Mobility "Unplugged": Technologies, policy challenges and market opportunities

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Outline

- No wires: what's all the fuss?
- Technology focus
- The mobile phone as the device of choice
- Key policy challenges
- Advantage Asia
- The world's biggest mobile growth market
- A peek into the future?

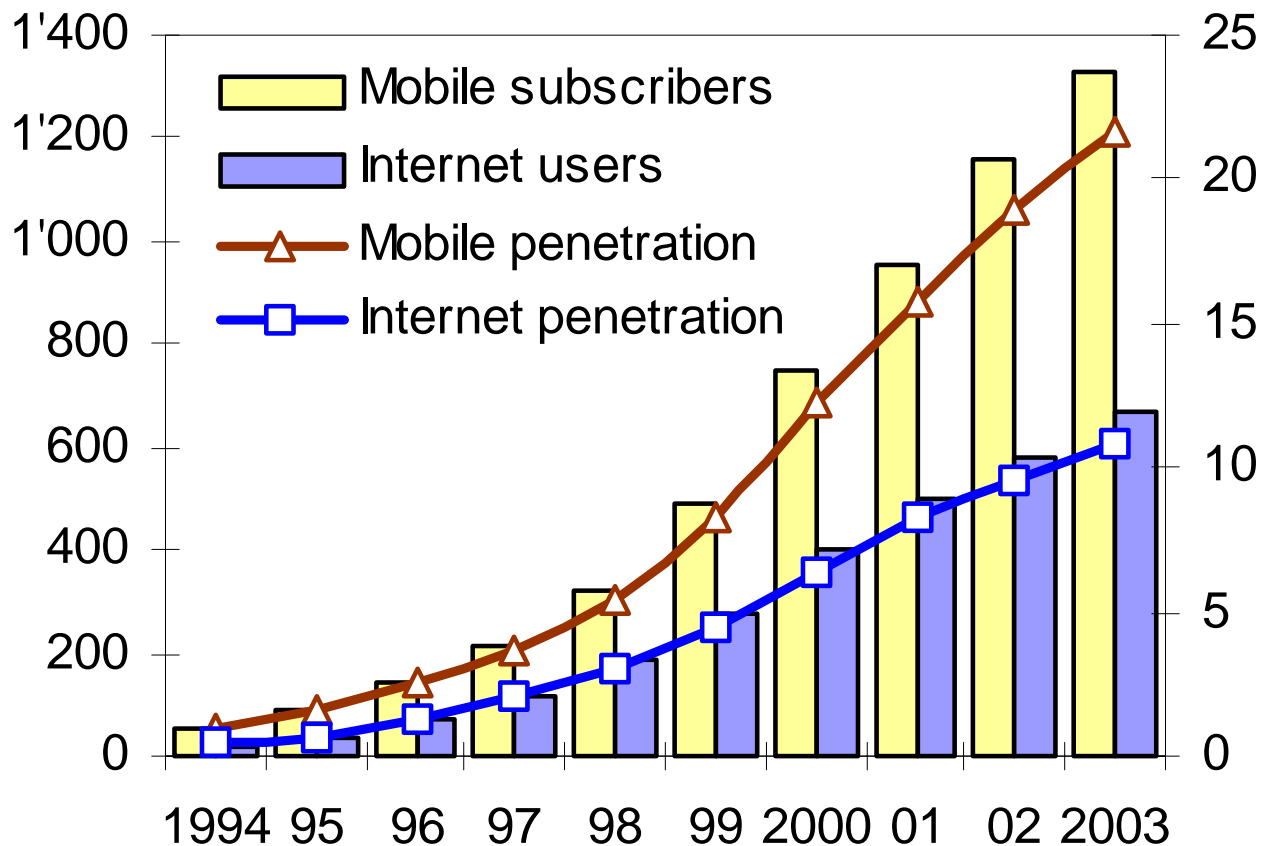# What's all the fuss: Look ma, no wires!

We have come a long way

1910: Lars Magnus Ericsson and his wife Hilda regularly worked the first car telephone

Copyright 1994 Anders Suneson

Mobile and Internet: Twins born two years apart

Users (millions) and penetration per 100 pop.

Legend:
- Mobile subscribers
- Internet users
- Mobile penetration
- Internet penetration

Years: 1994 95 96 97 98 99 2000 01 02 2003

Today's information society…

- Growth of high-speed fixed and wireless broadband infrastructure(fibre, xDSL, W-LAN, WiMax, IMT-200 and systems beyond etc…).

- Popularity of wireless communications in both developed <u>and</u> developing world

- Popularity of the "personal communications device", be that a PDA (personal digital assistant), mobile phone, smart phone etc…

- Emphasis on "always-on" communication technologies

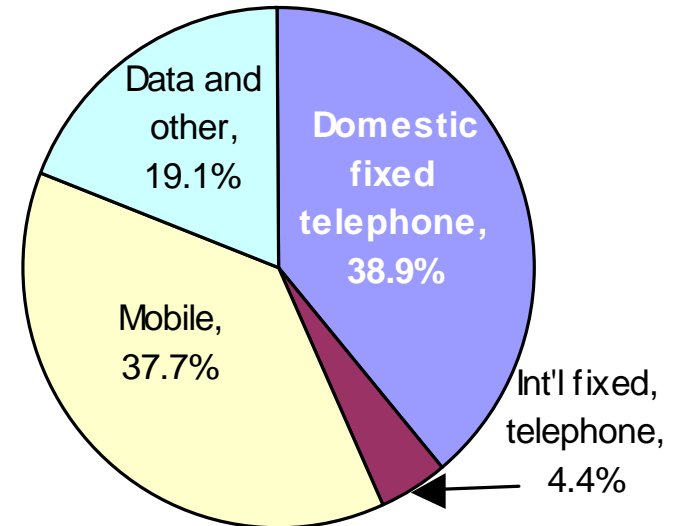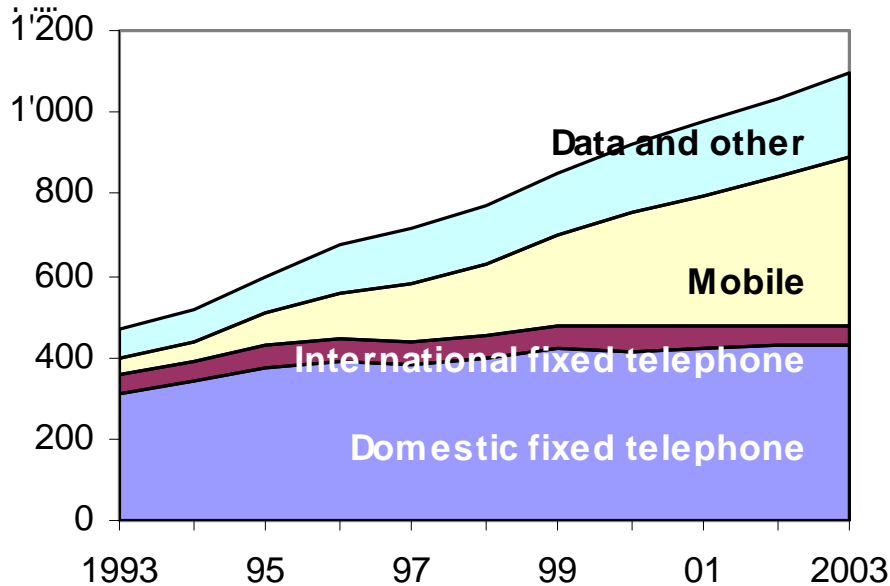- Shift towards overall "ubiquity of access"

