The activities of ITU-BDT for Wireless Communications in Developing Countries

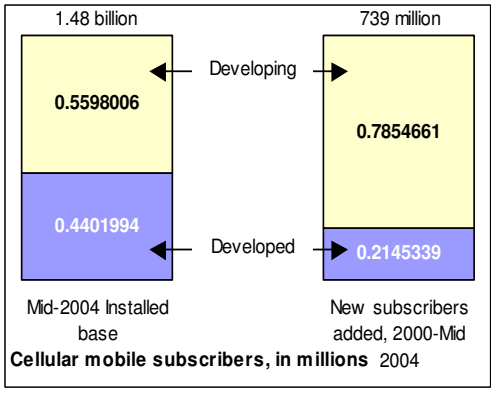
Regional Seminar on Broadband Wireless Access for rural and remote areas for Asia Pacific Region

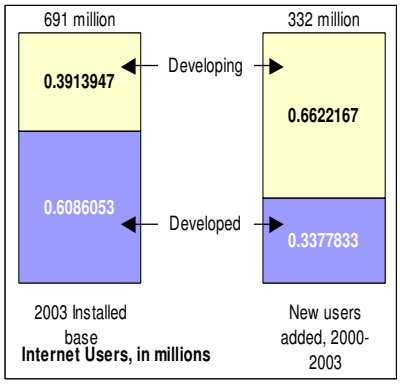
Shenzhen 1-2 September 2005

R. Passerini, ITU-BDT

Telecommunication Market size and growth

Number of Users and users added in mobile and Internet markets in developed and developing economies, worldwide





THE PORTABLE INTERNET AS A TOOL FOR BRIDGING THE DIGITAL DIVIDE

The digital divide problem

In recent years, as information and communication technologies (ICT) have become the backbone of the global information economy, increasing attention has focused on the gap in access to ICTs between developed and developing countries.

This gap has come to be known as the **"digital divide":** it is multifaceted, with the gap in access to technologies affecting rural and remote populations, females, children, the elderly, those with health problems and disabilities, ethnic minorities, the illiterate and poorly educated and others both within and between nations.

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The digital divide problem

Table 5.1: Where the divides lie
Overview of the main forms of the digital divide affecting individuals and countries

For individuals	For countries
Socio-economic status	Development stage
Gender	Infrastructure
Age, life stage	Public policy
Language/ethnic status	Skills mix
Rural/urban location	Size of domestic market
Skills balance	Location relative to trading partners

Source: Adapted from *"How real is the Internet market in developing nations?"* by Madanmohan Rao, at http://www.isoc.org/oti.articles/0401/rao.html

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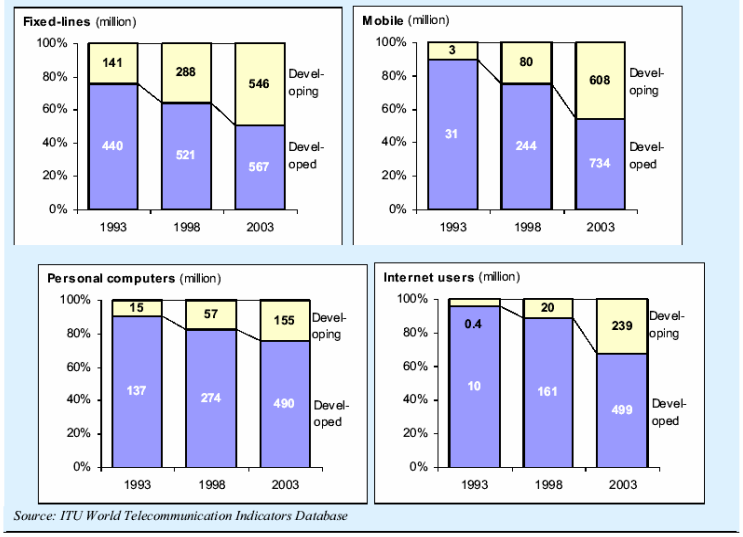
Figure 5.1: The shrinking digital divide
Percentage shares among developed and developing economies of fixed lines, mobile phones, personal computers and Internet users in 1993, 1998 and 2003



Source: ITU World Telecommunication Indicators Database

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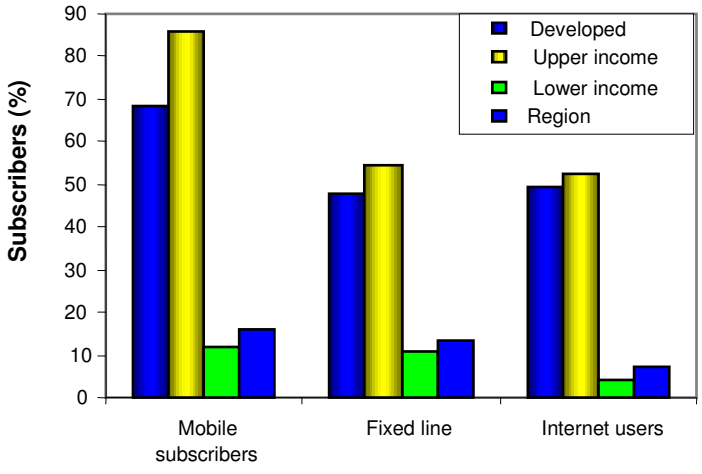
Asia-Pacific's digital divide

ICT penetration rates across Asia-Pacific region, 2003.



Source: ITU World Telecommunication Indicators Database.

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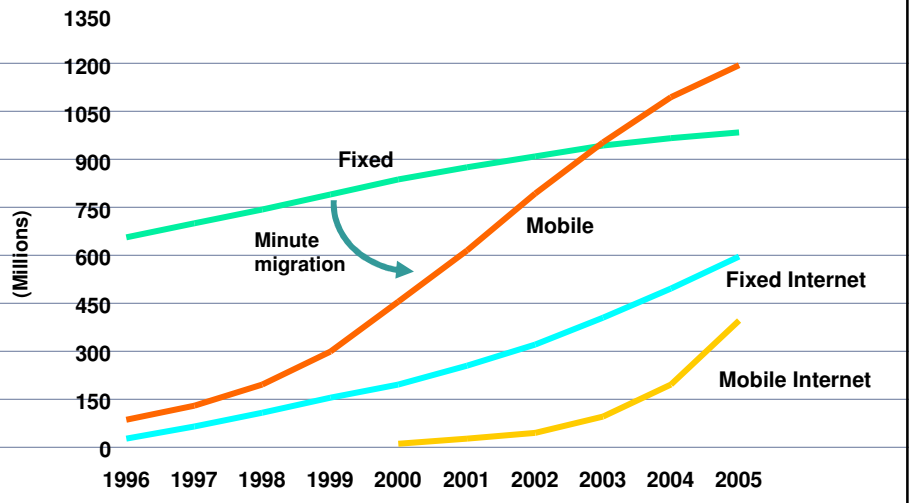
Subscriber Growth



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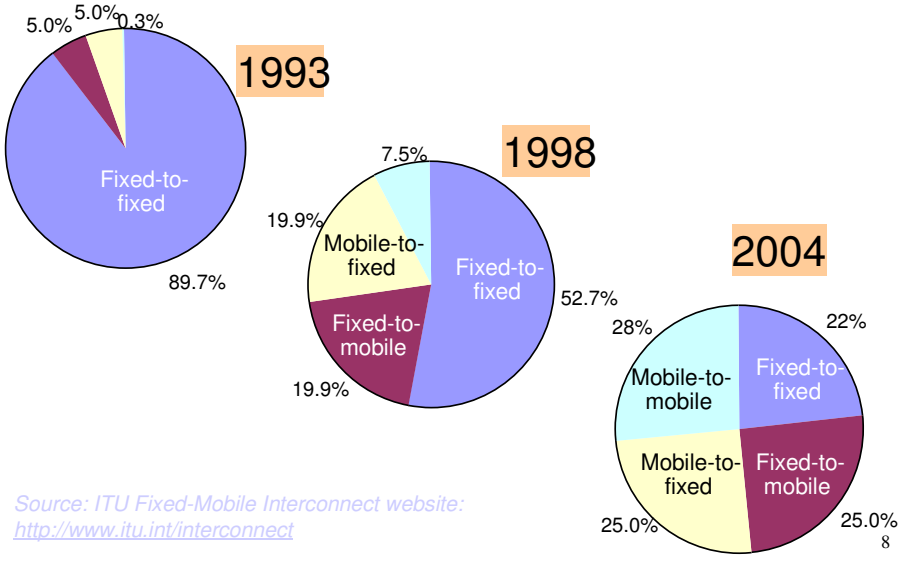
Calling opportunities worldwide



Source: ITU Fixed-Mobile Interconnect website: http://www.itu.int/interconnect

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The digital divide problem

Notwithstanding the growth in mobile penetration, portable wireless devices that are Internet-enabled, in other words the portable Internet, are a long way from being fully deployed in developed, **let alone developing areas of the world**.

Portable Internet-enabled devices could bring access to information and communication to huge numbers of the world's population who are currently without it.

If the mobile revolution is one day extended to include portable Internet-enabled devices at low cost to users, then a bright future can be imagined.

