International Telecommunication Union

# Broadband as a Commodity:

# Hong Kong, China Internet Case Study


ITU International Telecommunication Union

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Michael Minges prepared this report. Tim Kelly drafted the mobile section. Nathalie Delmas was responsible for formatting and production. The report is based on field research carried out from 3 to 6 December 2002 as well as articles and reports noted in the document. The assistance of *the Office of the Telecommunication Authority*, particularly M. H. Au and Sara Lam, was indispensable and highly appreciated. Equally, the report would not have been possible without the cooperation of the Census and Statistics Department, Hong Kong Broadband Network, i-Cable and Pacific Century Cyberworks. The report benefited from comments both within and outside ITU. Within ITU, Vanessa Gray, Esperanza Magpantay, Taylor Reynolds and Gary Sacks remarked on the report. Externally, M. H. Au, Fion Fung, Yiu-choi Siu and Benjamin Tong provided valuable observations.

The report is one of a series examining the Internet in different economies around the world. Additional information is available on ITU's Internet Case Study web page at <www.itu.int/ITU-D/ict/cs/>.

The report may not necessarily reflect the opinions of ITU, its members or the Government of Hong Kong Special Administrative Region of the People's Republic of China.

The title refers to the evolution of broadband Internet access in Hong Kong such that it is increasingly perceived as a basic commodity.

NOTE: FOR BREVITY, THE HONG KONG SPECIAL ADMINISTRATIVE REGION OF THE PEOPLE'S REPUBLIC OF CHINA IS REFERRED TO AS HONG KONG IN THE REPORT.

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# 1. Introduction

## 1.1 Background

Promotion of the Internet has become a top priority in many economies around the world. Some are now moving beyond basic Internet access to promoting high-speed *broadband* infrastructure and networks. The deployment of broadband infrastructure is increasingly perceived as important for overall economic and social development. According to the Chairman of Singapore's information and communication technology regulatory agency:

*"Broadband is a defining technology of our age. In the future, no nation can claim to be of developed status without good broadband access."*[1]

Central to broadband development are mass-market technologies for end user access. In that respect, the International Telecommunication Union (ITU), the United Nations specialized agency for telecommunications, has embarked on a series of case studies researching the development of the Internet. This study looks at the development of the Internet and particularly broadband access in the Hong Kong Special Administrative Region of the People's Republic of China (hereafter referred to as Hong Kong).

## 1.2 Methodology

The Mosaic Group[2] has developed a framework for characterizing the state of the Internet in an economy. They consider six factors, each of which has five values ranging from zero (non-existent) to four (highly developed). The factors are as follows:

- **pervasiveness:** a measure based on users per capita and the degree to which non-technicians are using the Internet.
- **geographic dispersion**: a measure of the concentration of the Internet, from none or a single city to nationwide availability.
- **sector absorption**: a measure of the degree of utilization of the Internet in the education, commercial, health care and public sectors.
- **connectivity infrastructure**: a measure based on international and domestic backbone bandwidth, exchange points, and user access methods.
- **organizational infrastructure**: a measure based on the state of the Internet Service Provider industry and market conditions.
- **sophistication of use**: a measure characterizing usage from conventional to highly sophisticated and driving innovation.

This framework is used to assess the situation in Hong Kong with a particular focus on broadband Internet access.

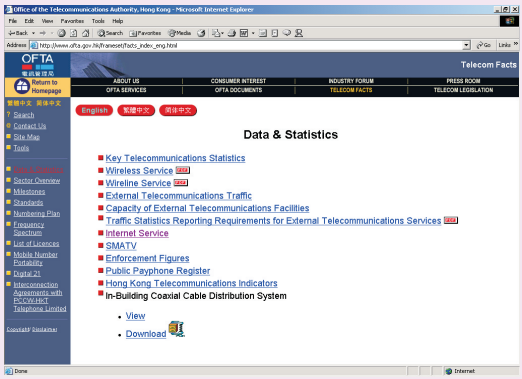
## Box 1.1: Abundant information

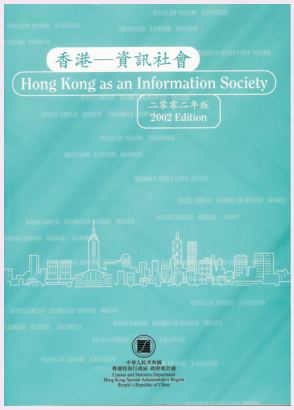
One of the advantages of studying a market like Hong Kong is the large amount of timely and relevant statistics available for the information and communication technology sector. This assists policy making by allowing Hong Kong to be benchmarked against other leading economies in terms of ICT. The data are to be commended for they follow international standards and unlike some other economies, statistics from Hong Kong are transparent and clear. In addition, Hong Kong is at the forefront of disseminating new statistics often before other economies have started collecting them. Sources include:

- The Office of the Telecommunication Authority (OFTA), the telecommunication industry regulator, publishes a variety of statistics on its web site.[3] These include monthly statistics on the number of fixed and mobile telephone and Internet subscriptions (disaggregated by dial-up and broadband). OFTA also disseminates data on voice and Internet traffic as well as twice yearly updates on Hong Kong's international Internet bandwidth. OFTA is one of the world's leading telecommunication regulators in terms of the timeliness and relevance of the statistics it disseminates.
- Since all of Hong Kong's main telecommunication operators are publicly traded, they publish data relating to their businesses on an annual basis. Most also publish semi-annual interim or quarterly reports. In addition to financial data, these reports also contain operational data and enhance the ability to analyze Hong Kong's ICT sector, particularly from a market share perspective.
- Hong Kong's government statistical office, the Census and Statistics Department (C&SD), carries out regular annual surveys on the usage of information and communication technology in households and businesses.[4] The surveys provide an essential supplement to the administrative records available from OFTA and market participants. Annual data include the number of Internet users, households with PCs and Internet access and businesses with Internet access. Of special note is the *Hong Kong as an Information Society* report issued in September 2002 that unifies data from a number of sources to gauge the development and impact of information technology in Hong Kong.

### Box Figure 1.1: ICT Statistics

Data & Statistics section of OFTA web site and Hong Kong as an Information Society publication from the C&SD




*Source:* ITU adapted from OFTA, C&SD.

[1] IDA. "More than 950'000 Singaporeans Now Use Broadband to Enhance Their Internet Experience." *Media Release*. 11 April 2002. Available on the IDA website at www.ida.gov.sg

[2] <mosaic.unomaha.edu/gdi.html>.

[3] Data are available from the Telecom Facts section on the OFTA web site at: http://www.ofta.gov.hk/frameset/home_index_eng.html

[4] For an overview of C&SD's ICT statistics activities see Amy Sui-sum Yu. "Latest Developments in IT&T Statistics in Hong Kong, China." 3rd World Telecommunication/ICT Indicators Meeting. Geneva, Switzerland. 15 - 17 January 2003. http://www.itu.int/ITU-D/ict/WICT02/doc/pdf/Doc35_E.pdf

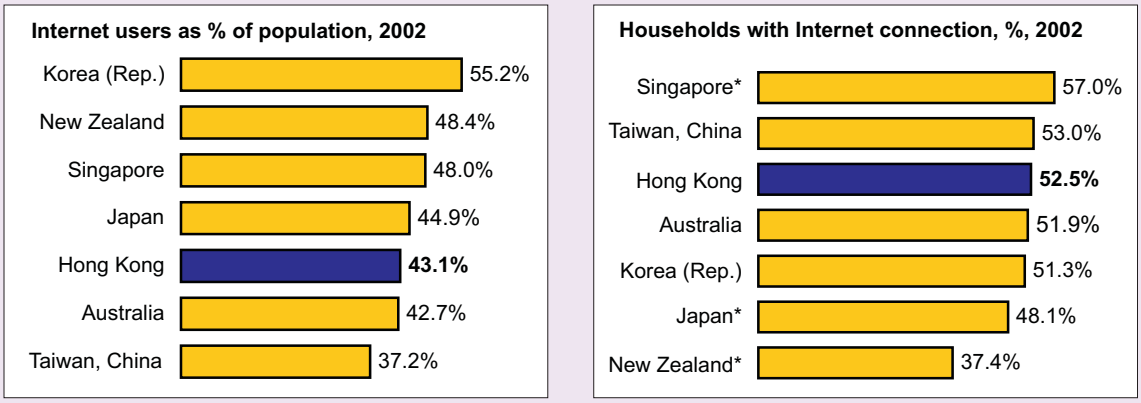
## 2. Pervasiveness

**Pervasiveness** is rated at level 4, *Pervasive.*

A survey carried out between May-July 2002 by Hong Kong's Census and Statistics Department (C&SD) found that almost half the population (48.2 per cent) over the age of ten—2.9 million people—had used the Internet in the previous twelve months.[1] In terms of households, 1.1 million or 52.5 per cent had an Internet connection. Hong Kong has the thirteenth highest Internet penetration in the world and the fifth highest in the Asia-Pacific region (see Figure 2.1).

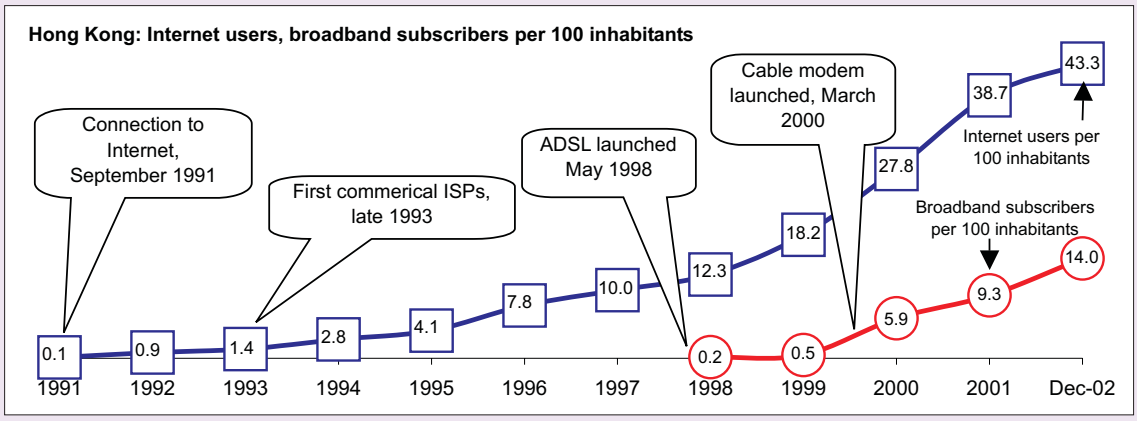
A number of factors have contributed to Hong Kong's level of Internet usage. It has had over a decade of experience with the Internet (see Figure 2.2). Hong Kong connected to the Internet in September 1991 when a 64 kbps circuit was established between the Chinese University of Hong Kong and the United States. It was also one of the first economies to launch broadband services in May 1998. Another factor is wealth. In terms of income, Hong Kong is the 12th wealthiest economy in the world with a per capita Gross National Product of US$ 25'920 in 2001.[2] It is the second richest in the Asia-Pacific region, after Japan. Economic barriers to Internet access in Hong Kong are few. The median monthly household income in Hong Kong in 2001 was HK$ 18'705 (US$ 2'398). At that income, entry-level dial-up and broadband Internet subscription plans would only consume 0.2 per cent and 1.1 per cent of monthly income respectively. Virtually all of Hong Kong's households could afford a dial-up Internet subscription and three-quarters could afford broadband (assuming monthly expenditure on Internet access should be less than two per cent of monthly income). These assumptions are confirmed by survey data where only six per cent of Hong Kong's homes said that cost was a reason for not having a Personal Computer (PC). Of households with a PC, only ten per cent stated that the monthly charge was a reason for not having Internet access.

