its push for a telecommunications act arguing that it is a necessity for a socialist market economy, a requirement of telecommunications development and reform, and important for China's situation after WTO accession.²⁵⁹ The MII also feels that a telecommunications act will help to safeguard the order of China's telecommunication market, protect the legal right and interest of telecommunication operation enterprises and telecommunication users, give China the opportunity to enter the world telecommunications market, and strengthen China's telecommunications market.²⁶⁰

Some of current regulation that is in place dealing with network interconnection is a set of guidelines known as the *Provisional Regulations over Telecommunications Network Interconnection*. These regulations define an operator with more than 50% of the market share as a dominant (incumbent) operator and impose on this operator the obligation to provide interconnection to all other operators requesting network interconnection at any technically possible and economically reasonable point, as long as network security is not compromised.²⁶¹ China Telecom is the incumbent in the fixed local and fixed mobile telephony markets. This means that, even after the restructuring of the Chinese telecommunications market, China Telecom controls the fixed network for both local and long distance services; so the company still enjoys significant dominance in the sector and the barriers to entry remain as high as they were before restructuring.²⁶²

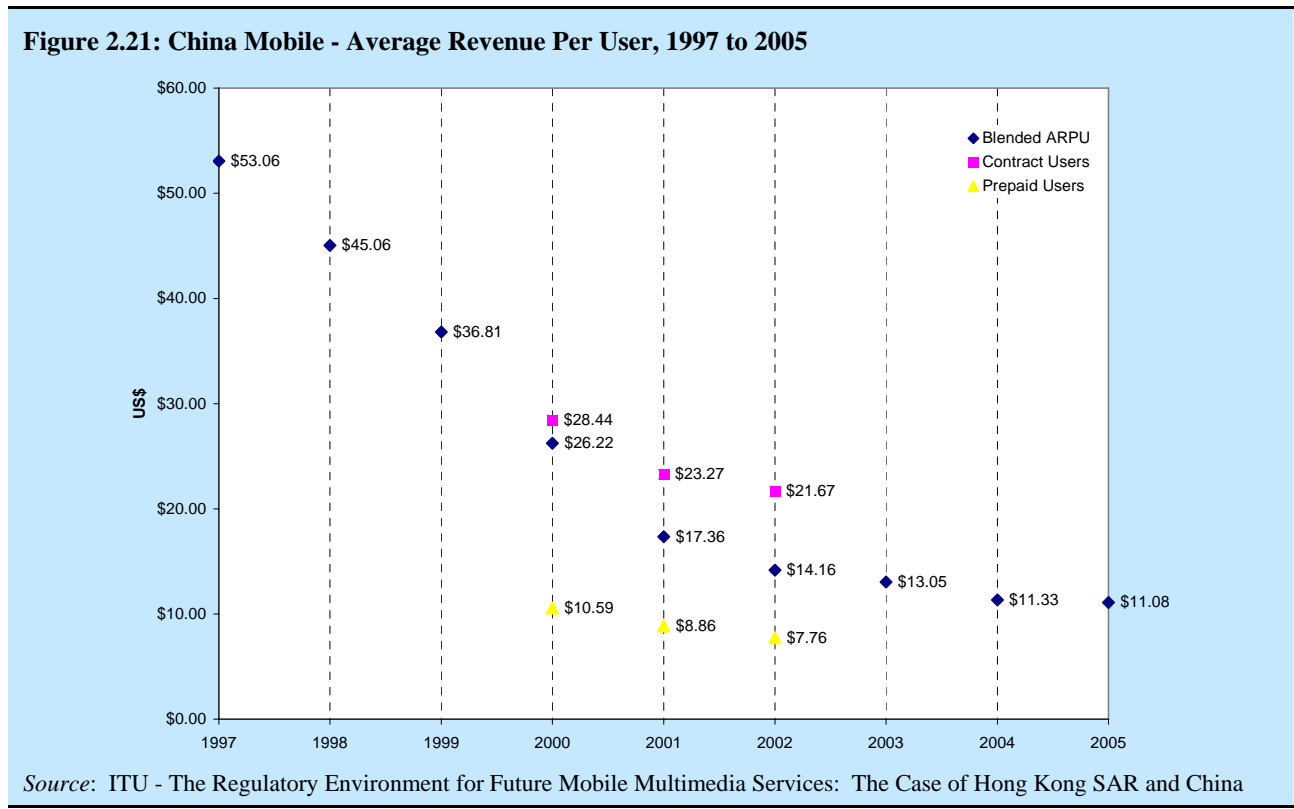
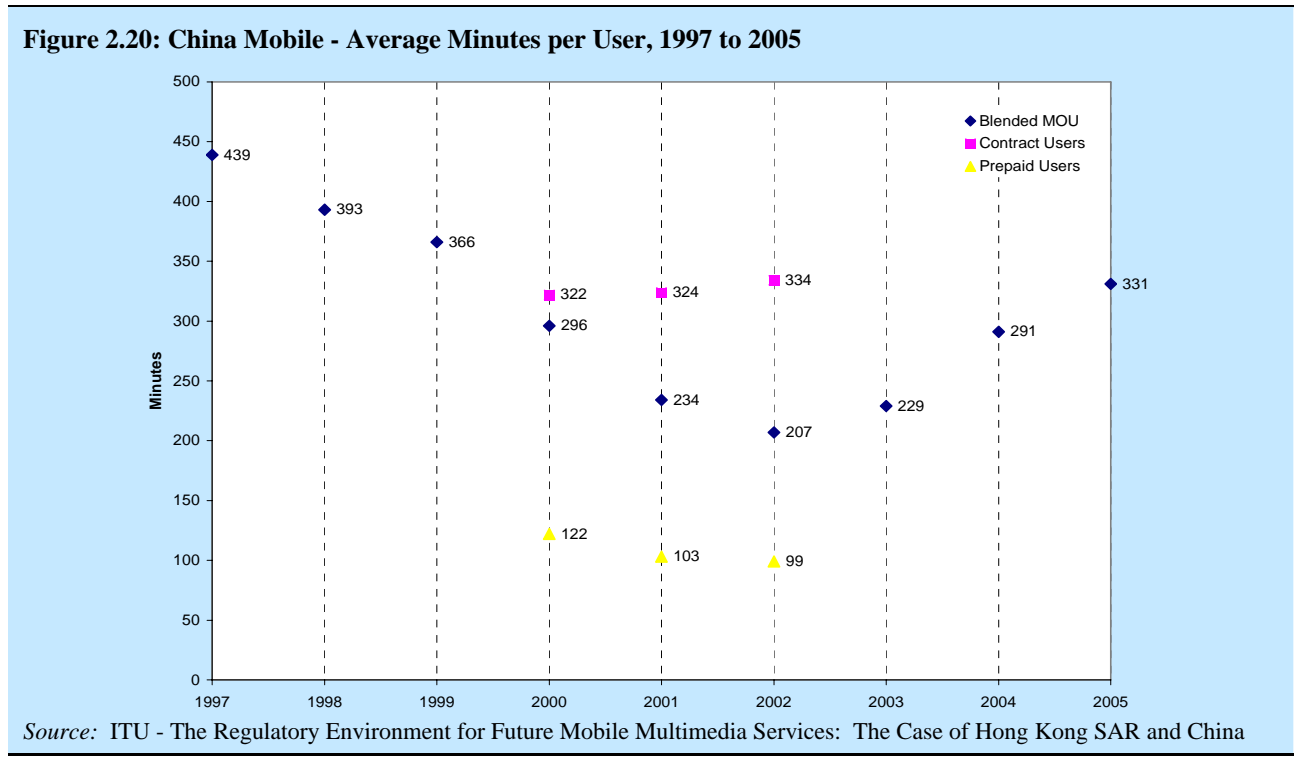
Because of the regulatory structure in China, a technology neutral stance has been a difficult one to maintain for MII. The Chinese government must balance the financial returns of operators with the economic return for the economy as a whole and MII is subject to this concern because it is a government agency and not an independent regulator. One of the places the difficulty has arisen is with 3G development, which is critical to Chinese operators as well as the Chinese telecommunications manufacturing industry and will have implications for foreign vendors.²⁶³ The estimates are that 3G will be a US\$100 billion market.²⁶⁴

As far as 3G, China must decide what 3G technology standard to adopt.²⁶⁵ The ITU has accepted three international standards. One of these standards is TD-SCDMA (Time-Division – Synchronous Code Division Multiple Access), which is a Chinese technology. This marks the first time that a Chinese technology has been accepted as an international standard.²⁶⁶ Currently, no licenses have been issued and no official choice has been made for a 3G standard.²⁶⁷ This may be a sign of favoritism towards TD-SCDMA, which is not yet ready for commercial deployment.²⁶⁸ The response to questions on when licenses will be issued is always "soon."²⁶⁹ Analysts are predicting early 2007 as the time that licensing will occur.²⁷⁰

Mobile Telephony

The most recent estimate is that there are approximately 440 million cell phone users in China.²⁷¹ Mobile service became available in 1987 and the first provider was the MPT, who held a monopoly. This monopoly ended when China Unicom was established in 1994, and since the restructuring of the telecommunications market, China Unicom has been able to increase its market share from less than 6% in 1998 to 29.7% in 2005.²⁷²

The Chinese market has shown a great deal of growth since being restructured; however, that growth is not universal within the mobile sector. China Mobile has seen a decline of 79% in the APRU, down to US\$11.08 (90 Yuan) in 2005. There was also a decline in minutes of usage (MOU) of 53% between 1997 and 2002. These declines can be attributed to an increase in lower usage subscribers, in particular, prepaid subscribers.²⁷³ Figures 2.20 and 2.21 illustrate these declines.