Widening access to basic infrastructure should help to reduce the other forms of divide. In this context, the portable Internet should be seen for the future promise it holds especially in developing countries and in rural and remote areas of the developed world.

Developed versus developing divides

The differences between developed and developing economies can be seen in the **level of penetration of different ICT services (telephone, mobile phone, Internet) and of personal computers**.

The gap between developed and developing economies has narrowed markedly, with particularly rapid progress in the case of mobile phones and Internet users.

With respect to mobile phones, the number of users in the developing world has grown from just 3 **million in 1993 to some 608 million a decade later. In the case of the Internet, the respective numbers are 0.4 and 239 million**

Developed versus developing divides

Nevertheless, given that the developing world accounts for more than **80 per cent of global population**, there is still along way to go to reduce the divide. Even if national populations were growing at similar rates, and current ICT growth rates were sustained, it would take at least ten years for this gap to be reduced.

But in reality, **developing country populations are growing faster than developed ones,** and they have a much higher percentage of their population under the age of 15. In reality, therefore, it will take **much longer to bridge the digital divide**.

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Developed versus developing divides

Furthermore, given that more than a billion of the world's developing country population lives on less than USD 2 per day, well below the generally accepted minimum level of income needed for ownership and use of ICTs, it is likely that the fundamental nature of the divide will persist unless there is profound change in basic socio-economic conditions.

Portable Internet may help speed up this process, by making ICT access more affordable and easier to deploy.
The current shift from circuit-switched to IP-based networks, and from fixed-lines to wireless, associated with the development of the portable Internet, **is likely to have a Positive effect , especially given that mobile is overtaking fixed even more decisively in developing countries than in developed ones.**

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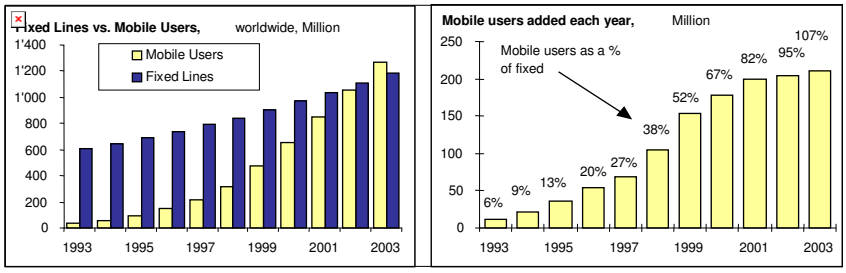
The growth of mobile cellular services

1993-1999 actual, with forecasts to 2003.



Source: ***ITU World Telecommunication Indicators Database and ITU forecasts in Trends in Telecommunications Reform, 2000 -2001: Interconnection Regulation .***

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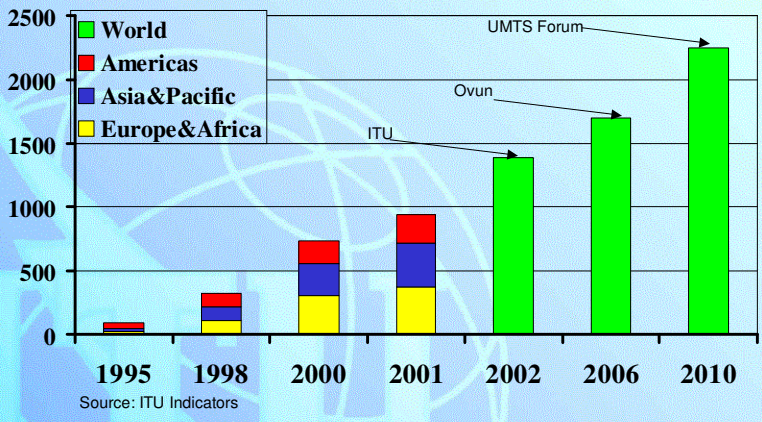
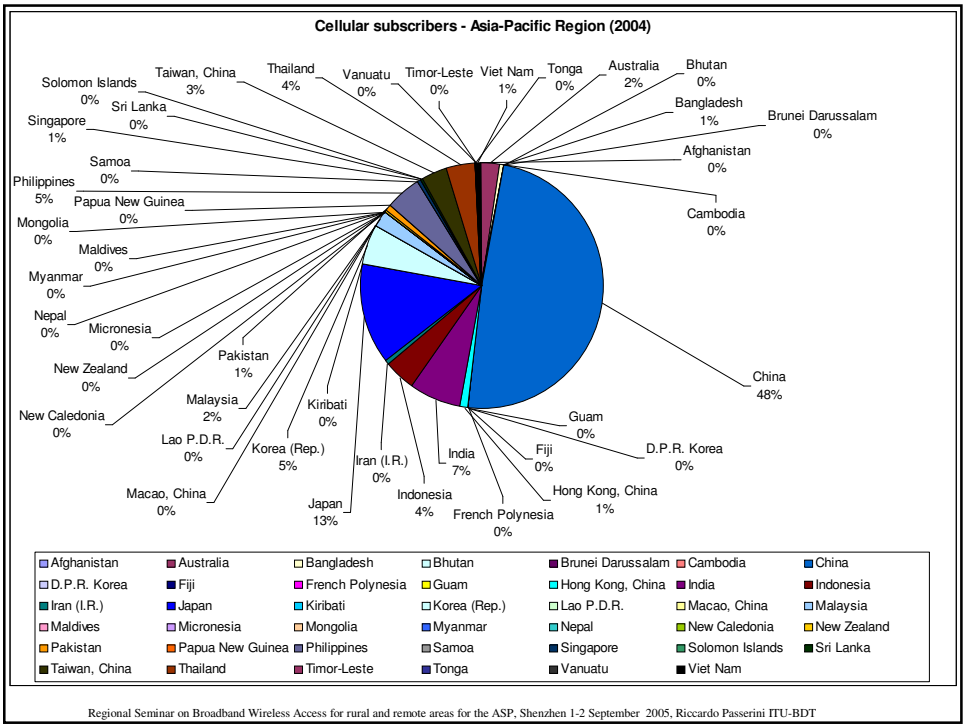
Trends – Mobile Growth (worldwide)

Cellular Subscribers (millions)

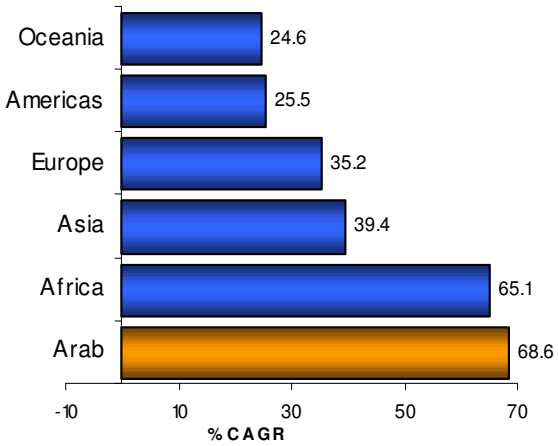


Source: ITU Indicators

Number of mobile subscribers already greater than fixed



Regional Mobile Growth: Compound Annual Growth Rate (CAGR) in mobile subscribers (%), 1998- 2003



CAGR: Compound Annual Growth Rate. The year over year growth rate applied to an investment or other part of a company's activities over a multiple-year period. The formula for calculating CAGR is (Current Value/Base Value)^(1/# of years) - 1.

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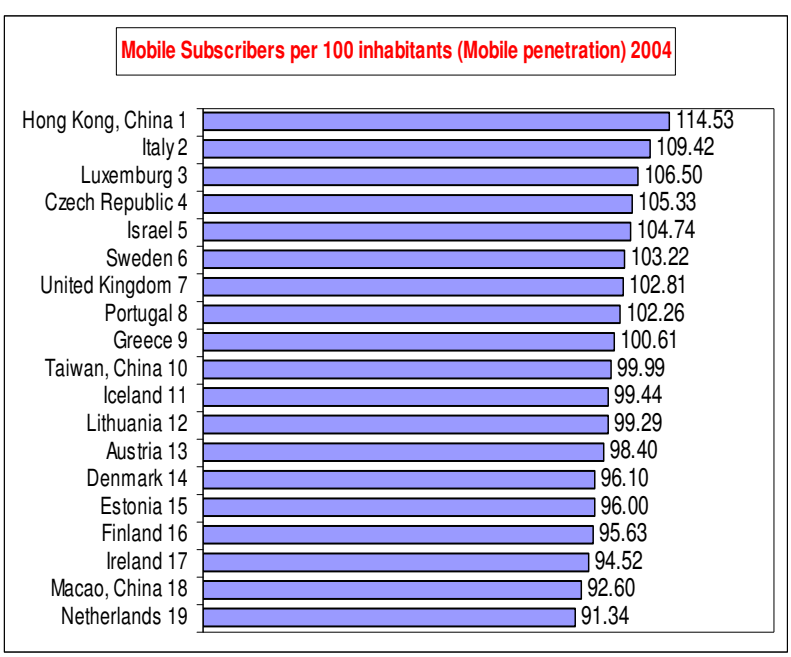
Mobile Subscribers per 100 inhabitants (Mobile penetration) 2004
Hong Kong, China 1 114.53
Italy 2 109.42
Luxemburg 3 106.50
Czech Republic 4 105.33
Israel 5 104.74
Sweden 6 103.22
United Kingdom 7 102.81
Portugal 8 102.26
Greece 9 100.61
Taiwan, China 10 99.99
Iceland 11 99.44
Lithuania 12 99.29
Austria 13 98.40
Denmark 14 96.10
Estonia 15 96.00
Finland 16 95.63
Ireland 17 94.52
Macao, China 18 92.60
Netherlands 19 91.34