… is more mobile than fixed

Fixed and mobile lines (world, millions)

1.33 billion mobile

1.21 billion fixed
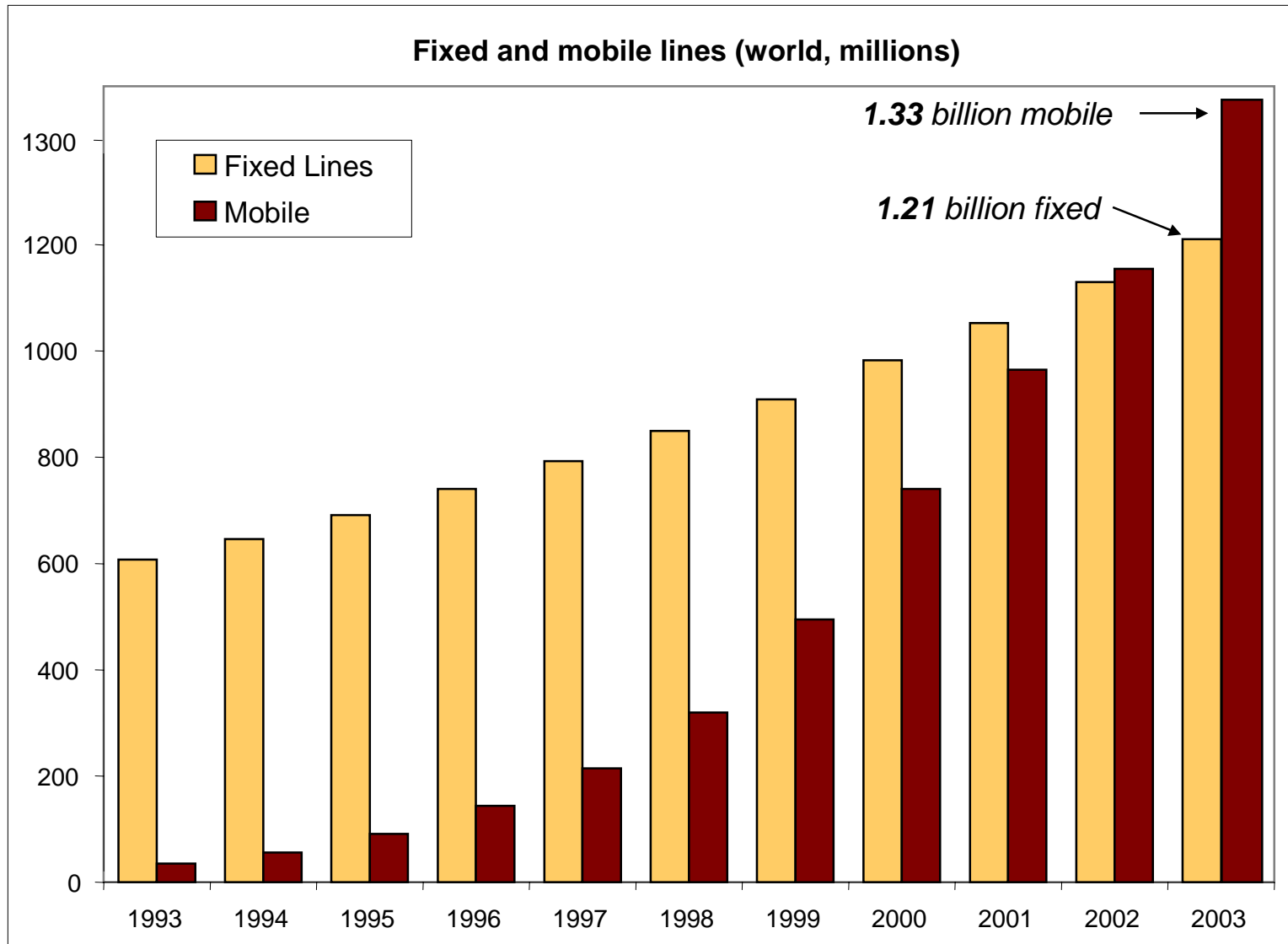
Source: ITU

Not a surprise that mobile is where the money is

Global service revenue trends, in current US$

1'200
1'000
800
600
400
200
0

Data and other

Mobile

International fixed telephone

Domestic fixed telephone

1993   95   97   99   01   2003

Data and other, 19.1%

Domestic fixed telephone, 38.9%

Mobile, 37.7%

Int'l fixed, telephone, 4.4%

Global service revenues, 2003: Total = US$1.1bn

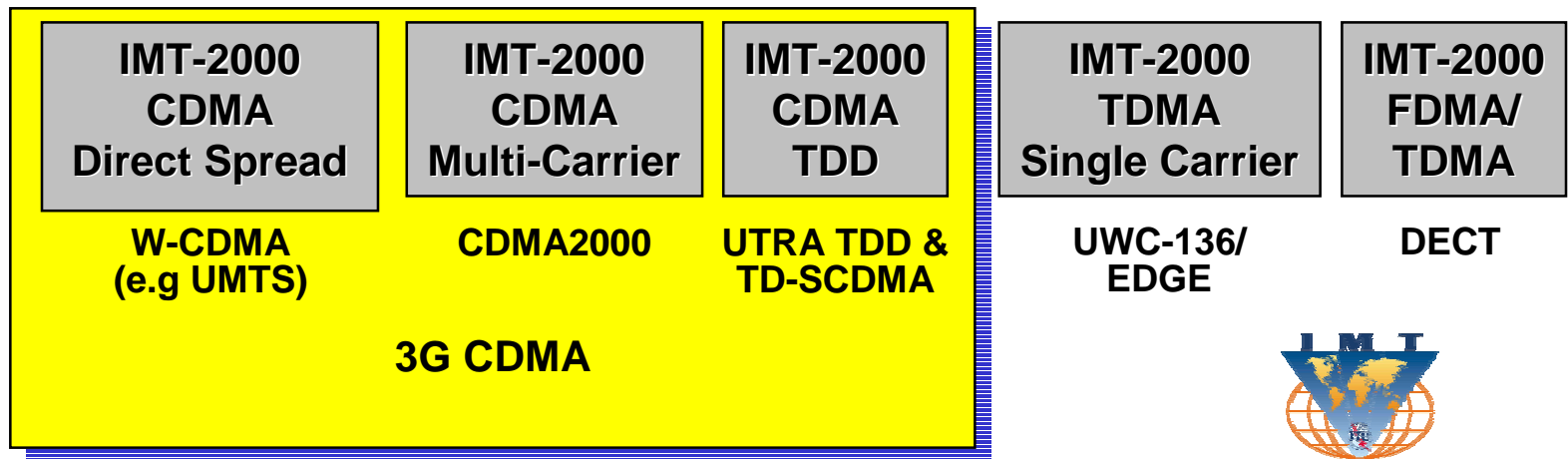# Mobile/wireless: Selected technologies

Cellular mobile:
From generation to generation

- Development of mobile communications described in terms of "generations"