To compensate for these declines and to maximize the value of the existing infrastructure and network resources, mobile operators in China have turned to value-added services as a way to generate extra revenue. These services include caller number display, ring tone downloading, voicemail, call forwarding, conference calls, long distance IP telephony, and SMS.²⁷⁴ For example, China Mobile has been aggressive in its attempts to generate revenues from new services in addition to revenues from voice service.²⁷⁵ These new revenues come from SMS, non-SMS data services, and voice value-added services.²⁷⁶ Figures 2.22 and 2.23 show the contribution these new services have made to China Mobile's business.

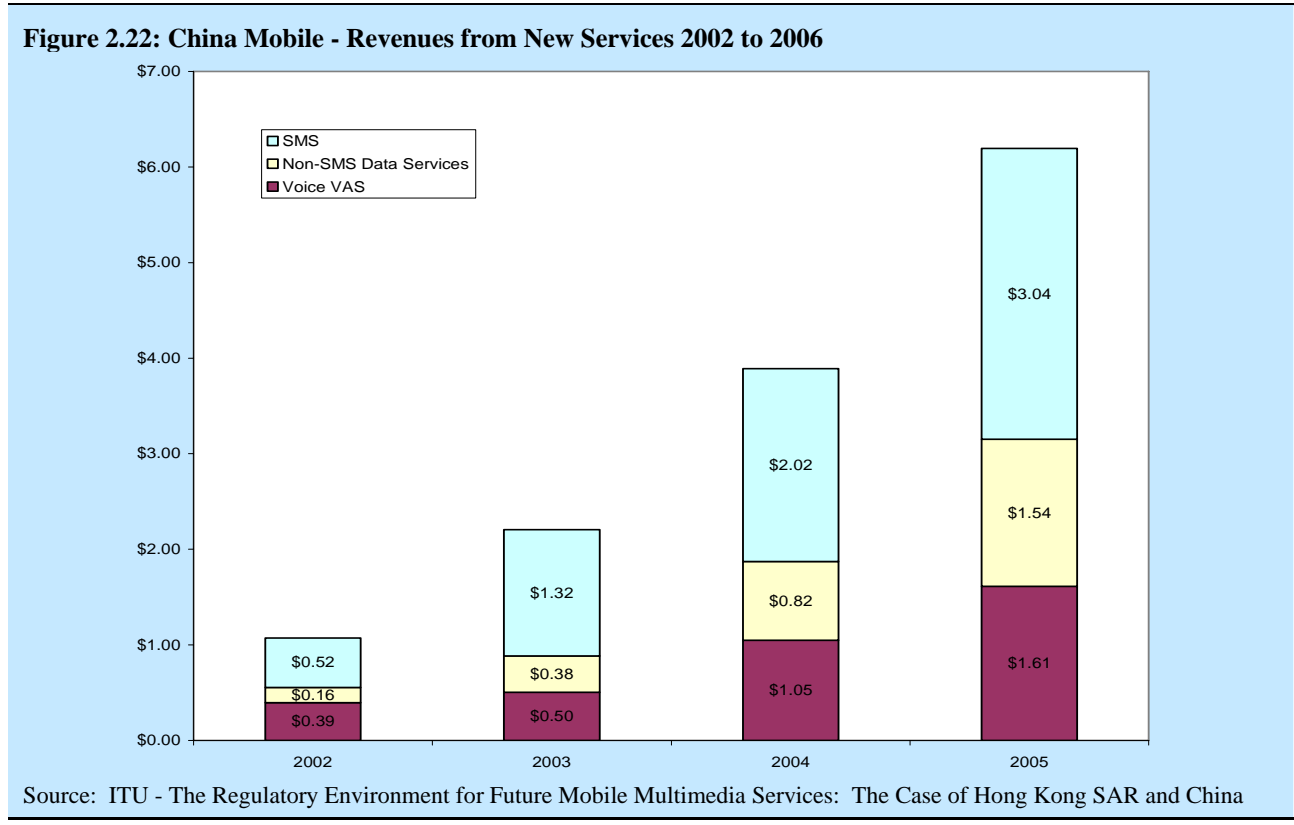
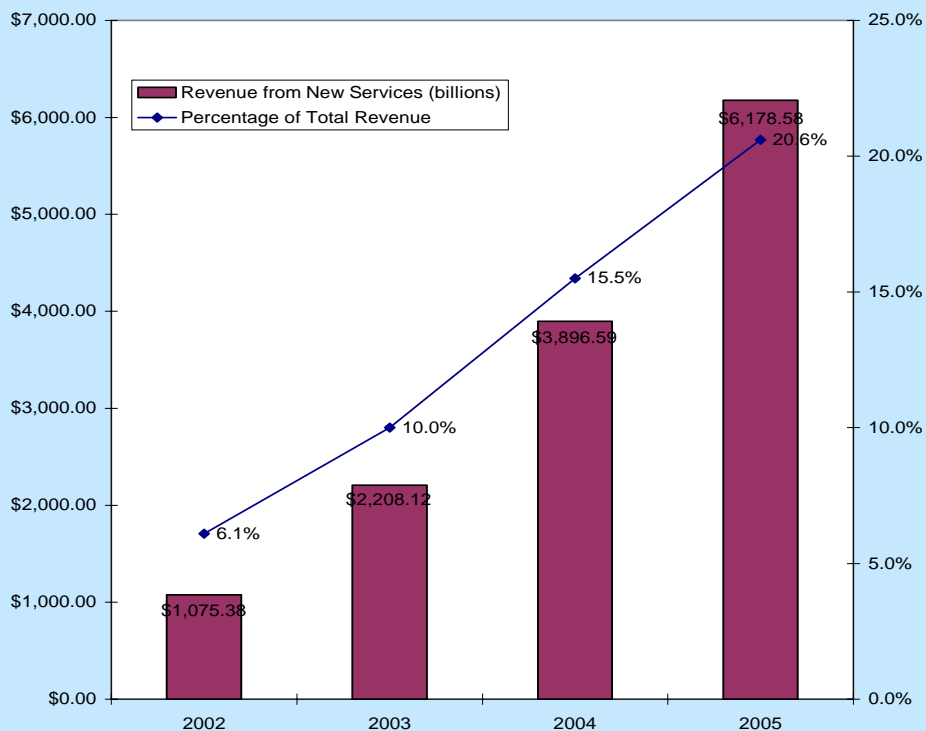


Figure 2.23: China Mobile - New Services Revenue and Its Percentage Contribution to Total Revenue, 2002 to 2005



Source: ITU - The Regulatory Environment for Future Mobile Multimedia Services: The Case of Hong Kong SAR and China

In China, SMS has experienced a great deal of growth. For China Mobile, the usage volume of SMS has increased from 440.1 million messages in 2000 to 249.6 billion messages in 2005.²⁷⁷ Because of the popularity of SMS, many fixed-line Internet portals have added a service that allows customers to use their personal computers to send messages to mobile phone customers. Mobile phone customers can also use these portals to research information such as new or weather reports in the form of short messages.²⁷⁸

Another successful business strategy for China Mobile has been that of Japan's NTT DoCoMo. The idea behind it is to form a "win-win" strategy with content providers. China Mobile introduced the Monternet program in November 2000. The program allows content providers to access the carrier's mobile network at any place to provide nationwide service, which is also known as the "one-stop shop, China-wide service" arrangement. China Mobile keeps 9% of the content revenues while the content providers receive the remaining 91%. If the arrangement includes coverage for bad debts, China Mobile gets 15% of the revenue instead of 9%. The Monternet program has generated an enthusiastic response from content providers. By the end of 2005, more than 800 content providers had joined the program. Because there are now too many content providers, China Mobile has been forced to implement "cherry-picking" in order to supply its limited capacities to the most valuable content providers.²⁷⁹

2.5.4 The Internet

In China, the commercialization of the Internet occurred in 1995. The first regulatory guidelines for Internet development were created by the Leading Group on Informatization (LGI), a cross ministerial coordination group reporting directly to the State Council. In 1996, LGI issued the Interim Regulations [on International Interconnection of Computer Networks]. These regulations put LGI in charge of overseeing the Internet in China and separated networks into two categories: Interconnecting Networks (IN), which connect to the

global Internet, and Access Networks, which provide local access to the Internet. Each of the four INs would be operated by a different entity²⁸⁰ Of these four, ChinaNet is the only point of public international interconnection and is the only one that can sell Internet access, on commercial terms, to other Internet Service providers (ISPs). Because it is controlled by China Telecom, China Telecom has a great deal of control over the Internet in China.²⁸¹

As the Internet has become more developed in China, the government has pushed its growth, mostly by cutting access fees.²⁸² China has the second most Internet users in the world, behind only the United States.²⁸³ Currently, the main providers of Internet access are China Public Computer Network (ChinaNet), which is the dominant Internet provider; the Golden Bridge Network (GBNet), which focuses mostly on the corporate market; China's Education and Research Network (CERNET), which is the principal academic network; and China Science and Technology Network (CSTNet), which is similar to CERNET.²⁸⁴ Table 2.16 and figures 2.24 and 2.25 show the progression of Internet penetration in China.

