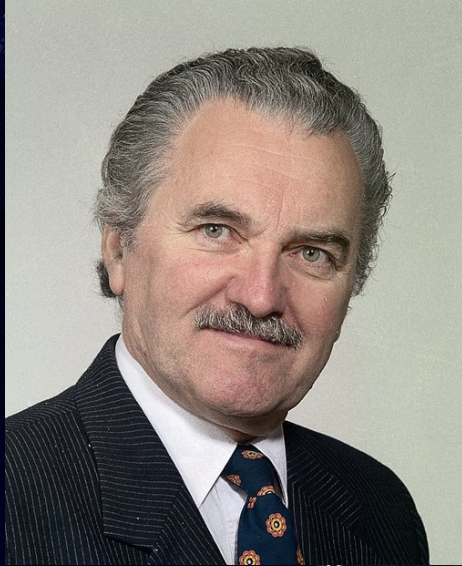




Broad-band wireless & the digital divide in Europe

Prof. R Struzak



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Co-Founder & Chair, International Wroclaw Symposium on EMC

V-Chair, CCIR SG1 on Spectrum Management & Monitoring

Professor, Institute of Electrical Metrology, Wroclaw

Editor-in-Chief, Global Communications, London

Consultant, ITU, UN-OCHA, WB, etc...



- Progress of humanity -- thanks to gathering and sharing information and knowledge



See: World Bank, 1998, quoted after Sarah Cummings, Richard Heeks & Marleen Huysman: 'Knowledge and Learning in Online Networks in Development - A Social Capital Perspective' (2003); <http://www.sed.manchester.ac.uk/idpm/publications/wp/di/index.htm>



Cyrus Cylinder - first charter of [human rights](#)

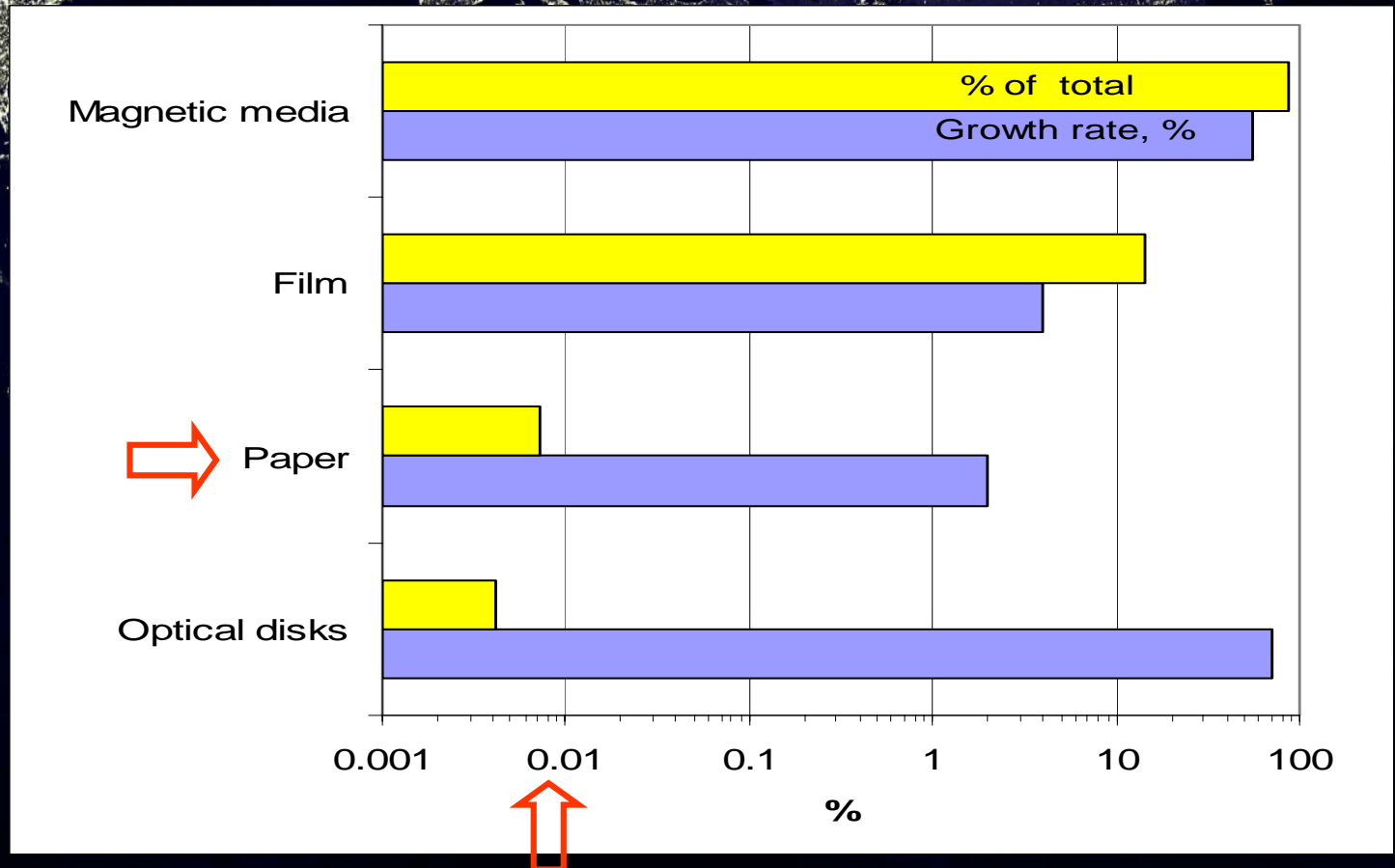


[Code of Hammurabi](#)



Information in the world

- **Production:**
~800Mb / person
(~10m bookshelf)
- **Storage:**
Print: <0.01% of total
information stored
- **Transmission:**
Phone, radio, TV,
Internet – 3.5 x more
than stored
- **Effects:**
Politics
Culture
Quality of life
Safety/ security
Business ...





Trends

- The amount of *new* information has doubled in about 3 years
 - Stored on paper, film, magnetic, and optical media
- The next 3 years will see more new information than has been produced over the *entire history of mankind*
 - If that trend continues
 - source: <http://www.sims.berkeley.edu/research/projects/how-much-info-2003/>
- What about *accessing* it?



Towards ubiquitous network society – Japan & Korea programs: from e-services to u-services

1. portable internet
2. mobile television
3. home networking
4. vehicle-based information systems
5. radio-frequency identification (RFID) technology,
6. W-CDMA mobile telephony,
7. digital television broadcasting,
8. Voice Over Internet Protocol (VoIP) services.



Trends



Cellphones- 40% of world population

Intelligent multi-medial terminals

Communications among 'things'



The world's first commercial mobile TV service using DVB-H technology was launched in Italy on 5th June, 2006, just ahead of the FIFA World Cup.

3 Italia, the mobile network operator, claimed to have signed up 111'000 users in the first six weeks of operation.

The operator is aiming to have 500'000 clients by the end of 2006.

The rapidly-growing service is already available in over 2'000 Italian towns and cities.

