Global technology trends

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International Telecommunication Union (ITU)

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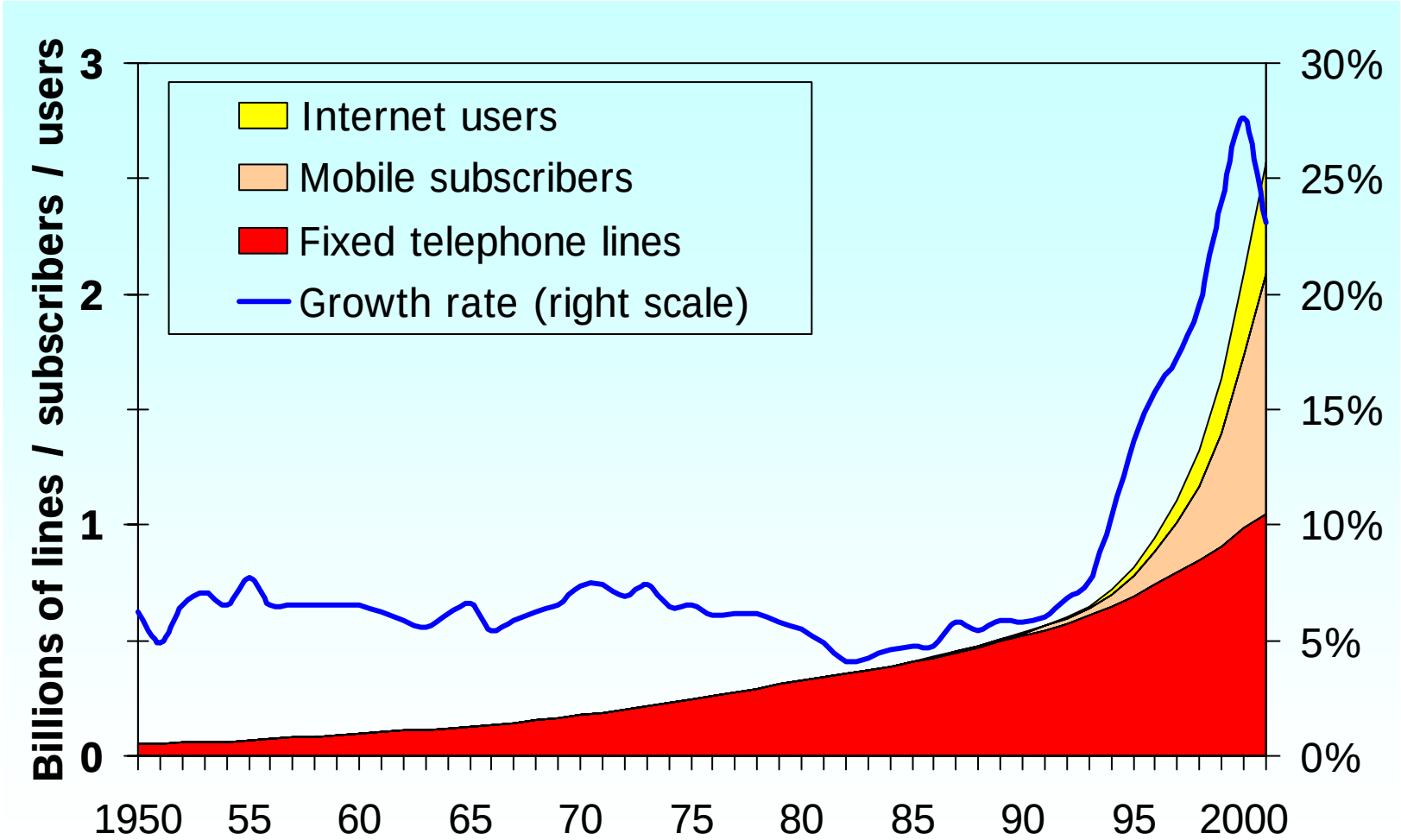
Agenda: Global technology trends

- The state of the world's telecom networks
  - Fixed-line
  - Mobile
  - Internet / Broadband
- Five hot trends for the future
  - Advanced wireless technologies
  - Ubiquitous communications
  - Broadband platforms
  - Everything over IP
  - The rise of the Information Society
- ITU (2004) The Portable Internet

The state of the world's networks

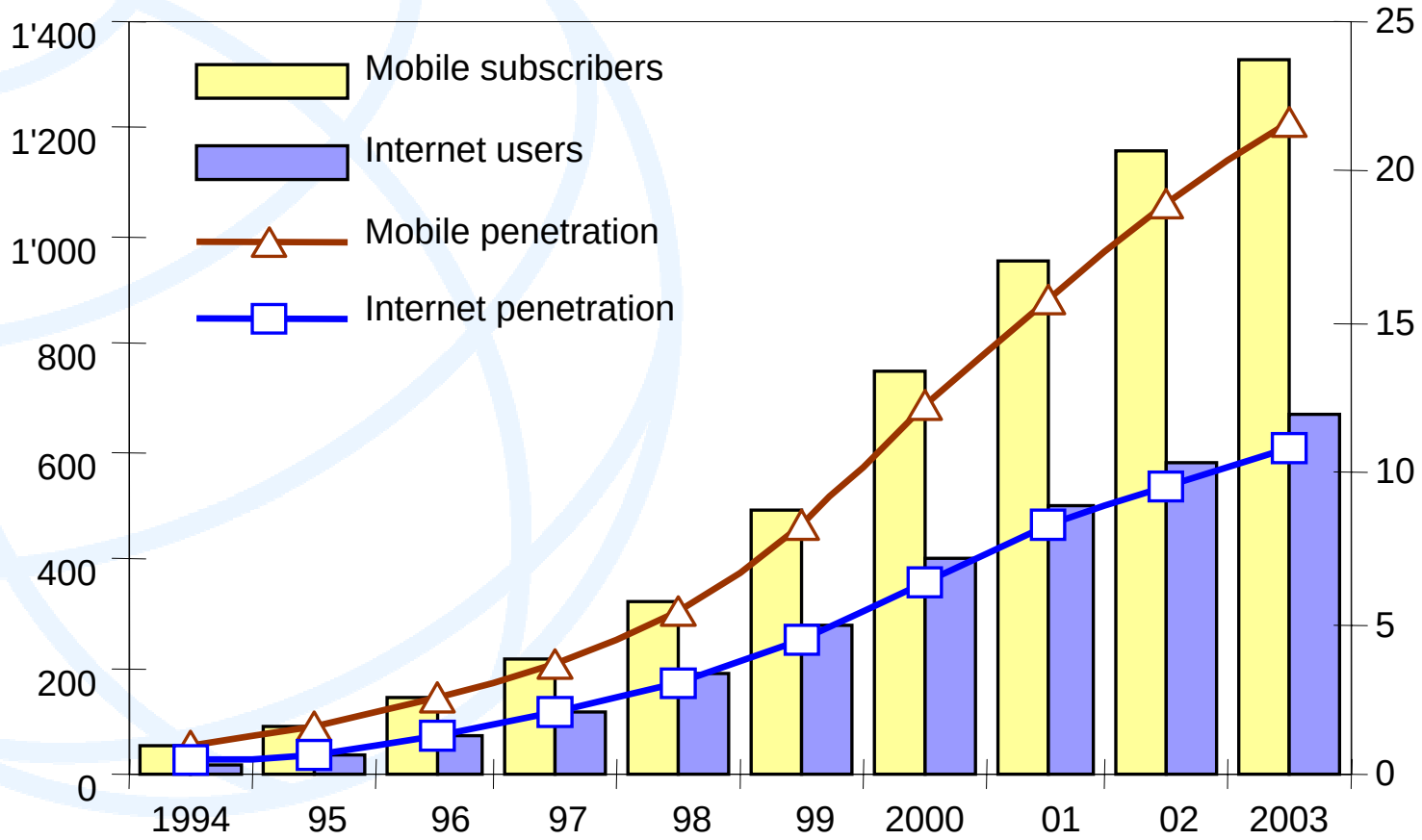
"The goal of the 20th Century was to achieve "anywhere, anytime, anyone" communications. The goal for the new century should be to achieve "everywhere, always-on, everyone" communications."