  - 1G: analog cellular systems (1970s, early 1980s), mostly IMTS (Improved Mobile Telephone Service)

  - 2G : existing digital cellular systems (end 1980s), such as GSM and PDC. number of regional & proprietary standards

  - 3G : new generation of mobile systems - refers to standards developed at a global level under the IMT-2000 banner and under the leadership of the ITU. Now deployed in a number of countries worldwide
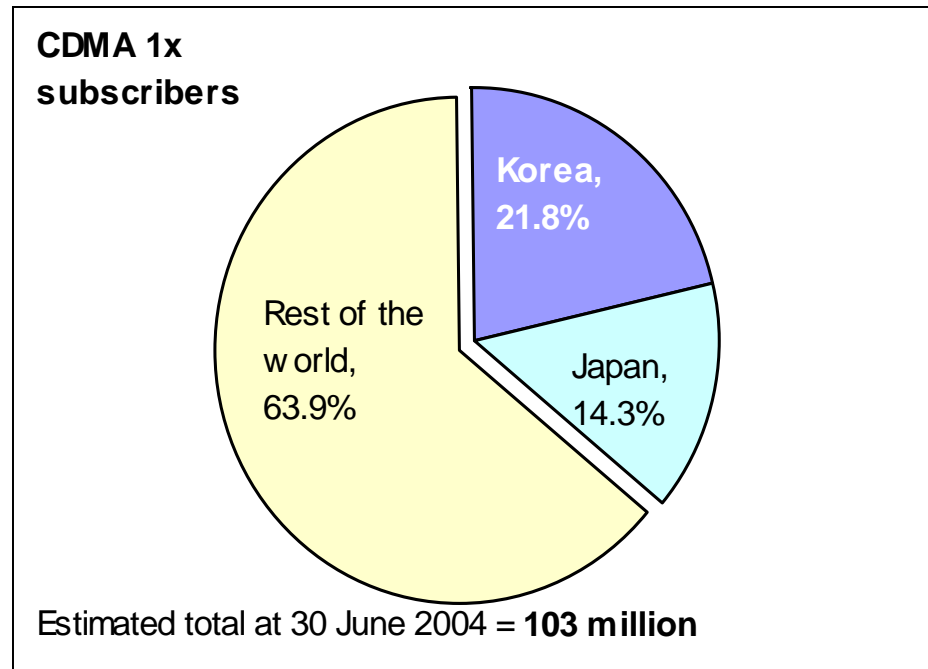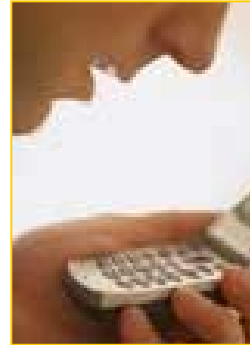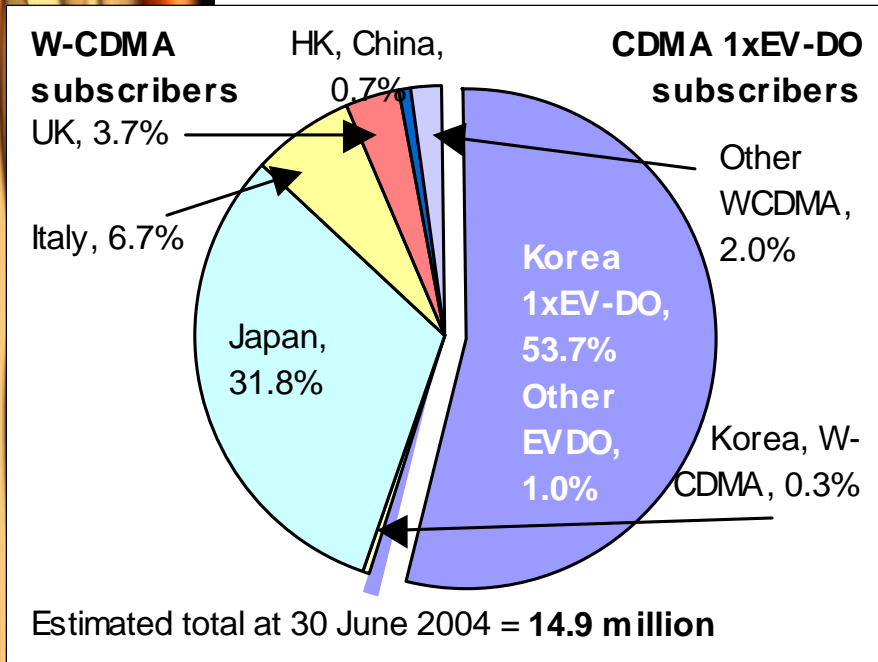
3G or IMT-2000

- ITU-developed concept in mid-1980s
- Stands for "International Mobile Telecommunications"
  - Known as "3rd" generation systems (3G)
- there were strong proponents of different approaches to 3G technology resulting in 5 terrestrial radio interfaces

IMT-2000 CDMA Direct Spread	IMT-2000 CDMA Multi-Carrier	IMT-2000 CDMA TDD	IMT-2000 TDMA Single Carrier	IMT-2000 FDMA/ TDMA
W-CDMA (e.g UMTS)	CDMA2000	UTRA TDD & TD-SCDMA	UWC-136/ EDGE	DECT

3G CDMA

Although there are five terrestrial standards, most of the attention and energy in the industry has been toward the CDMA standards