**Figure 2.1: Internet penetration in advanced Asia-Pacific economies**




*Note:* In left chart, Internet users taken as a percentage of the entire population. In right chart, * = 2001.
*Source:* ITU World Telecommunication Indicators Database.

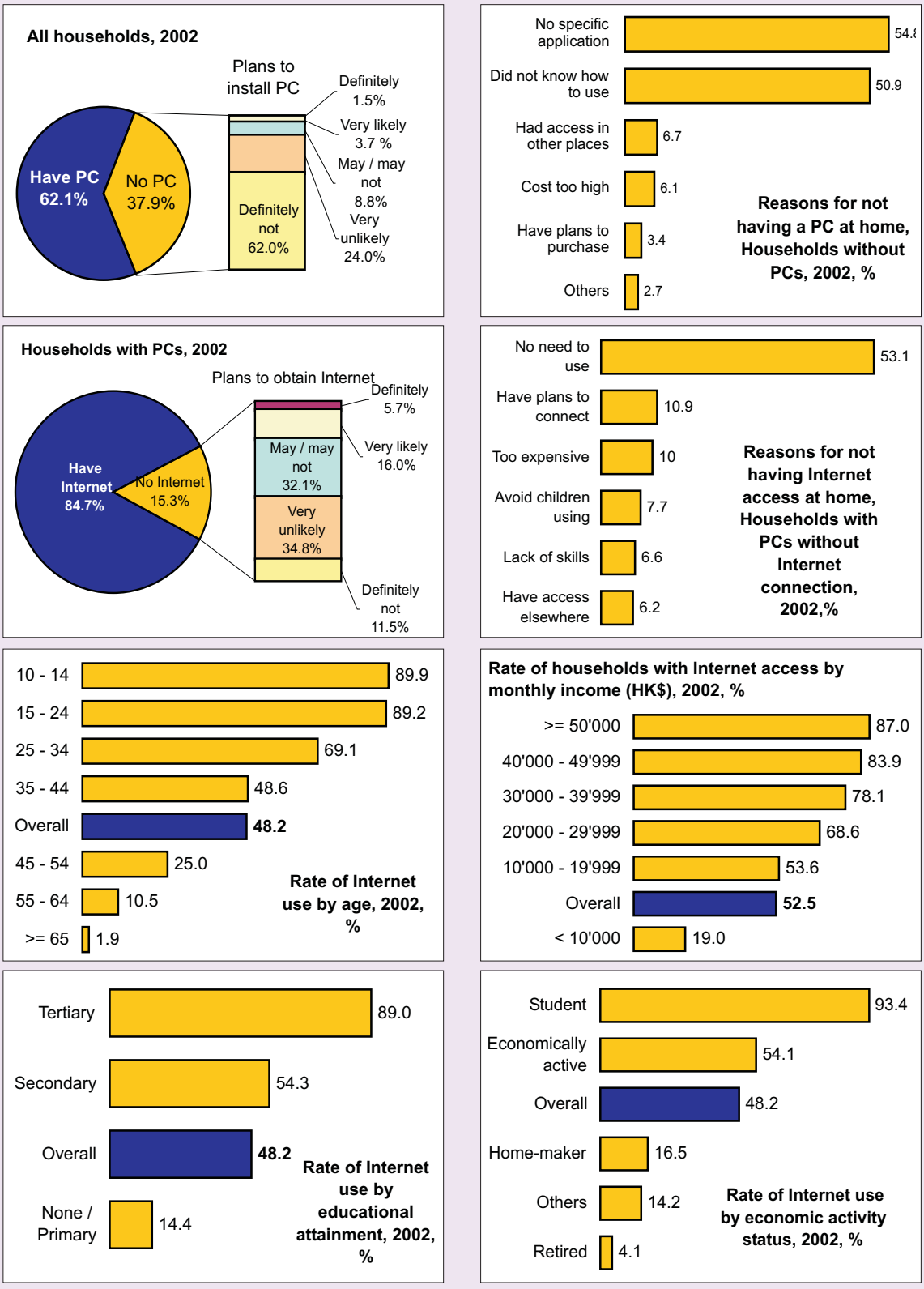
**Figure 2.2: Hong Kong's Internet history**




*Source:* ITU.

Like any other economy, Hong Kong has its own digital divide. Availability and use of PCs and the Internet is dependent on age, income and education (see Figure 2.3). Education is fundamental with 93 per cent of students above the age of ten online as are 89 per cent of those with a college degree. These two groups account for 56 per cent of all Internet users in Hong Kong. Household PC penetration is approaching saturation with only five per cent of those without a PC saying they plan to buy one. There are some interesting aspects surrounding the data offering hope of reducing the divide. One is that reasons for not obtaining a PC or Internet access are not primarily economic but linked to awareness and need. Another interesting point is that some nine per cent of Hong Kong's Internet users do not have secondary or higher education suggesting that limited education need not be a barrier to Internet use. There is no gender divide in Hong Kong with males and females each accounting for about half of Internet users (50.5 and 49.5 per cent respectively).

## Figure 2.3: Hong Kong's Digital Divide




*Note:* Charts referring to Internet users relates to those aged 10 and over who have used the Internet in the last year.
*Source:* ITU adapted from C&SD.

## Box 2.1: English language, Hong Kong and the Internet

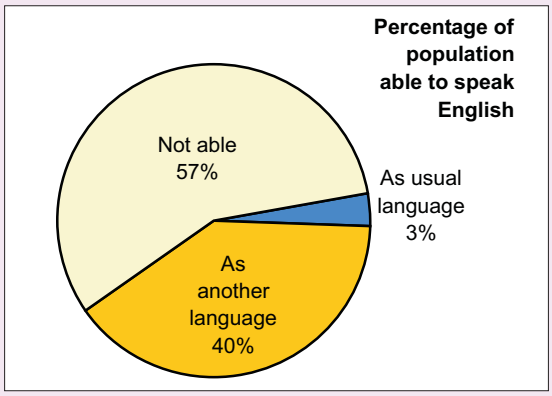
Hong Kong became a Special Administrative Region of the People's Republic of China on 1 July 1997, after a century and a half of British administration. Despite that long link with the United Kingdom, only 3.2 per cent of Kong Kong's population speaks English as a first language and less than half (43 per cent) speak it at all (see Box Figure 2.1, left). This does not seem to be a barrier to Internet use and the rate of household Internet penetration in Hong Kong is higher than in the United Kingdom (53 and 46 per cent respectively). In fact, Hong Kong surpasses the UK in a number of Internet related indicators (e.g., more hours of use, more broadband subscriptions).

One reason the Internet is doing well in Hong Kong is growing Chinese applications and content. There are Chinese versions of major software packages such as Microsoft Windows, Explorer and Office. The Hong Kong government portal <www.info.gov.hk> is available in Chinese as well as English, the two official languages, as is the Electronic Service Delivery e-citizen portal, <www.esd.gov.hk>. All of the top global web sites accessed by Hong Kong's Internet users (e.g., Yahoo, MSN, Lycos) have Chinese interfaces. Another development is Chinese broadband portals. The incumbent telephone company, PCCW, launched a Chinese portal in April 1999 that featured Chinese language search engines and email. One goal was to attract Chinese-speaking users from all over the world that would help drive advertising growth.[3] The portal has since evolved into the broadband portal <www.now.com.hk>. i-Cable, the cable television and cable modem provider also has a broadband portal, launched in March 1999, <www.i-cable.com> (see Box Figure 2.1, right). Content is aimed at niche interests such as horse racing, stocks, gaming and sports. It is the only Cantonese news portal updated on a 24-hour basis and attracts a lot of traffic from mainland China.

Barriers working with Chinese text are also being overcome. The Chinese alphabet uses ideographic characters where the appearance of the symbol is tied to its meaning. Though this can serve as a kind of shorthand reducing the number of symbols that are needed to represent a word it also results in many more characters. The Hong Kong Chinese character set contains 4'818 symbols. The local government has been working to standardize various coding sets used to represent Chinese. Though Chinese can be difficult to type, 43 per cent of Hong Kong's population over the age of ten has knowledge of using Chinese input methods for computers.

### Box Figure 2.1: Who needs English?

Percentage of Hong Kong population, age five and over, able to speak English, 2001 and i-Cable broadband portal




*Source:* ITU adapted from C&SD, i-Cable.

[1] Census and Statistics Department. "Findings of the "Household Survey on Information Technology Usage and Penetration" and the "Annual Survey on Information Technology Usage and Penetration in the Business Sector" in 2002 released." *Press Release*. 5 December 2002. http://www.info.gov.hk/censtatd/eng/press/ops/1202/051202_index.html.

[2] http://www.worldbank.org/data/databytopic/GNIPC.pdf.

[3] Hongkong Telecom. Annual Report 1999.

## 3. Geographic dispersion

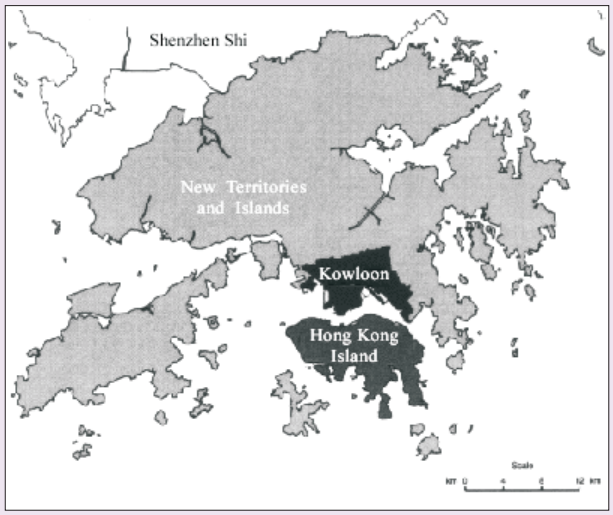
**Geographic dispersion** is rated at level 4, *Nationwide*.