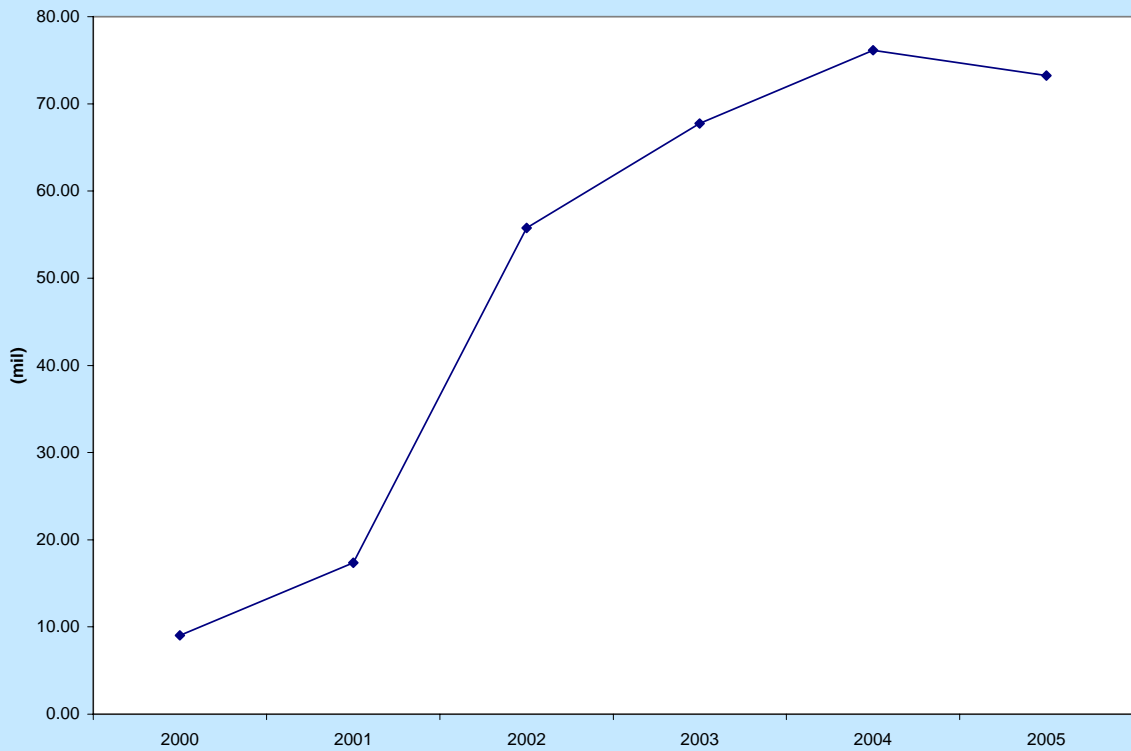
Table 2.16: China - Internet Penetration Rate, 2000 to 2005

	2000	2001	2002	2003	2004	2005
Internet Subscribers (Dial-up)	9,004,654	17,326,000	56,453,000	56,531,000	51,223,000	35,660,000
Internet Subscribers (Broadband)	0	339,510	5,367,000	11,147,000	24,875,000	37,504,000
Internet Subscribers (Total)	9,021,717	17,364,000	55,763,000	67,746,500	76,163,000	73,232,620
Internet Users (Estimate)	22,500,000	33,700,000	59,100,000	79,500,000	94,000,000	111,000,000
Population	1,295,330,000	1,312,710,000	1,284,530,000	1,292,200,000	1,299,880,000	1,315,844,000
Penetration Rate	1.74%	2.57%	4.60%	6.15%	7.23%	8.44%

Note: Penetration rate is calculated using the estimated number of Internet users divided by the population.

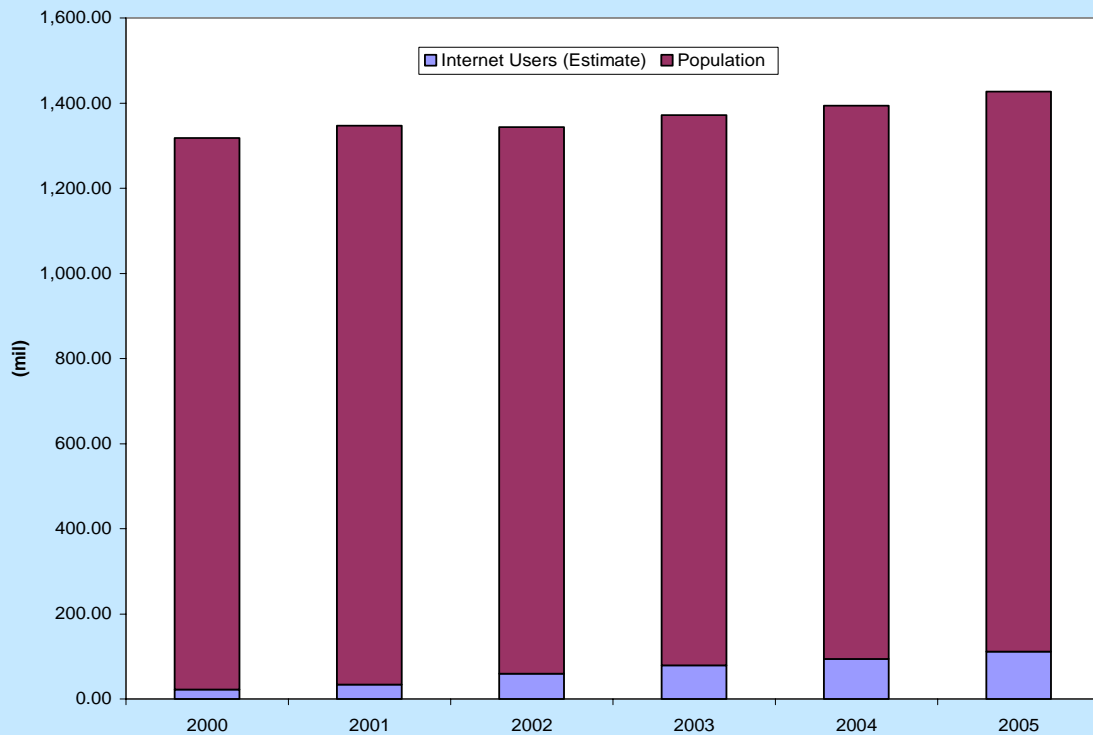
Source: ITU World Telecommunications Indicators 2006

Figure 2.24: China - Internet Subscribers, 2000 to 2005



Source: ITU World Telecommunications Indicators 2006

Figure 2.25: China - Internet Users versus Total Population, 2000 to 2005



Source: ITU World Telecommunications Indicators 2006

Because of the size of the Chinese Market more than 90% of the potential market remains unexploited despite the fact that there are over 110 million Internet users. In comparison to other, equivalent developing countries, China has a relatively high penetration rate; however, this rate is much lower than that of developed countries. China also has a digital divide that it must deal with. There is a significant difference between the penetration rate in the urban areas and in the rural areas. It is estimated to be six times greater in the urban areas and the gap is growing, possibly due to the underdevelopment of websites and the domain name regime.²⁸⁵