Source: *ITU, World Telecom Development Report, 2002 "Telecoms Revisited".*

Mobile and Internet showing similar growth paths

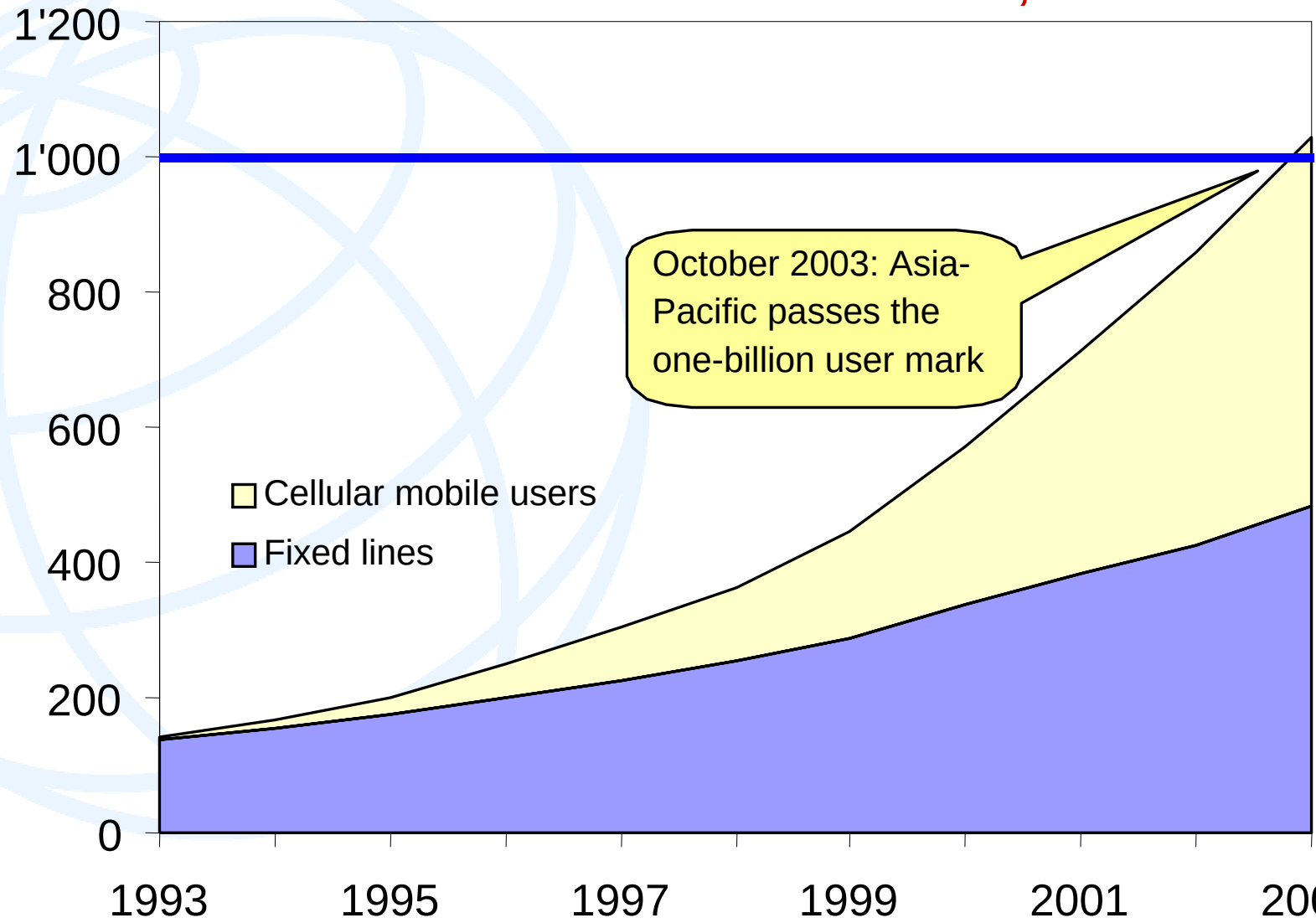
Users (millions) and penetration per 100 pop.