Hong Kong's land area is relatively small, just over 1'100 square kilometres. Hong Kong's population density—some 6'000 people per square kilometre—is the third highest in the world, after Macao, China and Monaco. Hong Kong is essentially one big city. Some 95 per cent of the population lives in urbanized Kowloon, Hong Kong Island or the new towns in the New Territories (see Figure 3.1). Hong Kong's inhabited landscape is predominantly vertical: 95 per cent of the population live in apartment buildings.

Hong Kong's compactness makes it extremely easy to cover with communication infrastructure. This is borne out by its high level of communication access. It ranks second in the Asia-Pacific region in overall telephone density. There is telephone access in 95 per cent of households. Over 90 per cent of the population have mobile phones and coverage is practically total with signals available down on subways, on the top of skyscrapers or on the many ferries that traverse its waterways.

Therefore, telephone service is practically ubiquitous. And since wherever there is a phone there can be Internet access—either with a PC and a modem or a mobile phone with Wireless Access Protocol—Internet access is available from virtually anyplace. For those who do not have access either because they lack a PC or cannot afford it, the government is providing free access through community centres (see Box 3.1). According to government surveys, some 2.2 per cent of the population use the Internet through these centres (while 4.4 per cent access the Internet through cyber cafés).

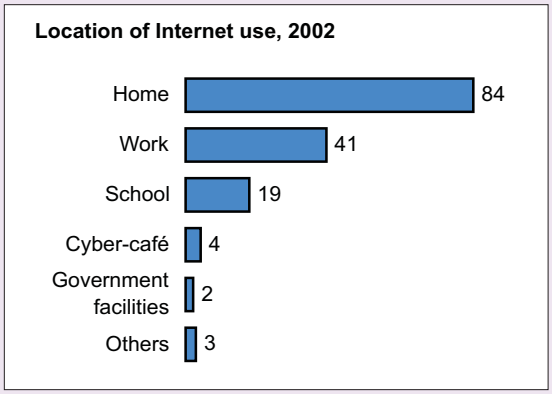
**Figure 3.1: Map of Hong Kong**




*Source:* C&SD.

**Figure 3.2: Where we use the Internet**

Location of Internet use, percentage of persons aged ten and over who had used Internet at least once a week in the last year, per cent, Hong Kong, May-July 2002




*Note:* Multiple answers possible.
*Source:* ITU adapted from C&SD.

## Box 3.1: Community Cyber point

The Cyber Points project was designed to provide free computing facility for the general community to promote IT awareness. The facilities enable the public to:

- Access Government information through the Government home pages;
- Through the Universal Free Electronic Mail Service Scheme, members of the public can use the facility for e-mail communications;
- Browse other Internet web sites; and
- Access Electronic Service Delivery (ESD) for those families without personal computers (PCs).

The project was implemented in different phases to meet users' requirements and government pledges. The Phase I project was launched to the public on 29 June 1999. 50 PCs were installed in enclosed workstations at 20 different community halls and centres of the Home Affairs Department.

The Phase II project was implemented in three stages. Stage I was completed in April 2000 with 50 PCs launched at 21 different community halls and centres. Stage II was completed in June 2000 with 64 PCs launched in 21 different HAD locations. At completion of stage III in October 2001, a total of 200 Cyber Points PCs was launched in 78 different HAD locations and non-government organizations.

To provide equal opportunity to different groups of the community, the Cyber Points has extended the computing facility to the Visually Impaired (VI). A trial project of installing 28 PCs with special furniture, computer hardware and software was launched in June 2000 at four different VI agencies.

A Super Cyber Centre with 100 PCs at the Canton Road Government Offices to provide free IT facilities and training programmes to the community has been open in July 2001.

**Box Figure 3.1: Cyber Points, 2002**


*Source:* <www.info.gov.hk/digital21/eng/programme/cyberpt.html>.

## 4. Sector absorption

**Sector Absorption** is rated at level 3.5, between *Common* and *Widely Used*.

### 4.1 Education

Internet connectivity in Hong Kong's academic sector is high. Hong Kong's tertiary sector pioneered the use of the Internet. The Chinese University of Hong Kong (CUHK) set up the first 64 kbps Internet connection in September 1991. The Hong Kong Academic and Research Network (HARNET) links Hong Kong's eight tertiary institutions. HARNET also provides connections to the Hong Kong Internet Exchange as well as the Internet2 (STARTAP) in the United States. All of Hong Kong's primary and secondary schools have an Internet connection and half have direct ten Mbps fibre access.[1]

### 4.2 Government

Government ICT adoption is progressing rapidly (see Table 4.1). Almost two thirds of government employees have a PC and some 40 per cent have access to the Internet. The Information Technology Services Department <www.itsd.gov.hk> of the Commerce, Industry and Technology Bureau is responsible for coordinating government computerization.

### 4.3 Health

The Health, Welfare and Food Bureau <www.hwfb.gov.hk > has overall responsibility for health care in Hong Kong. One of the most active agencies involved in health information technology is the Hospital Authority (HA) <www.ha.org.hk>. It is responsible for managing Hong Kong's 44 public hospitals as well as 62 outpatient clinics and has almost 50'000 staff. HA has some two dozen information technology projects underway.

All HA hospitals and clinics are connected to the HA network which is in turn connected to the Internet. Only approved staff is permitted access to the external Internet, some 6.2 per cent of the total. However around half the staff (22'000) has access to internal medical databases via some 3'500 workstations.

### 4.4 Business

Hong Kong is renowned for its entrepreneurial spirit and government commitment to free markets. In terms of IT adoption, however, the business sector appears to lag behind other advanced economies. Part of the reason is that the majority of business

**Table 4.1: Government computerization**

| | |
|---|---|
| Government IT Expenditure (2001/2002) | HK$ 2'483 (US$ 318) million |
| Percentage of staff with PC (December 2002) | 64.0% |
| Percentage of staff with Internet access (December 2002) | 40.3% |
| Percentage of staff with internal e-mail access (December 2002) | 27.3% |

*Source:* <www.itsd.gov.hk/itsd/english/comp/ecomp.htm>.

**Table 4.2: Penetration and usage of information technology in the business sector**

Percentages

| | 2000 | 2001 | 2002 |
|---|---|---|---|
| Establishments using personal computers (1) | 51.5 | 49.7 | 54.5 |
| Establishments with Internet connection (1) | 37.3 | 37.2 | 44.2 |
| Establishments with Web page/Web site (1) | 7.3 | 10.7 | 11.8 |
| Business receipts from selling goods, services or information through electronic means as a percentage of the total business receipts | 0.17 | 0.43 | N.A. |

*Note:* (1) As a percentage of all establishments in the industries covered in the annual Survey of Information Technology Usage and Penetration in the Business Sector. Figures for 2000 refer to March-June, while figures for 2001 and 2002 refer to April-June.
*Source:* C&SD.

establishments are small and medium sized. In addition, the Hong Kong economy has been sluggish recently. After ten per cent growth in 2000, Gross Domestic Product (GDP) only grew 0.6 per cent in 2001. This causes businesses to put off investment including for information technology.

Out of 333'000 business establishments covered in a government sample survey on information technology usage and penetration in the business sector conducted in 2002, over half (55 per cent) used PCs. Usage is heavily skewed by size with 95 per cent of large business establishments (over 100 employees for manufacturing establishments and over 50 for others) using PCs. Over two fifths (44.2 per cent) of companies have a connection to the Internet. Among them, half (50.9 per cent) had a broadband Internet connection. Like PCs, the Internet connection rate varies by the size of the company with 83 per cent of large establishments having a connection. The overwhelming majority used the Internet for email or looking up information. Only 16 per cent used it for purchasing products and services and only 8.3 per cent used it for making online payments. 11.8 per cent of establishments had a web page. The value of electronic commerce transactions in Hong Kong was HK$ 22'116 (US$ 2'835) million in 2001, or 0.43 per cent of total business receipts.

[1] For more on information technology in schools see the Education Department web page at www.ited.ed.gov.hk.

## 5. Connectivity infrastructure

**Connectivity Infrastructure** is at level 4, *Immense.*

### 5.1 International and national backbone

According to OFTA, Hong Kong's international Internet connectivity at September 2002 was 8'612Mbps. Hong Kong's international bandwidth has grown rapidly over the last few years (Figure 5.1, left). One reason is the liberalization of Hong Kong's external connectivity market since January 2000. At December 2002, there were 18 cable-based and six satellite facilities operators. A number of new submarine fibre optic systems to which Hong Kong is connected have also been completed over the last few years. Hong Kong ranks first in terms of international Internet bandwidth per capita in the Asia-Pacific region (see Figure 5.1, right). Leading ISPs have their own international connectivity, particularly since this is a requirement for connecting to the local Internet exchange. One of largest international Internet Protocol (IP) backbones is that of Reach, a joint venture of Hong Kong's incumbent telecommunication operator PCCW and Australia's Telstra (see Figure 5.2). Hong Kong also has a diversity of IP backbone routes, with Reach having direct connections to some twenty countries.

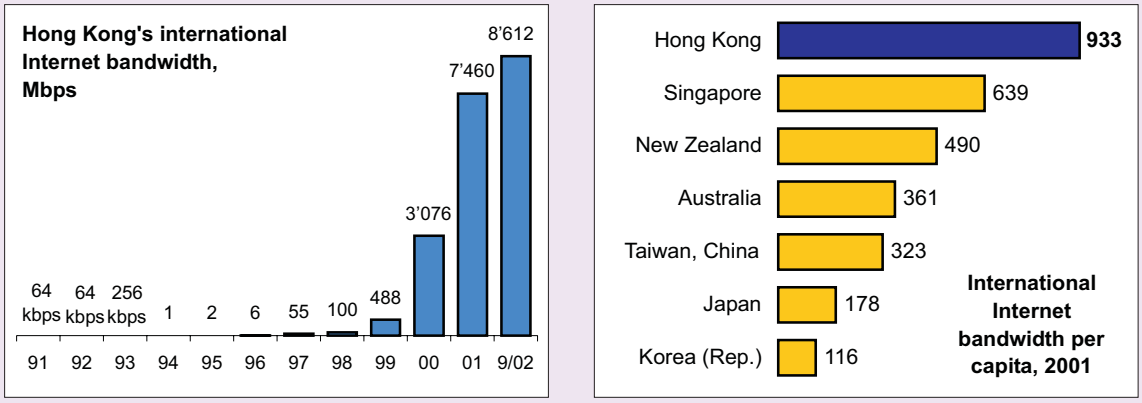
There are several domestic fibre optic backbone networks owned by licensed fixed telecommunication operators. Hong Kong is fibre rich with more kilometres of fibre optic cable than roads. These backbones are utilized by the licensed operator ISP subsidiaries or leased to other ISPs. The backbones operate in Asynchronous Transfer Mode (ATM) (155 Mbps) as well as pure IP backbones operating at speeds up to ten Gbps.