As of June, there were 118 m 3G users worldwide

W-CDMA subscribers

HK, China, 0.7%

UK, 3.7%

Italy, 6.7%

Japan, 31.8%

CDMA 1xEV-DO subscribers

Other WCDMA, 2.0%

Korea 1xEV-DO, 53.7%

Other EVDO, 1.0%

Korea, W-CDMA, 0.3%

Estimated total at 30 June 2004 = **14.9 million**

CDMA 1x subscribers

Korea, 21.8%

Rest of the world, 63.9%

Japan, 14.3%

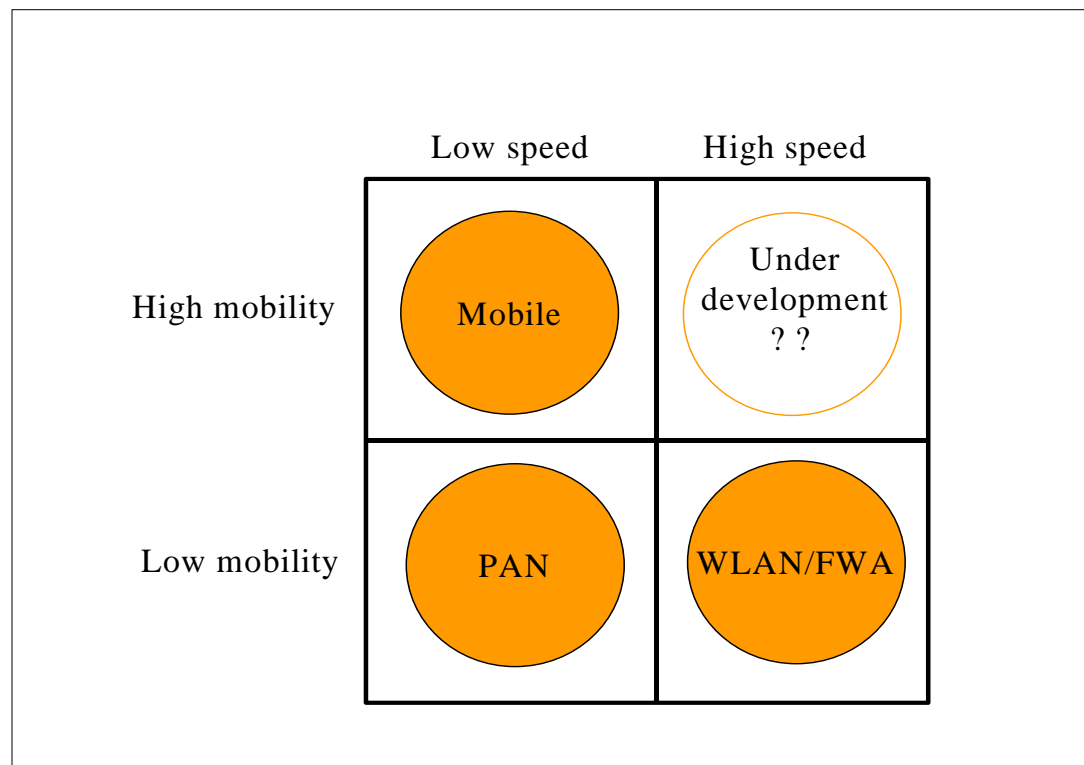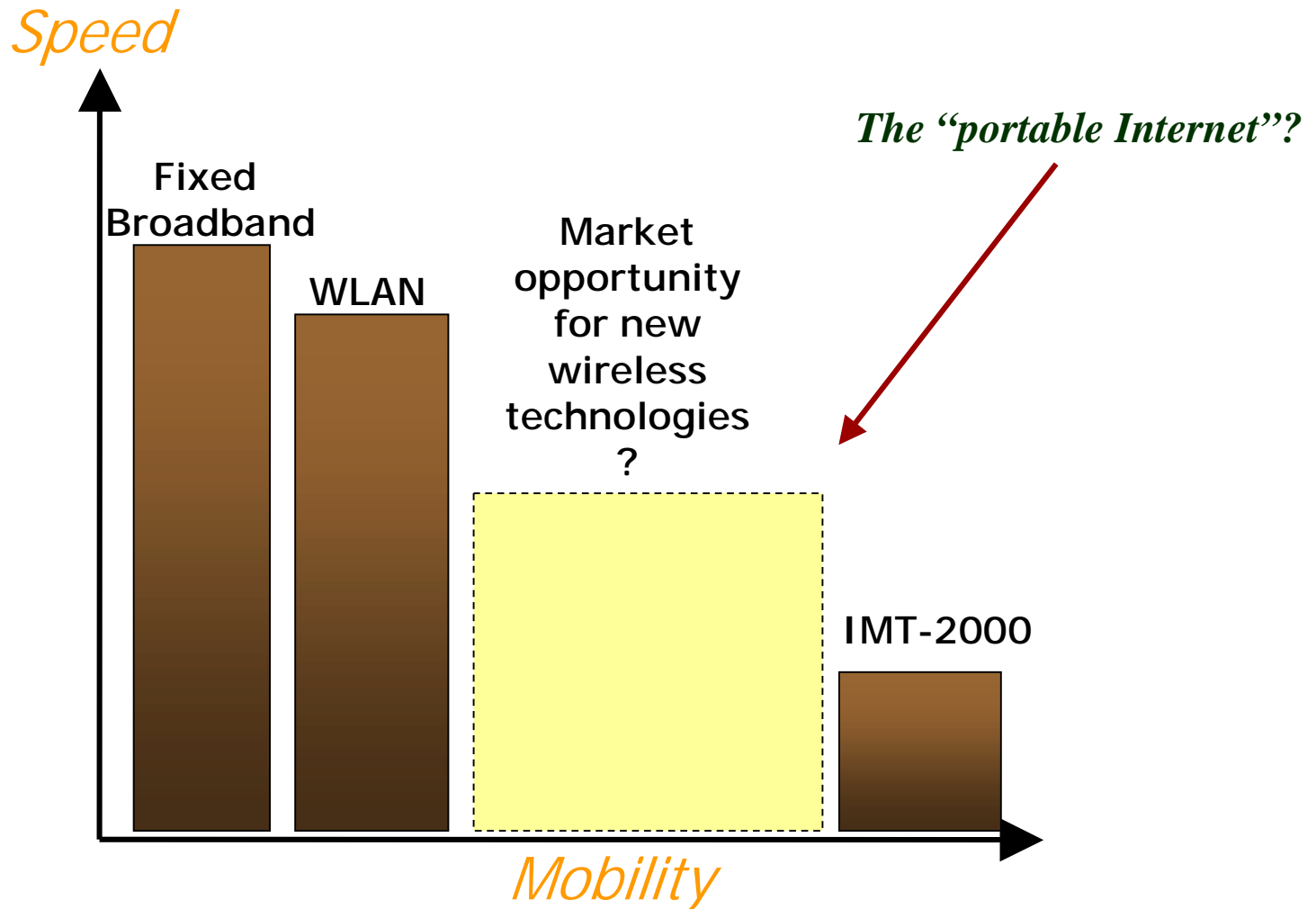Estimated total at 30 June 2004 = **103 million**

Wireless LANs

- Most popular is currently 802.11b (IEEE standard) or Wi-Fi ("hotspots")
  - Range is limited (100m) but speed is high (up to 11 Mbit/s). Mostly for stationary environments
  - Advantages: unlicensed spectrum, easy to deploy.
  - Disadvantages: no dedicated bandwidth, security concerns, high power consumption
- Others and some under development: 802.11a, 802.11g ; 802.11i, 802.11n, 802.11h etc…
- Estimated (mid-2004): 115 million users worldwide

So 3G is not the only radio access system for mobile data…

- Alternative networking technologies for the transmission of mobile data exist (e.g. WLANs and PANs such as bluetooth)

	Low speed	High speed
High mobility	Mobile	Under development ? ?
Low mobility	PAN	WLAN/FWA

Untapped market opportunities?

Speed

The "portable Internet"?

Fixed Broadband

WLAN

Market opportunity for new wireless technologies ?