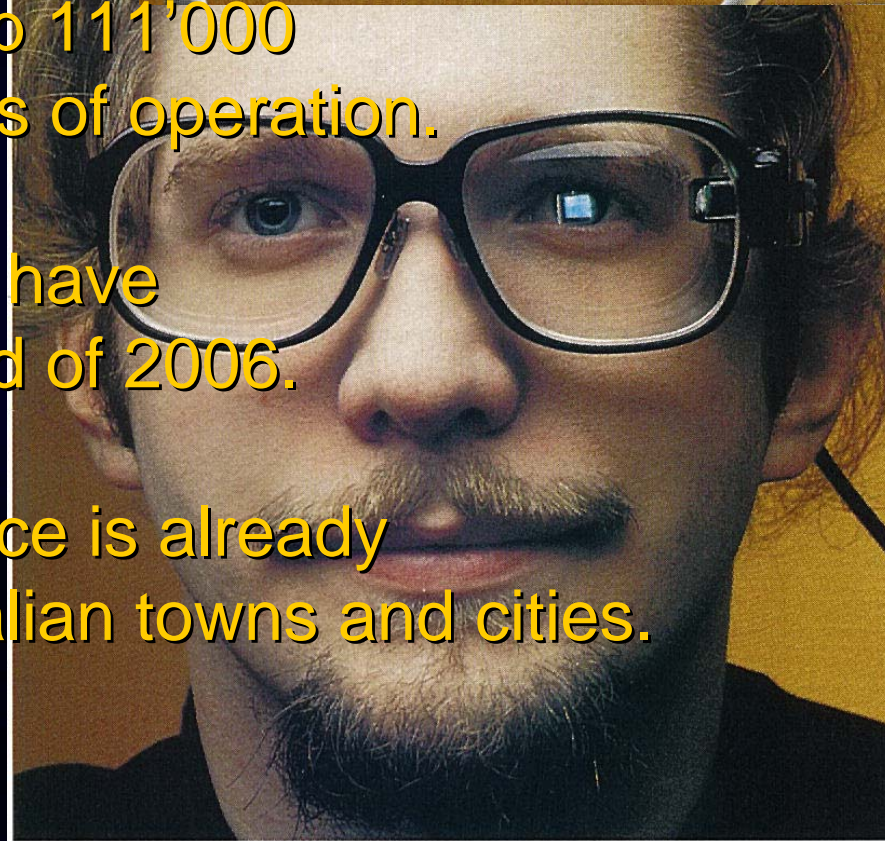




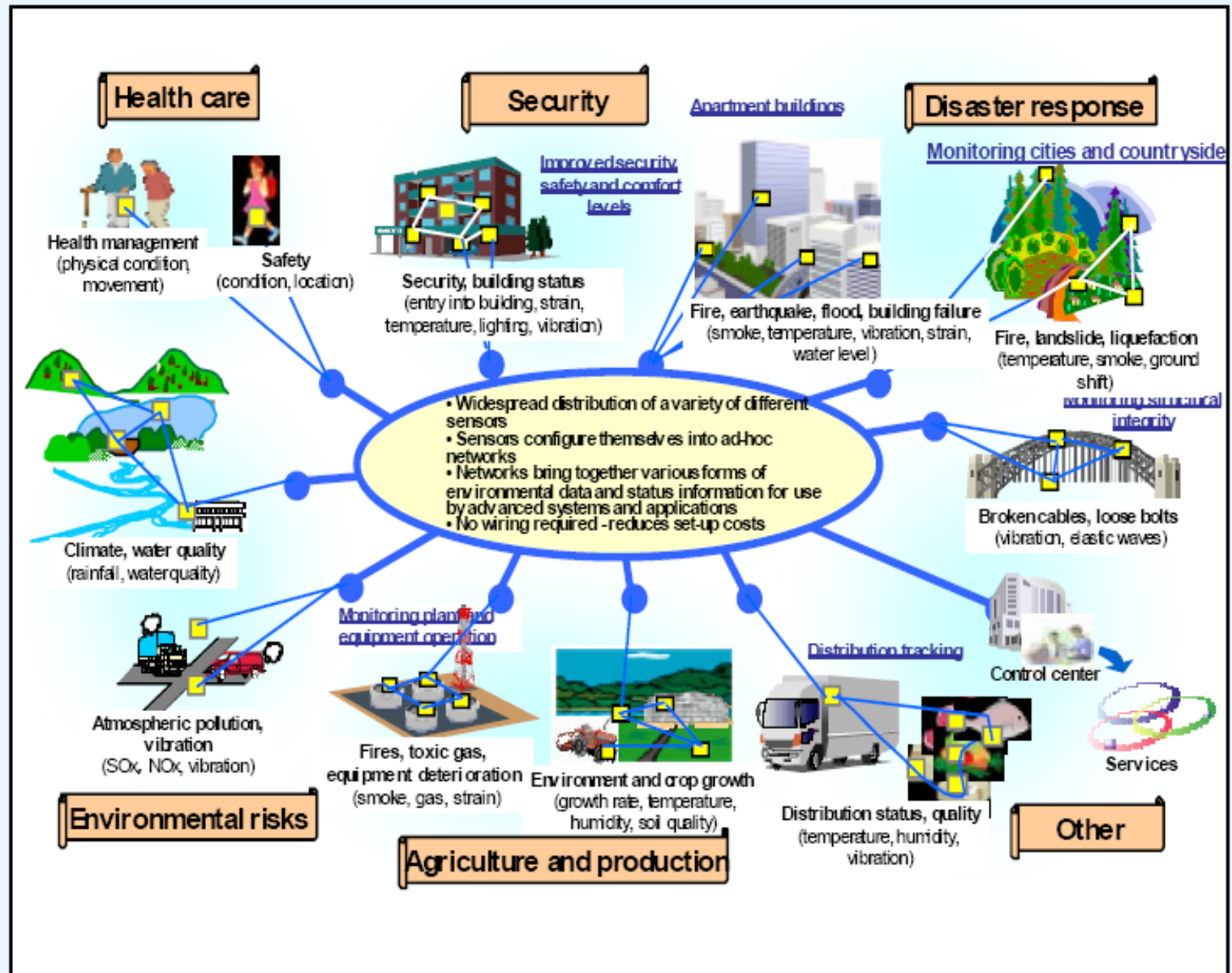
Figure 2.4: Smart people, smart home
Technology for intelligent living



Sources: ITU, adapted from Line9



Figure 2.3: The wide reach of sensor networks
A Japanese vision of ubiquitous sensor networks

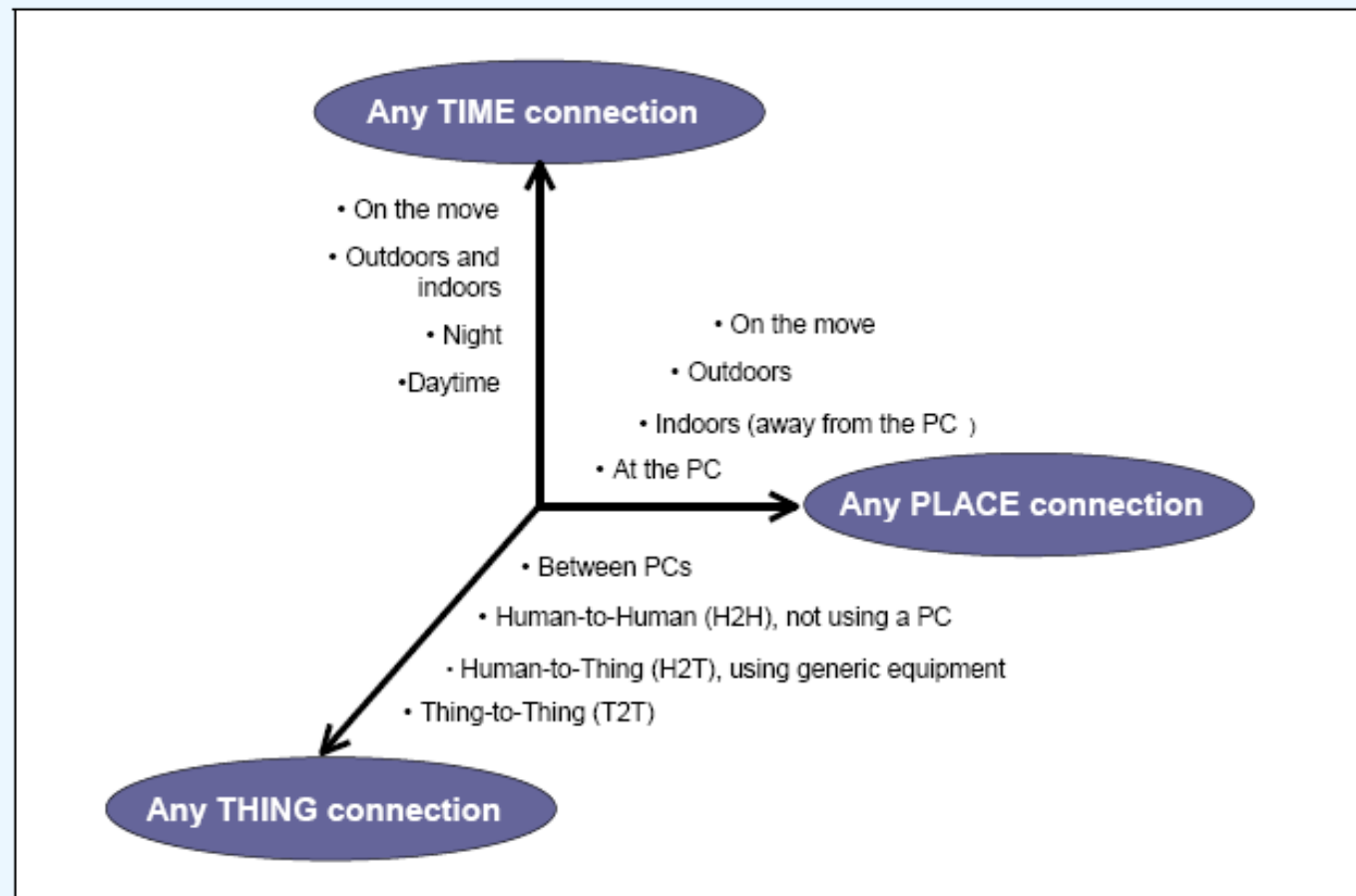


Source: Ministry of Internal Affairs and Communications (Japan)



Figure 1.2: Introducing a new dimension to the telecommunication environment

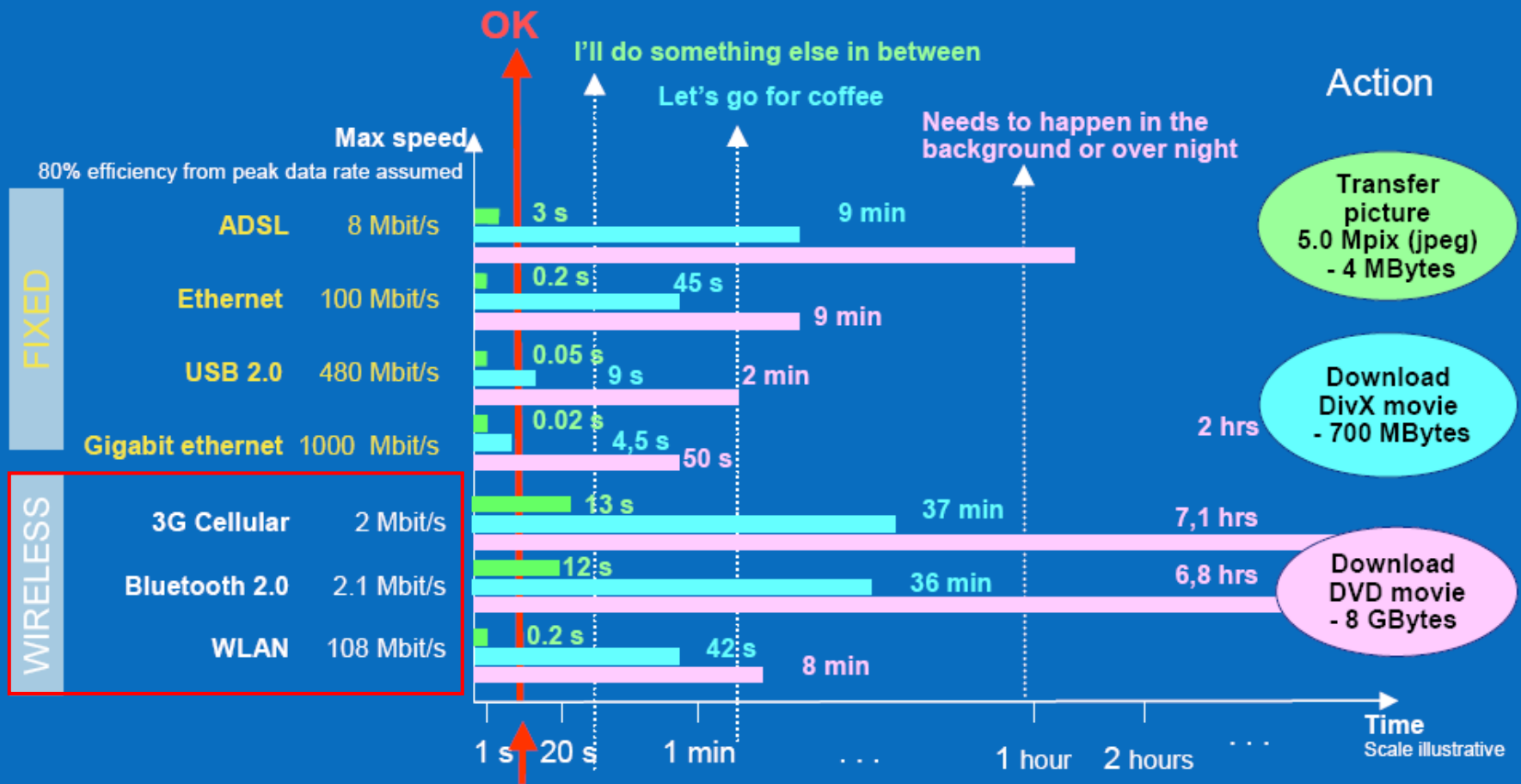
Connecting Things



Source: ITU, adapted from the Nomura Research Institute, "Ubiquitous Networking: Business Opportunities and Strategic Issues", August 2004



Why broadband?