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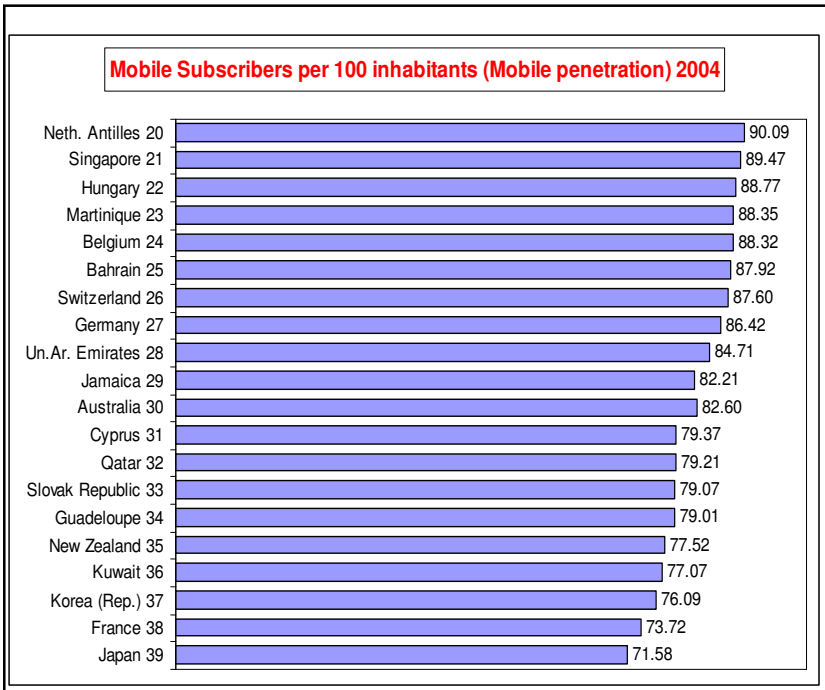
Mobile Subscribers per 100 inhabitants (Mobile penetration) 2004
Neth. Antilles 20 90.09
Singapore 21 89.47
Hungary 22 88.77
Martinique 23 88.35
Belgium 24 88.32
Bahrain 25 87.92
Switzerland 26 87.60
Germany 27 86.42
Un.Ar. Emirates 28 84.71
Jamaica 29 82.21
Australia 30 82.60
Cyprus 31 79.37
Qatar 32 79.21
Slovak Republic 33 79.07
Guadeloupe 34 79.01
New Zealand 35 77.52
Kuwait 36 77.07
Korea (Rep.) 37 76.09
France 38 73.72
Japan 39 71.58

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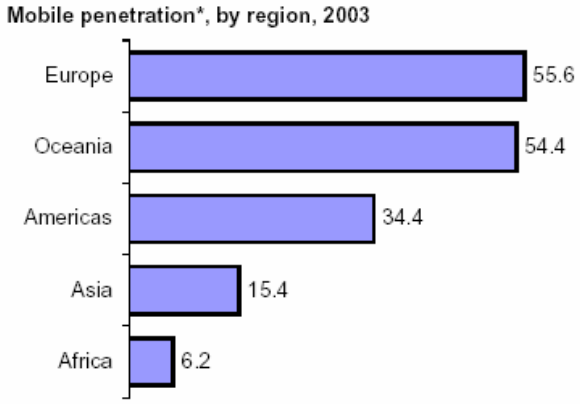

Source: ITU World Telecommunication Indicators Database

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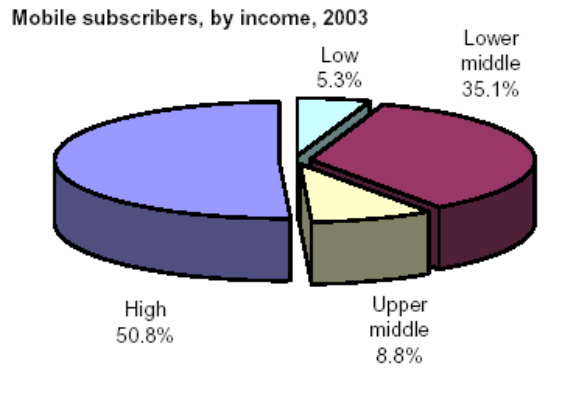

Source: ITU World Telecommunication Indicators Database

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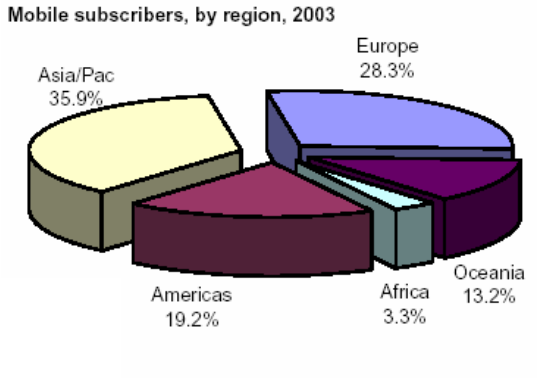

Source: ITU World Telecommunication Indicators Database

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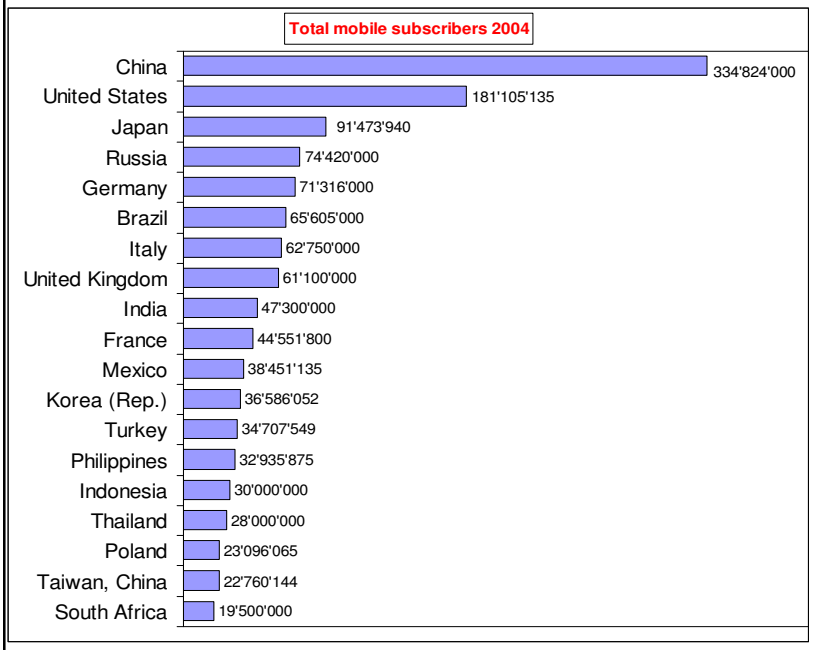

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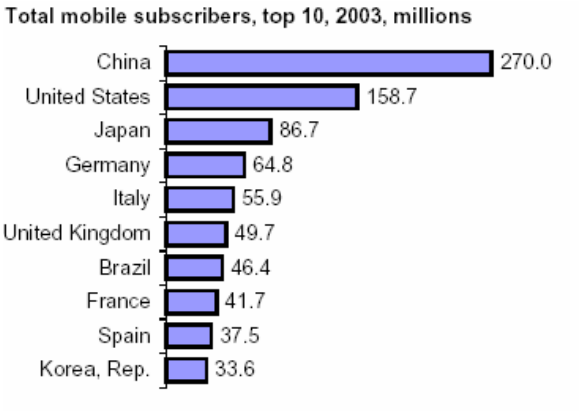

Source: ITU World Telecommunication Indicators Database

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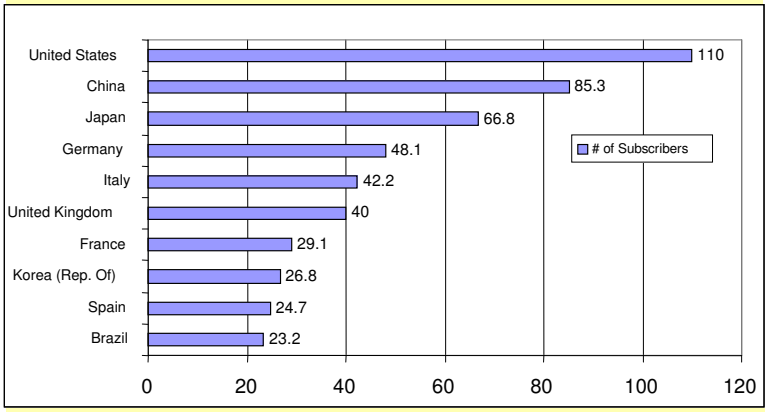
Figure 1: Top Mobile Economies (2000, millions)