As of June 30, 2006, users in China were accessing the Internet in the following ways: 26.8 million were using leased lines, 47.5 million were using dial-up, 77 million were using broadband, and 13 million were using their mobile telephones.²⁸⁶ The numbers do not add up to the total population because users adopt multiple methods of accessing the Internet.²⁸⁷ Other than free access, the average monthly cost for accessing the Internet is US\$12.95 (102 Yuan).²⁸⁸ In China, the Internet has become the primary source that the public turns to for information (82.6% the population) and second on the list is TV (64.5% of the population). Similar to the survey on access, multiple answers were allowed; so the total of the percentages is greater than 100%.²⁸⁹ Regarding Internet use, the services most frequently used or accessed include news (66.3% of users); email (64.2% of users); BBS, community, or forum (43.25% of users); instant message (42.7% of users), watching/downloading video (37.3% of users); listening/downloading music (35.1% of users); Internet games (31.8 of users); and online shopping (26.0% of users).²⁹⁰ Also, VoIP and online booking services have been becoming increasingly popular. Currently, there are approximately 9 million customers using VoIP and another 6 million enjoying the benefits of online booking services. In terms of Internet entertainment, as of June 2006, online/download movie and TV programs had become a 45 million customer market; in addition, the market for online or music (radio) downloads is more than 40 million customers.²⁹¹

2.5.5 VoIP

Until 1998, MII, through China Telecom, resisted the spread of IP telephony services by implying that such services were illegal and by using harsh enforcement tactics on anyone who provided such services. At that time, many small computer and ISP outlets were using China's network backbone to provide domestic and international long-distance at a fraction of the price of the incumbent. Eventually, MII realized that its position was untenable and China Telecom embarked upon a "dramatic turnaround." China's IP telephony market formally opened in April 1999. The first licenses issued were trial licenses, but due to their success, they were extended.²⁹²

There is a general consensus in the administration of Chinese telecommunications that IP telephony will eventually replace traditional telephone technology. In preparation for this, the government has established an IP telephony standards group, consisting of twenty seven domestic telecommunications research institutes and equipment manufacturers whose task it is to establish standards for IP telephony and work on regulations and other issues pertaining to IP telephony.²⁹³

The most recent news dealing with VoIP is in regards to Skype's efforts to enter the Chinese telecommunications market. Initially, Skype was banned by the Chinese government and access to Skype's website was blocked by Chinese ISPs in what seemed to be a commercial move to preserve revenue for the state-owned operator.²⁹⁴ In September 2005, the concern of the government and China Telecom was mainly SkypeOut, the feature which allows a Skype user to call a fixed-line or mobile phone. It was reported that China Telecom was collecting the names of its customers who were attempting to use SkypeOut. At that time, they were making the argument that the law of China strictly regulated PC-to-phone service and only China Telecom and China Netcom were permitted to have trials of such a service.²⁹⁵ On its end, Skype has negotiated a partnership with TOM Online, a Chinese company, and considers China to be a very important market for its business. The basis of this joint venture is the creation of a simplified version of Skype's

Internet telephony software. The details of the deal involve a 51% (TOM) to 49% (Skype) split.²⁹⁶ China, along with the US and Germany, are the three biggest markets for Skype in terms of active users of the service, and China, in particular, shows a large potential for growth.²⁹⁷ Because of this, Skype is allowing TOM to filter instant messages that are sent using its software in order to appease Chinese authorities and comply with Chinese regulations.²⁹⁸ Based on reports from MII early in 2006, there have been signals that China may relax its policy towards VoIP; however, no concrete timeline exists and there are conflicting reports on when this may occur.²⁹⁹ This may happen sooner rather than later as there are reports that Chinese software developers have successfully reversed engineered Skype's telephony software and created a clone.³⁰⁰ If these reports are true, this new software could have interesting effects on the Chinese VoIP market as the possibility would exist for both the creation of third party Skype clients and the favoring of Chinese developed technology by Chinese telecommunications operators.³⁰¹

2.5.6 IPTV & Mobile TV

China has great potential for the development of an IPTV market both because of its large population and the fast growth of the market for Internet services. As of 2002, the total number of TV viewers, over the age of four, was 1.115 billion accounting for 93.9% of the population.³⁰² Predictions have the number of broadband subscribers reaching 79 million by 2007, surpassing the number in the United States, and reaching 139 million by 2010.³⁰³ At the end of 2004, the IPTV market in China contained approximately 1.32 million subscribers. It is estimated that the number will be more than 8 million by 2008 and the market worth will be US\$12.5 billion.³⁰⁴ Although, the market shows a great deal of promise and there is much optimism, there are problems that the market must deal with. Three of the most significant challenges for IPTV development in China are regulation, bandwidth, and piracy. Of these, regulation is the most important, although it should be noted that China does not have a strong tradition of upholding copyright.³⁰⁵

Regulation is the foremost problem for IPTV because the development of this market is subject to the tension that exists between the telecommunications industry and the broadcasting industry.³⁰⁶ Although this is a situation that exists in many countries, it is particularly difficult in China because of the high level of control the state has in both industries. China is centralized both politically and economically and the operators in telecommunications as well as broadcasting are state-owned.³⁰⁷ In an attempt to avoid confusion and turf wars among state agencies and operators, the Chinese State Council issued Decree 75 in 1999. This decree keeps telecommunications and broadcasting separate and bans convergence.³⁰⁸ As a result, no broadcasting or cable companies have been given a license to become a telecommunications provider, and telecommunication carriers are forbidden from entering the broadcasting market.³⁰⁹ This policy is now under a great deal of pressure as a result of technological and market convergence.³¹⁰

China has not only separated the industries of telecommunications and broadcasting, they have also separated their regulation. Broadcasting is regulated by the State Administration of Radio, Film, and Television (SARFT), which regulates content and issues broadcasting network licenses. SARFT has strong bargaining powers that it uses to defend the interests of Chinese broadcasters and it has supported the move by cable providers into provision of Internet services and created a challenge to the market control of China Telecom and China Netcom.³¹¹

SARFT is the agency who currently controls the regulations and licensing for IPTV and mobile TV, although both fall within the competency of MII as well.³¹² According to SARFT's No. 39 Command, all IPTV and mobile TV providers are required to obtain a license with the "regulation on Audio-Video Programs Transmitted via Internet and Other Information Networks." They argue that only television stations or their provincial or high level affiliates can obtain the necessary licenses for IPTV or mobile TV. This means that telecommunications operators are excluded from these markets unless they set up a partnership with a broadcaster. On April 30, 2005, the first mobile TV license was issued to Shanghai TV

who is cooperating with China Mobile's Shanghai branch to offer mobile TV services. In May 2006, China Central TV (CCTV) acquired the second mobile TV license.³¹³

In the case of IPTV, obtaining a license is even more difficult, an operator must receive a license and permission from multiple state agencies. First, a permit from SARFT is necessary in addition to one from MII because IPTV falls under both broadcasting services and value-added services. Then, depending on the type of IPTV to be offered, the operator must get permits from either the Ministry of Communications (online gaming) or the General Administration of Press and Publication (GAPP) (censorship of audio-visual products). Because of the number of agencies involved, IPTV is highly regulated in China in respect to licensing as well as content.

The result of this regulatory regime is one characterized by uncertainty and inter-agency rivalry. Discussions and disagreements regarding the development of IPTV occur not only in at least two different state agencies but also between state-owned broadcasters and state-owned telecommunications companies. In addition, there can be issues between the central agencies and their local affiliates. Local authorities do not always accept the licenses that are granted by the central agency.³¹⁴

Further complications for IPTV development arise from the fact that SARFT is committed to promoting digital TV and not IPTV; therefore, the agency has very little enthusiasm for the technology since they feel it may undermine the prospects for digital TV. This position remains consistent with their tradition emphasis on film, radio, and TV and with the attempts in China to separate broadcasting and telecommunications. It also should be noted that SARFT's lack of enthusiasm for IPTV may be contributed to by the fact that it is much easier to control the content of traditional broadcast media than it is for IPTV, which is an open media and will limit the possible for censoring content.³¹⁵

2.5.7 Summing Up / Conclusions

China's major strength is the size of its markets, although they remain largely unexploited. Because of the country's population, China has the potential to have the most users in the world in any telecommunications service with only a fraction of its population participating as subscribers. In an effort to exploit this potential, the Chinese government has made an effort to reform regulation, markets, and its general approach to telecommunication. Although these efforts have shown some success, China does not yet have what can be called an open and competitive market.

China is a country at odds with itself. It is fully aware of the potential of its markets; however, it is reluctant to allow market forces to control. In an effort to preserve revenues and government control of content and markets, China is fighting convergence although it would probably benefit Chinese consumers. The difficulties are compounded by the fact that government controls of all operators, the regulators are not independent, and there is internal fighting within and mixed motives behind Chinese regulatory policy. This causes the regulation to be inefficient and stunts the growth of the market for new technologies. IPTV, which has the potential to be US\$12.5 billion market by 2008, is a perfect example of this. China has banned convergence between the telecommunications and broadcasting industries, putting MII and SARFT at odds over IPTV. As a result, the regulatory regime for this technology has become one full of inter-agency rivalry causing uncertainty at all levels from local to national and making it a difficult market to enter.