OK

I'll do something else in between

Let's go for coffee

Needs to happen in the background or over night

Action

Transfer picture
5.0 Mpix (jpeg)
- 4 MBytes

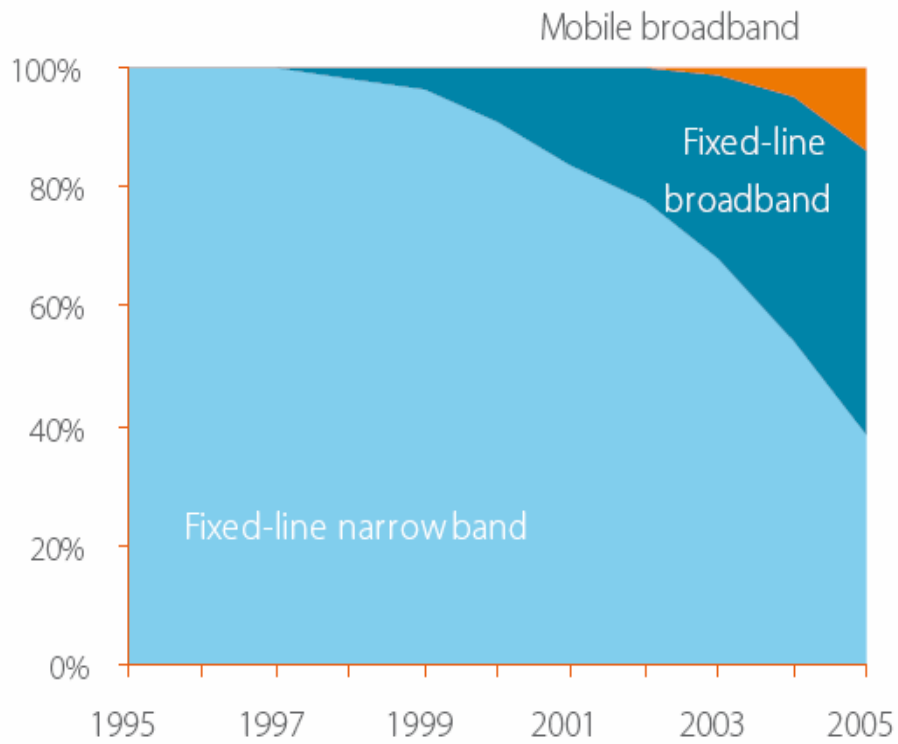
Download
DivX movie
- 700 MBytes

Download
DVD movie
- 8 GBytes

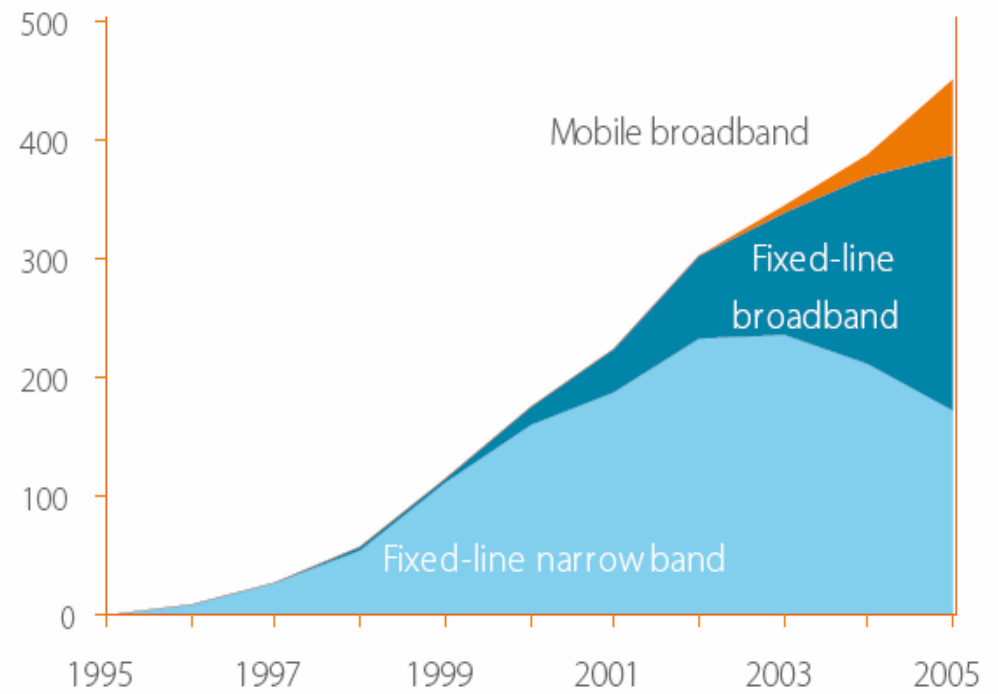
7s = valuable time for person to wait



Internet subscribers worldwide, in %



Internet subscribers worldwide, in millions

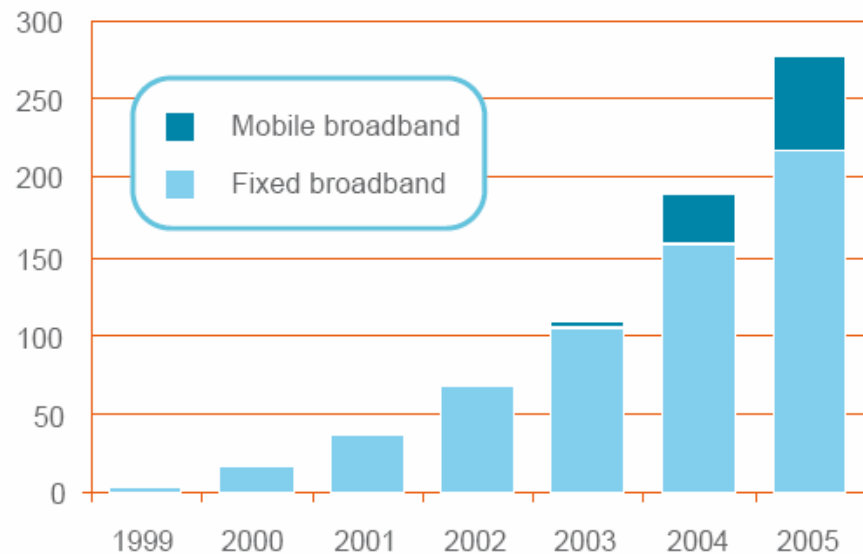


Source: Digital life ITU Internet Report 2006

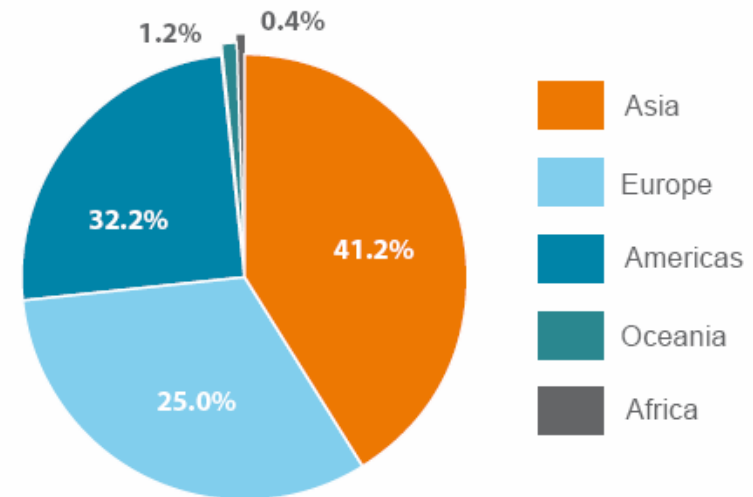
Broadband Networks

Development of broadband networks, worldwide, 1999-2005 and by region, 2006

Total broadband subscribers, worldwide, millions



Total broadband worldwide, 2006



Total 2006: 277 million

Source: Digital Life. ITU Internet Report 2006



We Must Close The Digital Gap...

Kofi Annan: We, The Peoples: The Role of the UN
in the 21-st Century. Millennium Report (2000)

UN Secretary General, Report 2000 (<http://www.un.org/millennium/sg/report/full.htm>)



Humanitarian viewpoint

„We, the representatives of the peoples of the world, assembled in Geneva from 10-12 December 2003 for the first phase of the World Summit on the Information Society, declare our common desire and commitment to build a people-centered, *inclusive* and development-oriented Information Society, where *everyone* can create, *access*, utilize and share information and knowledge, enabling individuals, communities and peoples to achieve their full-potential in promoting their sustainable development and improving their quality of life...”