Source: International Telecommunication Union

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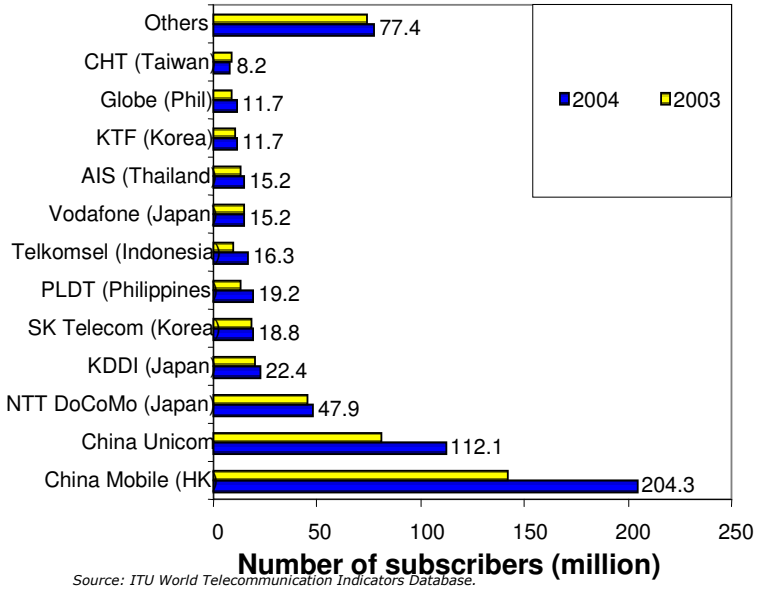
Mobile market *Cellular mobile subscribers for 12 largest operators, 2003 and 2004.*



Source: ITU World Telecommunication Indicators Database.

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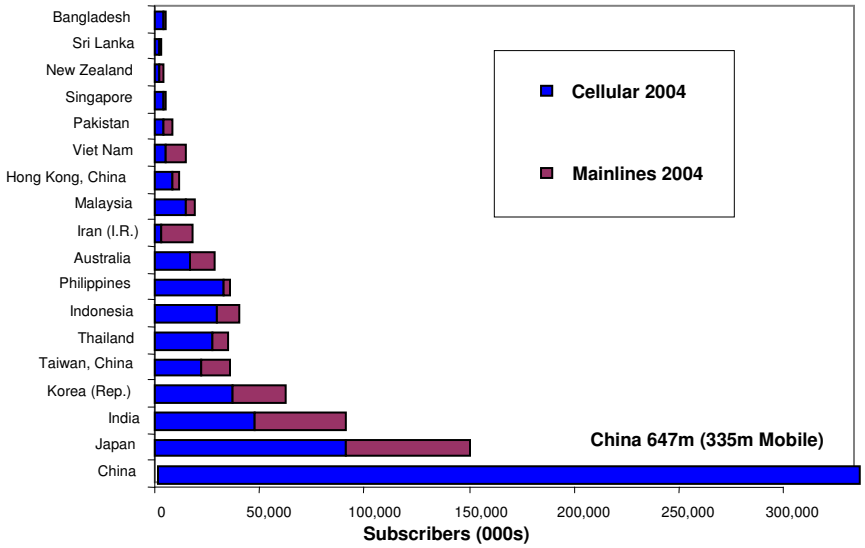
Telephone subscribers, in total (Fixed and Mobile)



Source: ITU World Telecommunication Indicators Database

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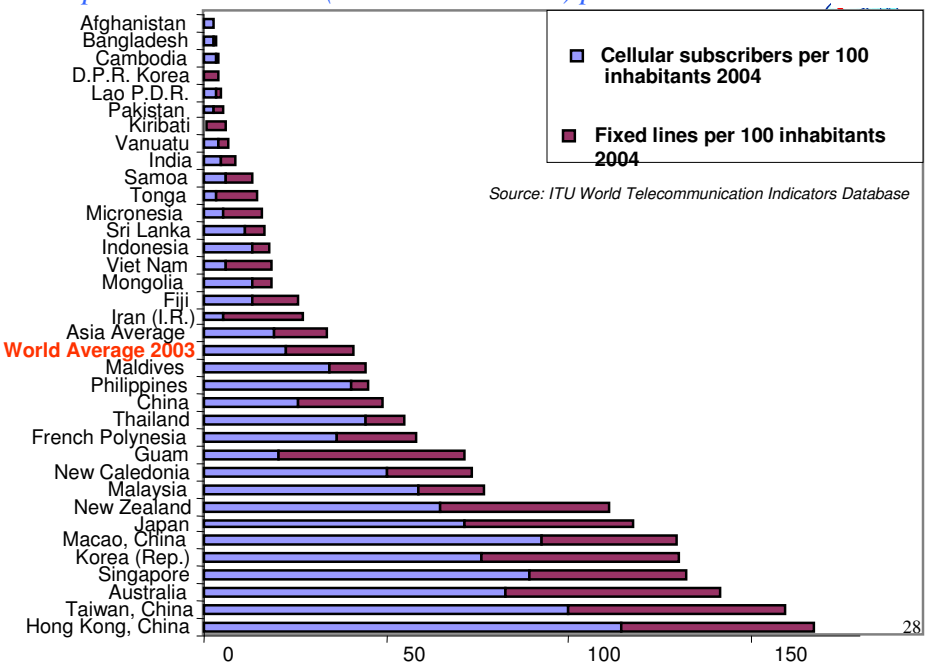
Telephone subscribers (Fixed and Mobile) per 100 inhabitants



Source: ITU World Telecommunication Indicators Database

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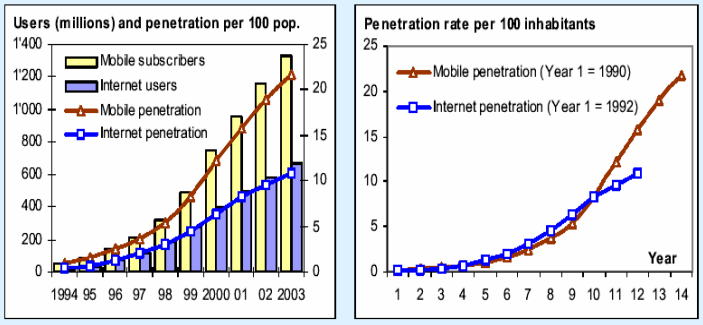
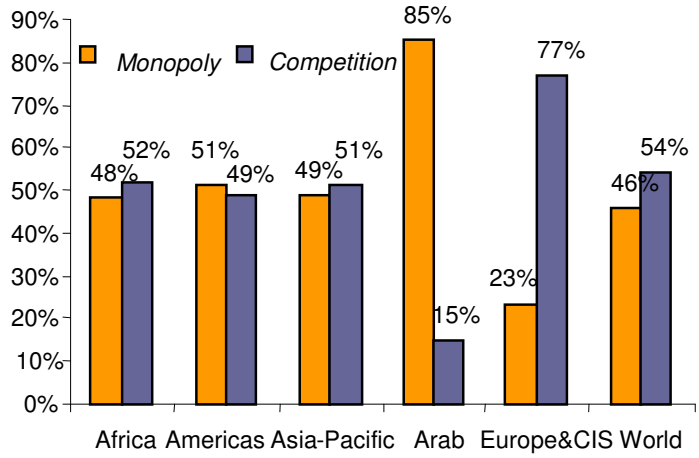
Figure 1.2: The stakes in play: The mobile and Internet sectors worldwide

Mobile and Internet users, worldwide, 1994-2003, and staggered penetration rates since 1990/92



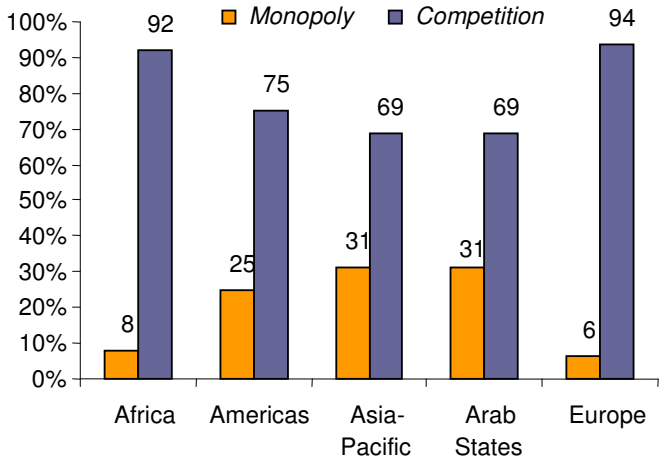
Source: ITU World Telecommunication Indicators Database

Competition in Basic Services



Source: ITU World Telecommunication Regulatory Database.

Competition Cellular mobile services



Source: ITU World Telecommunication Regulatory Database.