Source: ITU "The Portable Internet" (2004)

Crossing the one billion mark

Fixed-lines and mobile users in the Asia-Pacific, million

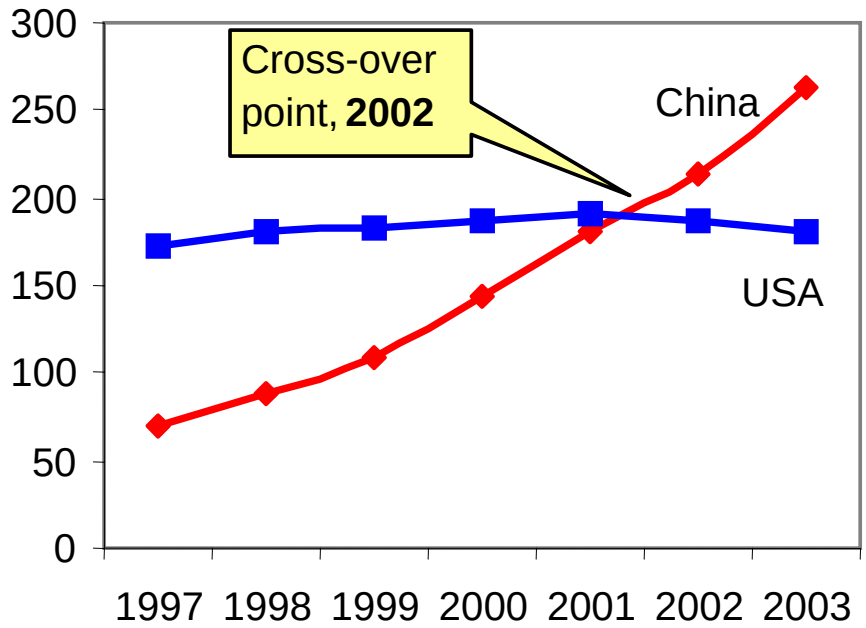


Source: ITU World Telecommunication Indicators Database.

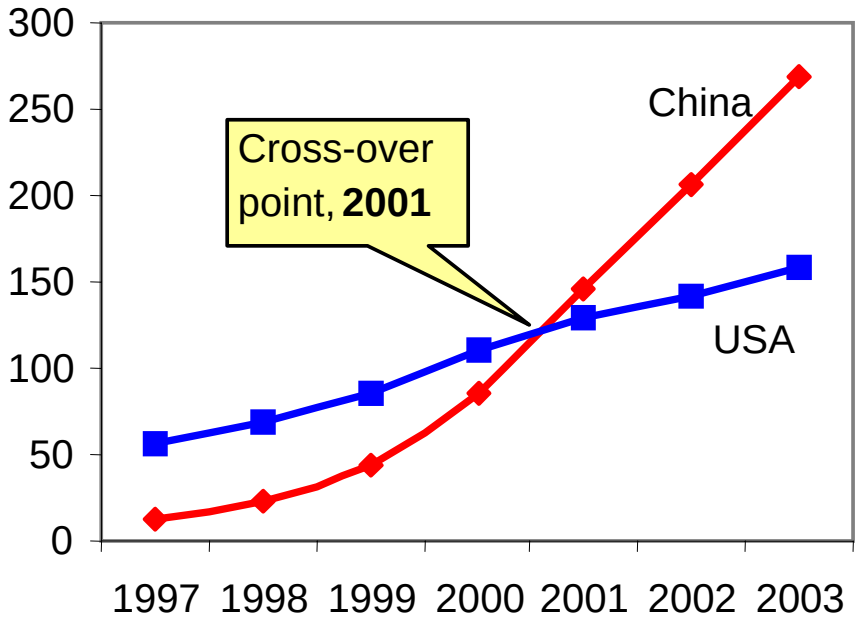
Superpower switch (1):

China overtaking USA in the telecom services market

Fixed lines, million



Mobile phones users, million

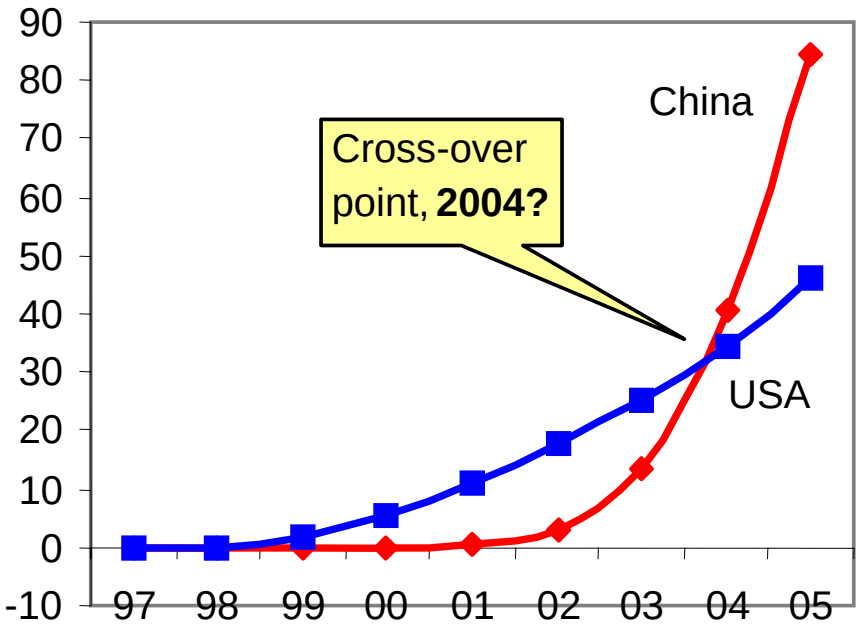


Source: ITU World Telecommunication Indicators Database.

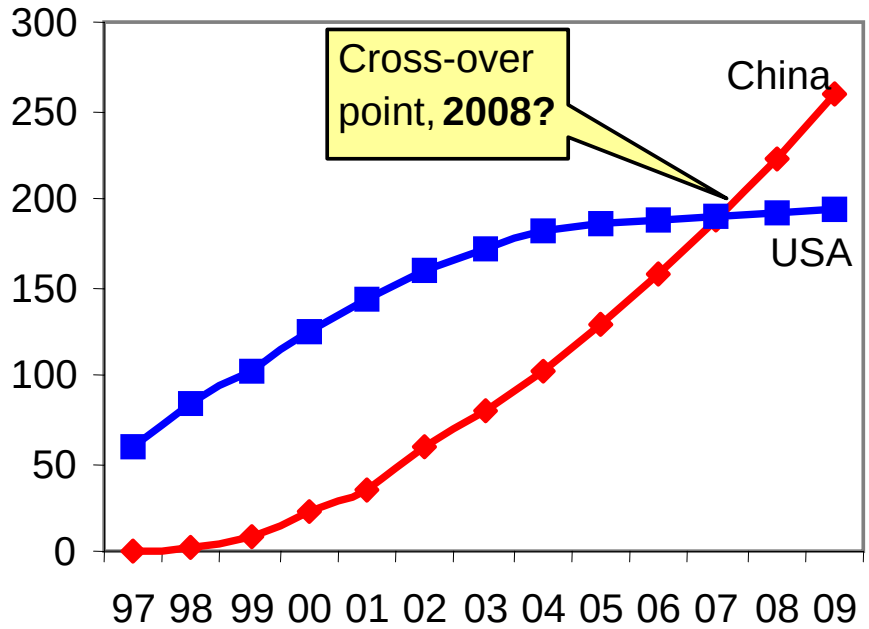
Superpower switch (2):