[World Summit on the Information Society, Declaration of Principles, <http://www.itu.int/wsis/docs/geneva/official/dop.html>]



Business viewpoint

- ICT-related businesses must continue (to keep jobs & profits)
- Profitable markets approach **saturation**
- Conclusion:
Equipment Manufacturers, Service Providers,
Contents Creators must invent:
 - New markets
 - New services/ applications
 - New business models/ technologies



Digital Opportunity Index (DOI)

Opportunity

- 1 Percentage of population covered by mobile cellular telephony
- 2 Internet access tariffs as a percentage of per capita income
- 3 Mobile cellular tariffs as a percentage of per capita income

Infrastructure

- 4 Proportion of households with a fixed line telephone
- 5 Proportion of households with a computer
- 6 Proportion of households with Internet access at home
- 7 Mobile cellular subscribers per 100 inhabitants
- 8 Mobile Internet subscribers per 100 inhabitants

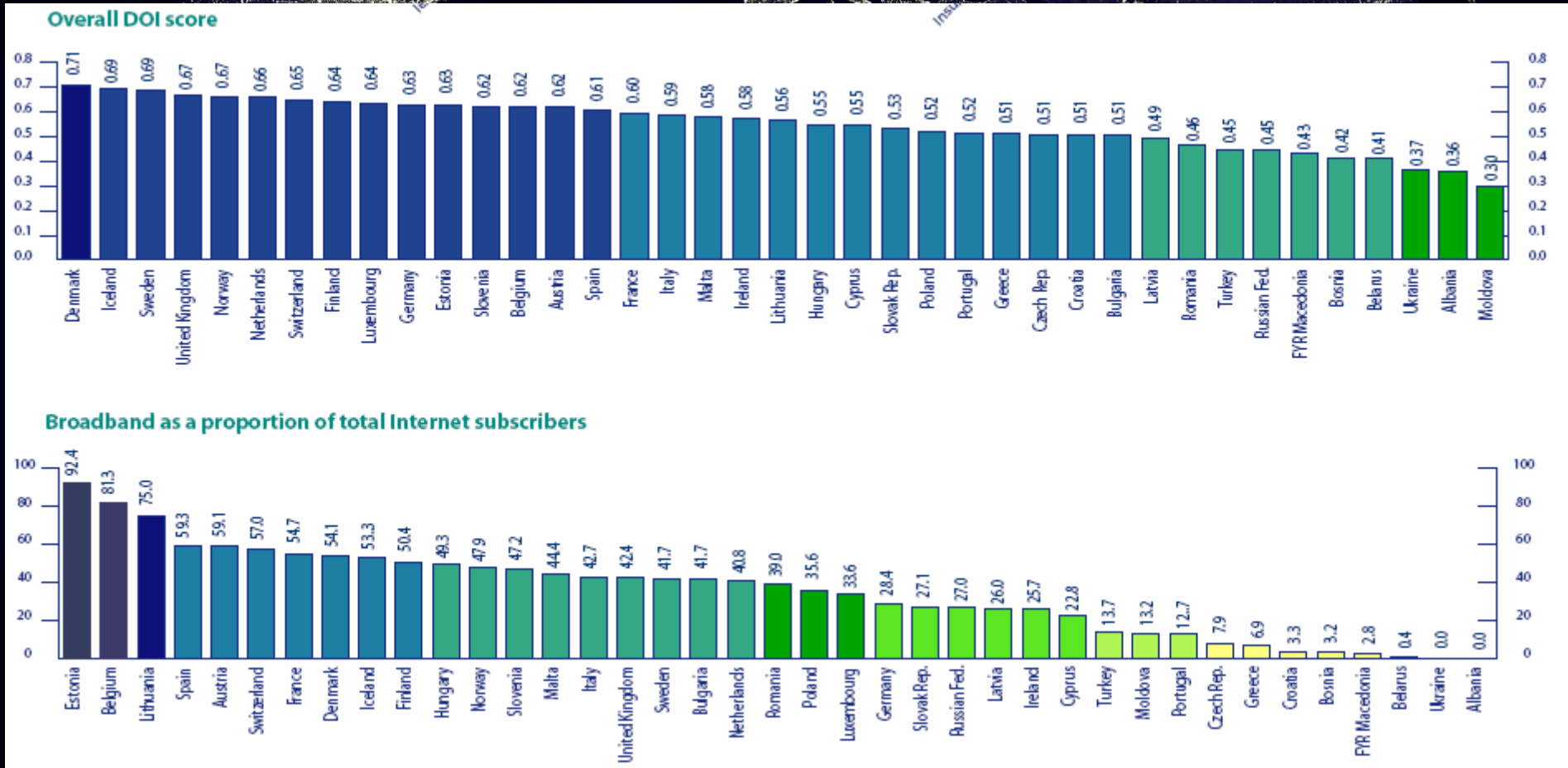
Utilization

- 9 Proportion of individuals that used the Internet
- 10 Ratio of fixed broadband subscribers to total Internet subscribers
- 11 Ratio of mobile broadband subscribers to total mobile subscribers

DOI



EU DOI

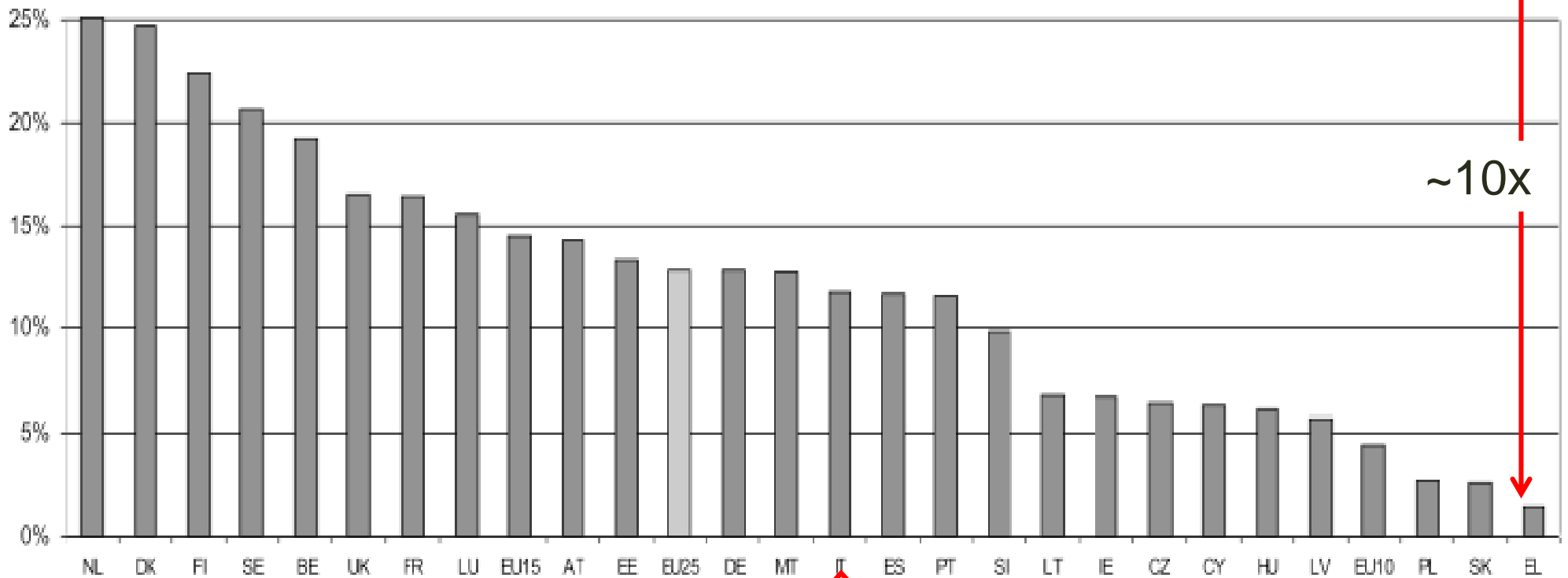


Source: World Information Society Report , ITU 2006



EU25: Broadband penetration

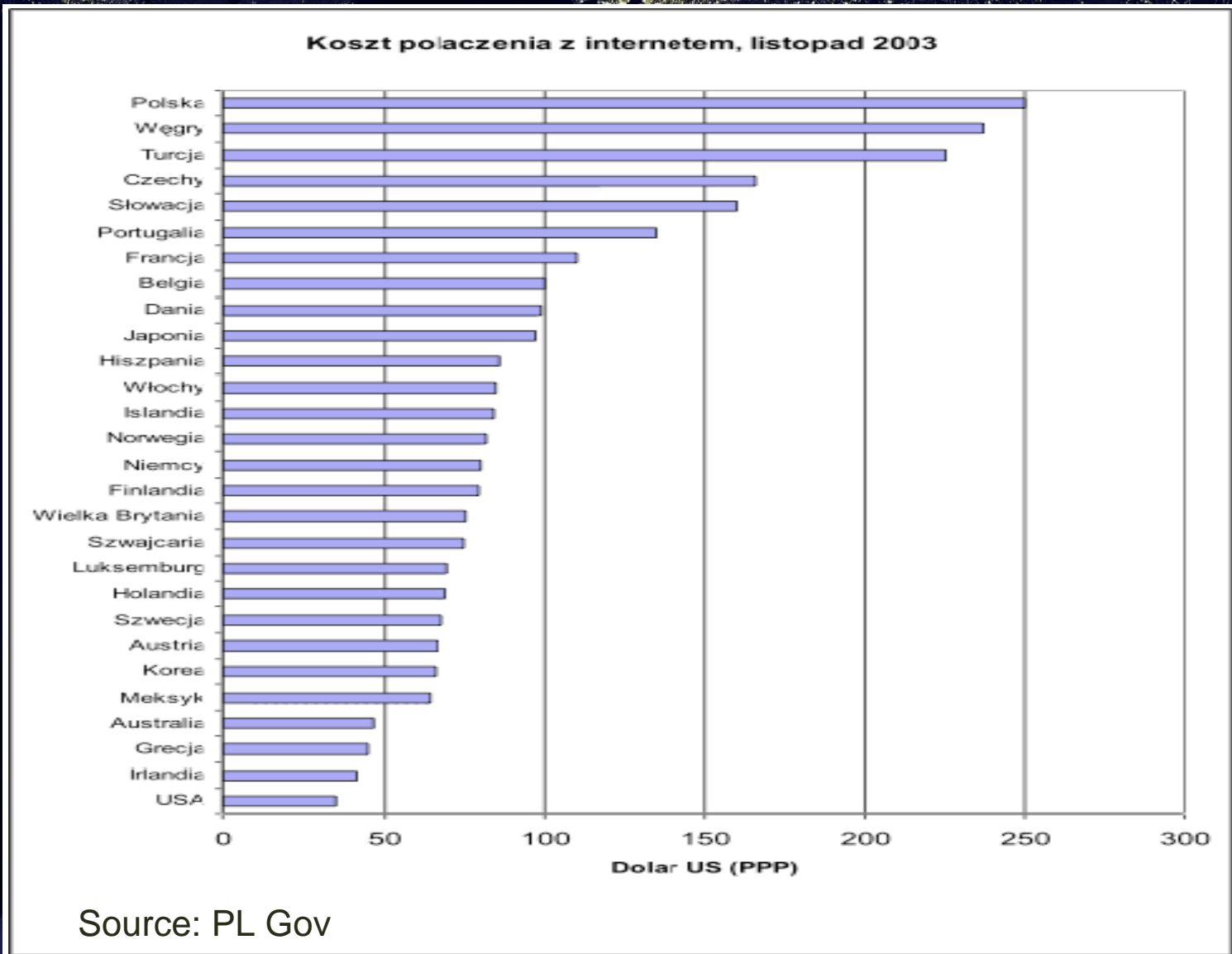
EU Broadband penetration rate, 1 January 2006