IMT-2000

Mobility
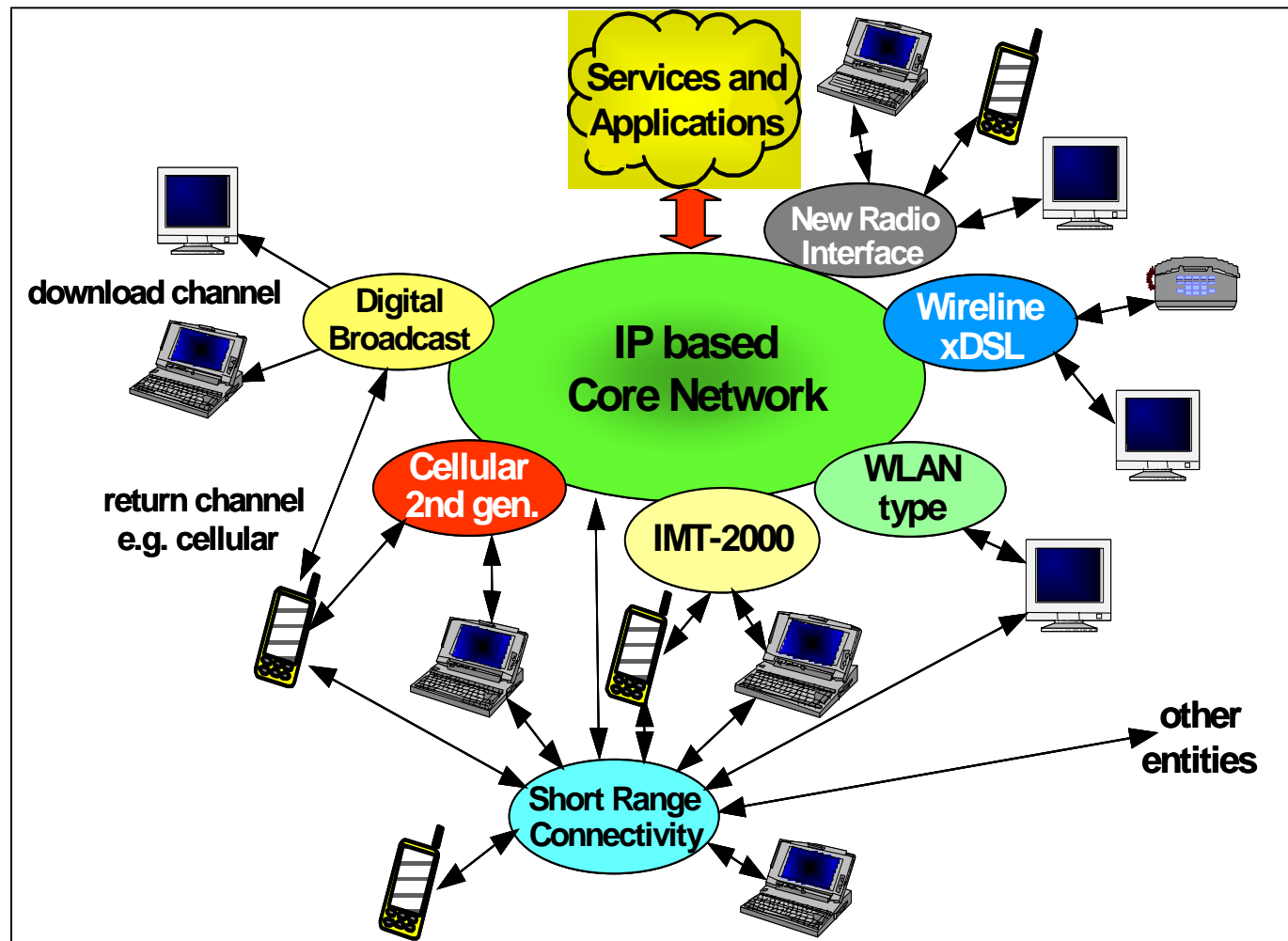
Longer-range solutions for mobile data

- 802.16 or WiMax
  - Worldwide Interoperability for Microwave Access
  - Capacity: max 70 Mbit/s over 50 km
  - e.g. Korea's vision "WiBro" or "3.5G"?
- 802.20 also known as "Mobile-Fi"
  - Optimized for high-mobility environments
- In terms of marketing, WiMax has a stronger push at this time
- "4G" or Systems beyond IMT-2000

Substitutes or complements?

# The mobile phone still is the device of choice

The "personalization" of the mobile

- **Physical proximity**: users are getting *closer & closer* to their mobiles, all times of the day

- **Emotional Attachment**: many can't leave home without it. Its theft/loss has been described as akin to "bereavement" & often causes *panic* and *disruption* to daily life

- **Fashion**: mobile is quickly becoming an important *daily accessory*

- **Identity:** mobiles are playing an increasingly important role in creating/maintaining identity (through pictures, SMS messages etc…)

Some regulatory and policy challenges
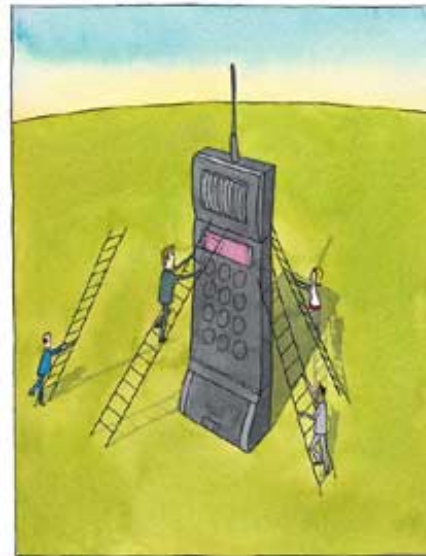
Preserving a healthy market structure in the public interest

- Spectrum allocation and use
- Fostering a level playing field
  - Interconnection requirements
  - Role of content providers
- Affordability and Access
  - Costing for termination and international roaming
  - Extending access to underserved areas
- Individual and global health
- Data/privacy protection
  - Increase in person-generated content
  - The advent of mobile 'spam'
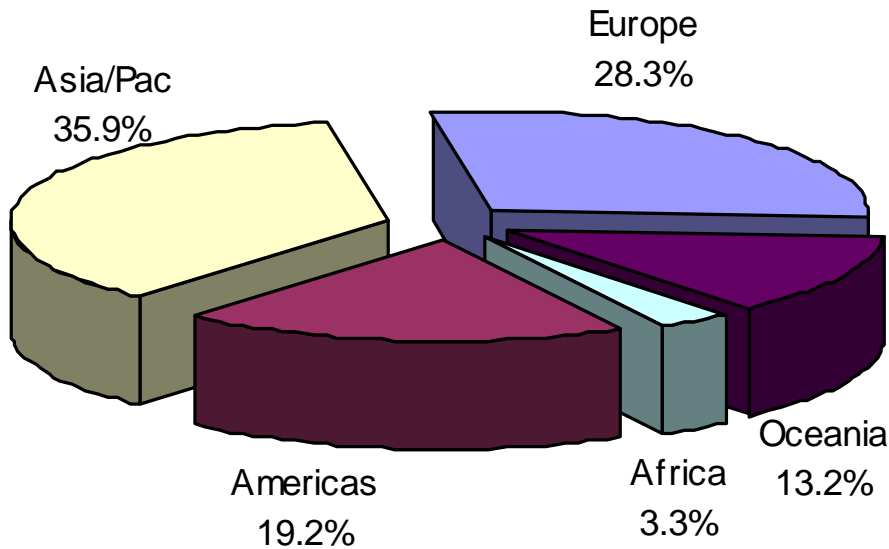
Spectrum for a converging world