China overtaking USA in the Internet market

Broadband subscribers, million



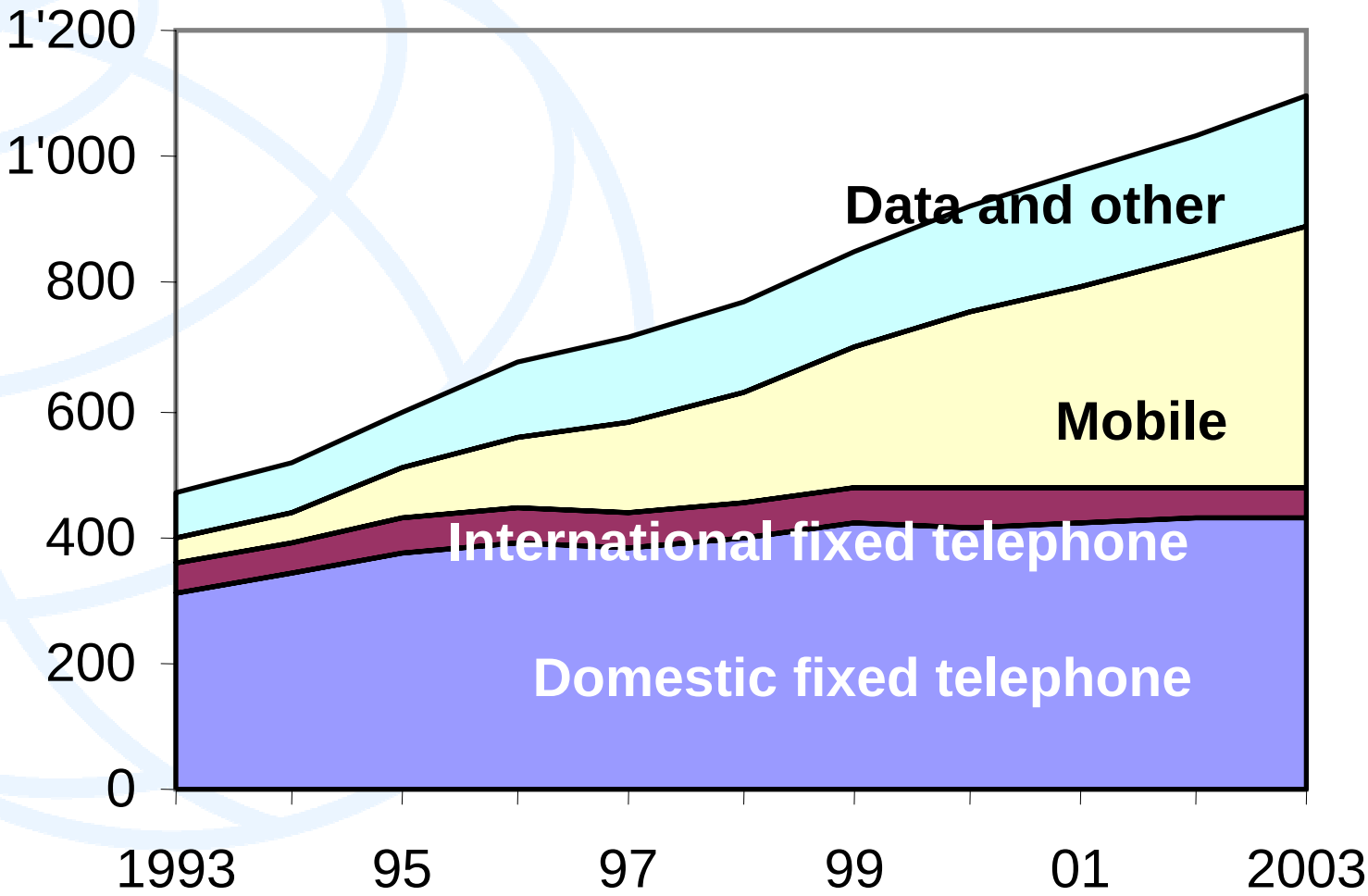
Estimated Internet users, million



Source: ITU World Telecommunication Indicators Database.