Source: EU 2006

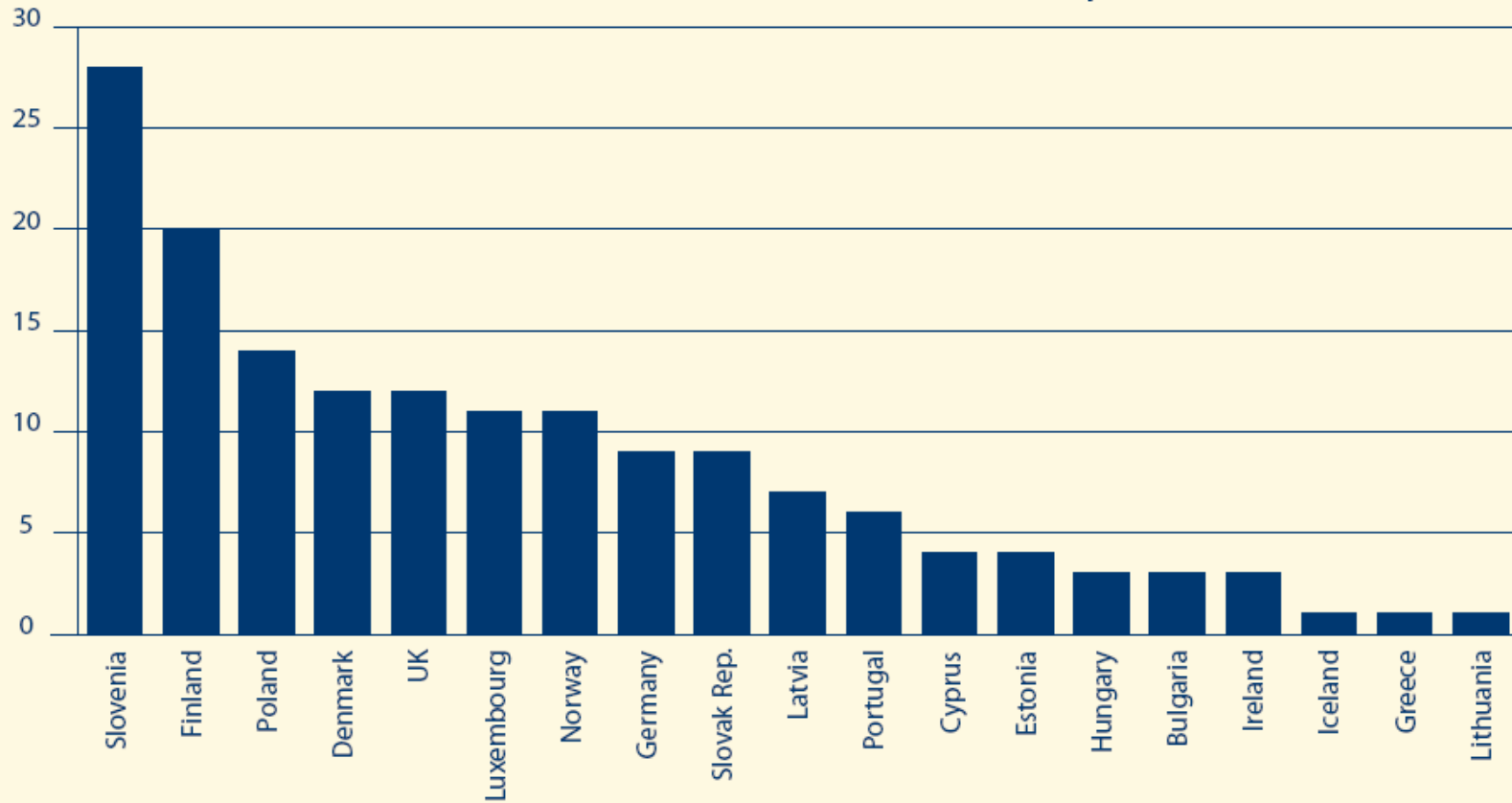


EU25: Internet cost (2003)





% of households with access to the internet from a mobile phone, 2004



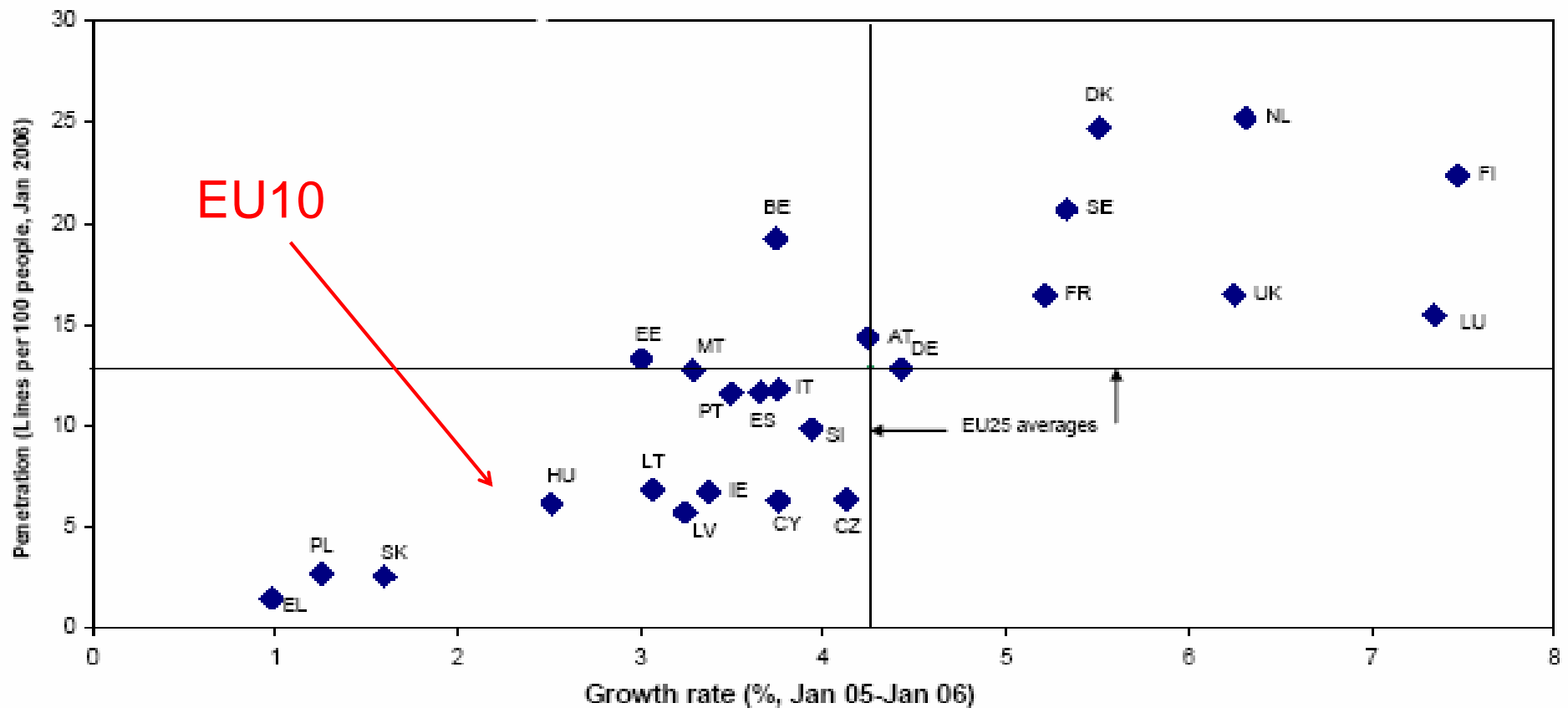
Source: World Information Society Report , ITU 2006



EU25: Broadband level & growth

chart 1

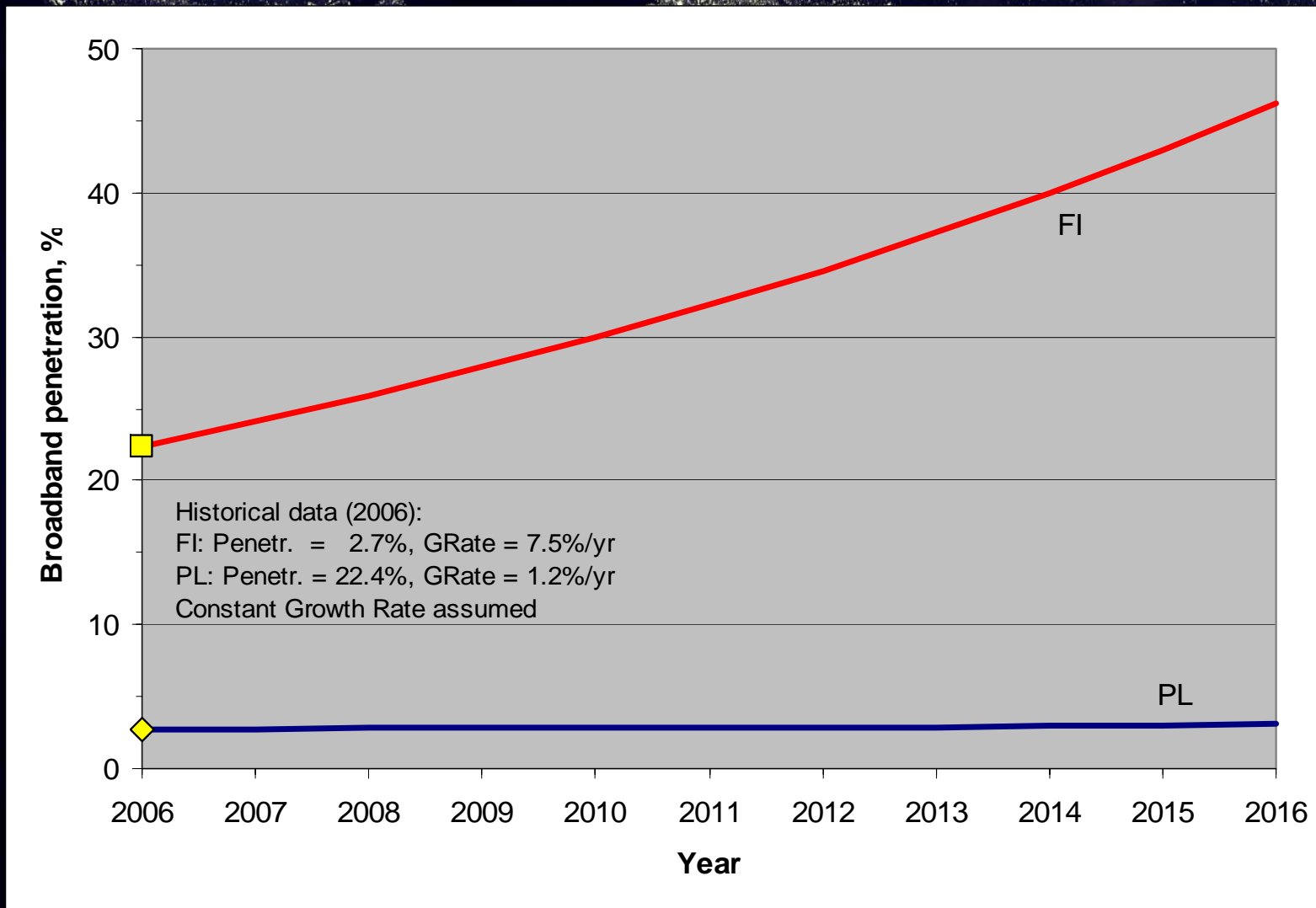
Broadband: leaders grow faster



Source: Commission services based on data from COCOM



The gap increases...