### 5.2 Local exchange

Local Internet traffic is exchanged at the Hong Kong Internet eXchange

**Figure 5.1: Hong Kong's international bandwidth**

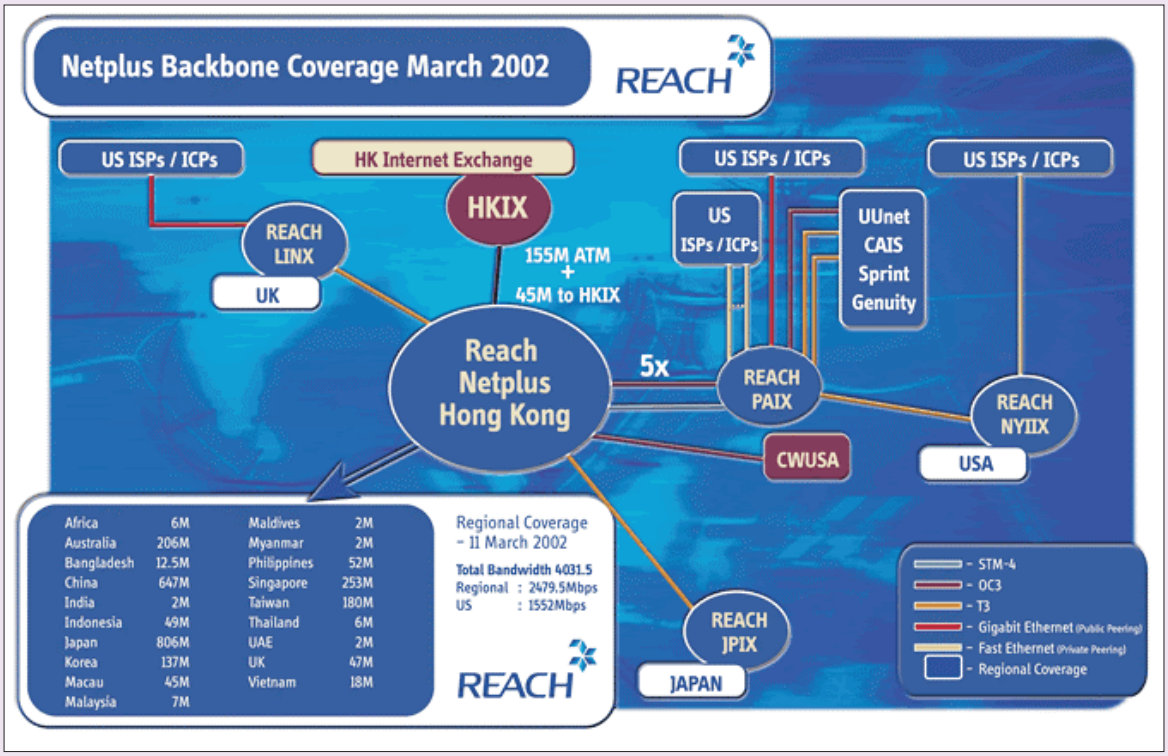
International Internet bandwidth, Hong Kong, Megabits per second, 1991-September 2002 and International Internet bandwidth per capita, bits per second, 2001, advanced Asia-Pacific economies




*Source:* Left chart: ITU estimates, OFTA. Right chart: ITU World Telecommunication Indicator database.

**Figure 5.2: Reach international Internet backbone**

March 2002



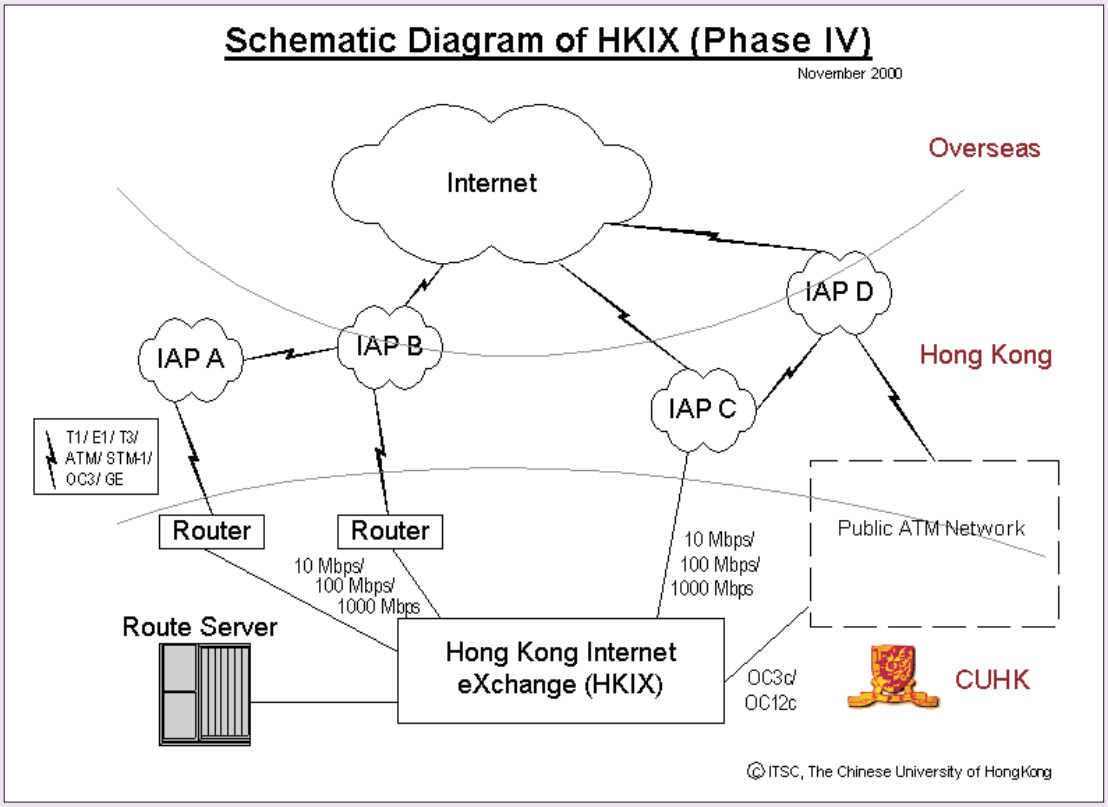

*Source:* Reach.

(HKIX), operated by the Information Technology Services Centre of the Chinese University of Hong Kong (see Figure 5.3). It was created in April 1995 with two ISPs.[1] Presently 60 per cent of Hong Kong's ISPs connect to HKIX (69 directly and 12 indirectly).

## 5.3 Local access

Local access options include 56 kbps dial-up, leased lines and broadband such as Asymmetric Digital Subscriber Line (ADSL), cable modem, fibre-to-the-building and Ethernet over twisted pair. Broadband access is progressing rapidly and eclipsing dial-up as the prevalent local access method. Dial-up subscriptions peaked in August 2000 and have been declining ever since (see Figure 5.4, top left). The majority of Hong Kong's households with Internet access report they now connect via broadband (see Figure 5.4, top right). Over half of business establishments report a broadband subscription. Business have converted from leased lines to broadband at a stunning rate. Internet leased line subscriptions peaked in December 2000 at 11'527. By December 2002, there were just 3'439 leased line connections versus 70'623 office broadband subscriptions. There were 989'115 broadband Internet connections at December 2002 or 14.6 per cent of the population (see Figure 5.4, bottom left). Hong Kong had the second highest broadband Internet penetration in the world at December 2002 (see Figure 5.4, bottom right).

**Figure 5.3: Hong Kong Internet Exchange**




*Source:* HKIX.

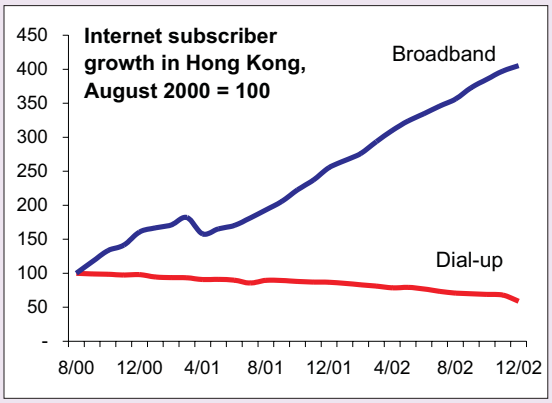
**Table 5.1: Broadband coverage in Hong Kong**

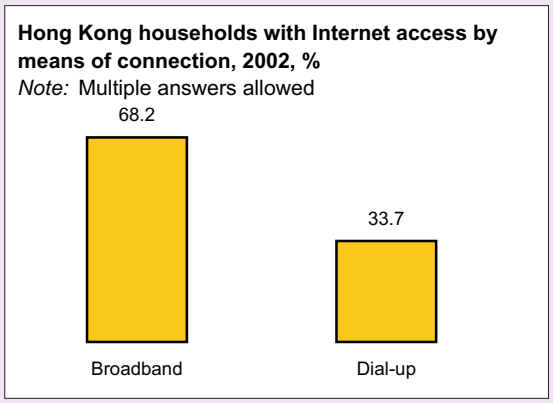
Status of network coverage of main broadband providers at June 2002

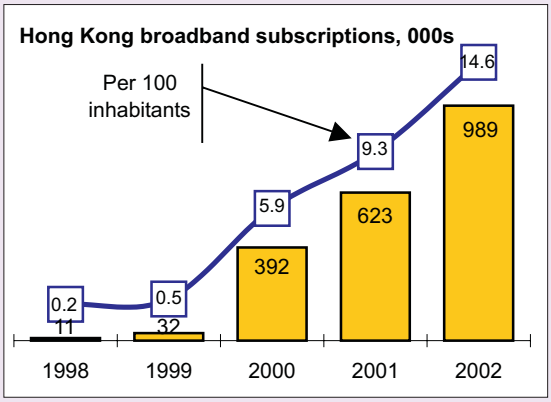
| Technology | Homes passed | Coverage | Subscribers | Note |
|---|---|---|---|---|
| ADSL | 2'000'700 | 95% | 487'000 | Within 4 km of exchange. Including 102'000 wholesale ADSL subscribers. |
| Fixed wireless / Ethernet over copper | 950'000 | 45% | 130'000 | Refers to HKBN network. Data at August 31, 2002 |
| Cable modem | 1'780'000 | 85% | 192'000 | Refers to i-Cable network. |

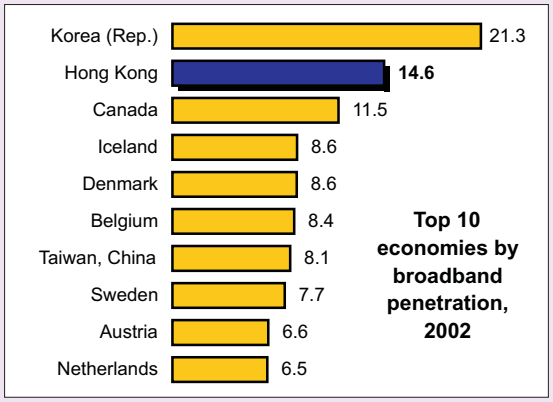
*Source:* ITU adapted from broadband operator data.