3 ANALYSIS

Within the Asia Pacific region, various voice usage patterns exist among consumers of voice communication services. Generally, there has been a preference shown for mobile communication over fixed-line communication, and as a result, customers have been shifting their subscriptions and usage. Also, in certain regions, particularly where price is an issue, a preference for the use of mobile data services over voice calling has become apparent. This increasing demand for mobile communication services can be attributed to the flexibility and mobility that is characteristic of these technologies as well as the value-added services that have become incorporated into the offerings of mobile providers. Tables 3.1 and 3.2 provide a comparison of countries for voice communications and data communications respectively.

Table 3.1: Analysis - Comparison of Voice Communications

	Fixed-Line	Mobile
Hong Kong	<ul style="list-style-type: none"> Fully liberalized; Universal service obligation; Number of subscribers experiencing a decline. 	<ul style="list-style-type: none"> High mobile penetration rate (127%); 3G technology with HSDPA for high speed access already in operation; Operators rely on exclusive content to differentiate themselves from competitors.
South Korea	<ul style="list-style-type: none"> At a saturation point Number of experiencing a decline. 	<ul style="list-style-type: none"> 2G and 3G available; Home to global giants in handset manufacturing; Operators' strategy relies on content provision.
Japan	<ul style="list-style-type: none"> Demand has been declining since 2000. 	<ul style="list-style-type: none"> Digital mobile communication; Using 3G and PHS across various interfaces.
Australia	<ul style="list-style-type: none"> Close to saturation; Universal service obligation; Market is dominated by Telstra which was 51.8% government owned until November 2006 	<ul style="list-style-type: none"> Close to saturation; Expected to surpass 100% by 2008; Major contributor to the economy.
China	<ul style="list-style-type: none"> Showing steady growth but has been surpassed by mobile; Penetration rate is less than third of the population; All operators are government controlled. 	<ul style="list-style-type: none"> Growing quickly Penetration rate remains below a third of the population; All operators are government controlled.

Table 3.2: Analysis - Comparison of Data Communications

	SMS	Broadband	VoIP	IPTV
Hong Kong	<ul style="list-style-type: none"> • Slow growth; • Low usage especially in comparison to China; • Not perceived has having much value by mobile subscribers (secondary form of communication). 	<ul style="list-style-type: none"> • Early adoption with advantage of high speed in building wiring; • Open market with easy market entry; • Surpassed dial-up in 2002 and ARPU is twice that of dial-up; • PCCW controls 75% of the market. 	<ul style="list-style-type: none"> • Providers are authorized under existing operators license; • Classified into two categories; • Ongoing discussion of a new numbers for this service. 	<ul style="list-style-type: none"> • First and largest provider in the world (PCCW); • 25% penetration rate; • Mobile TV via broadcast through cell multimedia broadcast (CMB) available; • PCCW controls 66% of the market.
South Korea	<ul style="list-style-type: none"> • Common with teenagers; • Inexpensive. 	<ul style="list-style-type: none"> • Available over various technologies ADSL, VDSL, CATV, FTTH; • Fast and inexpensive. 	<ul style="list-style-type: none"> • Recognizes three types of VoIP services; • Separate numbering plan. 	<ul style="list-style-type: none"> • Pilot launch in progress despite regulatory uncertainties. • Digital multimedia broadcast (DMB) available since 2005.
Japan	<ul style="list-style-type: none"> • Low usage; • Preference for other data applications 	<ul style="list-style-type: none"> • Available over ADSL, CATV, W-LAN and FTTH; • FTTH experiencing a steady rise as the infrastructure of the future. 	<ul style="list-style-type: none"> • Three types in existence according to quality of service; • 13 operators who provide the best quality service. 	<ul style="list-style-type: none"> • Rules for operation and technical requirements are being formulated; • It is regulated as a cable broadcast not a telecommunication service.
Australia	<ul style="list-style-type: none"> • A major source of growth within the telecommunications market; • Initially linked to media such as TV programming. 	<ul style="list-style-type: none"> • \$3 billion network upgrade planned; • Telstra controls the network; • Dial-up customers exceeded broadband customers until 2006. 	<ul style="list-style-type: none"> • Government feels that no regulation change need to accommodate VoIP; • Legislation may be created to remove barriers from market entry; • Support for non-geographic numbering system. 	<ul style="list-style-type: none"> • Secondary concern behind digital TV; • Broadband network must be upgraded before a commercial IPTV service will be possible.
China	<ul style="list-style-type: none"> • High usage; • Cost effective for consumers, 	<ul style="list-style-type: none"> • Rapid growth; • Penetration rate remains low (less than one tenth of the population). 	<ul style="list-style-type: none"> • High market potential; • Difficult regulatory framework that may be relaxed soon. 	<ul style="list-style-type: none"> • High market potential; • Expected to be a US\$12.5 billion market by 2008; • Difficult regulatory framework because of conflict between MII and SARFT as well as local regulators.

Overall, the pattern that these case studies show is one of decline in both revenue and subscriber base in the more traditional voice services. They also show a shift to alternative means of communication that are based in pre-existing infrastructure. In all five countries, mobile communication has overtaken fixed communication in terms of number of subscribers. In South Korea, the subscriber base of mobile

communication surpassed that of fixed communications in 1999 and has been climbing ever since. In Japan, mobile communication service subscribers overtook fixed-line in 2000, and since, there has been a steady decline in the demand for fixed communication that can also be attributed to the rise in the broadband subscriptions available through diverse technologies and IP telephony.³¹⁶ In Hong Kong, mobile surpassed fixed prior to 2000 and mobile penetration has reached 127%. In Australia, the number of mobile subscribers was greater than the number of fixed beginning in 2001, and there has been a good deal of growth within mobile value-added services. China is experiencing a leapfrog effect. Mobile surpassed fixed subscribership in 2003 and continues to grow rapidly even though the penetration rate of fixed service had only reached 20.33% in 2003 and 26.63% in 2005.

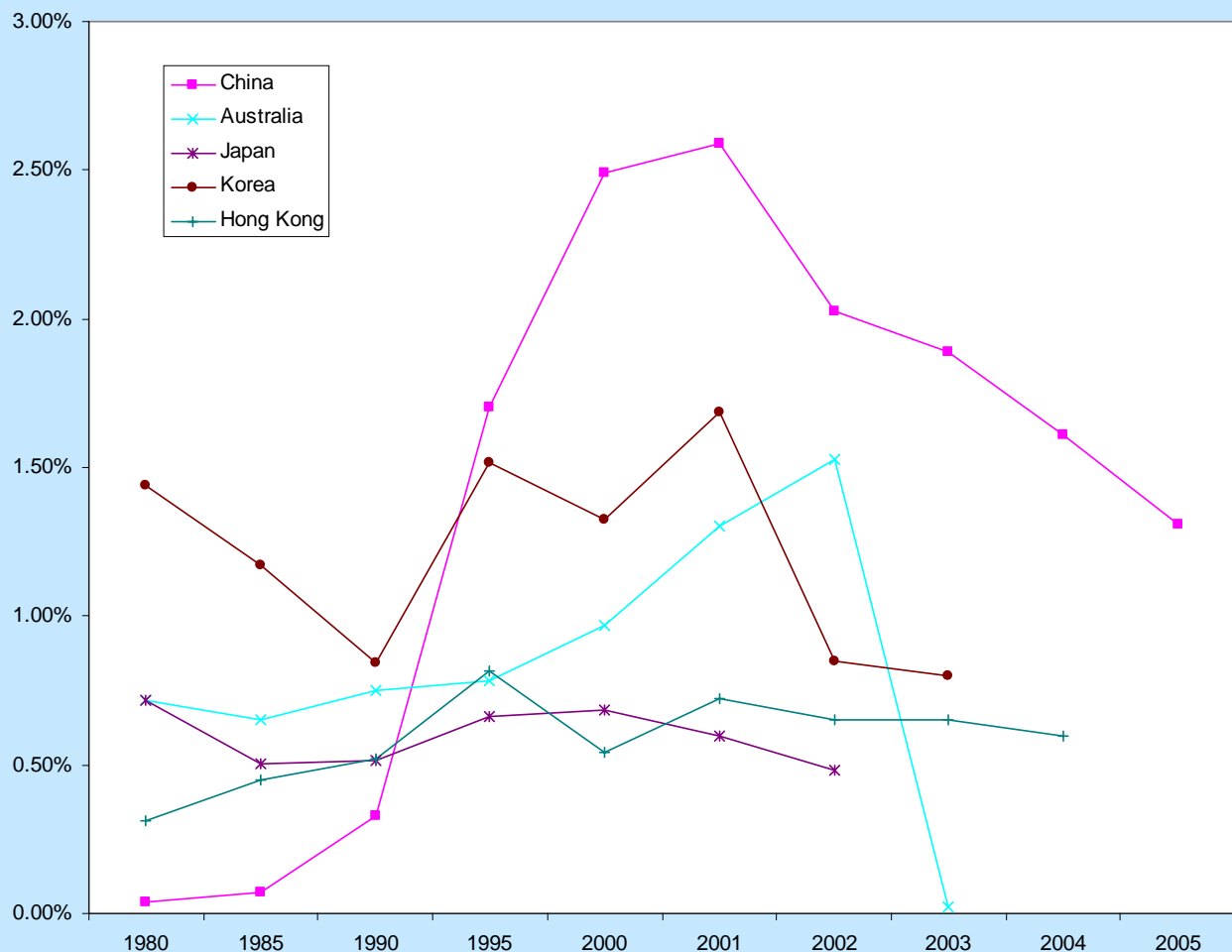
When examining the migration from fixed voice communication to mobile voice communication, the low cost of mobile communication, in addition to the sophistication of consumers and previous achievement of fixed-line saturation, is a significant contributing factor in Hong Kong, South Korea, and Japan. The wide coverage of the network and demographics make the technology easy for the public to accept in these countries. China and Australia do not share similar demographics as the above countries, but are instead characterized by large land mass. Despite this, Australia has managed a mobile penetration rate of 98% (with land coverage of 20%) because of the concentration of the population within the urban areas. China is similar to Australia in that a significant part of the countryside is sparsely populated. Because Chinese consumers are choosing mobile service over fixed-line service, the gap between the respective penetration rates will continue to grow. A majority of Chinese market has not yet been exploited but mobile communication remains very profitable.