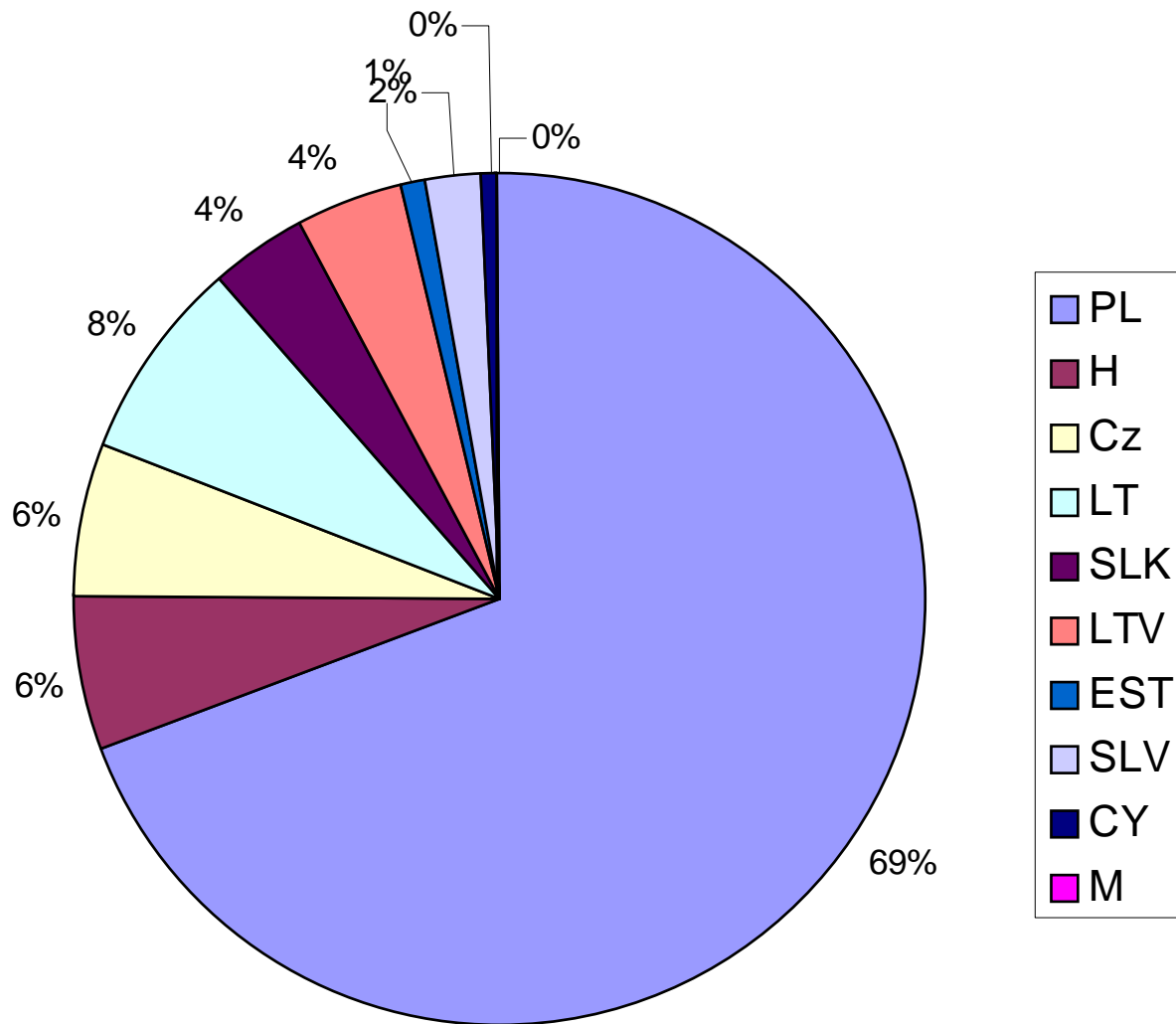
Source: R Struzak



Urban-Rural digital divide



UE10 Rural: People empl. in agriculture ~3.6M (2006)



Rural EU10 (2006)



Challenge of the 21st Century

- Access to modern information infrastructure in rural, remote, and under-developed regions
 - Market mechanism failing
 - Government programs failing
 - International assistance failing



Example: PL 2006

- EU has allocated ~€150M to support country's informatization in 2004-2006
- Till 24 Oct 2006, only 3.5% of that amount has been used

Source: Rzeczpospolita 24 Oct 2006

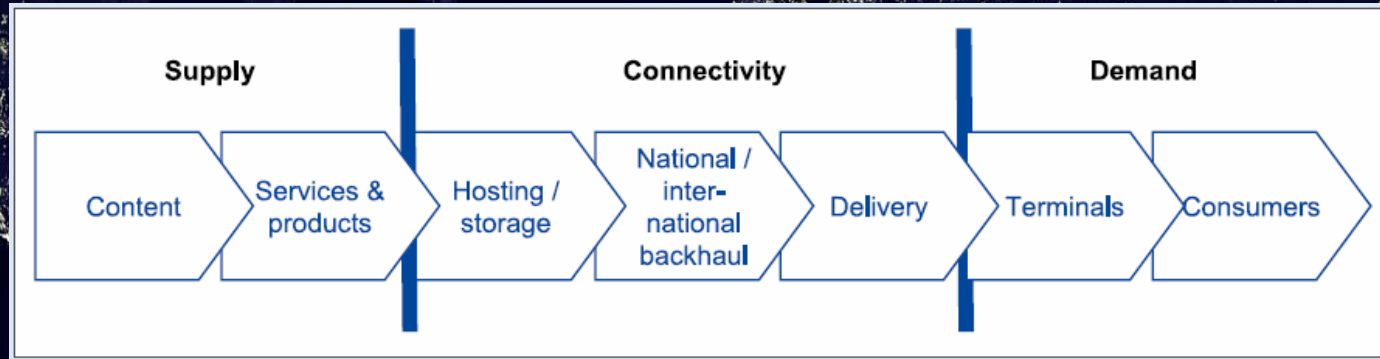


Problems

- Lacking:
 - Widely supported vision
 - Local leaders
 - Viable business models
 - Efficient management/ organization
 - Telecom infrastructure
 - Stable & enforced laws & regulations



'Content is the king, access is the key'



- Internet perceived as being oriented towards *urban* population
- Insufficient content/ services relevant to rural life
- Migration of youths to cities/ computer illiteracy of the elderly
- Intellectual property rights



- Needed:
new ideas, new business models,
new technologies,
new (qualified) people ...
- Progress impossible without
involvement of *young* generation and
local communities



Hope in radio

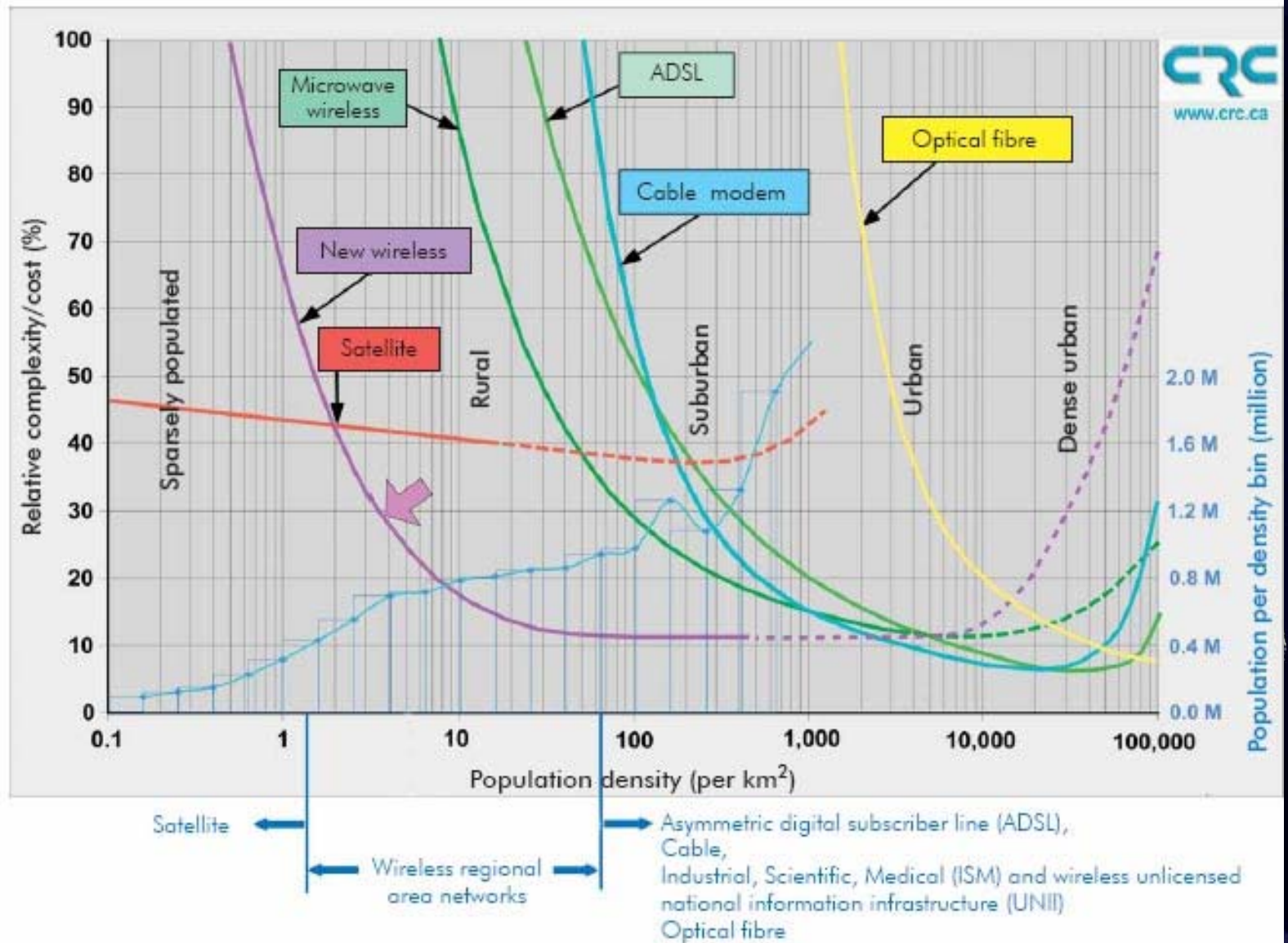
Radio waves carry information from/to fixed and mobile users with the speed of light...