Growing service revenues

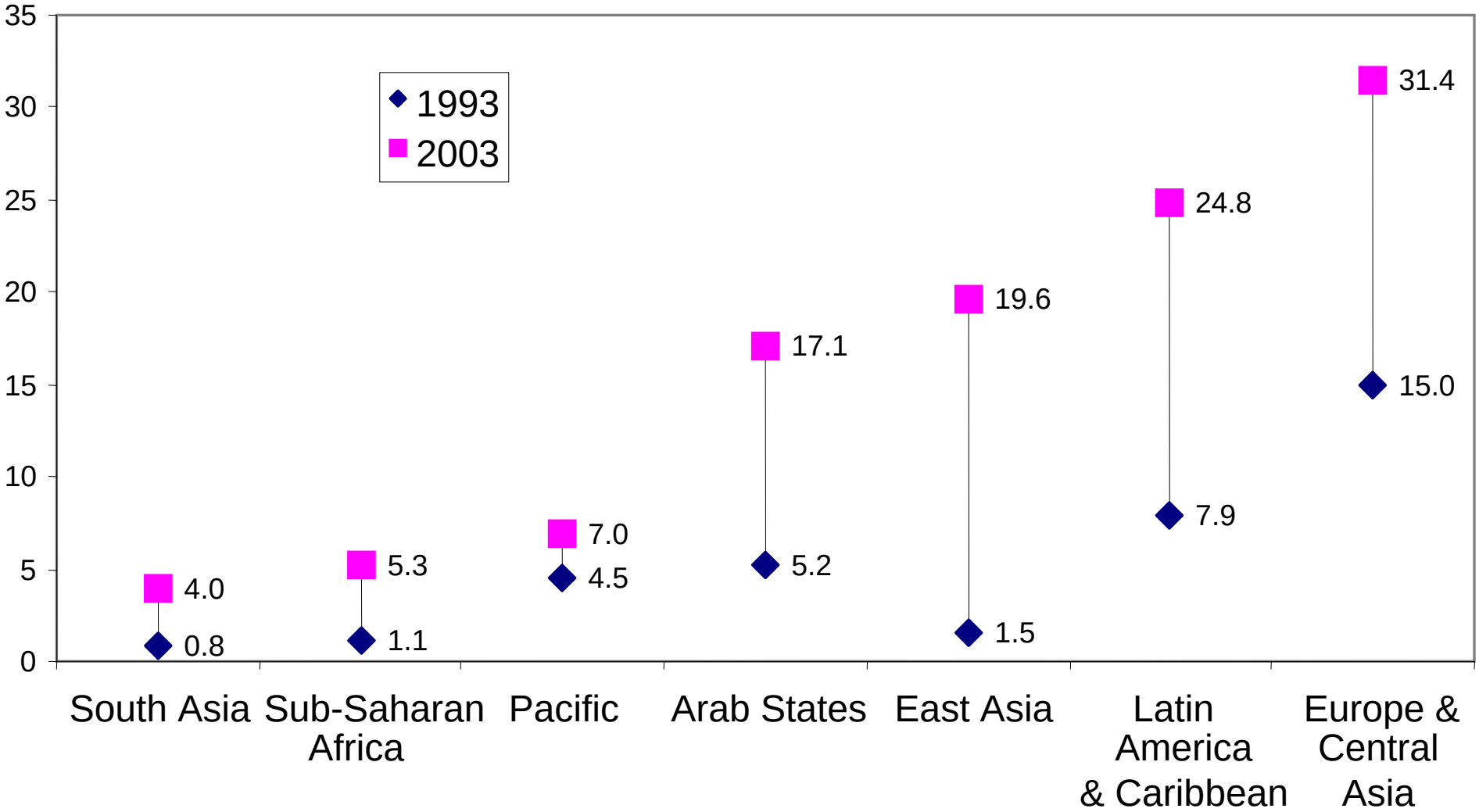
In US$ billion



Source: ITU World Telecommunication Indicators Database.

The shrinking digital divide: Regional

Change in effective teledensity, developing regions, 1993-2003

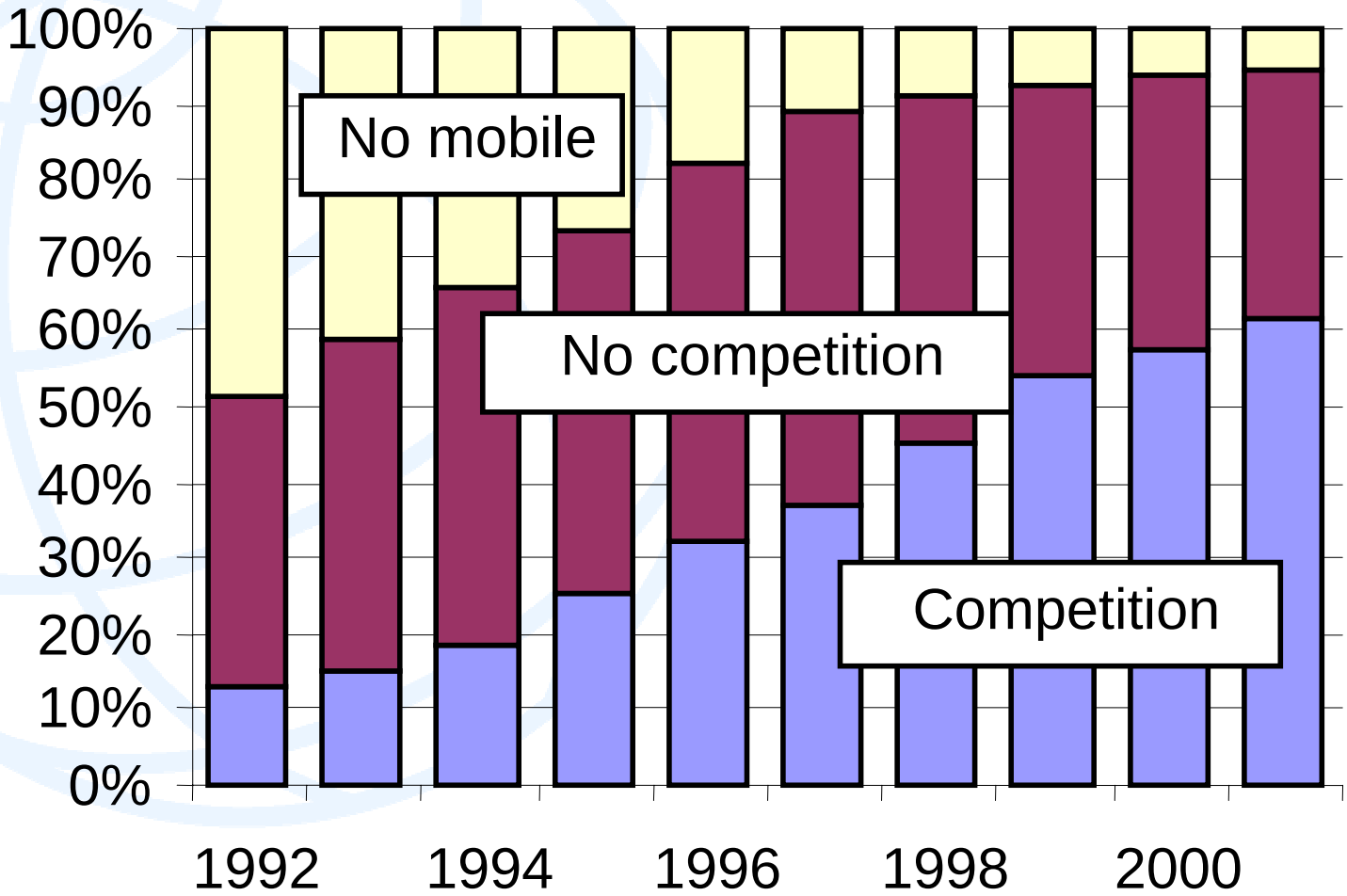


Note: *"Effective Teledensity" = fixed lines or mobile phones per 100 inhabitants, whichever is higher.*

Source: *ITU World Telecommunication Indicators Database.*

Increasing level of competition

Countries with competitive mobile markets (%)