The use of data services as alternative means of communication is widespread in many parts of the Asia Pacific region. In China, for example, China Mobile's ARPU has fallen by more than 70% and the MOU are down by more than 50% between 1997 and 2002. However, the operator has been able to use SMS to counteract this trend. As of 2005, the total use of SMS in China had grown over 500 times reaching 250 billion. These numbers remain unrivalled in the world. Australia has also seen a great deal of growth within SMS with the number of SMS growing over two and a half times between 2000-2001 and 2003-2004.

SMS is only one of the value-added services telecommunications operators have turned to in an attempt to revive declining revenues and use. Hong Kong has not been as receptive to SMS as China and Australia. Subscribers consider it to be a second-hand form of communication and see it as having little or no societal value. Hong Kong already has mobile voice calls that are low cost and high penetration of broadband (for IP telephony); so SMS does not have much of a place in everyday life in Hong Kong. In South Korea, the move to data services has been fueled by the country's advancements in communication technology. The availability of 3G network services and their upgrade with HSDPA to provide a high speed connection makes data communication relatively easy to deploy. Mobile gaming, music, video, mobile banking and commerce are but a few of the services embraced by consumers. In South Korea, as in Hong Kong, SMS is not the preferred means of communication. However, it is popular amongst the teenage groups. Koreans sent a total of 59 billion SMS, almost double the 32 billion text messages sent in 2004. Much of this increase can be attributed to SMS sent to determine a friend's location or checking sports scores.

With the rise of services such as VoIP and IPTV, broadband deployment has become an integral part of any communications infrastructure. An increasing number of Internet subscribers are opting for broadband over dial-up. Among the five countries examined, Hong Kong, South Korea, and Japan are all in a good position to supply the infrastructure necessary to support these services. China still needs to work on its infrastructure as it is an expansive project due to the size of the country. Australia has plans to for a \$3 billion upgrade to its network which will facilitate in the provision of broadband and its related services. Figure 3.1 and table 3.3 illustrate the level of telecommunication investment within the Asia Pacific region.

Figure 3.1: Analysis - Telecommunications Investment as a Percentage of GDP, 1980 to 2004



Source: ITU World Telecommunications Indicators 2006

Table 3.3: Analysis - Total Telecommunications Investment in US\$ (bill) , 1980 to 2005

	1980	1985	1990	1995	2000	2001	2002	2003	2004	2005
Hong Kong	0.086	0.150	0.387	1.157	0.900	1.187	1.065	1.034	0.990	..
Korea	..	1.340	2.968	4.369	7.766	6.372	9.224	5.169	5.416	..
Japan	7.673	6.864	15.653	35.114	32.681	24.618	19.257	20.422	23.199	24.061
Australia	1.144	1.097	2.317	2.821	3.669	4.663	6.471	0.103	..	..
China	0.141	0.284	1.250	11.917	26.858	30.836	25.040	26.782	26.559	25.220

Source: ITU World Telecommunication Indicators 2006

Hong Kong has a 65% broadband penetration rate and a cable TV penetration rate of 90% of homes. Also, 71% of homes are covered by at least one fiber-based network. It is this infrastructure plus the ease of adding infrastructure with the vertical construction of Hong Kong that has allowed it to be a first-mover in technologies like IPTV. South Korea is similar to Hong Kong in its statistics. Cable TV is available in approximately 60% of homes and ADSL is available in 90% of homes. In addition, apartment LANs provide Internet access. The broadband access is offered at speeds of 20-40 Gbps, but the market may be saturated as growth has been limited and faster connections speeds have become a lure to get companies to shift to competing services. Connection speed is also a government priority in South Korea and policies have been created to facilitate in the efficient use of and innovation in Internet infrastructure. In Japan, the

Internet penetration is 66.8% with approximately 2.33 million broadband subscribers. Broadband subscription via DSL accounts for 16.2% while FTTH has 5.46 million subscribers and cable modem service has 3.3 million subscribers.

Broadband deployment in China leaves much to be desired with only 2.85% penetration rate in 2005. It does offer a huge potential market and could grow to be the biggest broadband market in terms of subscriber base. As with mobile versus fixed telephony, China appears to be leapfrogging technology-wise as 51.21% of Internet subscribers are broadband subscribers. As of June 2006, China had about 77 million broadband users and 40 million subscribers.

As far as infrastructure, Australia is in a position where the incumbent, Telstra, controls the infrastructure necessary for the provision of services. This means other operators must have access to Telstra's network in order to provide competing service. Australia is unique among the countries examined in that it is the only one where the number of dial-up subscribers exceeded the number of broadband subscribers until 2006 (see table 3.4). Australia suffers from low broadband speeds and dial-up has been able to maintain its subscriber base because of the cost effectiveness of untime local calls.

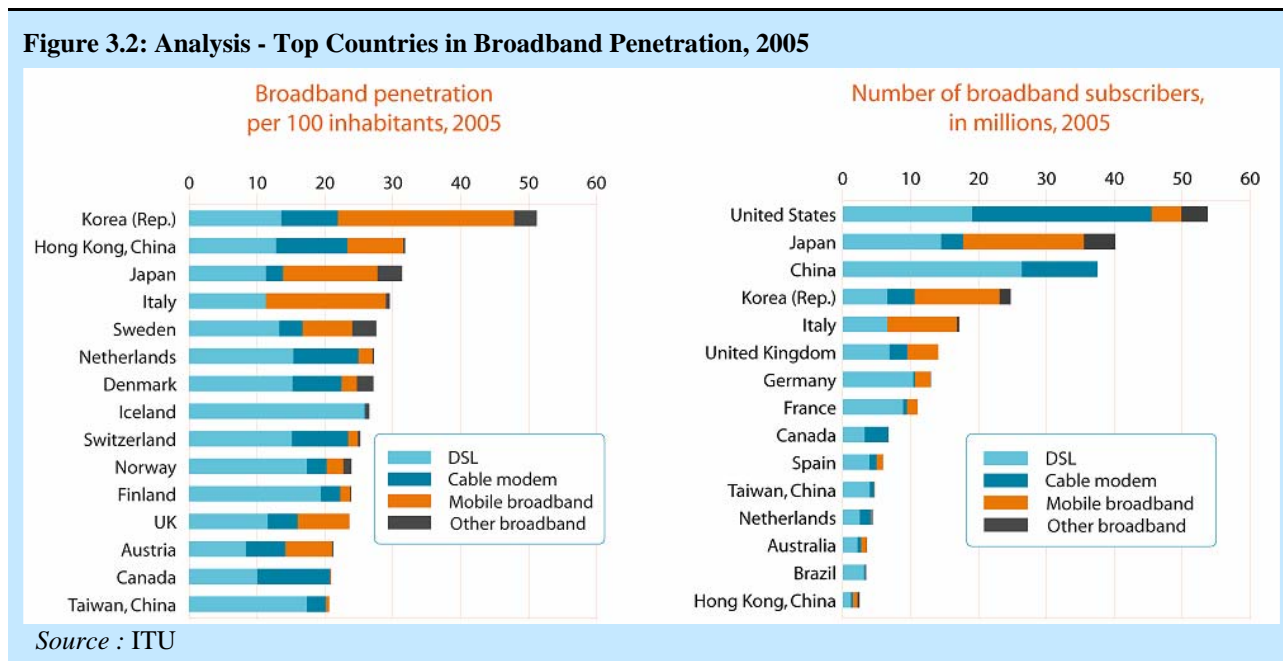
Table 3.4: Analysis - Telecommunications Indicators 2005