- Deployment time & cost (emergency situations!)
- Ubiquitous - any place, any time, at no cost ...
- Free; no right-of-way
- Indestructible (theft, snow, wind, flood, earthquake, tornado, trees...)
- No cable (production/ transport/ maintenance...)
- Easy to setup, upgrade & expand
- Often the most cost-effective -- ideal for the “last mile” solution
- Future-proof (most of future applications - mobile/ transportable)



Figure 1 — Suitable broadband access technologies as a function of population density



Source: Chouinard, CRC, 2006



Figure 2.1: WiMAX Growth, Forecast Sales, 2004-5

Worldwide Forecasted Sales of WiMAX Equipment	
2005	\$23 million
2006	\$207 million
2007	\$568 million
2008	\$1.1 billion
2009	\$1.5 billion

Source: Sky Light Research, Sept. 29, 2005.

Source: ITU



Hope in young people

- ICTP approach:
 - initiate a self-developing process
 - teach teachers
 - that disseminate further the awareness and know-how
 - generate demand,
 - activate market forces,
 - augment other programs



Introducing ICTP

Founded

1964 by Abdus Salam (1979 Nobel Laureate)

Operates

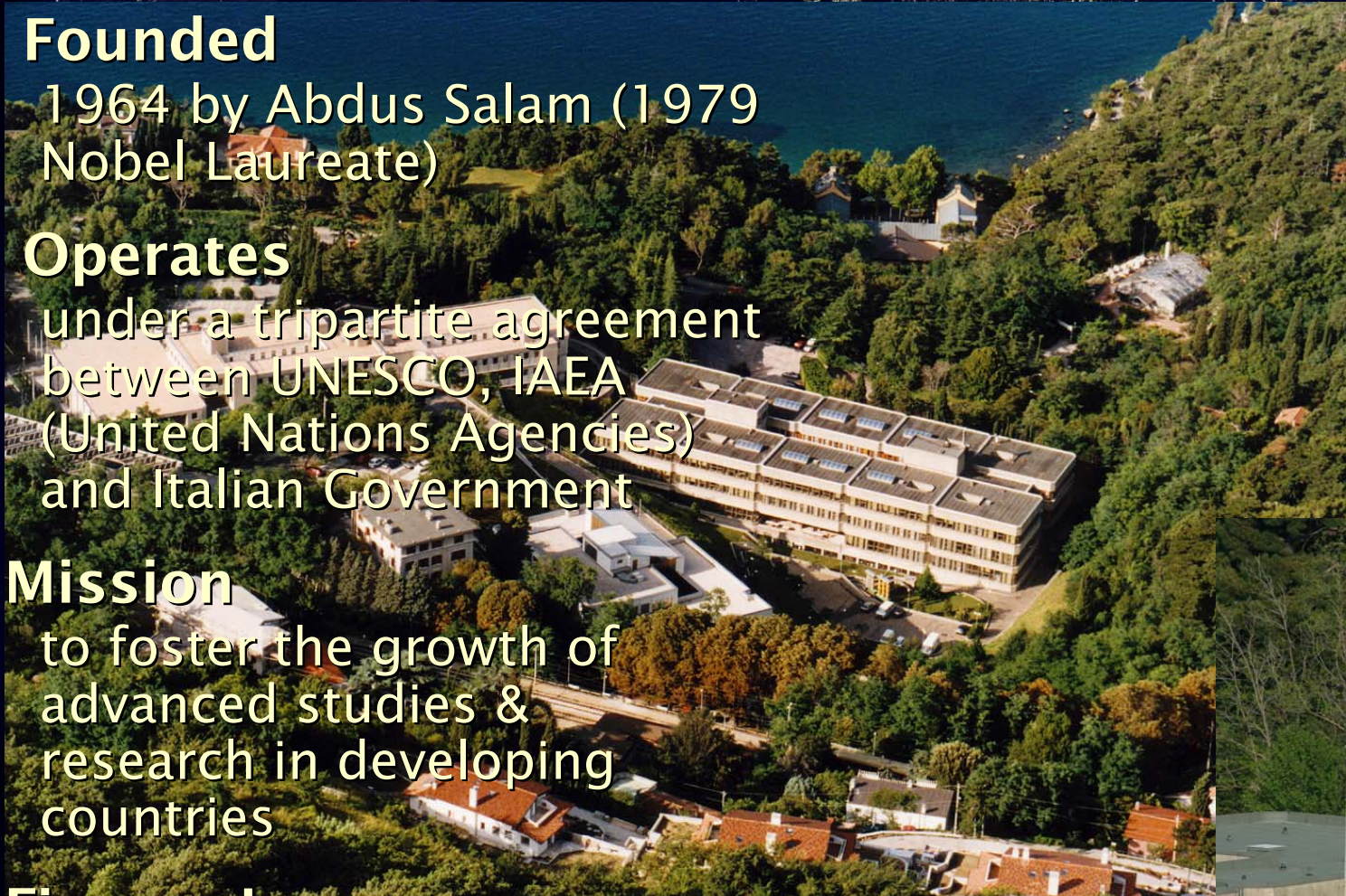
under a tripartite agreement between UNESCO, IAEA (United Nations Agencies) and Italian Government

Mission

to foster the growth of advanced studies & research in developing countries

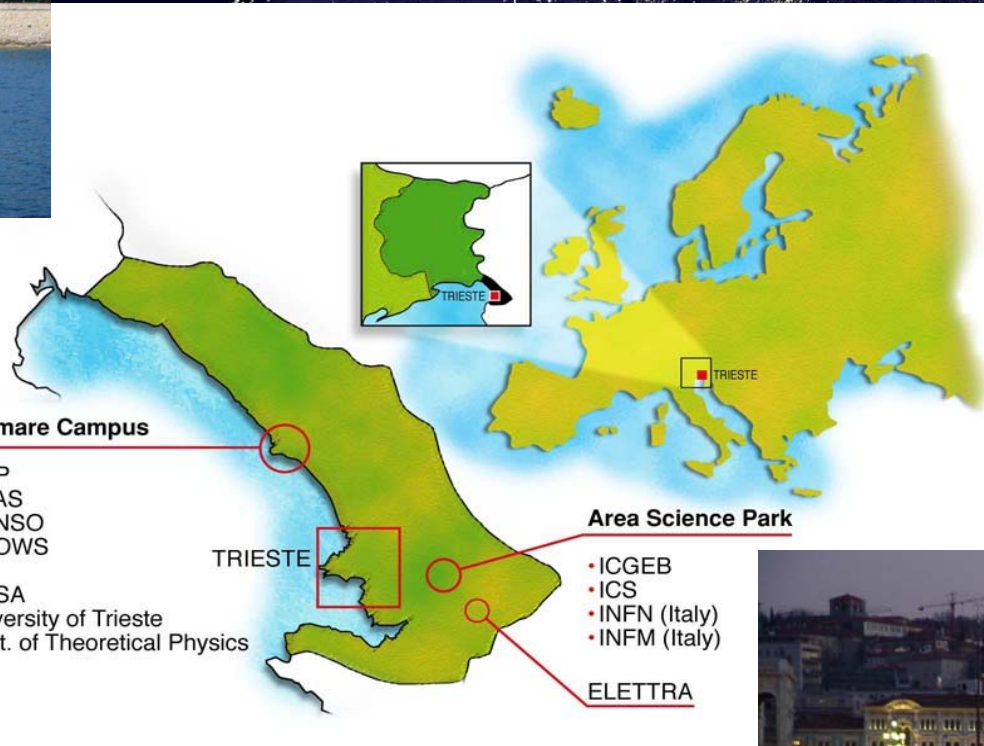
Financed

UNESCO, IAEA, & others (Italy >80% of the budget)