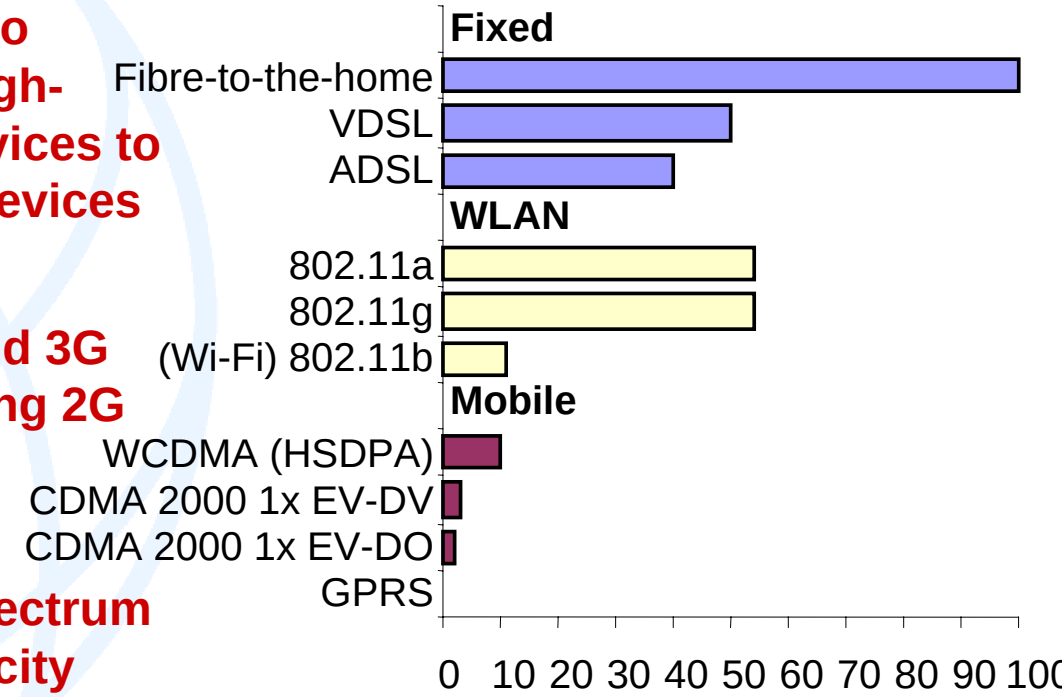


Source: ITU World Telecommunication Development Report, 2002: Reinventing Telecoms.

Five hot future trends

1. Advanced wireless technologies

- **Wireless broadband**
  - **Wi-fi, WiMAX and WiBro standards will bring high-speed (>10 Mbit/s) services to laptops and portable devices**
- **Network roll-out**
  - **3G and services beyond 3G will be replacing existing 2G services by 2006**
- **Spread spectrum**
  - **New techniques for spectrum hopping will ease scarcity**
- **Substitution**
  - **In many developing regions, wireless services will substitute for fixed-line**



Maximum speeds (in Mbit/s) of selected advanced wireless technologies

Source: ITU "The Portable Internet" (2004)

Wireless broadband

New wireless technologies

Long Range

- IMT-2000 (3G)
- WiMax - IEEE 802.16
- IEEE 802.20
- HiperMAN
- Satellite
- HAPS/LAPS
- LMDS
- MMDS
- WiBro

Medium Range

- WLAN
  - Wi-Fi - IEEE 802.11b
  - IEEE 802.11a
  - IEEE 802.11g
  - IEEE 802.11i
- Free space optics
- HiperLAN2
- Ultra wideband

Short Range

- Bluetooth
- RFID
- ZigBee

Source: ITU Internet Reports 2004: The Portable Internet.

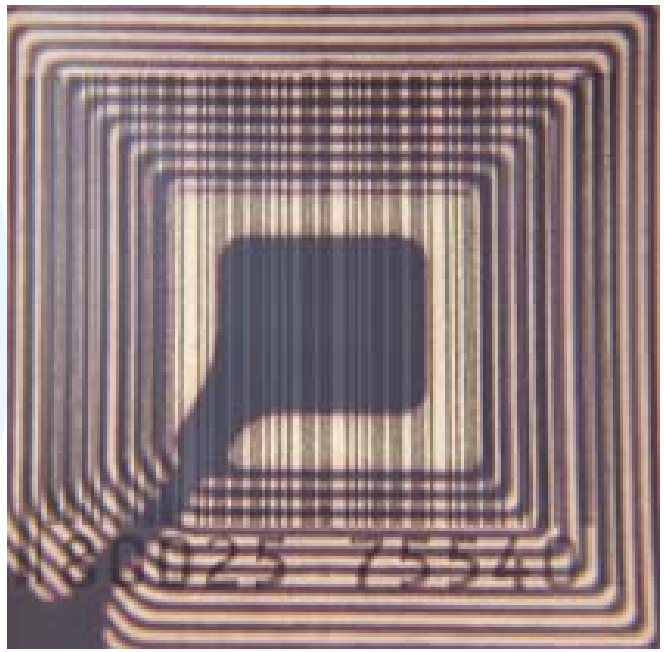
The long and short of wireless broadband

"One wireless technology to reach remote areas, another to share the connection once it's there"

- **Long range**
  - **Technologies such as WiMax (IEEE 802.16a) and WiBro can transport large amounts of data over long distances. WiMax should provide 70 Mbit/s connection over 50 km. WiBro offers 1Mbit/s to users in moving vehicles**
- **Short range**
  - **WLAN technologies such as Wi-Fi (IEEE 802.11) can spread the connection over a short distance from the "landing spot" of a long-range connection. Wi-Fi offers between 11-54 Mbit/s over ranges of up to 100 metres.**

2. Ubiquitous communications

- **Anytime, anywhere, always-on**
- **Pervasive computing and communications**
- **“Internet of things”**
- **Key technologies include:**
  - **Advanced wireless networks**
  - **Network Robotics**
  - **Radio Frequency ID**
  - **Nanotechnology**



RFID tag

Using the “portable Internet”