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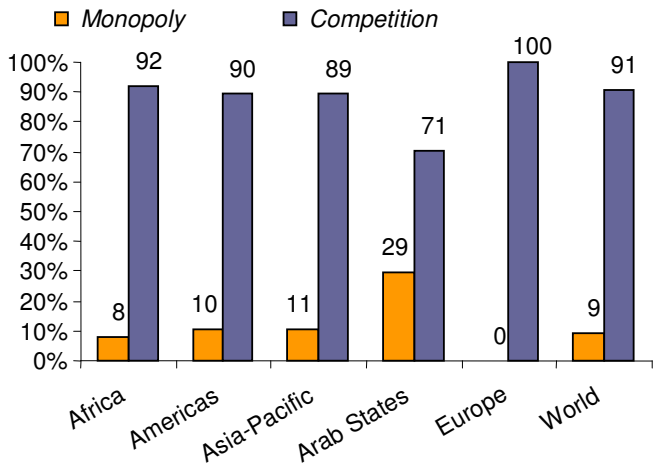
Competition Internet services



Source: ITU World Telecommunication Regulatory Database.

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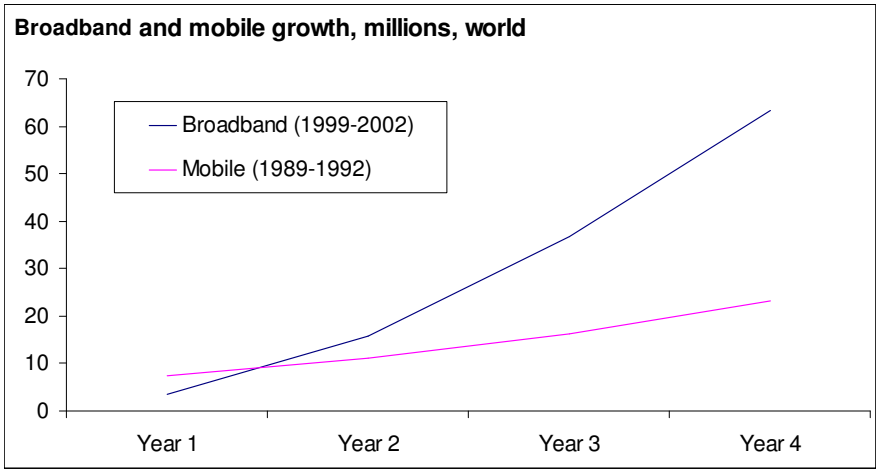
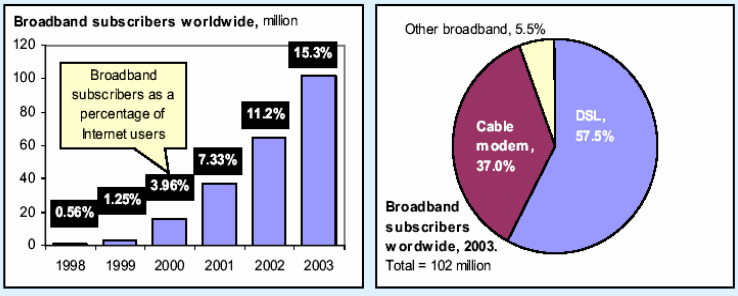
Growth of broadband



Source: ITU World Telecommunication Indicators Database

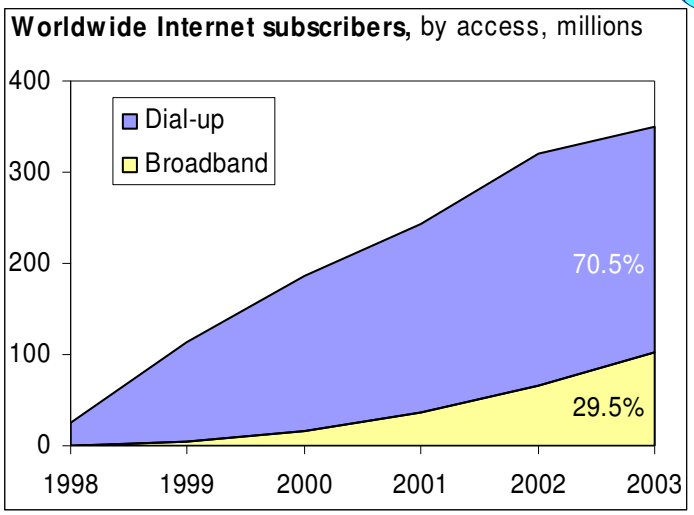
Growth of broadband

Figure 3.4: Broadband worldwide
Broadband subscribers worldwide, 1998-2003, and broken down by access technology, 2003



Note: "Other broadband" includes fibre to the home, metro Ethernet, wireless LANs, broadband by satellite etc.
Source: ITU World Telecommunication Indicators Database, OECD

Growth of broadband



Source: ITU World Telecommunication Indicators Database

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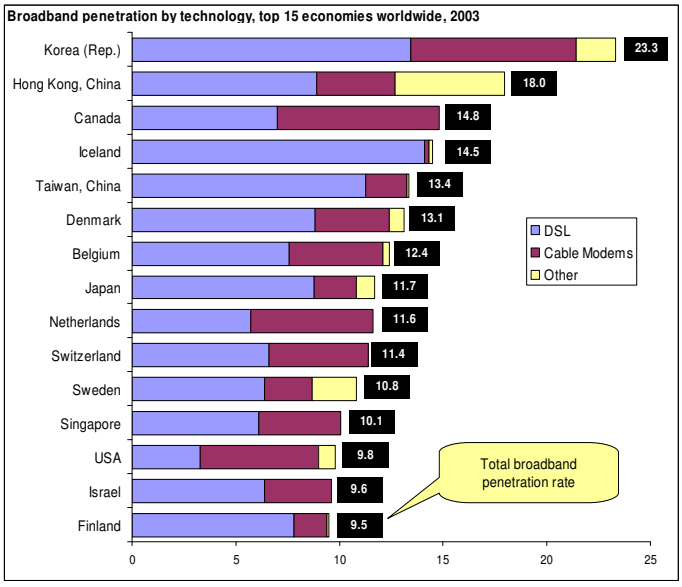
Growth of broadband



Source: ITU World Telecommunication Indicators Database

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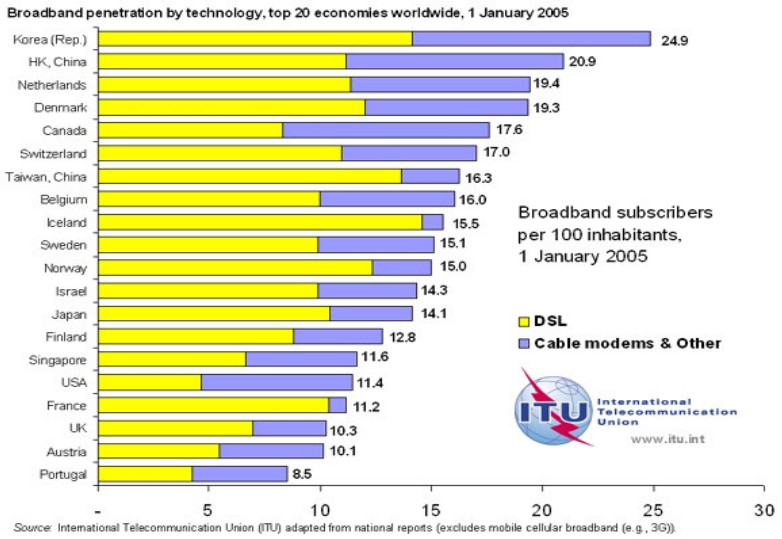
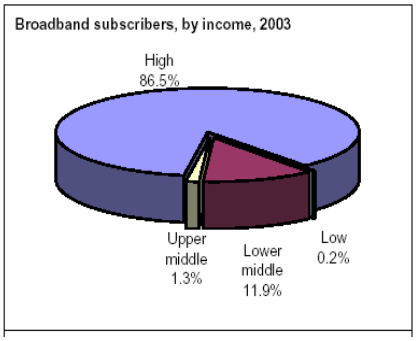
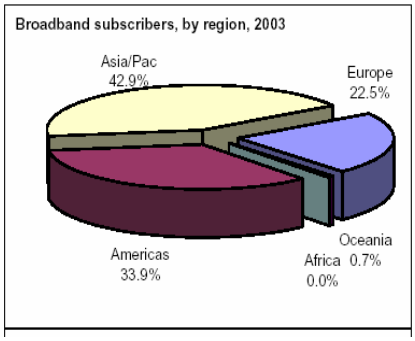
Broadband penetration