	Hong Kong	Korea (Rep. of)	Japan	Australia	China
Main Telephone Lines (Fixed Lines) per 100 inhabitants	53.89	49.17	45.89	56.86	26.63
Mobile Cellular Telephone Subscribers per 100 Inhabitants	123.47	79.39	73.97	91.39	29.90
Internet Subscribers (Dial-up)	969,406	..	..	3,877,200	35,660,000
Internet Subscribers (Dial-up) per 100 Inhabitants	13.77	..	..	19.24	2.71
Internet Subscribers (Broadband)	1,659,098	12,190,710	22,365,150	2,102,800	37,504,000
Internet Subscribers (Broadband) per 100 Inhabitants	23.56	25.24	17.46	10.43	2.85
Internet Subscribers (Total)	2,639,948	12,190,710	..	5,980,000	73,232,620
Internet Subscribers per 100 Inhabitants	37.49	25.24	..	29.67	5.57
Internet Users (Estimated Number)	3,526,200	33,010,000	85,290,000	14,190,000	111,000,000
Internet Users per 100 Inhabitants	50.08	68.35	66.59	70.40	8.44
Population	7,041,000	48,294,140	128,084,000	20,155,000	1,315,844,000

Source: ITU World Telecommunications Indicators 2006

With the level of saturation in many of these markets, operators must take advantage of existing infrastructure to provide alternative voice services as well as value-added services. For example, KT, the largest telecom operator in South Korea, has called for facilities-based telecommunications providers to consider providing value-added services on their networks. This may not totally be IP based but companies are encouraged to build on the existing widespread infrastructure as total solution providers. In Hong Kong, offerings of mobile Internet and IPTV have become methods used by operators to differentiate themselves

from competitors. Figure 3.2 shows the top countries in broadband penetration several of which are included in this study.



Among users, there has been an upward trend in the use of the Internet and Internet-related services. More than half of the users in South Korea spend over ten hours online per week.³¹⁷ Of this time, 86.9% was spent engaging in communication activities, in particular email and instant messaging. In Japan, the average time spent online by a user was thirty four minutes per day in 2005. In China, the Internet is the principal means of finding out information with 66% of users getting their news from the Internet, 64% using the Internet for email, and 43% using the Internet for instant messaging.

IP telephony and VoIP service has been welcomed by consumers within the Asia Pacific region and by operators as well. In the case of consumers, VoIP allows them to reduce their costs in many countries in the region. Services, like Skype, offer a lower cost solution to long distance and international communications than many consumers can get through more traditional operators. However, these kinds of VoIP services are encountering regulatory difficulty in some countries either due to classification issues within the regulatory framework or general resistance from the government or regulatory bodies. For operators, voice calls, particularly international calls, which are made using fixed-line infrastructure can be routed using IP and this can significantly reduce the supply costs.

Within the Asia Pacific region, VoIP services have traditionally been divided into three categories:

1. Usually PC to PC communication but increasingly becoming mobile with use of mobile terminals with wireless broadband and mobile networks (also known as “soft” VoIP);
2. VoIP originating from a “soft” device terminating on the PSTN or regular telephones;
3. VoIP originating and terminating on a PSTN connected device (usually IP technology is used for the call routing).

These traditional categories are gradually fading as convergence within the telecommunications industry progresses. IP telephony is now available over mobile phones. Regulators have begun to focus on the quality of the service and usually classify based on this. As alluded to earlier, the deployment of IP technology can be encouraged or burdened by regulation. The regulatory approach that has been advocated the most is that of a light-handed approach which will allow an open and innovative market. However, this

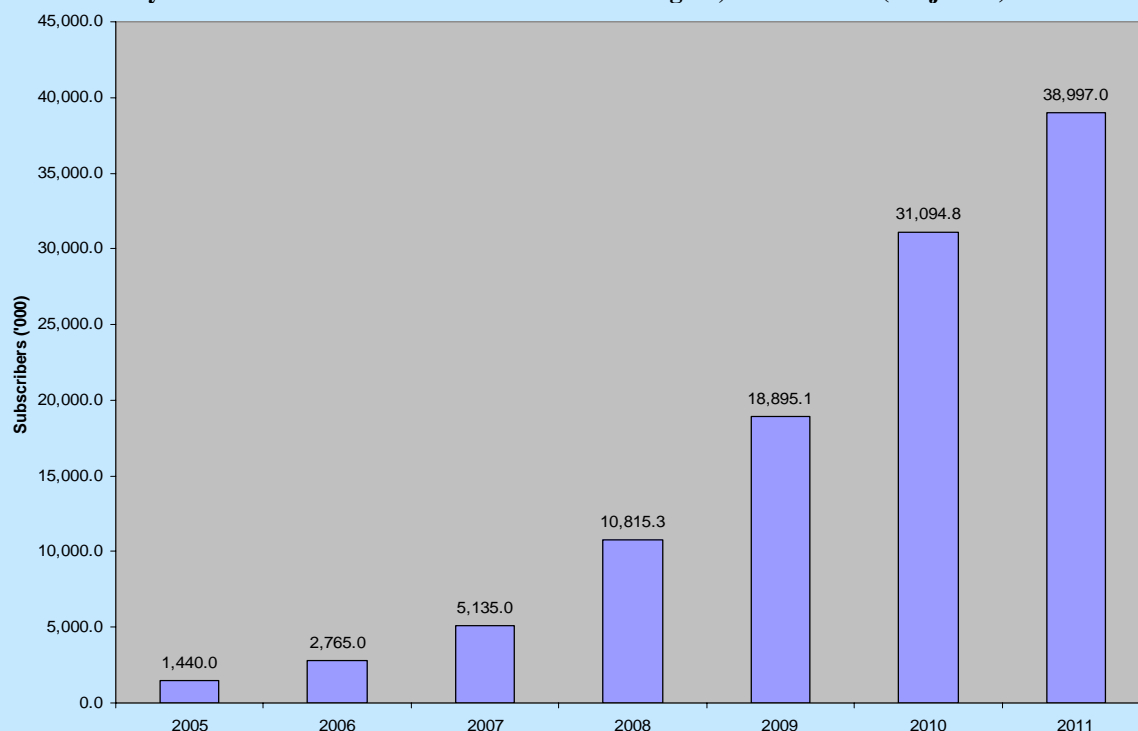
approach has been criticized for lacking consumer protection measures and sufficient information for the consumer as well as causing possible issues with the provision emergency services.

Among the countries in the Asia Pacific, a variety of approaches have been taken towards VoIP services. Generally, the regulation of VoIP centers on quality of service and consumer issues such as emergency calling, location data identification, and countries have mostly relied on these factors to qualify the service for effective regulation. VoIP service which is almost indistinguishable from fixed communication in voice quality and service offering usually receives the same regulatory treatment as the fixed service it resembles. Regulators have also either implemented or are considering implementing special number schemes to designate the origin of the voice service and the expected quality.

Among these five countries, all have opened their market to VoIP in some manner, although China has been extremely strict in its regulation. Japan categorizes and regulates services based on their quality. Hong Kong favors the principle of network neutrality which allows operators to provide telecommunications services irrespective of the technology used in the provision of the service. OFTA, the regulatory agency in Hong Kong, has determined that the existing operator licenses allow the provision of VoIP services and that no changes need to be made to the licensing scheme. South Korea, has taken a similar approach. The determination has been made that use of IP for the provision of telephone service falls within the existing operator licenses; however, soft VoIP requires additional approval. Australia, on the other hand, views VoIP not much differently than traditional telephony and has chosen to focus on developing a regulatory framework based in consumer protection and emergency.

IPTV is a technology which also shows a lot of promise within the Asia Pacific region as an additional source of revenue beyond that of voice and data services. The number of IPTV subscribers is expected to increase from 1.4 million subscribers in 2005 to over 30 million subscribers in 2010 at a compound annual growth rate (CAGR) of 89%.³¹⁸ These numbers are based on the assumption that the number of residential broadband subscribers in the Asia Pacific region will continue to grow at a rapid pace. The expectation is that they will increase from just over 54 million in 2005 to 106.1 million subscribers by 2010 at a CAGR of 14%.³¹⁹ According to In-Sat, total IPTV revenue in the Asia-Pacific region will reach US\$8.1 billion by 2011.³²⁰ Figure 3.3 shows the projected number of IPTV subscribers through 2011.

Figure 3.3: Analysis - IPTV Subscribers in the Asia-Pacific Region, 2005 to 2011 (Projected)



Source: ITU – IPTV: Market, Regulatory Trends and Policy Options in Asia-Pacific

PCCW's NOW Broadband TV is the most successful IPTV service within the Asia Pacific region.³²¹ This service illustrates the strategy being utilized by many providers: bundling of services. In the telecommunications market, "triple play offerings, that include bundling of voice, video, and data services, have shown multiple benefits. IPTV has not only added value to the broadband pipe but also enabled service providers to reduce churn rate of basic broadband access, while adding additional revenue streams."³²² This said, the IPTV markets throughout the Asia Pacific region are quite varied.