**Figure 5.4: Broadband trends in Hong Kong**



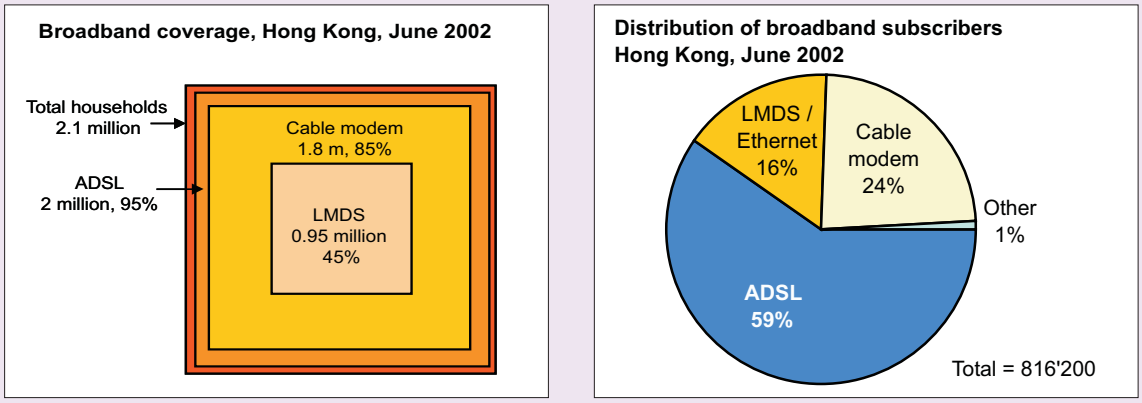




*Source:* ITU adapted from OFTA, C&SD and industry reports.

One reason for Hong Kong's rapid broadband adoption is its compact size and existing level of in-building wiring. ADSL passes 95 per cent of homes and other broadband technologies are rapidly increasing their coverage. In general, the provision of broadband simply involves connecting a backbone connection to an apartment or office building and then using the existing copper or coaxial cable in-building wiring. Backbone connections are either fibre optic or Local Multipoint Distribution System (LMDS) technology operating in the 25 – 31 GHz band. The latter provides a point-to-point connection between the antenna placed on top of buildings and hubs. Transmission speed ranges between 10 – 100 Mbps. In addition to utilization of existing in-building wiring some operators are installing their own copper twisted pair wiring and using Ethernet over twisted pair protocol. This makes use of a PC's Ethernet LAN port rather than an ADSL or cable modem. Speeds of up to ten Mbps (symmetrical) are possible.

**Figure 5.5: Broadband coverage and subscribers**

Percentage and number of households covered by different broadband technologies and distribution of broadband subscribers by technology, June 2002




*Source:* ITU adapted from operator data.

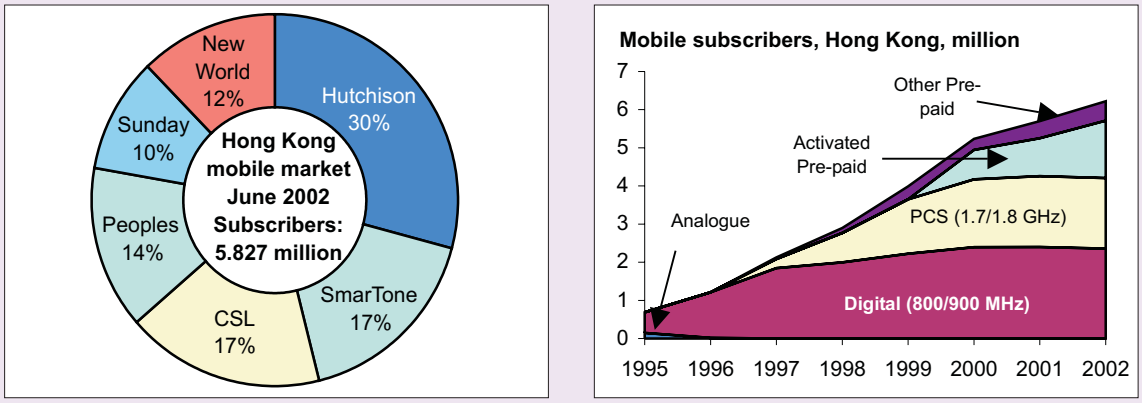
## 5.4 Mobile

### 5.4.1 Mobile market structure

The Hong Kong government has long followed a pro-competitive policy for mobile communications. By 1987, three licenses for analogue mobile service had been issued. In 1992, SmarTone obtained the fourth license and began offering digital GSM service. In 1996, OFTA issued another six licenses for Personal Communication Service (PCS), which in the case of Hong Kong refers to GSM in the 1.7/1.8 GHz band. This triggered another round of fierce competition. After a period of mergers and alliances, there are now six mobile operators holding eleven analogue and second generation mobile licenses, and a further four third generation (3G) licences. With a population of just 6.7 million people, it may not be an exaggeration to claim that Hong Kong has the most competitive mobile market in the world. Figure 5.6 (left chart) shows the market share of these six operators, namely CSL,

**Figure 5.6: Hong Kong: The world's most competitive mobile market?**

Mobile market shares, June 2002 and mobile subscribers,1995-2002, in Hong Kong




*Note:* * Data for 2002 is at October. All other data in right chart is for year-end.
*Source:* ITU adapted from operators reports, OFTA.

Hutchison, New World, Peoples, SmarTone and Sunday. None of the operators is able to dominate the market due to the high subscriber churn that has been facilitated by mobile number portability. Figure 5.6 (right chart) shows the evolution of the different waves of mobile technology.

### 5.4.2 Mobile data

In the ITU's 2002 *Internet for a Mobile Generation* report[2], a Mobile/Internet index ranked some 200 economies in terms of 26 variables. The variables were chosen because they were thought to be good predictors of the likely adoption of the mobile Internet. Hong Kong was ranked first, with a score of 65.9 out of a maximum of 100. It is ahead of other regional economies such as the Republic of Korea (7th), Singapore (13th), Japan (20th) and China (67th). Hong Kong achieves top ranking because of its existing strength both in second-generation mobile penetration (for which it is fifth in the world) and broadband Internet (for which it is placed second, globally, behind the Republic of Korea).

The ITU's Mobile/Internet index is a measure of the *likelihood* to adopt the mobile Internet rather than the current situation. Indeed, in terms of *actual adoption*, Hong Kong is some way behind the regional and global leaders, Japan and the Republic of Korea. Hong Kong completed its licensing process for 3G in September 2001, some 15 months later that Japan (see Box 5.1). Nevertheless, the late start did have

**Box 5.1: Hong Kong's 3G licensing process**

Hong Kong not only has one of the highest fixed telephone densities in Asia, but also one of the highest mobile densities in the world. At December 2002, Hong Kong's mobile penetration was 91.2 per cent, fifth in the world. This high level of mobile use makes it a promising environment for 3G.

Hong Kong carried out its 3G licensing process somewhat differently than other economies. The regulator, OFTA, opted for a hybrid process consisting of a pre-qualification phase followed by spectrum auctioning. The process took place in several stages, with applications invited from operators using any of the family of IMT-2000 standards, subject to compatibility with existing standards. Furthermore, OFTA decided to allow existing 2G operators, whether successful or not in obtaining 3G spectrum, to use any IMT-2000 standard within their assigned 2G frequency bands for 3G services, when equipment becomes commercially available. Rather than a purely fee-paying system, royalty payments, with a schedule of minimum payments, were introduced by OFTA, in order to minimize the financial burden on operators. As a concession to the difficult operating environment, OFTA announced in October 2002 a waiver for the first-year's payment of performance bonds by the licensed operators.

The results of the process were announced in September 2001, with 3G licences awarded to four successful bidders: Hong Kong CSL Limited (now fully-owned by Telstra Corporation of Australia); Hutchison 3G HK (joint-owned by Hutchison Whampoa and NTT DoCoMo); SmarTone 3G and Sunday 3G. The winners bid HK$ 4.1 (US$ 0.5) million for the licenses. In addition they must each pay a royalty for spectrum utilization over the next 15 years amounting to five per cent of revenue subject to a minimum fee. Thus the minimum amount they must pay is HK$ 1'307 (US$ 168) million each. Under the regulatory framework of open network access, the 3G licensees are required to allocate at least 30 per cent of their capacity for use by Mobile Virtual Network Operators (MVNOs) and/or content and service providers. Also in October 2001, OFTA published its guidelines for the application of Public Non-Exclusive Telecommunications Service (PNETS) licences and invited applications from potential MVNOs. OFTA has thus sought to ensure that competition be enhanced and the market be kept as vibrant and balanced as possible. By the end of December 2002, six companies had obtained MVNO licences in Hong Kong, with the majority being mainland owned. They are currently using 2G technology for service provision, with plans to migrate to 3G technology once the networks are ready.

As of the end of December 2002, only 170'931 of Hong Kong's 6.2 million mobile subscribers (2.7 per cent) were 2.5G users, in the sense that they had subscribed to a particular service plan (e.g., GPRS or CDMA IS-95B) or used the service at least once in the last month. Like many economies, Hong Kong's experience with mobile Internet to date has not lived up to high expectations. However it is hoped that with the faster speeds and greater functionality introduced by 3G, this will change. According to OFTA, "Hong Kong is well positioned to be a world centre of 3G innovation."[3]

the advantage that Hong Kong's policy-makers were able to learn from the experiences of other countries.[4]

The majority of revenue from mobile data services comes not from GPRS but rather from humble SMS services. In December 2002, Hong Kong's mobile users received 71 million SMS messages, or an average of three per week for every subscriber. Volume is growing by around three per cent per month. As an example of how "push" media, via SMS, is being used rather than the "pull" of web-browsing, take the UK Premiership football service offered by Orange HK (Hutchison). For a fee of HK$ five per match (around 65 US cents) subscribers can receive all the live news of starting line-ups, goals scored and red cards issued delivered via an SMS-alert service.

The popularity of SMS augurs well for Multimedia Messaging Systems (MMS), which were introduced by CSL on 28 March 2001, the first Asian operator to do so. MMS operates on a GPRS platform. At the opening special offer prices, the MMS handsets were sold at HK$ 3'088 (approximately US$ 400) or HK$ 3'988 (US$ 510) for a handset with a mobile camera. Charges for content ranged from HK$ three for a stock quote service to HK$ 15 for greetings cards and comics. Introductory offer GPRS service packages were charged at a monthly fee of HK$ 149, with two megabytes of data usage, subsequently charged at HK$ 0.16 per kilobyte, or HK$ 49, with one megabyte of usage, subsequently charged at HK$ 0.2 per kilobyte. This volume-based tariff structure is somewhat different from the per-message pricing structures adopted elsewhere in the world. In December 2002, Hong Kong's six operators made arrangements for the interconnection of MMS traffic, greatly expanding the potential market.