Growth of broadband

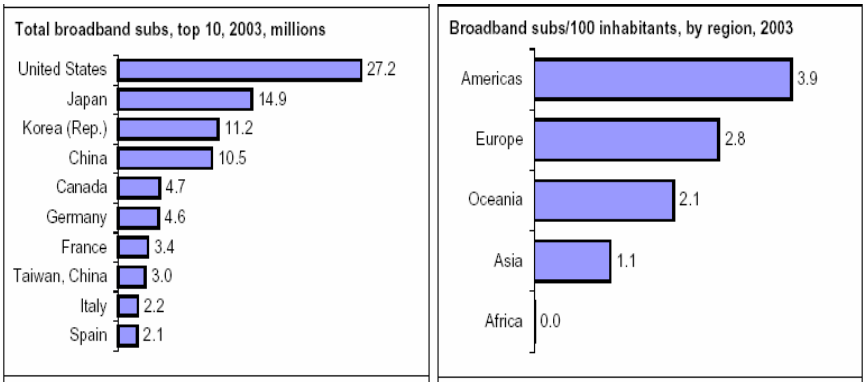
6. Broadband Subscribers





Source: ITU World Telecommunication Indicators Database

Growth of broadband



Source: ITU World Telecommunication Indicators Database

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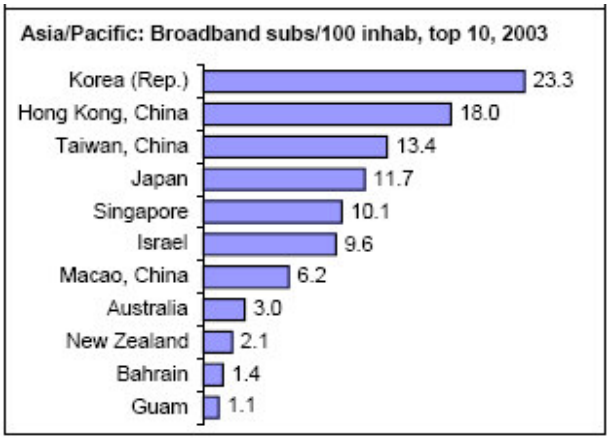
Growth of broadband



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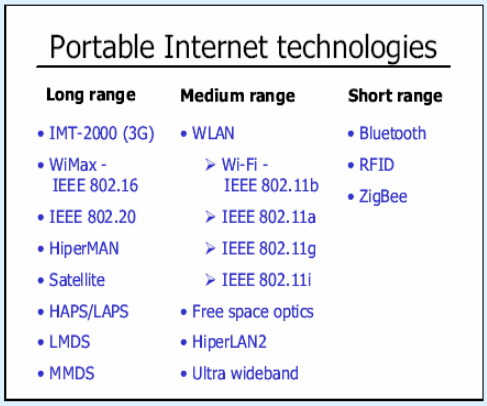
Wireless Broadband Technologies

Figure 2.2: Portable Internet technologies, by range
The portable Internet will involve a wide range of technologies for different speed and mobility needs



Source: ITU

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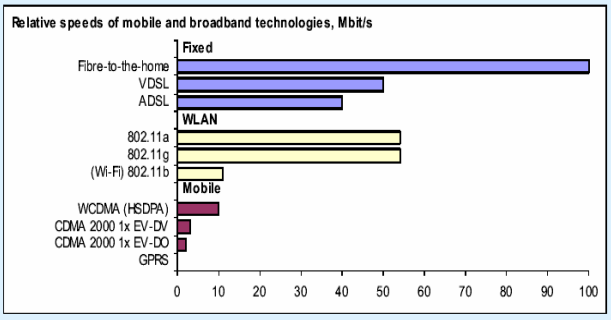
Broadband Technologies

Figure 2.1: Relative speeds of mobile and broadband technologies
Fixed connections are among the fastest connections available; WLAN technologies offer high-speed connectivity within a very small area of mobility and IMT-2000 (3G) technologies offer the lowest speeds with the highest degree of mobility



Source: ITU

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Deploying Wireless Broadband infrastructure

Technologies for narrowing the gap: IMT-2000

Existing 2G and 2.5G cellular networks provide a platform for slow-speed and medium-speed Internet access, as well as for voice. **But for higher speeds, advanced wireless technologies and techniques provide a platform for high-speed data access using Internet Protocol (IP).**

For developing economies, one of the most promising technologies may be WiMAX (IEEE 802.16), which offers high-speed connectivity over a range of up to 50 kilometres

Cellular mobile: IMT-2000 or third-generation (3G) mobile technologies

The number of mobile phone users in the world overtook the total number of fixed line subscribers in 2002.

With this tremendous **growth of mobile communications comes the possibility that the world's vast mobile networks can offer the most promising method of delivering the portable Internet to users.**

The great majority of the world is still using second-generation mobile networks, but IMT-2000 (3G) networks have begun to make their impact: there were 118 million 3G users in the world by mid-2004.

IMT-2000 or third-generation (3G) mobile technologies

In terms of Internet access, the data speeds for 2G networks were too slow to allow efficient connectivity for mobile phones.

In addition, a large number of inoperable mobile standards has made universal roaming throughout the world impossible. With these two issues in mind, the ITU started work on a new, global standard for third generation mobile communication.

This work culminated in the development of the IMT-2000 "International Mobile Telecommunications-2000" standard.

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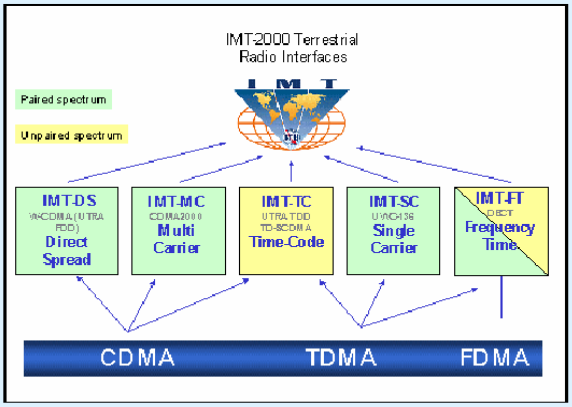
Box 2.3: IMT-2000 (3G) and beyond
Looking towards the next generation of networks

The IMT-2000 project harmonized the standards for third-generation networks with three different access technologies using five different radio interfaces (see graphic below). However, even as network operators proceed with rolling out IMT-2000 networks, work in also proceeding to develop faster, higher capacity networks for future mobile connectivity, known as "Systems beyond IMT-2000" or 4G. The World Telecommunications Standardization Assembly (Montreal, 2000) created a Special Study Group (SSG) to study of four questions regarding network signalling and protocols that can enable next-generation mobile services. Future work on Systems beyond IMT-2000 will help ensure that mobile networks will provide fast data access and reliable multimedia transmission at high mobile speeds.



Note: For acronyms, see Glossary.
Source: ITU

What is IMT-2000?

IMT-2000: International Mobile Telecommunications-2000 for Data & Multimedia Services, set of globally harmonized standards for third generation wireless communications (3G)

They will provide access, any time and anywhere, by means of one or more radio links, to a wide range of telecommunications services supported by the fixed telecommunication networks (e.g. PSTN/ISDN/IP), and to other services which are specific to mobile users.

A range of mobile terminal types is encompassed, linking to terrestrial and/or satellite based networks, and the terminals may be designed for mobile or fixed use.

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Key features of IMT-2000 (1)

High degree of commonality of design worldwide

Compatibility of services within IMT-2000 and with the fixed networks

Provisioning of these services over wide range of user densities and coverage areas (In-building, Urban, Sub-urban, Global)

High quality, high speed access 144 Kb/s, 384 & 2Mbit/s fast wireless access to Internet

Across Networks, across Technologies using a small pocket terminal for worldwide use

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Key features of IMT-2000 (2)

worldwide roaming capability

capability for multimedia applications, and a wide range of services and terminals.

efficient use of radio spectrum consistent with providing service at acceptable cost

IMT-2000 shall cover application areas presently provided by separately systems i.e cellular, cordless and paging etc.

A MODULAR STRUCTURE WHICH WILL ALLOW THE SYSTEM TO GROW IN SIZE AND COMPLEXITY

Key features of IMT-2000 (3)

- **SINGLE UNIFIED STANDARD (Data & Multimedia Services)**

  ACROSS NETWORKS, ACROSS TECHNOLOGIES, SEAMLESS OPERATION USING A SMALL POCKET TERMINAL WORLDWIDE.

- **HIGH SPEED ACCESS 144KB/S, 384 KB/S & 2MB/S FAST WIRELESS ACCESS TO INTERNET**

- **FULL MOTION VIDEOPHONE**

- **TERRESTRIAL & SATELLITE COMPONETS**

IMT-2000 Will provide

- Simultaneous transfer of speech, data, text, pictures, audio and video
- High-speed, mobile access to Internet
- Entertainment on demand (movies, Music..)
- Video-conferencing
- Mobile-commerce
- Travel information (roads, flights, trains,…)

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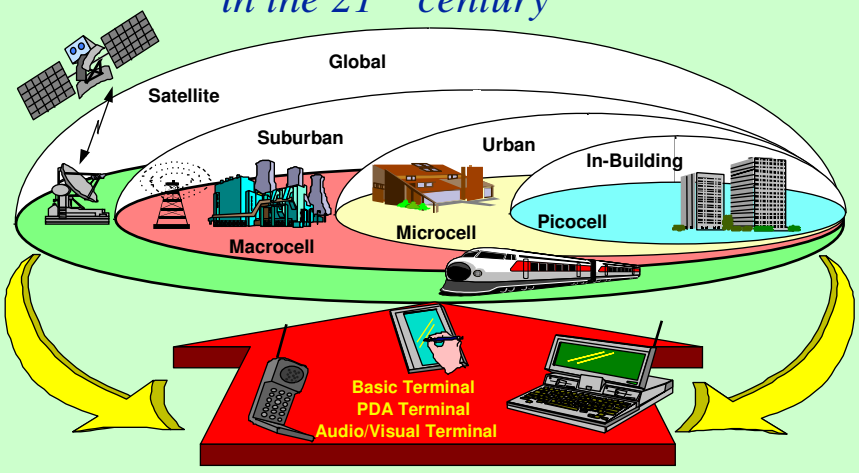
IMT-2000

The ITU vision of global wireless access in the 21 st century



Regional Seminar on Broadband Wireless Access for rural and remote areas for the ASP, Shenzhen 1-2 September 2005, Riccardo Passerini ITU-BDT

Technologies for narrowing the gap:Fixed Wireless Access

IMT-2000 technologies will cover the highly mobile **but lower speed portions of the portable Internet while fixed wireless technology will fill the niche of high-speed, long distance, but stationary connectivity.**

However, **fixed wireless connections are currently being promoted as replacements for wired broadband connections**.