Three important observations must be considered as the IPTV market develops. First, broadband and other IP platforms are a competing infrastructure for the delivery of TV services.³²³ Prior to the introduction of this service, terrestrial, satellite, and cable networks were the main delivery platforms and the development push was towards digitalization. This, for example, is the state of the market in Australia. In the provision of IPTV services, many operators simply copy the business model used by cable TV and satellite TV by offering service in different packages, which are transmitted to an IP set-top box that converts the signal to regular TV. This is a popular model for IPTV that is included as part of triple play services.³²⁴

Second, because of the interactive characteristics of IP platforms, the service is changing from one that is based on broadcast to one based on on-demand service. This allows a subscriber to access content which is stored on a server at any time. However, it still allows for the provision of live streaming when that is main value of the programming.³²⁵

Third, the technology allows content providers to directly reach the consumers and bypass the service providers.³²⁶ This is a possibility in older technologies as well, including traditional analogue terrestrial broadcasting and Free-to Air satellite where there is no service provider. In the provision of IPTV, the business model of offering a channel package through a service provider is still an option; however, the

broadcaster can choose, instead, to offer the channel directly to end users. The ability to bypass the service provider creates competing incentives between the broadband providers and content providers because the broadband operator does not get any revenue out of the traffic generated when end users connect directly to an IPTV service.³²⁷

IPTV is a perfect example of a phenomenon that has been going on throughout the telecommunications industry: convergence. This service along with others, such as VoIP, gives a picture of the future, technologically and strategically. In general, convergence is the process by which communications technologies, markets, or operators blend together to facilitate a wider and more integrated method for the distribution of information.³²⁸ Convergence has transformed basic voice communication devices, services, and business strategies into ones that integrate components of telecommunication, media, and information technologies. These innovations are impacting the way users go about their day-to-day life and the way in which businesses operate in the telecommunication, broadcast, and information industries.

There are a variety of theories on convergence, which usually involve categorizing types of convergence that can be observed within the telecommunications market. One suggested organization breaks down convergence into seven subsets which are the following:

- Network Level Convergence – a merger of underlying transport technologies, e.g., the migration of circuit-switched voice networks to packet-switched data networks;
- Bundled Convergence – a business strategy where services are delivered and used independently but they are marketed, priced, and billed in a single retail package, e.g., triple play (cable TV, Internet, and fixed-line service);
- Gateway Convergence – separate services that a customer accesses through a single interface, e.g., voice telephony and email access using a mobile handset;
- Service Convergence – the delivery of multiple services through a single “pipe” to the customer, e.g., cable TV and Internet over xDSL;
- Substitutional Service – the market appeal of one service overlaps with that of a separate, existing service and becomes a substitute for that service, e.g., in some markets, mobile voice service is replacing fixed voice services;
- New Converged Services – the use of new technologies and functionality to create entirely new services, e.g., unified mailboxes that operate over a variety of networks; and
- Market Convergence – the creation of services in a way such that they are a perfect substitute for other services on both the supplier and the consumer end, e.g. it is often claimed that hybrid fiber optic (HFC) Cable and xDSL are perfect substitutes.³²⁹

Although this model can be applied to the countries included in these case studies, another organizational possibility breaking down convergence in the industry was observed from the data. When looking at the characteristics displayed by these five countries, the following categories of convergence became apparent:

- Convergence of Operators – mergers, acquisition, joint-ventures, or investment among telecommunications operators or manufacturers used as a strategy for entering new markets or maintaining market share within an existing market, e.g., in Japan, Softbank acquired Vodafone Japan gaining access to the mobile telephony market;
- Convergence of Services – the development of business strategies that either involve the incorporation of one service within another or the simple offering of one service with another, e.g., mobile Internet included with mobile telephony or triple play (package offering cable TV, Internet, and fixed-line telephony for a single price);
- Convergence of Technology – the incorporation of one technology into another, e.g., incorporating broadcasting technology into mobile phones to allow for mobile TV;
- Convergence of Markets – services that were once non-competing become competing or when operators who were once non-competing become competitors due to substitutability of the service,

e.g., broadcasters in the telecommunications market and telecommunication operators in the broadcast market; and

- Convergence of Regulation – the alteration of regulatory schemes or regulatory bodies such that they are have power over areas of technology which were previously dealt with individually (typically a reaction to one of the other forms of convergence), e.g., the proposed merger of OFTA and the Broadcasting Division of the Television and Entertainment Licensing Authority to create the Office of the Communications Authority (OFCA).

Each of these categories of convergence does not appear in isolation. They are often found together and the appearance of one can cause the appearance of another. For example, the convergence of technology is often the catalyst for the convergence of markets. In the case of mobile TV, 3G mobile technology allows for the provision of video to a mobile handset. The response of mobile telephony providers has been to create content or to license content from content providers, essentially putting these telephony providers in the broadcast market. Table 3.5 provides a breakdown of the attitudes towards convergence in the Asia Pacific region.

Table 3.5: Analysis - Comparison of Attitudes towards Convergence in the Asia Pacific Region

	Government Strategy	Operator Strategy	Consumer Demand
Hong Kong	<ul style="list-style-type: none"> • Maximization of open competition; • All markets fully liberalized; • No barriers to convergence. 	<ul style="list-style-type: none"> • Exclusivity of content (the walled-garden approach) to attract customers and differentiate operators; • Value-added services; • Bundling. 	<ul style="list-style-type: none"> • Highly sophisticated consumers; • Willing to adopt new technologies.
South Korea	<ul style="list-style-type: none"> • Broadband Converged Network (BCN), executed in three phases, to be completed in 2010; • First mover in the creation of infrastructure. 	<ul style="list-style-type: none"> • Operators positioned to provide more than voice services as total solutions providers; • Pilot project for IPTV allowed by KBC and MIC. 	<ul style="list-style-type: none"> • Very technology savvy; • Willing to adopt new technologies.
Japan	<ul style="list-style-type: none"> • The u-Japan program which is move towards the convergence of communication broadcasting and consumer electronics into a single network. 	<ul style="list-style-type: none"> • Expand market power or move into new markets by merging with or acquiring another operator(s). 	<ul style="list-style-type: none"> • Technology savvy; • Willing to adopt new technologies.
Australia	<ul style="list-style-type: none"> • Slow regulatory reaction; • Attempting to apply existing regulatory framework and only making changes as deemed necessary; • Emphasis on industry self-regulation. 	<ul style="list-style-type: none"> • Access to Telstra's fixed network is key; • Value-added services. 	<ul style="list-style-type: none"> • Willing to adopt new technologies if they are cost effective.
China	<ul style="list-style-type: none"> • State-controlled competition; • Government is fighting the push towards convergence in broadcast and telecommunications; • Convergence between telecommunications and broadcast is banned. 	<ul style="list-style-type: none"> • Competition based on service, no exclusivity of content; • Partnerships are forming to allow telecommunications operators in broadcast and broadcast operators in telecommunications. 	<ul style="list-style-type: none"> • High demand for cost-effective services; • Huge market potential; • Willingness to leapfrog technologies indicates a high interest in converged services.

Convergence brings with it many advantages for consumers and providers, but it also brings with it difficulties, particularly in market regulation. For example, convergence of operators includes the convergence of manufacturers. A possible result of this is vertical and horizontal integration within the market and the concentration of market power. This could cause major antitrust concerns as horizontal and vertical monopolies may result. This will also raise the question of whether a natural monopoly will and should exist in the new market of converged services. Antitrust issues are only one of the challenging regulatory issues convergence has raised as regulators attempt to maintain quality and affordability as well as meet community standards for responsibility and accountability while nurturing the markets for these new services.³³⁰

4 CONCLUSION

Traditional voice does have a future in the Asia Pacific region, but no longer as a sole service. Convergence whether through technology, business models, or regulation is the future. Simple offerings of voice services will no longer be able to provide the revenue needed to operate in the emerging competitive environment as revenue and usage of these will continue to decline. However, people will always want some form of voice service, and they will look to those service providers who offer them additional value in the form of value-added services or cost-effective packages. This demand will drive service providers to find and incorporate those additional services or packages that will address the desires of the consumers, but at the same time, the service provider will continually pursue ways to reduce its supply costs and maximize revenue.

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- ⁵ CIA World Factbook: Hong Kong - <https://www.cia.gov/cia/publications/factbook/geos/hk.html>.
- ⁶ Id.
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- ¹¹ The Regulatory Environment for Future Mobile Multimedia Services: The case of Hong Kong SAR and China, pg 4.
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