- Historical approach coming under scrutiny
- Market-based approaches
  - Auctions & hybrids
  - Spectrum trading
  - Leasing/Sharing
  - License exempt spectrum
  - Incentive pricing
- Increasing spectrum efficiency
  - Frequency-hopping, e.g. agile radio systems
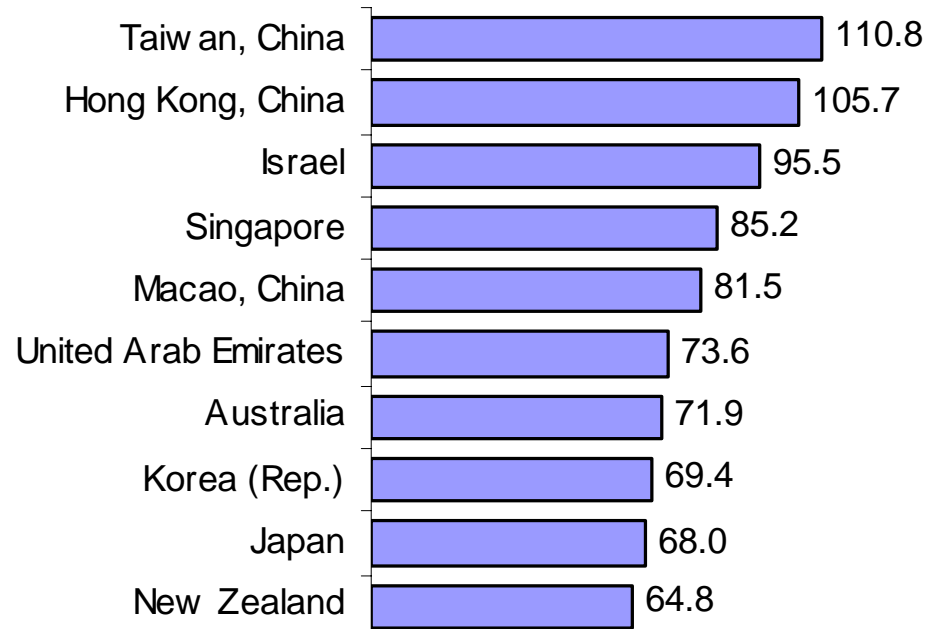 - Software-defined radio

Advantage Asia

Asian-style mobility is coupled…

Mobile subscribers, by region, 2003

Asia/Pac
35.9%

Europe
28.3%

Americas
19.2%

Africa
3.3%

Oceania
13.2%

Asia/Pacific: Mobile penetration, top 10, 2003

Taiwan, China	110.8
Hong Kong, China	105.7
Israel	95.5
Singapore	85.2
Macao, China	81.5
United Arab Emirates	73.6
Australia	71.9
Korea (Rep.)	69.4
Japan	68.0
New Zealand	64.8

…with high-speed leadership

Broadband subscribers, by region, 2003

Asia/Pac 42.9%
Europe 22.5%
Americas 33.9%
Oceania 0.7%
Africa 0.0%
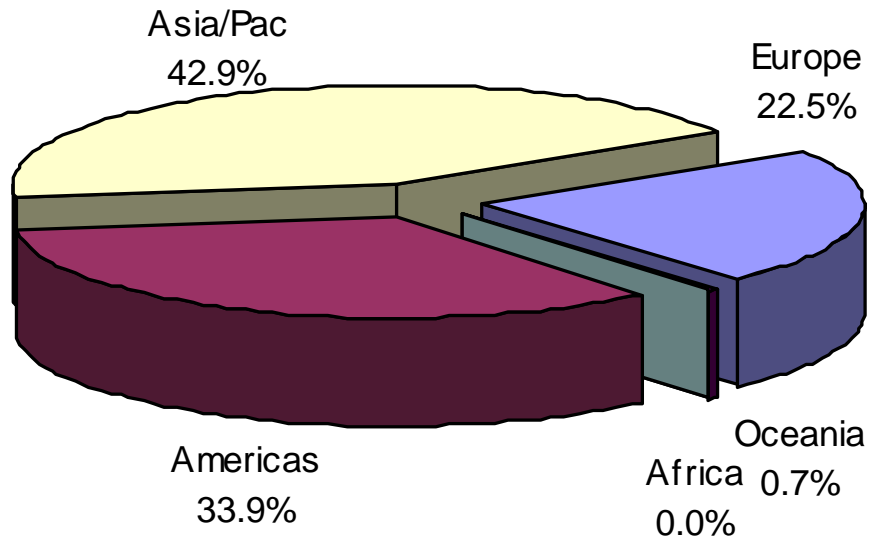
Asia/Pacific: Broadband subs/100 inhab, top 10,

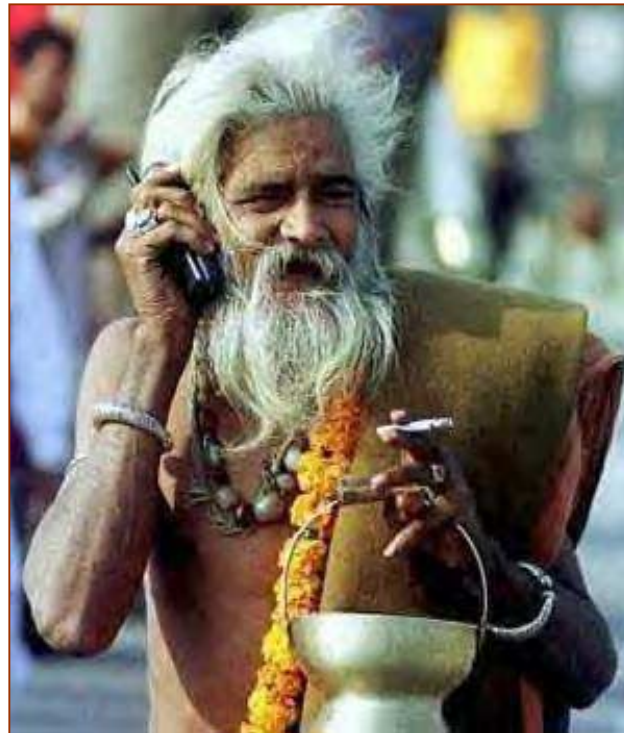| Region	Value
Korea (Rep.)	23.3
Hong Kong, China	18.0
Taiwan, China	13.4
Japan	11.7
Singapore	10.1
Israel	9.6
Macao, China	6.2
Australia	3.0
New Zealand	2.1
Bahrain	1.4
Guam	1.1
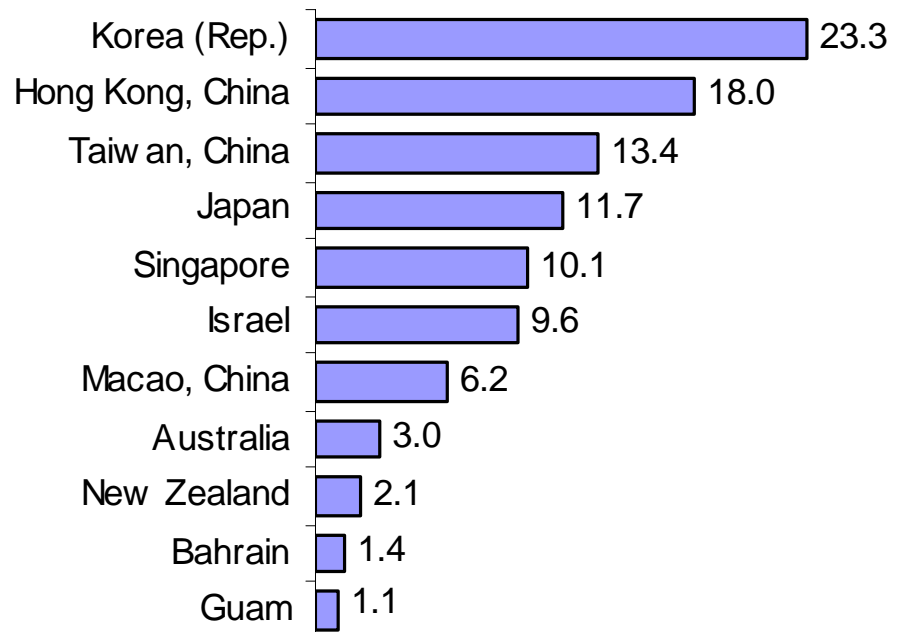
Asia has much going for it