### 5.4.3 Wireless LAN

The main rival to mobile Internet access via 2.5G and 3G networks is access from wireless local area networks (WLAN) using technologies such as "WiFi" (IEEE 802.11b). The incumbent fixed-line operator, PCCW, has installed around 150 *hotspots* around the territory, including at the international airport, and Pacific Coffee and Haagen Dazs ice cream shops. The service was free up to the end of 2002, and now costs HK$ three (around 40 US cents) per ten minutes. i-Cable, the cable television operator which also provides Internet access via cable modem, has over 1'500 hotspots covering major shopping malls.

PCCW markets the service principally to customers of its NETVIGATOR broadband service. This is significant, because it shows that PCCW has taken the conscious decision to associate WLAN with broadband rather than mobile.[5] In Hong Kong, there is not the tradition of carrying portable computers to work that exists elsewhere, so there is perhaps not yet the demand for WLAN services on the move in Hong Kong. But this could change, especially with the increasing popularity of personal digital assistants (PDAs).

In August 2002, OFTA issued a consultation paper regarding the licensing of public WLAN services.[6] After considering the views from the industry, OFTA decided to create the class licence as proposed, which came into effect on 21 February 2003. Under the class licence, no licence fee needs to be paid and operators of public WLAN services simply need to register with OFTA.

[1] For background on the establishment of HKIX, see Che-Hoo Cheng. "Internet eXchange for Local Traffic: Hong Kong's Experience." http://www.isoc.org/isoc/whatis/conferences/inet/96/proceedings/h1/h1_3.htm. The HKIX web site is at www.hkix.net.

[2] The summary of the report is available at: www.itu.int/mobileinternet.

[3] OFTA. "TA Announces Results of Third Phase Auction for 3G Mobile Service Licensing." Press Release. 26 September 2002. http://www.ofta.gov.hk/press_rel/2001/sept_2001.html#1.

[4] "In Hong Kong the allocation of 3G licenses has avoided the mistakes of Europe and their consequences." John Ure. "Deconstructing 3G and reconstructing telecoms." *Telecommunications Policy*. No. 27 (2003) 187-206.

[5] This decision was made easier by the sale of its remaining ownership in mobile operator CSL to Australia's Telstra in July 2002.

[6] The consultation paper is available at: http://www.ofta.gov.hk/report-paper-guide/paper/consultation/cp20020802.pdf.

## 6. Organizational infrastructure

The **Organizational infrastructure** is at level 4, *Robust.*

There is an industry regulator—the Office of the Telecommunication Authority (OFTA)—and market entry conditions are clear and transparent.[1] OFTA was established in July 1993 as an independent government department, funded mainly by license fees. A license is required to provide telecommunication services in Hong Kong. The type of license depends on the nature of the service to be provided. The incumbent fixed line monopoly ended in July 1995 when 15-year *Fixed Telecommunication Network Services* (FTNS) licenses were awarded to three new operators.[2] The number of licenses was initially limited to allow the new entrants time to recoup their investment. However, as of January 2003, there are no longer any restrictions on the number of FTNS licenses.

**Table 6.1: Hong Kong's telecommunication and regulatory timeline**

| | |
|---|---|
| 1871 | First submarine telegraph cable laid. |
| 1873 | Forerunner company of Cable & Wireless (Hong Kong) formed to operate international services. |
| 1877 | Telephone service introduced. |
| 1925 | Hong Kong Telephone Company (HKTC) incorporated as a private company in 1925 to acquire part of the business of China and Japan Telephone and Electric Company Limited, which had operated Hong Kong's first public telephone services since 1882. In the same year, HKTC was awarded the sole right to provide Hong Kong's local telephone services for 50 years. This right was subsequently extended to 1995. |
| 1984 | Cable & Wireless acquires HKTC. |
| 1988 | HKTC and Cable & Wireless (Hong Kong) formally merge into Hongkong Telecom. |
| Sep-91 | The Chinese University of Hong Kong establishes the first Internet connection. |
| 1995 | Following the expiration of HKTC's monopoly on fixed-line telephone services, OFTA issued a non-exclusive license to HKTC and three other companies to provide fixed telecommunications network services on a competitive basis. The licenses are valid until 2010 and were renewable for a period of 15 years at the discretion of OFTA. |
| Mar-98 | HKTC surrendered its exclusive license to provide all external telecommunications facilities in Hong Kong. |
| May-99 | OFTA extends moratorium on the granting of additional FTNS licenses to 31 December 2003. Announces it would begin granting licenses for wireless local fixed telecommunication network services, effective in January 2000 and license Hong Kong Cable Television Limited to provide telecommunications services using cable modem technology over its hybrid fibre coaxial cable television network. |
| Jan-99 | Resale of external telecommunication services liberalized. |
| Jan-00 | Markets for external facilities-based competition, wireless FTNS and telecom service using cable television network opened. |
| Aug-00 | PCCW acquires Cable & Wireless HKT (former Hong Kong Telecommunications Limited) for HK$225,000 million. |
| Jan-02 | OFTA announces details to fully liberalize the FTNS market from 1 January 2003. |

Source*:* ITU adapted from OFTA, PCCW.

Commercial Internet services started in 1993. There were 258 *registered* Internet Service Providers (ISPs) at December 2001. It is estimated that between 135-141 are actually in service.[3] ISPs require a *Public Non-Exclusive Telecommunication Service* (PNETS) license that costs HK$ 750 (US$ 96) per year and is renewable annually. In addition, if ISPs provide services that require access to sites outside of Hong Kong, they must obtain an *External Telecommunication Services* license which costs HK$ 750 per year. The value of the ISP market was put at HK$ 3'326 (US$ 426) million in 2000, the latest year for which data are available.[4]

OFTA issued a statement on broadband interconnection in November 2000, following two earlier rounds of industry consultations.[5] The statement laid out ground rules for how broadband interconnection should work in the event that commercial negotiations fail. The statement defined broadband as speeds higher than 144 kbps. Hong Kong has two types of telecommunication network interconnection. Type 1 refers to interconnection among network switches. In regards to broadband, Type 1 interconnection is not legally mandatory. However, because all of Hong Kong's major ISPs exchange traffic through the HKIX local Internet exchange this has not been an issue. Type 2 interconnection refers to allowing access to subscriber premises lines (i.e., "local loop unbundling"). This is particularly relevant for broadband where access to the local loop is considered a bottleneck. The reason is that virtually all of Hong Kong's population lives and works in high-rise apartments and offices, most of which already have internal wiring. The space available for adding new wiring and supporting equipment is constrained which makes it difficult for new operators to add new local lines. The OFTA statement called for all in-building copper and coaxial cable being made available for interconnection after February 2001. Though the statement did not establish a concrete formula for interconnection rates, it clarified numerous points and implied that OFTA was ready to intervene if market forces failed.

At December 2002, Hong Kong's ISPs served 1'371'705 dial-up, 3'439 leased line and 989'115 broadband Internet subscribers. The high number of dial-up subscribers is misleading. Both dial-up subscriptions and traffic have been in sharp decline since the end of the year 2000. Furthermore, the dial-up figure is inflated from free subscriptions that are no longer or rarely used. Surveys of residential and business users show that a majority use broadband to access the Internet. The average revenue per user (ARPU) for broadband is more than twice that of dial-up.

There are 15 companies providing retail broadband services (see Table 6.2). These include the four fixed line operators, five fixed wireless operators, the cable television company and five ISP resellers. The market is particularly concentrated for broadband where the three main infrastructure-based providers account for 90 per cent of the market. The three major facilities-based broadband providers are:

- **PCCW**, the incumbent telecommunication operator. It launched Hong Kong's first broadband service, a 1.5 Mbps ADSL product, in May 1998. At December 2002, it reported 424'000 subscribers. PCCW also wholesales ADSL lines to ISPs (135'000 at December 2002). PCCW reported US$ 76 million of retail consumer broadband revenue for the first half of 2002. PCCW also had 264'000 dial-up subscribers at June 2002. PCCW's 3.35 million fixed telephone lines in service accounted for 87 per cent of the Hong Kong total at June 2002.

- **i-Cable**, the cable television company. i-Cable obtained a 12-year exclusive license to provide cable television services in June 1993. It launched its cable television network four months later in October. In March 1999, it introduced dial-up Internet service. In January

2000, it was awarded an FTNS license allowing it to provide broadband Internet service over its cable television network and began converting its network to bi-directional capacity to support Internet access. At December 2002, it had 605'000 Pay TV subscribers and 225'000 cable modem subscribers. i-Cable reported a profit on its broadband operations during 2002 with revenues of HK$ 450 (US$ 58) million.

- **Hong Kong Broadband Network**, a subsidiary of City Telecom. Established in 1992, City Telecom is an external telecommunications services provider in Hong Kong, focusing on the international telecommunications market. It established a subsidiary, Hong Kong Broadband Network (HKBN) that was awarded a Wireless FTNS license in February 2000. HKBN uses wireless

**Table 6.2: Hong Kong's broadband operators**

| | Operator | Techno-logy | Speed | Note | Web site |
|---|---|---|---|---|---|
| 1 | PCCW | ADSL | 1.5/3/6 Mbps down, 512 kbps up | Fixed FTNS license (incumbent operator). Reported 424'000 broadband subscribers at December 2002. | www.pccw.com |
| 2 | HGC | Ethernet | 10 Mbps Symmetric | Fixed FTNS license. | www.hgc.com.hk |
| 3 | New World | Ethernet | 2 Mbps Symmetric | Fixed FTNS license. | www.newworldtel.com |
| 4 | Wharf New T&T | Ethernet | 2/4 Mbps Symmetric | Fixed FTNS license. | www.wharfnewtt.com |
| 5 | i-Cable | Cable modem | 8 Mbps Symmetric | Cable TV fixed FTNS license. Reported 225'000 broadband subscribers at December 2002. | www.i-cable.com |
| 6 | HKBN | LMDS/ Ethernet | 10 Mbps Symmetric | Wireless FTNS license. Reported 160'000 broadband subscribers at January 2003. | www.hkbn.com.hk |
| 7 | SmarTone Broadband | LMDS/ Ethernet | 1.5 Mbps | Wireless FTNS license. | www.ismart.net |
| 8 | CPCNet | LMDS/ Ethernet | 1.5/3 Mbps | Wireless FTNS license through purchase of PSINet Hong Kong. | www.cpcnet-hk.com |
| 9 | Eastar | LMDS/ Ethernet | 3/6 Mbps | Wireless FTNS license. Reported 800 broadband subscribers at September 2002. | www.hendersoncyber.com |
| 10 | Hua Nan-Teligent | | | | |
| 11 | HKNet | ADSL | | ISP owned by NTT of Japan. | www.hknet.com |
| 12 | Pacific Supernet | ADSL | | Hong Kong's oldest ISP, owned by Pacific Internet of Singapore. Reported 7'600 broadband subscribers at September 2002. | www.hk.super.net |
| 13 | So-net | ADSL | | ISP owned by Sony of Japan. | www.so-net.com.hk |
| 14 | Netfront | ADSL | | ISP | www.netfront.net |
| 15 | Cyber Express | ADSL | | ISP | www.cyberec.com |

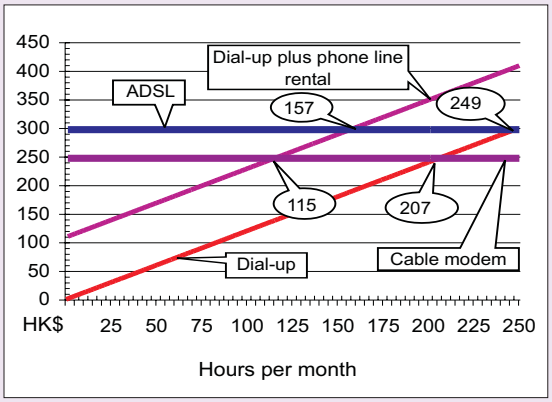
*Source*: ITU adapted from operators data.