The key role of **fixed wireless technologies in the portable Internet will probably remain as a cost-effective high-speed backhaul connection to a city, village, or even a community access centre.**

Technologies for narrowing the gap:Fixed Wireless Access

Fixed wireless systems have been slow to gain ground when compared with traditional, wired high-speed connections.

However, **a new set of technologies is promising to change wireless adoption the same way Wi-Fi has changed localized Internet access. Two promising new developments, WiMAX, IEEE 802.16 and IEEE 802.20 are competing to become the new standard for fixed wireless.**

In fact, both are promising something that previous fixed wireless technologies have not allowed, that is to say **mobility (Regulatory aspect, Technical aspects).**

Technologies for narrowing the gap: Fixed Wireless Access

In addition to the wide geographical range, **WiMAX also promises to be relatively quick, easy and cheap to install.** A particular advantage with WiMAX is that the main investment burden falls on users rather than network or service providers, or the government.

Start-up costs are thus much lower and investment burden is more widely shared. WiMAX networks are characterised by relatively low sunk costs and networks can grow "organically", as more users join the network. **The spectrum costs for WiMAX are also likely to be much lower than for IMT-2000.**

Fixed-wireless as a formula for low-cost Internet access

Fixed Wireless Access is and option that can ensure greater user affordability, particularly by virtue of low-cost installation and roll-out, and the use of licence-exempt frequencies.

Fixed wireless systems use a small, inexpensive microwave antenna that is attached to a local radio network at the customer premises and their provision costs are far less than digging up the earth to install copper-based cables. **They can be employed as an efficient and cost-effective method for bypassing the last-mile of the existing telecommunication network.**

Fixed-wireless as a formula for low-cost Internet access

They are also cheaper to install in countries with rugged terrain—as long as line of sight is available. Along with low-cost equipment and installation, the relative lack of regulation over the supply of fixed wireless also presents a considerable cost advantage.

However, for developing countries in particular, the potential loss of revenues received by the incumbent operator and resulting loss of taxes, is an issue that needs to be taken into consideration.

Fixed wireless systems have been deployed in a number of countries, each addressing particular needs and requirements

WLAN (Wireless Local Area Networks)

Fixed-line broadband connections offer the fastest speeds but are confined to wired connections.

However, a subset of wireless technologies, WLANs, is expanding the reach of broadband in the **100-metre range.**

The WLAN market is currently dominated by one technological standard, **IEEE 802.11b (commonly known as Wi-Fi),** though several new variations are quickly gaining popularity.

WLAN (Wireless Local Area Networks)

Table 2.1: Wi-Fi ranges
The various ranges of Wi-Fi in different environments

	Range	
Environment	**Maximum**	**at 11Mbit/s**
Outdoors / open space with standard antenna	225-300 m	45-100 m
Office / light industrial setting	75 - 100 m	30-45 m
Residential setting	40-60 m	20-25 m

Source: The Wi-Fi Alliance at: http://www.weca.net

WLAN (Wireless Local Area Networks)

While medium-range technologies offer higher bandwidth it comes at a cost, reduced mobility. Medium range technologies are often given the name **"portable"** rather **than "mobile"** since they are essentially a fixed connection that can be transported.

Medium-range connections can be used within a large radius of a transmitter, making the connection portable. **However, the ability to easily maintain a connection while moving (mobile) has been elusive**

Wi-Fi: Cheap, unregulated and unlicensed broadband

The advantages of **Wi-Fi for increasing wireless access** include the fact that it can be built from the bottom up, **by small and local entrepreneurs.** Each telecommunication operator can provide services within the local community simply **by purchasing the basic radio equipment and transmitting on these unlicensed frequencies.**

The model is relatively inexpensive, responsive to local needs and realities, able to grow organically and fully scalable. It can also create employment, especially where the provision of Wi-Fi service is combined with sale of other services (e.g. mobile prepaid recharges, photocopying, etc.). As the number of local providers increases, so does the overall capacity of the network. Each new operator increases the number of pathways between any two points.

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Wi-Fi: Cheap, unregulated and unlicensed broadband

However, there are a number of **constraints with WLANs, most notably the small cell size, which may not be appropriate in rural areas.** Furthermore, while WLANs may be cheap to roll-out, **installing and operating conditional access and billing systems may be more expensive.**

For these reasons, it is more likely that **WLANs would be used in developing countries not as a standalone service, but in conjunction with another technology,** like WiMAX, DSL or Very Small Aperture Terminals (VSATs).

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Wired vs Wireless Broadband technologies

- At the present time, **wired broadband technologies can transport much more data than wireless technologies.**
- Fibre optic technologies are currently capable of 10 Gbit/s over one wavelength, and fibre should be able to support multiple wavelengths.
- **Wireless technologies, available to consumers, have recently been shown to reach 54 Mbit/s but only over short distances, and still with nearly 200 times less bandwidth than a single fibre strand**.

Wired vs Wireless Broadband technologies

The vastly superior speeds of wired connections mean they will continue to play a key role in providing high-bandwidth applications. Wired connections, where they are available, will be a vital element for high volume and low-cost data transportation.

For the foreseeable future, **wired and wireless technologies are likely to be complementary**, at least in the urban markets of the developed world

On the other hand, **wireless technologies may offer an effective way for countries without extensive fixed-line infrastructure to catch up**, and possibly "leapfrog" over other countries in terms of total connectivity.

Wired vs Wireless Broadband technologies

Residences subscribe to broadband via a fixed connection but then share the connection within the house or apartment via Wi-Fi. Businesses using WLANs almost always rely on wired infrastructure to reach their ISP.

Therefore, **instead of Wi-Fi competing against fixed-line broadband infrastructure, the two work together as complementary technologies.** Fixed broadband connections become more cost effective and attractive to users when they can be shared and Wi-Fi makes this possible.

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Wired vs Wireless Broadband technologies

The second area of possible competition of newer portable Internet technologies is **with third generation (3G or IMT-2000) mobile.** As of mid 2004, there were around 118 million 3G subscribers worldwide (compared with around 58 million a year earlier).

Some of the functionality that 3G offers is very similar to that which could be potentially offered by portable Internet technologies, **though 3G may still be preferred for use in fast moving vehicles.**

Furthermore, **although 3G may offer better coverage**, the start-up costs of providing nationwide coverage for **3G are likely to be much higher than a hybrid portable Internet solution based on a WiMAX backbone and a Wi-Fi local loop.** The main difference affecting the cost is the size of cells (much smaller for 3G than for WiMAX) and the requirement for

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Wired vs Wireless Broadband technologies

The high costs of acquiring licences and rolling out the network are part of the reason why 3G has been slow to arrive

But the main area of competition relates to tariff structures (see pricing discussion below). Mobile operators approach the provision of Internet services from the starting point of per-minute voice tariffs, **whereas portable Internet service providers approach it from the starting point of "always-on", flat-rate Internet tariffs.** In any like-for-like competition, flat-rate tariffs are always likely to be preferred in the marketplace over per-minute pricing strategies.

This is one of the reasons why 3G service providers, notably in Japan are moving towards flat-rate tariffs.