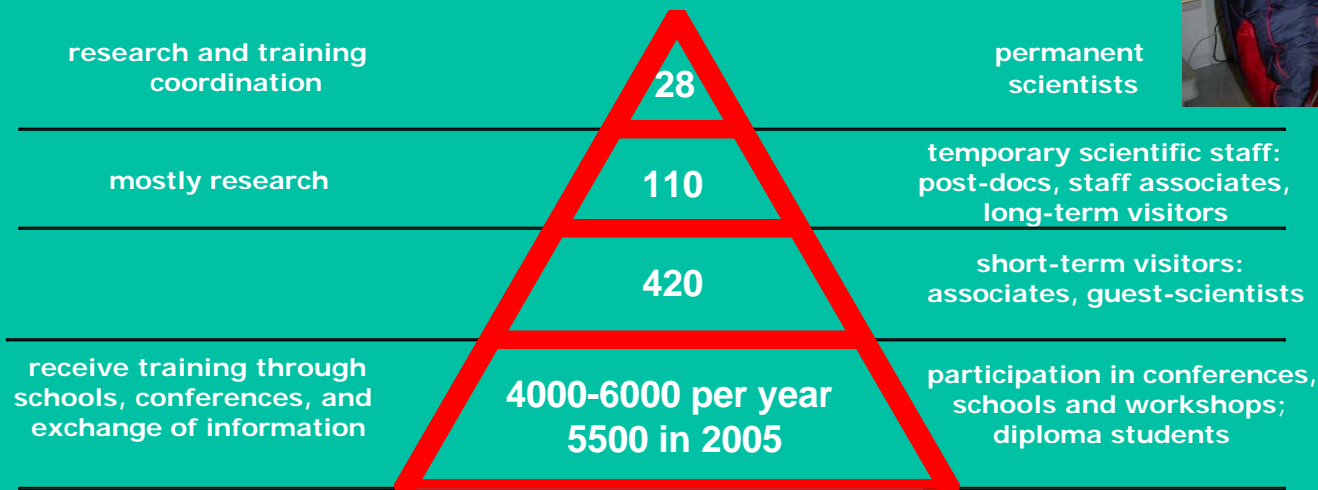
Where ICTP is located





ICTP training activities and people

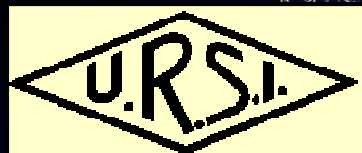
- ICTP offers many courses, conferences and workshops in emerging physics and math-related fields
- In 2005, 53 activities were carried out in Trieste and 9 outside Trieste.
- ICTP is run by a few scientists for the benefit of many:





ICTP School on Wireless Networking

<http://wireless.ictp.it>



Feb 2007:
10th edition of training activity (since 1993)
With ITU/BDT & URSI



Directors:
Prof. S Radicella
Prof. R Struzak



Focus on Modern Radio

Theory +
Technology observatory +
Hands-on training

- Radio
- IP
- Low-cost
- Free frequencies
- Free software



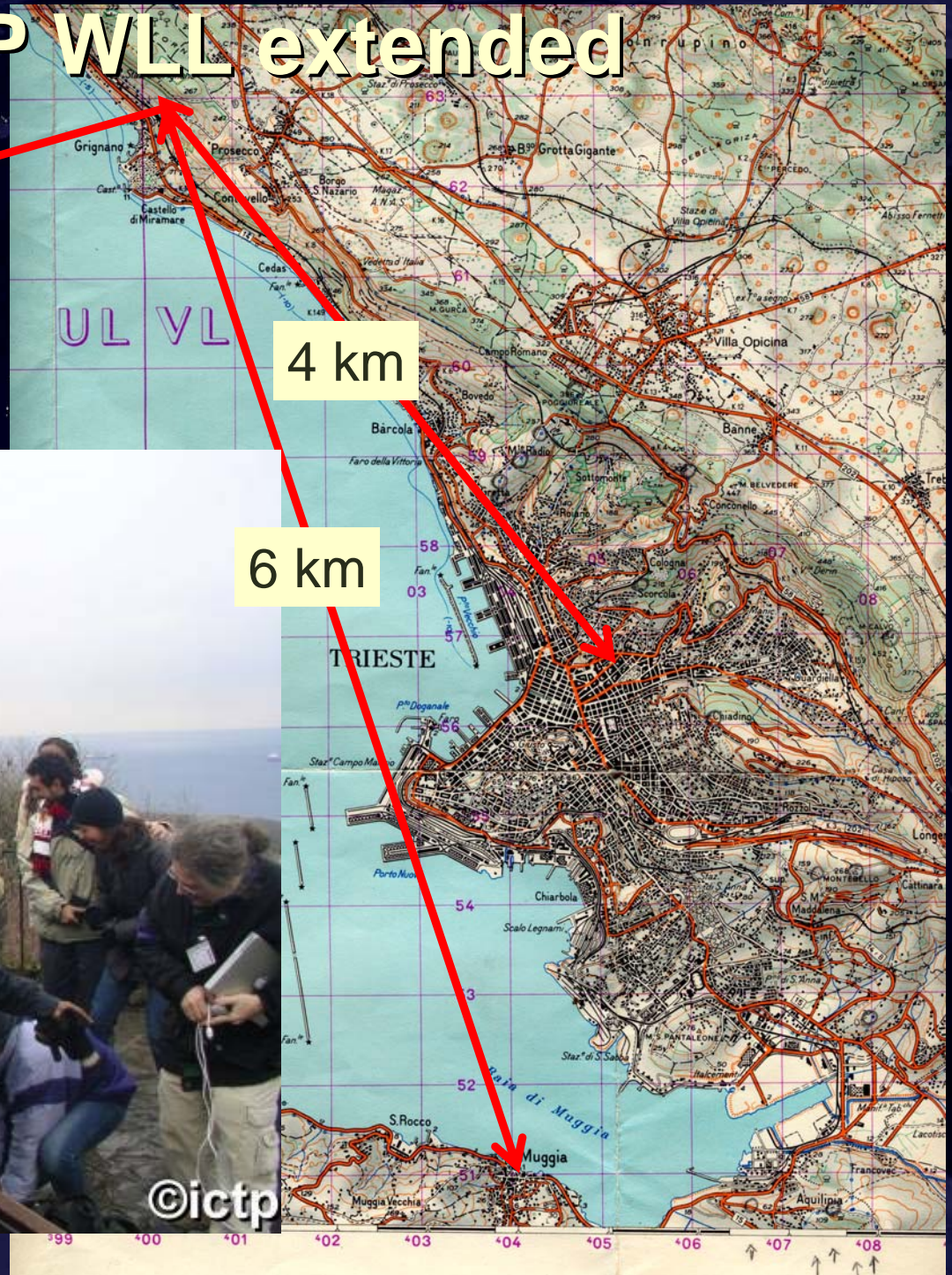


Example: ICTP WLL extended

25 km

4 km

6 km



©ictp



“...I was privileged to spend a week with a bunch of students who had, within three weeks of training, just completed a megabit link over a distance exceeding 25 km.

This, to me, is empowerment at its best, when people realize that they can take charge of their own telecommunications...”

Arun Mehta (India)



IL PERSONAGGIO

La storia di uno scienziato che insegna dall'89 ai corsi di radiocomunicazioni

Struzak un veterano all'Ictn



Tra le tante invenzioni l'uso delle lattine di olio per sostituire le antenne nei paesi sottosviluppati che collegano villaggi, università e ospedali

governativi e ricercatori accademici.

Perché tanta enfasi sull'Africa, professor Struzak? «Perché - risponde - è il continente che ha più bisogno di collegarsi con il resto del mondo. E poi noi europei dobbiamo aiutare l'Africa anche perché portiamo la responsabilità di un passato coloniale. Da una grande soddisfazione vedere questi giovani che vengono ai nostri corsi imparare un sacco di cose che potranno poi applicare nei paesi d'origine».

Struzak

Abdus Salam ci ha messo d'accordo sul ruolo fondamentale che le organizzazioni giovani nei paesi di sviluppo».

Wireless: The tin-can antenna offers a boon for third world

Elisabetta Povoledo International Herald Tribune
WEDNESDAY, MARCH 1, 2006

TRIESTE, Italy A physics research institute here is using a low-cost but effective tool to bolster communications in developing countries: the tin-can antenna.

Made from a can (the best are those used for seed oil, their creators say), a screw-on connector and a short brass wire, the "cantenna" is promoted by researchers as a cheap and efficient tool to amplify access to information and communication technologies in some of the world's poorest and often most remote areas. Cantennas work like regular antennas but cost around €2, or \$2.40, to build, while those purchased in a store can cost several hundred euros. They are directional antennas and can be used for short- to medium-distance point-to-point links. They can also be used as feeders for parabolic dishes. That means that by aligning a series of cantennas, it is possible to receive signals from a distant receiver using one or more repeaters, which send, amplify and redirect radio waves, and send signals to remote areas.

"Bring Aeronautics to the tin can."

Since touch developed to learn home, episodic canter

"You t of Tele activity Center Nobel years,

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International Telecommunication Union

Home : ITU News magazine

WIRELESS COMMUNICATIONS

Developing countries receive training in Trieste

New wireless technologies, often employing "free" unlicensed radio spectrum, can provide affordable broadband Internet access and voice service to the developing world if matched by supportive public policies and business approaches. Eighty young scientists, engineers, and lecturers, mostly from universities in developing countries, were in Trieste (Italy) from 7 February to 4 March 2005 to get a hands-on experience in developing low-cost and reliable technologies. They were selected from among 300 candidates from around the world to attend a course on "radio-based computer networking for research and training in developing countries. The three-week course was held within the scope of a cooperation agreement signed in February 2004 between the ITU Telecommunication Development Bureau (BDT) and the Abdus Salam International Centre for Theoretical Physics (ICTP).

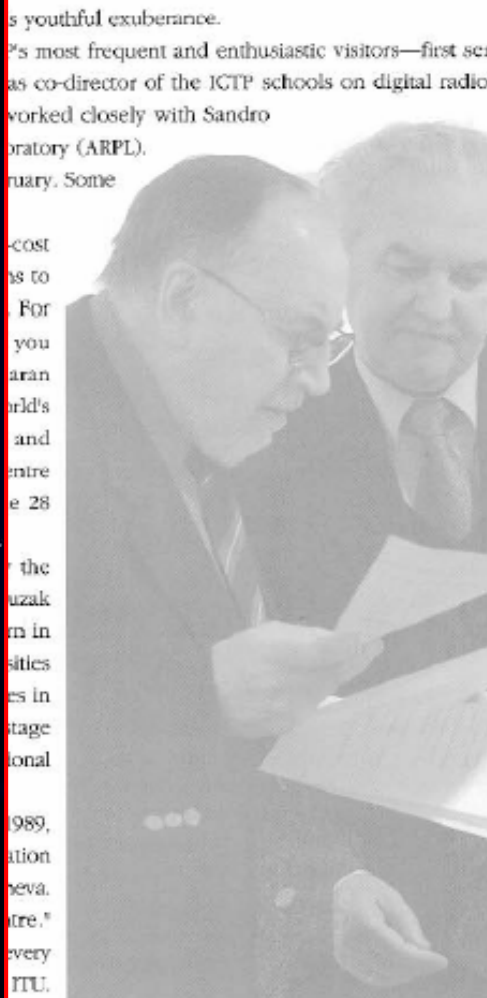


Rob Fickenger

Français Español

Print Version

Search





2007 Central European Workshop on Low-Cost Broadband Access in Rural Areas of CEI countries



Forgotten market of ~100 M people



**Thank you
for your attention!**