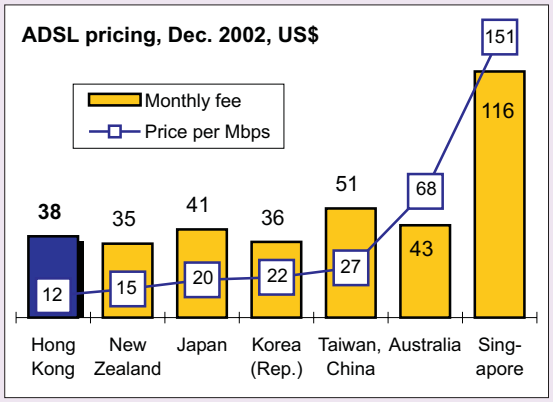
technologies such as LMDS to provide fixed network services in Hong Kong. It installs its own in-building blockwiring to provide service to customers. HKBN was upgraded as a wireline based FTNS licensee in April 2002. This upgrade allows HKBN to develop its own fibre-based backbone to supplement the existing wireless backbone in densely populated areas. As of January 31, 2003, its network covered 440 offices and 2'800 apartment buildings with approximately 1.2 million households and 160'000 broadband subscribers. It reported broadband revenues of HK$ 239 (US$ 31) million during its fiscal year ending 31 August 2002.

At first glance, broadband pricing in Hong Kong does not appear to be particularly cheap, especially in comparison with dial-up. Free dial-up subscriptions are widely available. However, users have to pay two Hong Kong cents per minute (15.4 US cents per hour) for telephone network access.[6] Dial-up Internet access is cheaper until 207 hours of use per month is reached, at which time cable modem access becomes cheaper. The point at which broadband access becomes cheaper than dial-up generally occurs at a lower number of monthly hours in most other economies. However, the increasingly competitive broadband market has drastically reduced prices. One interesting method of selling broadband is through street stalls where hawkers offer plans at below list price if subscribers are willing to sign on for a long-term contract. Thus, there is often a big difference between published tariffs and what the service can actually be obtained for. For example, PCCW offers an ADSL plan for HK$ 298 (US$ 38) that officially only includes 100 hours per month. If subscribers sign up for 18 months, they get unlimited access. HKBN offers unlimited broadband Internet access to residential customers at an even more competitive rate of HK$ 148 (US$ 19) if subscribers sign up for 12 months. Furthermore, it is argued that the main benefit of broadband is

**Figure 6.1: Broadband pricing**

Price of dial-up and broadband Internet access per hour of use, Hong Kong, December 2002, HK$ and monthly price of unlimited ADSL access, advanced Asia-Pacific economies, December 2002




*Note:* The left chart identifies broadband "crossover" points, the number of monthly hours of Internet access at which it becomes cheaper to use broadband rather than dial-up. For example, after 207 hours of use, it is cheaper to switch from dial-up to a cable modem broadband subscription. "Dial-up plus phone line rental" shows the price of dial-up access and the price of having a second line. The right chart is based on lowest priced unlimited access plan with at least 512 kbps download speed.
*Source:* ITU adapted from operator reports.

that it is always on and does not tie up the telephone line. Thus, the price of broadband service should also be compared to the cost of having a second telephone line (HK$ 110 per month). In that case, broadband becomes cheaper than dial-up after 115 hours of use per month.

In light of these developments, Hong Kong's broadband Internet access pricing has recently become among the cheapest in the region. Furthermore, it offers more value for the money than any other advanced Asia-Pacific economy in terms of price per bandwidth.

[1] OFTA has received the Best Asian Regulator award three times. See www.ofta.gov.hk/whats_new/best_asian_regulator.html.

[2] Hong Kong Telecom also had a 25-year exclusive license for international services that was due to expire in 2006. This was terminated 8 years early March 1998. The government paid a cash compensation of HK$ 6.7 billion (US$ 859 million), far less than the estimated HK$ 17 (US$ 2.2) billion in consumer benefits accruing from the early termination of the license.

[3] According to Netcraft <www.netcraft.com>, an English Internet consultancy, there were 141 ISPs in operation in Hong Kong at December 2001. The local Internet exchange, HKIX, reported that the 81 ISPs connected represent 60 per cent of market (thus 135 ISPs in total).

[4] It should be noted that in addition to registration and connection services, the figure includes web hosting and other unspecified Internet related services. Revenue from "Basic connection services" was HK$ 1'524 (US$ 195) million. See Census and Statistics Department. *Hong Kong as an Information Society. 2002 Edition*. September 2002.

[5] OFTA. Broadband Interconnection. Statement by the Telecommunications Authority of Hong Kong. 14 November 2000. http://www.ofta.gov.hk/tas/interconnect/ta20001114.pdf.

[6] Ironically, there is no charge for local voice calls but Internet access is charged. This has its roots in the days when Internet use started to become popular in Hong Kong and there were concerns that not charging for telephone network use would congest the network. It was also felt that those who did not use the Internet would be subsidizing those who do. As a result the so-called Public Non-Exclusive Telecommunication Service (PNETS) charge was introduced. The rate has been progressively reduced.

# 7. Sophistication

**Sophistication of Use** is at level 3, *Transforming.*

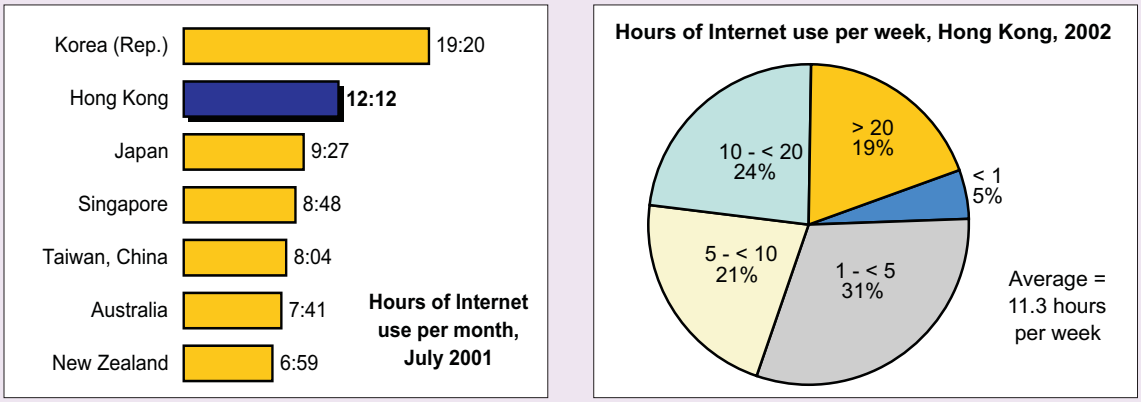
Hong Kong's Internet users are among the most intense in the world. A July 2001 survey ranked Hong Kong second globally in terms of monthly Internet use (see Figure 7.1, left). The Census and Statistics Department survey, carried out between May-July 2002, found that 87 per cent of Hong Kong's Internet users used the Internet at least once a week. These frequent users spend 11.3 hours per week online, with about one fifth spending more than 20 hours a week (see Figure 7.1, right). This intensity is reflected in Hong Kong's high broadband penetration since heavy users want fast speed.

Though the major purposes for using the Internet in Hong Kong are conventional (e.g., communicating with others, surfing and searching, see Figure 7.2, left), there are signs that the Internet is beginning to be used in ways that are more closely integrated with peoples' lives.

One example is using the Internet rather than traditional media (e.g., newspapers, radio, television) to stay informed of current events. Almost half (48 per cent) of Hong Kong's Internet users read a magazine or newspaper online. Personal finance is also increasingly carried out on the Internet. Almost one in five Hong Kong Internet user carries out some type of electronic business service related to personal finance (see Figure 7.2, right). However, the rate of actually performing an electronic commerce transaction online is low (8.6 per cent). Part of the reason may be that people in Hong Kong are never far away from shops. Three quarters of those Internet users who have not carried out electronic commerce transactions state the reason is because they do not have the need. Security is much less of a concern with 19 per cent stating that as a reason for not performing electronic commerce

**Figure 7.1: Heavy users**

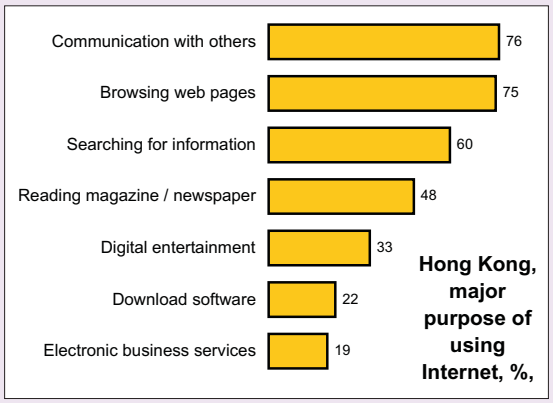
Average hours of Internet use per month, July 2001 and number of hours of Internet use per week, Hong Kong, May-July 2002

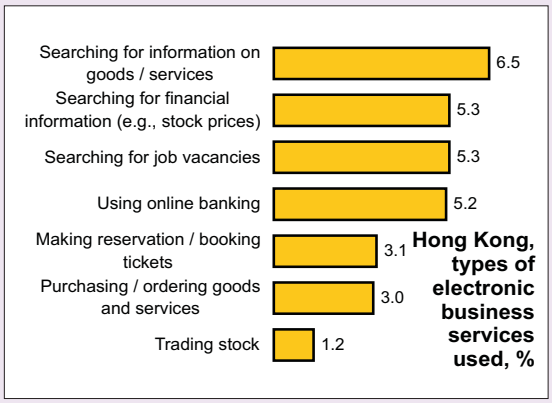



*Note:* Right chart refers to Internet users aged ten and over who had used the Internet at least once a week.
*Source:* ITU adapted from Nielsen//NetRatings and C&SD.