- Technophile consumer markets and early adopter attitude driving take-up
  - First region to launch 3G
  - First region to succeed in the mobile internet
- Spirit of innovation and customer service
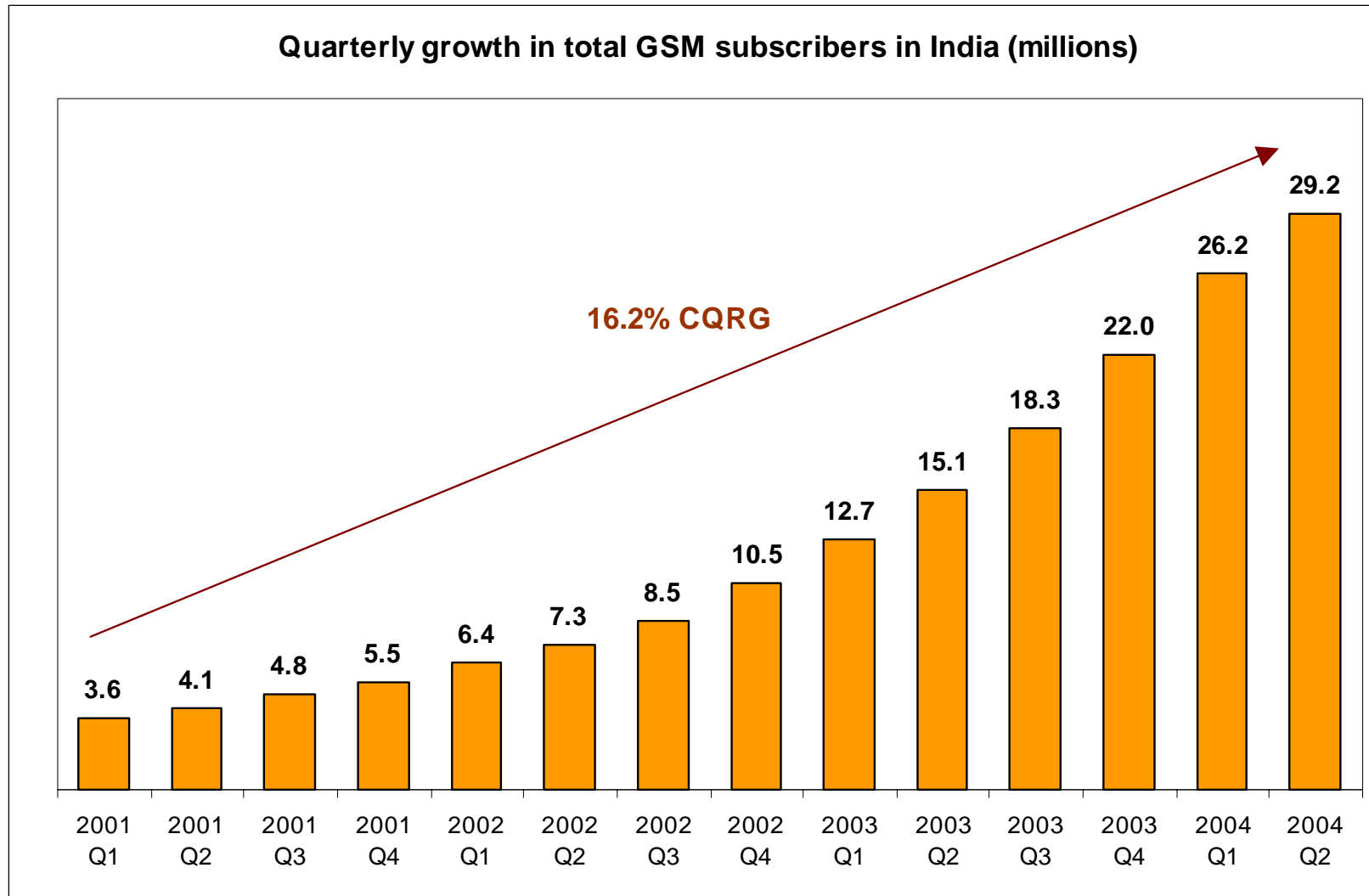- Large pool of potential new users

Continued regulatory reform will drive growth

- By 2004, over 55 % of countries had some form of competition in basic fixed services and digital mobile

- 45 % of the countries have a separate regulatory authority

- Still, need for a balanced regulatory environment, with effective competition, transparent rule-making and fair implementation

- This is even more important in developing Asia, where network infrastructure is limited and household incomes are low

Mobile India:
Tapping the untapped billion

Rapid take-up…

Quarterly growth in total GSM subscribers in India (millions)

16.2% CQRG

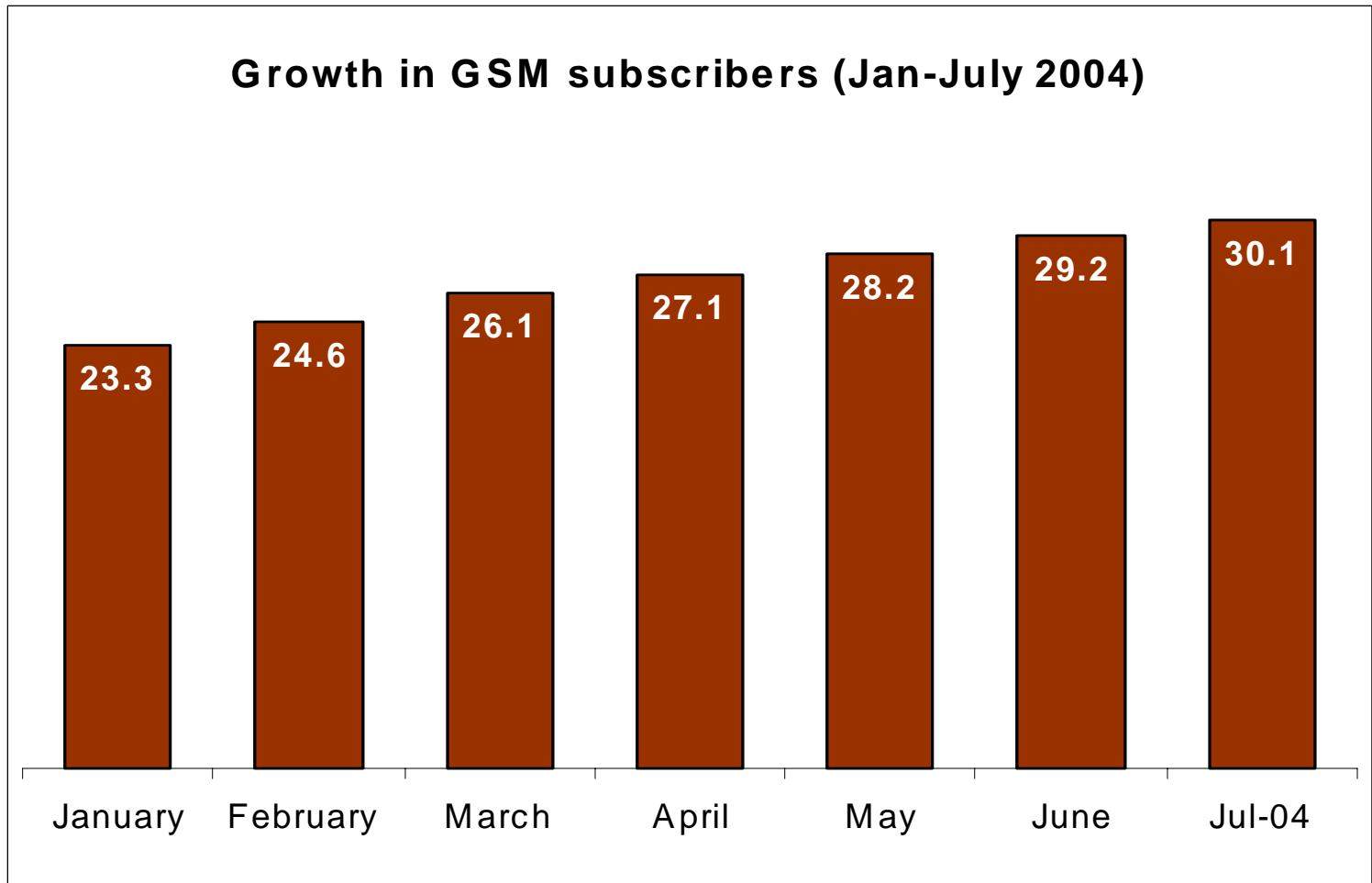| 2001 Q1	2001 Q2	2001 Q3	2001 Q4	2002 Q1	2002 Q2	2002 Q3	2002 Q4	2003 Q1	2003 Q2	2003 Q3	2003 Q4	2004 Q1	2004 Q2
3.6	4.1	4.8	5.5	6.4	7.3	8.5	10.5	12.7	15.1	18.3	22.0	26.2	29.2