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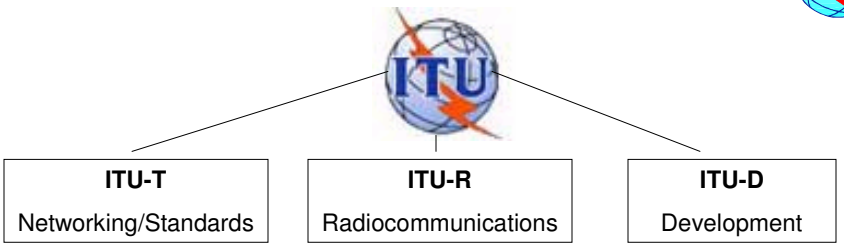
ITU Structure



ITU-D manages two study groups:

- These groups serve as a forum for developing and developed countries and public and private sector organizations to meet with the purpose of devising innovative solutions which address specific problem areas as identified by the World Telecommunication Development Conference (WTDC-02 Istanbul).
  1. Study Group 1: Telecommunication development strategies and policies (regulatory)
  2. Study Group 2: Development and management of telecommunication services and networks (technical)

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World Telecommunication Development Conference (WTDC)

- normally held every four years: WTDC 2002 in Istanbul, next WTDC in 2006
- fix objectives and strategies for worldwide and regional development of telecommunications
  - priority to expansion and modernization of networks and mobilization of resources to boost telecommunication penetration and access in the world's poorer countries.
- review progress made in telecommunication development in developing countries
- promote the international cooperation
- provide direction to BDT
- establish ITU-D study groups

ITU-D Study Groups

- ITU-D not involved in technical standardization so manages only two study groups
  - serve as **forum for developing and developed countries**, and public and private sector organizations to meet
  - purpose: devise innovative solutions to address specific problem areas as identified by WTDC
- study focus: telecommunications development strategies
- **SG 1 - Telecommunication development strategies and policies**
- **SG 2 - Development and management of telecommunication services and networks**

INTERNATIONAL TELECOMMUNICATION UNION
Telecommunications Development Bureau (BDT)

Results of World Telecommunication Development Conference

Istanbul, 18-27 March 2002

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Results of WTDC-02 related to IMT-2000

The recent ITU World Telecommunication Development Conference WTDC-02 (Istanbul, 18-27 March 2002), approved the following texts related to IMT-2000:

- **Resolution 43** (WTDC-02): Assistance for implementing IMT-2000

-**Question 18/2**: Strategy for migration of mobile networks to IMT-2000 and beyond

-**Programme 2, point 1.4**: Mobile terrestrial communications

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Question 18/2: Strategy for migration of mobile networks to IMT-2000 and beyond

3 Expected output

A guideline for smooth migration, including system interoperability among third-generation technologies, with proper collection, analysis and periodic dissemination of relevant data from relevant groups within ITU and those outside (operator groups for mobile services, etc.).

Guidelines on a Smooth Transition from 2G to IMT-2000 for Developing Countries

- From 2G to 3G: Special needs of Operators, Regulators and Users in developing Countries
- Spectrum Requirements and Licensing Aspects
- Transition Paths
- Economics of Transition to IMT-2000
- Business Plan and Analysis
- Operator Experience in Transitioning to IMT-2000 System

Programme 2, point 1.4: Mobile terrestrial communications

In addition to Resolution 43 and Question 18/2, the Istanbul Action Plan for the ITU Telecommunication Development Sector adopted by WTDC-02, in its Program 2 (Technologies and Telecommunication Network Development) point 1.4 dealing with "Mobile terrestrial communications, states that:

1.4 Mobile terrestrial communications

Mobile communications tended to be developed and implemented at the national or regional level, with little thought for global interconnection. The result is a wide range of technical standards which use many parts of the radio-frequency spectrum - analogue and digital cellular phones, pagers, cordless telephones, mobile data systems, wireless local area networks and the new breed of satellite-based mobile telephones, to name just a few. Incumbent mobile operators do not want to have to discard their entire existing infrastructure; rather, they prefer a new system, which can coexist and interoperate with the present one and act as an adjunct to it. Therefore, because of both the explosive growth of second-generation mobile systems, network development and migration to third-generation networks (IMT-2000) and beyond, high priority will be accorded to mobile communications within this programme. Information will be also provided on mobile systems operating below 600 MHz, which are of particular interest to some developing countries."

IMT-2000 BDT Database

Home : ITU-D :**http://www.itu.int/ITU-D/imt-2000/index.html**

BDT Activities

- ITU BDT activities and Seminars related to IMT-2000
- ITU Handbook on Deployment of IMT-2000 Systems
  - Structure and Content
  - On-sale publication
- Direct Assistance on mobile communications
  - Third GSM License in Kenya

ITU-D Studies and Activities

- Question 18/2 (ITU-D SG2 – Strategy for migration of mobile networks to IMT-2000 and beyond
- List of documents: Question 18/2
- List of documents: ITU-D SG2
- WTDC-02 Results – Resolution 43

Policy and Regulations

- Licensing

Other IMT-2000 Activities at ITU

- IMT-2000 ITU Homepage
- Radiocommunication Bureau (ITU-R)
- Standardization Bureau (ITU-T)
- ITU Strategy and Policy Unit (SPU)

Operations

- Status of IMT-2000 Deployments

Related Links

- Useful Links

Case Studies

ITU-BDT Broadband Activities

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Developing Regions

•Growing demand for Broadband

•Lack of Wireline infrastructure needed to meet the growing demand for Broadband

•BWA, economical and easy to install, is a good high-performance solution to address the needs of these Regions

•Availability of Broadband Services in Rural and Remote areas can address a variety of challenges posed by the distance

ITU-D Broadband Activities Presentation Agenda

- ITU-D Introduction
- Question 20-1/2: Broadband Access Technology
- Results of Questionnaire: Factors affecting broadband deployment
- Strategies to Promote Broadband
- Invitation to Participate

ITU-D Study Group 2 Question 20-1/2
Broadband Access Technologies

•**Approved at World Telecommunications Development Conference 2002:**
–Identify the technical, economic, and development factors influencing the effective deployment of broadband access technologies and applications.

•**Technology Scope:**
–All broadband technologies- as inclusive as contributions permit.

•**Draft Report (to be finalized by July 2005) currently available on ITU-D website:**
– **3 sections: 1) General broadband matters; 2) Technology Matrices, 3) Country experiences**
–**General broadband matters:**
•Social and Economic Benefits of Broadband
•Broadband Applications
•Broadband Deployment
•Strategies to Promote Broadband Development
–**Technology Descriptions:**
•Wireline: DSL, Cable, Fiber to the Home, Powerline, etc
•Wireless: Satellite, FWA, WLAN, IMT-2000, etc.
•Non-Standardized Technologies

Broadband Questionnaire Sent March 2003

- Questionnaire Aims:
  - Identify relevant wireless and wireline broadband access technologies and their attributes.
  - Identify economic, technical and development factors influencing deployment and accessibility of broadband.
  - Look at pricing trends for broadband access.
- Responses:
  - 58 Respondents from 52 countries from all ITU regions
  - American respondents include Barbados, Bolivia, Brazil, Canada, Chile, Costa Rica, Dominican Republic, Ecuador, Guyana, Honduras and Peru
  - Analyzed by ITU-D Secretariat External Consultant

Main Findings of Broadband Questionnaire (1/2)

- No regionally dominant broadband technology.
- DSL is dominant wireline broadband technology, followed by cable and E1/T1.
- Satellite, fixed wireless, WLAN and IMT-2000 are leading wireless broadband technologies.
- Fastest growing broadband platform identified as wireless.
- Business applications are the main adoption drivers – though personal use was a close secondary driver in both developed and developing countries.
- Huge differences exist between developed and developing nations in access to broadband services; even more pronounced in rural areas.
- Gender barriers to broadband exist mainly in lack of training and economic resources.
- The majority of respondent countries do not provide loans or support to enable broadband deployment.
- Many countries offer free broadband access through public centers.

Main Findings of Broadband Questionnaire (2/2)

- Price for broadband access on average 5 times higher in Africa than in Europe.
- Deployment costs followed by lack of demand for broadband services were identified as two largest barriers to broadband deployment.
- Of issues limiting spread of broadband, the most common was that the monthly fee was too high.
  - Other factors identified were insufficient demand to justify infrastructure costs, high installation costs and lack of access to personal computers.
- Lack of awareness is another factor limiting broadband deployment.
- Lack of regulatory framework conducive to network build out also negatively affects broadband deployment.
- Those countries w/ large rural areas and dispersed rural populations are among those facing the greatest difficulties in raising finances for broadband build-out.

Conclusions: Strategies to Promote Broadband (1/2)

In order to promote demand for broadband deployment, governments and businesses private sector can aim to:

- Increase broadband availability in schools, and other public centers (increases awareness of broadband benefits).
- Educate users on successful applications such as IP telephony, video chat, audio over broadband.
- Promote teleworking, e-health, e-learning, and e-government transactions (such as filing of tax forms and other administrative procedures).
- Encourage content development in local languages.
- Ensure regulatory environment protects intellectual property rights and user security.
- A competitive market structure is vital to sustain low prices in order to attract consumers.
- Support for research and development on broadband technologies and applications.

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Conclusions: Strategies to Promote Broadband (2/2)

In order to promote broadband supply, governments and businesses can aim to:

- Create incentives for competition both among providers of the same broadband technologies, and between providers of different broadband technologies.
- Establish policies that allow service providers the flexibility to independently choose technologies based on commercial and competitive considerations.
- Promote use of existing infrastructure to enable broadband rollout while at the same time encouraging new investment
- Utilize schools, hospitals, and community access centers as effective anchors for broadband demand in areas where individual household connections are not yet viable.
- Consider wireless broadband as a viable community alternative to fixed line solutions such as broadband via DSL or cable modem.
- Participate at all levels: national, regional and city-wide initiatives and community participation projects have been successful in expanding access.
- Particularly for rural and underserved areas, consider potential economic incentives for broadband build-out such as tax credits, grants for community planning efforts, subsidized or low-interest loans.

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