**Figure 7.2: What the Internet is used for**

Major purposes of using the Internet and type of electronic business services used via Internet, %, 2002, Hong Kong



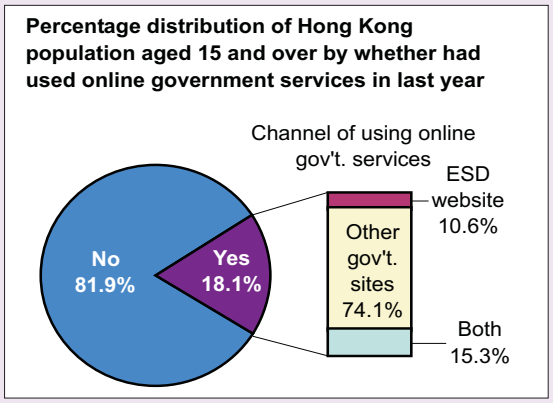



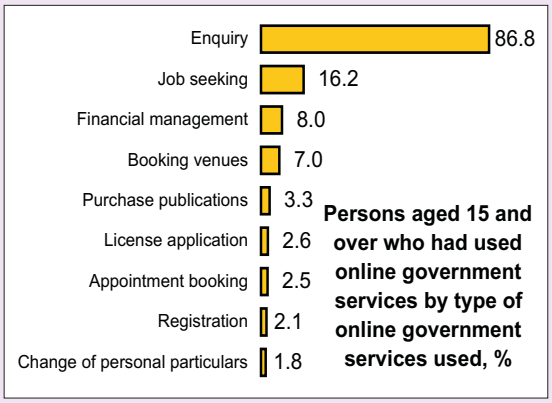

*Source:* ITU adapted from C&SD.

transactions online. Around five per cent of Internet users use on-line banking. Hong Kong's largest bank, HSBC, reported it had 340'000 online banking customers in June 2002. It has launched a service enabling customers to pay over 100 types of bills online (e.g., telephone, insurance, electricity, taxes).

The government has made major efforts to encourage the population to interact with it online. The government portal at www.info.gov.hk provides a large amount of information about the public administration in both Chinese and English. The government launched the Electronic Service Delivery (ESD) portal in December 2000. The ESD website is one of world's first bilingual government portals, providing over 110 services online. The ESD portal won the Stockholm Challenge Award

**Figure 7.3: Government online**




*Source:* ITU adapted from C&SD.

in 2001 under the category of Public Services and Democracy. Free access to ESD is available at some 4'800 public facilities including libraries, post offices and community centres and there are also 70 ESD kiosks. Around 40 per cent of Hong Kong's population over the age of 15 are aware of the ESD (up from 28.7 per cent in 2000). Over one third (36.3 per cent) of Internet users access government web sites to obtain information and ten per cent access government web sites to pay bills or submit forms such as taxes or license renewals online.

There are signs that Hong Kong's rising broadband penetration is beginning to be reflected in the types of applications that are used. One third of Internet users had accessed online entertainment in 2002, including over half of those between the ages of 10-24. This includes online gaming, music streaming and watching videos.

## 8. Conclusions

There are three key factors affecting broadband take-up in Hong Kong:

- As *competition* has intensified, prices have dropped sharply, particularly over the last year or so. In any case, Hong Kong's relatively high per capita income minimizes cost as a major barrier.

- Availability of broadband is high, a reflection of Hong Kong's compact urban geography and vertical habitation. If someone wants broadband, they can obtain it reasonably quickly. ADSL covers 95 per cent of the households and cable modem is available in 85 per cent of homes.

- Usage is intense with the frequent users (defined as those who had used Internet at least once a week) spending 11 hours a week on the Internet. According to a non-government survey, Hong Kong ranks second in the world in terms of the number of hours the average user is on the Internet. This heavy usage drives demand for fast, always-on Internet connections. A related factor is that Hong Kong has been connected to the Internet since 1991, which has allowed it to build up a base of savvy sophisticated users.

While some factors for Hong Kong's broadband explosion are tied to its unique situation (compact size, long period of time connected to the Internet), one factor that is replicable for other economies is the high level of competition. It is unlikely that there is this degree of broadband competition anywhere else in the world. There are 15 retail broadband providers in Hong Kong, resulting in intense competition for potential customers. As one broadband provider notes: "Competition is expected to be keener this year as the marketplace approaches *commoditisation*."[1] This commoditisation is reflected in stands set up in the street to hawk broadband Internet access as if it was apples or oranges. In order to entice potential users, providers offer everything from toasters to stereo equipment. In Hong Kong, broadband is no longer perceived as a luxury but a mass-market product. As a result, it is no longer a question of if users will get broadband but *when*. At current trends, virtually all of Hong Kong's Internet subscriptions will be broadband by the year 2005.

This rapid conversion to broadband has two implications. One is technological, the second social. Technically, the increasing penetration of broadband implies that the majority of Hong Kong's telecommunication traffic is IP-based. One wonders how

**Figure 8.1: Hawking broadband**

Broadband street sellers, near Wanchai Computer Centre, December 2002


*Source:* Michael Minges.

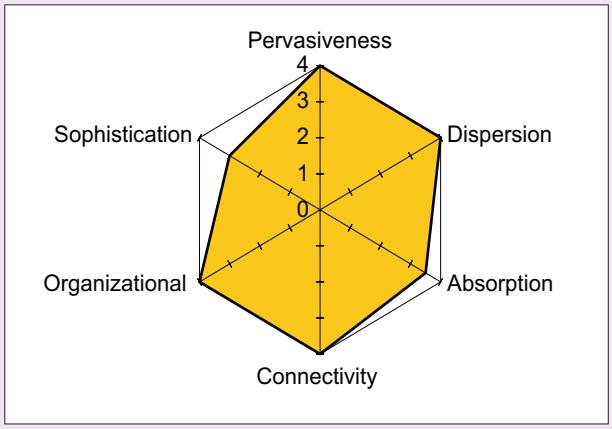
much longer it makes sense to maintain two different networks—the telephone network based on circuit switched technology and a second based on packet switched IP. At a certain point—perhaps 2005 when PCCW will have a fully IP network—the crossover to a packet data telecommunication network may take place. But for that to happen, much more work needs to be done in the area of provisioning IP-based voice services and providing IP-based terminal equipment (e.g., telephone sets).

The second implication revolves around the use to which broadband networks are put. Though broadband applications are available in Hong Kong, for the most part they are entertainment-based. Even for those applications, only one third of Hong Kong's users are using them. For the most part, usage of the Internet in Hong Kong revolves around the mundane—email, surfing web sites, etc.—with broadband mainly attractive because of its convenience (e.g., faster speed, not tying up the telephone line, always on). A snapshot of Hong Kong's e-readiness, as reflected in a widely used framework, shows that one of the few areas it does not obtain the highest ranking is sophistication of usage (see Figure 8.2). Much more work is needed to develop broadband applications and to entice users to use them. Once that happens, then Hong Kong will have transitioned from a broadband market to a broadband society.

**Figure 8.2: State of Internet in Hong Kong**

December 2002

| Dimension | Value |
|---|---|
| Pervasiveness | 4.0 |
| Geographic Dispersion | 4.0 |
| Sectoral Absorption | 3.5 |
| Connectivity Infrastructure | 4.0 |
| Organizational Infrastructure | 4.0 |
| Sophistication of Use | 3.0 |
| **TOTAL** | **22.5** |




*Note:* The higher the value, the better. 0 = lowest, 4 = highest.
*Source:* ITU.

[1] i-Cable Communications Limited. Annual Report 2001.

## Annex 1: List of meetings

| Date | Organization | Persons |
|---|---|---|
| Tuesday, 3 December 2002<br>10:00 am | i-Cable | Mr. Garmen K. Y. Chan, Vice President, External Affairs<br>Mr. Benjamin Tong, Executive Director, Multimedia Services |
| 3:00 pm | i-Cable | Ms. Cherie Lam, External Affairs Officer |
| Wednesday, 4 December 2002<br>10:30 am | PCCW | Mr. Dominic Leung, Executive Vice President, Consumer Marketing and Business Management<br>Mr. Allen Wong, General Manager, Product Development & Management<br>Ms. Irene Ho, Assistant Vice President, Corporate Communications |
| Thursday, 5 December 2002<br>9:00 am | Office of the Telecommunications Authority (OFTA) | Mr. M. H. Au, Deputy Director-General<br>Ms. Sara Lam, Senior Regulatory Affairs Manager |
| 2:00 pm | Hong Kong Broadband Network (HKBN) | Ms. Fion Fung, Director, Business Development, Broadband Network Services |
| Friday 6 December 2002<br>10:00 am | Census and Statistics Department (C&SD) | Mr. Yiu-choi Siu, Senior Statistician, Social Statistics Branch |

## Annex 2: Acronyms

| | |
|---|---|
| **ADSL** | Asymmetric Digital Subscriber Line |
| **ARPU** | Average Revenue Per User |
| **C&SD** | Census and Statistics Department |
| **ESD** | Electronic Service Delivery |
| **FTNS** | Fixed Telecommunication Network Services |
| **GPRS** | General Packet Radio Service |
| **HK$** | Hong Kong Dollar. Conversion rate used in this report is HK$ 7.8 = US$1. |
| **HKBN** | Hong Kong Broadband Network |
| **HKIX** | Hong Kong Internet Exchange |
| **IMT-2000** | International Mobile Telecommunication |
| **IP** | Internet Protocol |
| **LMDS** | Local Multipoint Distribution System |
| **Mbps** | Megabits per second |
| **MMS** | Multimedia Messaging Systems |
| **MVNO** | Mobile Virtual Network Operator |
| **OFTA** | Office of the Telecommunication Authority |
| **PCCW** | Pacific Century Cyber Works |
| **PDA** | Personnal Digital Assistant |
| **SMS** | Short Message Service |
| **WLAN** | Wireless Local Area Network |

## Annex 3: Bibliography

Census and Statistics Department. *Thematic Household Survey. Report No. 10. Information Technology Usage and Penetration.* December 2002.

Census and Statistics Department. *Hong Kong as an Information Society*. September 2002.

Census and Statistics Department. *Report on 2002 Annual Survey on Information Technology Usage and Penetration in the Business Sector*. November 2002.

City Telecom. *Annual Report 2002*. November 2002.

i-Cable Communications Limited. *2002 Interim Report*.

i-Cable Communications Limited. *2001 Annual Report*.

Hongkong Telecom. *Annual Report*. Various years.

PCCW. *Annual Report*. Various years.

Benjamin Tong. *Cable Broadband Development Study*. Presentation to ITU. 3 December 2002