On a plane

On a train

On the move

In a car

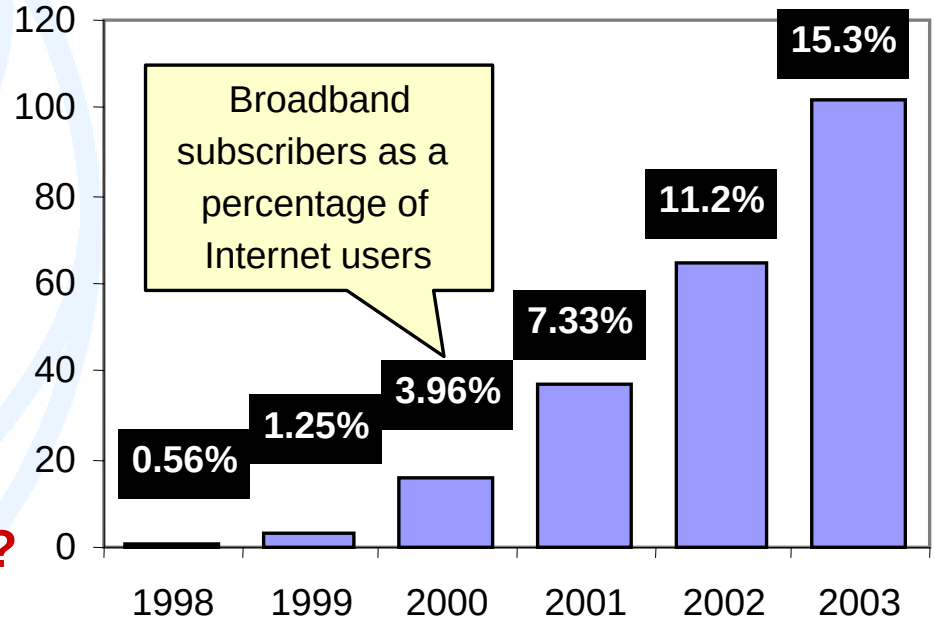
On the street

On a boat

3. Broadband platforms

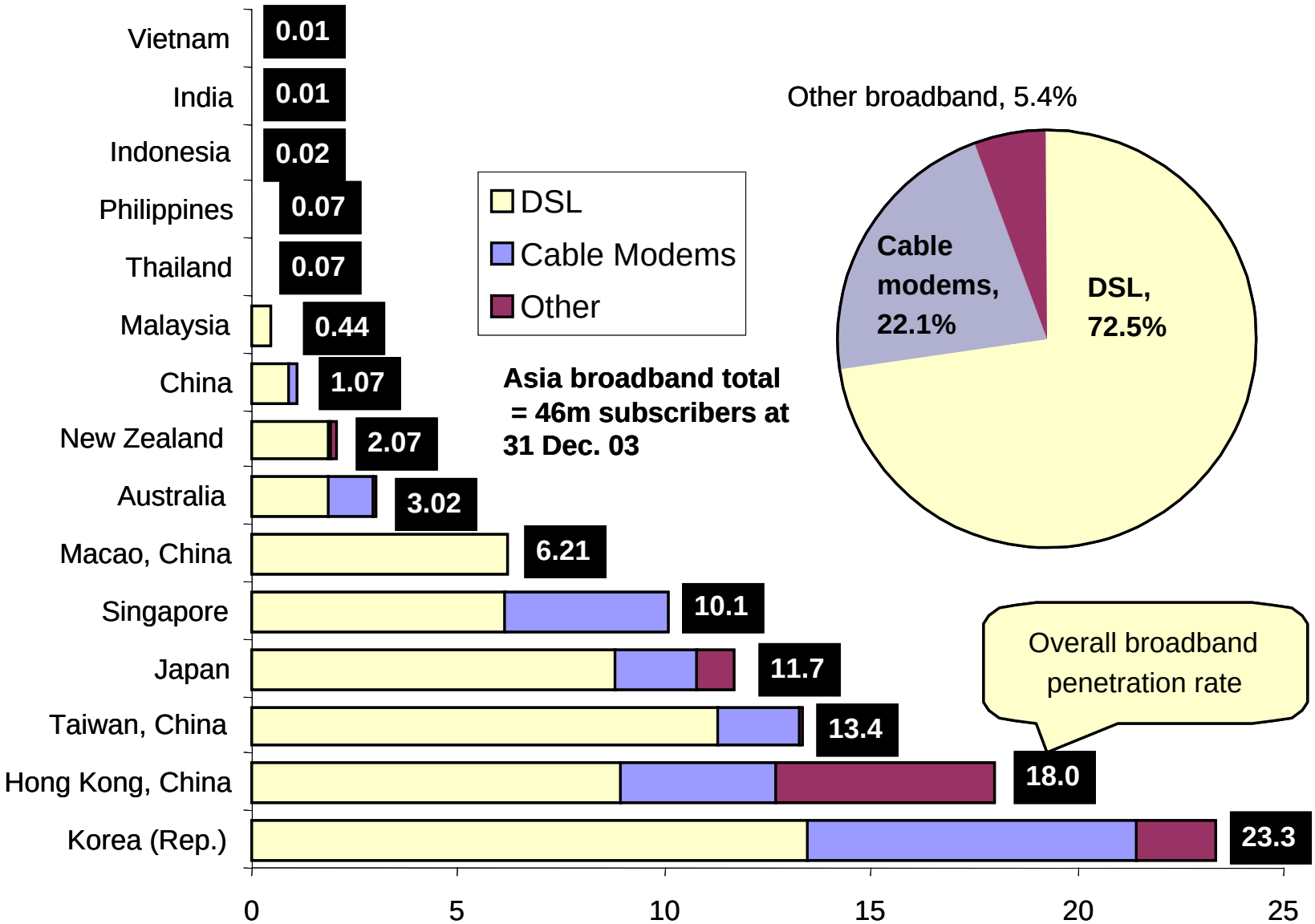
- **Broadband subscribers**
  - 100m start of 2004
  - 400m end of 2006?
- **Typical speeds**
  - 512 kb – 1 Mbit/s, 2004
  - 10 – 50 MB Mbit/s 2006?
- **Major applications**
  - WWW, email, P2P 2004
  - Video on demand, voice over IP, video chat 2006?
- **Market leaders**
  - Asia, 2004
  - Asia, Europe + N. America 2006

Broadband subscribers worldwide, million



Source: ITU World Telecommunication Indicators Database.

Asia-Pacific: Leading the world in broadband. Subscribers per 100 inhabitants, year-end 2003

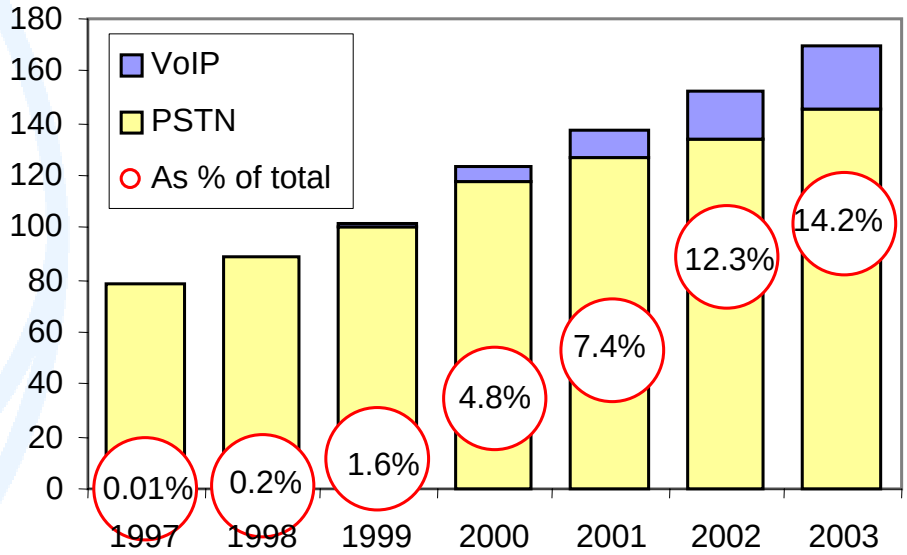


Source: ITU Internet Reports 2004: The Portable Internet.