Source: ITU, adapted from TRAI

… for a booming market

- Year-end 2003, there were 26.2 million mobile subscribers, and now over 30 million
  - Mobile subscribers have grown at an CAGR of over 85% from 1998-2003. At the end of 2003, 35% of all total telephone subscribers in India were mobile

- India is in **4th place in the region** for total Internet users + mobile users, behind Korea, Japan and China

- Analysts predict that revenues in India's telecom industry will grow to $25 billion by 2007 (Ernst & Young)

- Growth to be further stimulated by some key regulatory decisions…

But might there be a recent decline in growth?

Growth in GSM subscribers (Jan-July 2004)

January	February	March	April	May	June	Jul-04
23.3	24.6	26.1	27.1	28.2	29.2	30.1

Mobilizing the underserved areas

- How to close the gap between this billboard and who's in front of it
- 70% of country's population is rural
- Wireless technologies may offer a solution
  - Low-cost, fast deployment
  - Fostering use of small, low-cost end-user devices
- Combination of solutions might be the answer

Alternative wireless in India?

- Still early days for technologies like WLAN in India

- Government now deregulating the 2.4 GHz spectrum, where 802.11b sits (previously offered at high cost – and per user)

- But cost remains high compared to wired technology, and bandwidth is shared

- Early users most likely corporate, e.g. manufacturing, banking, education, government and the hospitality sector

- WiMAX may provide a suitable alternative when it becomes available, but what about until then?

Beyond infrastructure

- Education and awareness
  - Fostering entrepreneurship
- Affordability
  - Encourage pre-paid services also for mobile data
- Local and community-based initiatives
- Content development
  - Keep it local
  - Revenue sharing with content providers

The future of wireless technology:A peek?
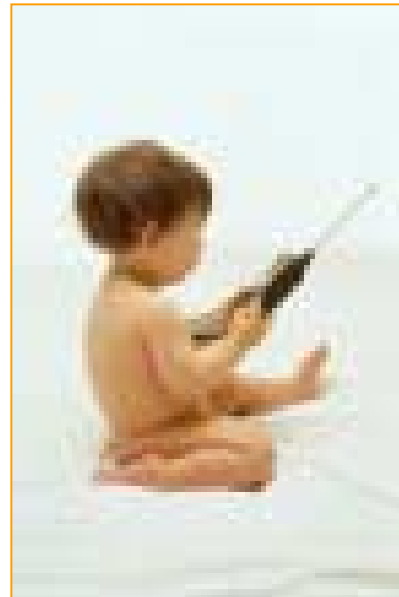
Network, network, everywhere

- Keeping healthy:
  - Swallowing tiny mobile device could help diagnose or monitor a patient remotely without need for travel or surgery
  - Mobile and wireless can bring medical facilities and care to underserved areas.

- Taking inventory: Tiny RFID tags track inventory, and pharmaceuticals… what about people?

- Keeping safe: Location technologies keep small children, elderly and unwell out of harm's way

- Secure houses: "smart" bricks ensure that the structural integrity of buildings can be monitored

- Saving your "*Chai*": An intelligent fridge pre-orders milk for you *before* you run out

ITU Internet Reports 2004

The Portable Internet

available 6 Sept 2004
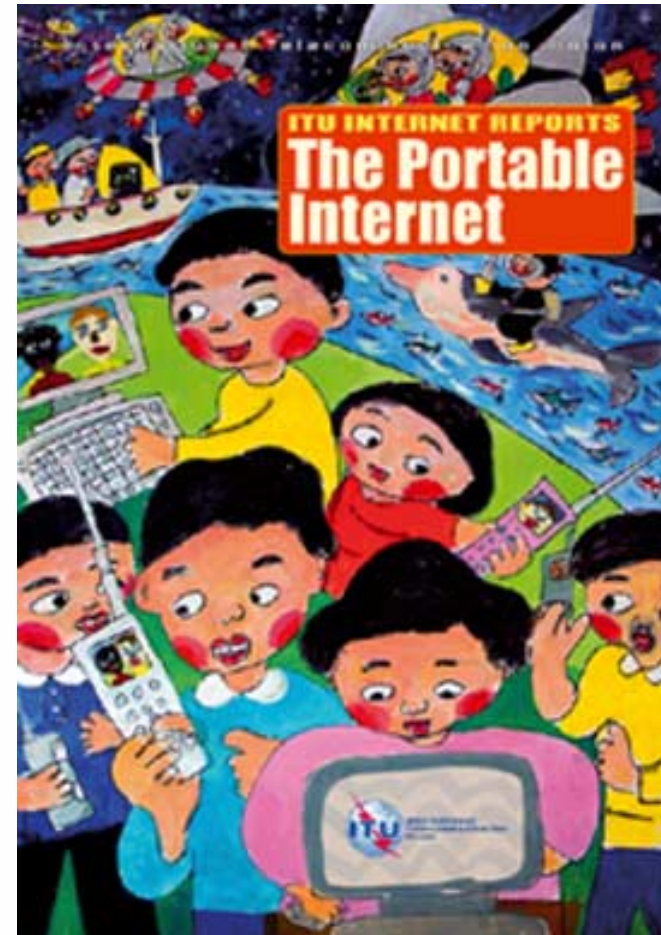
www.itu.int/portableinternet

A final thought

Change in all things is sweet…

- *Aristotle*

Helping the world communicate

International Telecommunication Union

Thanks!

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