4. Everything over IP

- **Network transition:**
  - **1990s, from analogue to digital**
  - **2000s, from PSTN to IP**
- **International VoIP:**
  - **22 bn minutes, 2003**
  - **70 bn minutes, 2006?**
- **Voice over IP over broadband**
- **TV over IP**
- **Mobile voice over IP**

Intern'l telephone traffic, in billions of minutes

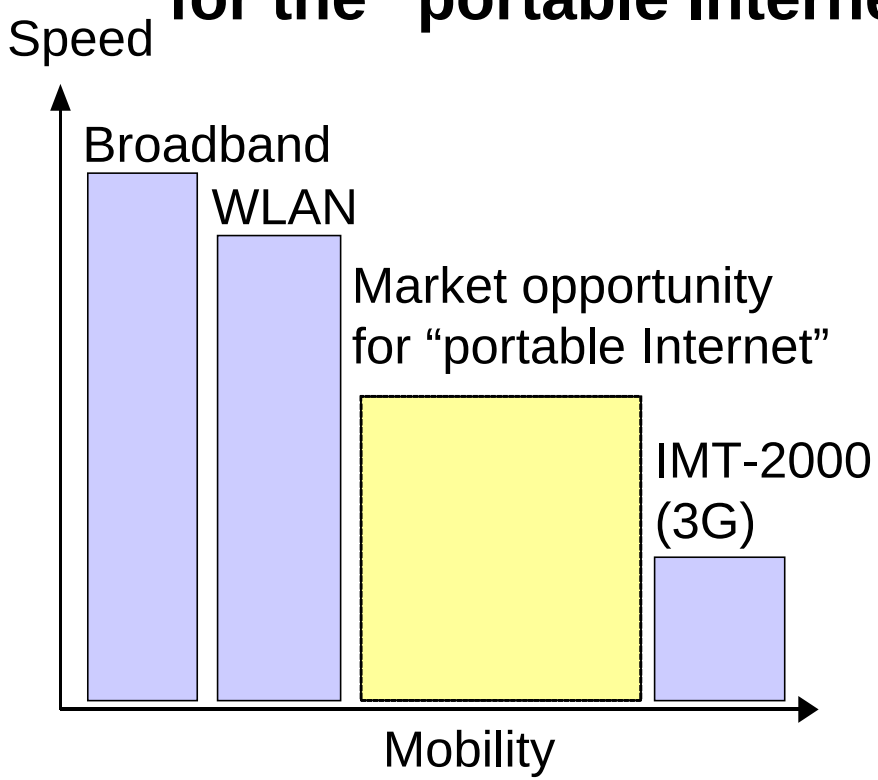


Source: ITU / TeleGeography Inc.

Characteristics of the “Portable Internet”

- **Portable**
  - **Based on advanced wireless technologies, including 3G mobile and Wireless LAN**
- **High-Speed**
  - **Providing speeds of at least 256 kbit/s up to >50 Mbit/s**
- **Large Storage**
  - **Multi-gigabyte storage capacity allowing storage of movies, music, files etc**
- **Inter-operable networks**
  - **“IP-over-everything” allows digital data exchange between services and applications**

The market opportunity for the “portable Internet”



Source: ITU (2004) “The Portable Internet”.

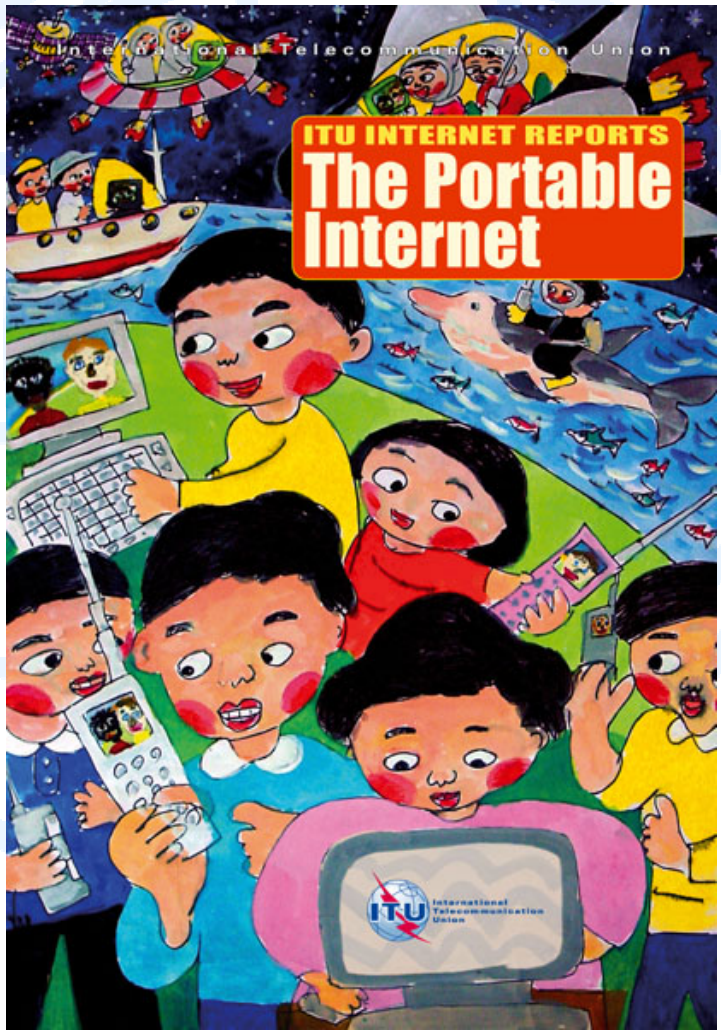
5. Information Society

world summit on the information society
Geneva 2003 - Tunis 2005

- 1st phase, Geneva, 10-12 December 2003
  - Adoption of Declaration of Principles and Plan of Action
- 2nd phase, Tunis, 16-18 November 2005
  - Focus on follow-up and implementation of Geneva Plan of Action
  - Financial Mechanisms for bridging the Digital Divide
  - International Internet Governance Issues
- PrepCom meetings in June 2004, Feb 2005 and Aug/Set 2005

ITU Internet Report: The Portable Internet

www.itu.int/portableinternet



1. Introduction
2. Portable Internet technologies
3. Market trends
4. Policy and regulation
5. A tool for bridging the digital divide
6. The future of portable Internet technologies
7. The information society and human factors

Statistical tables

220 pages