More than ten years of ICT at the Abdus Salam ICTP

Sandro M. Radicella
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Introducing the Abdus Salam International Centre for Theoretical Physics

What we do:

- Provide world-class research facilities for scientists from developing world
- Foster advanced scientific research, especially in theoretical physics and mathematics
- Create international forum for exchange of scientific information through comprehensive courses, workshops and seminars

Who benefits:

4,000-6,000 scientists/year
1,500 to 2,000 visitors attending
hosted activities
5 research groups
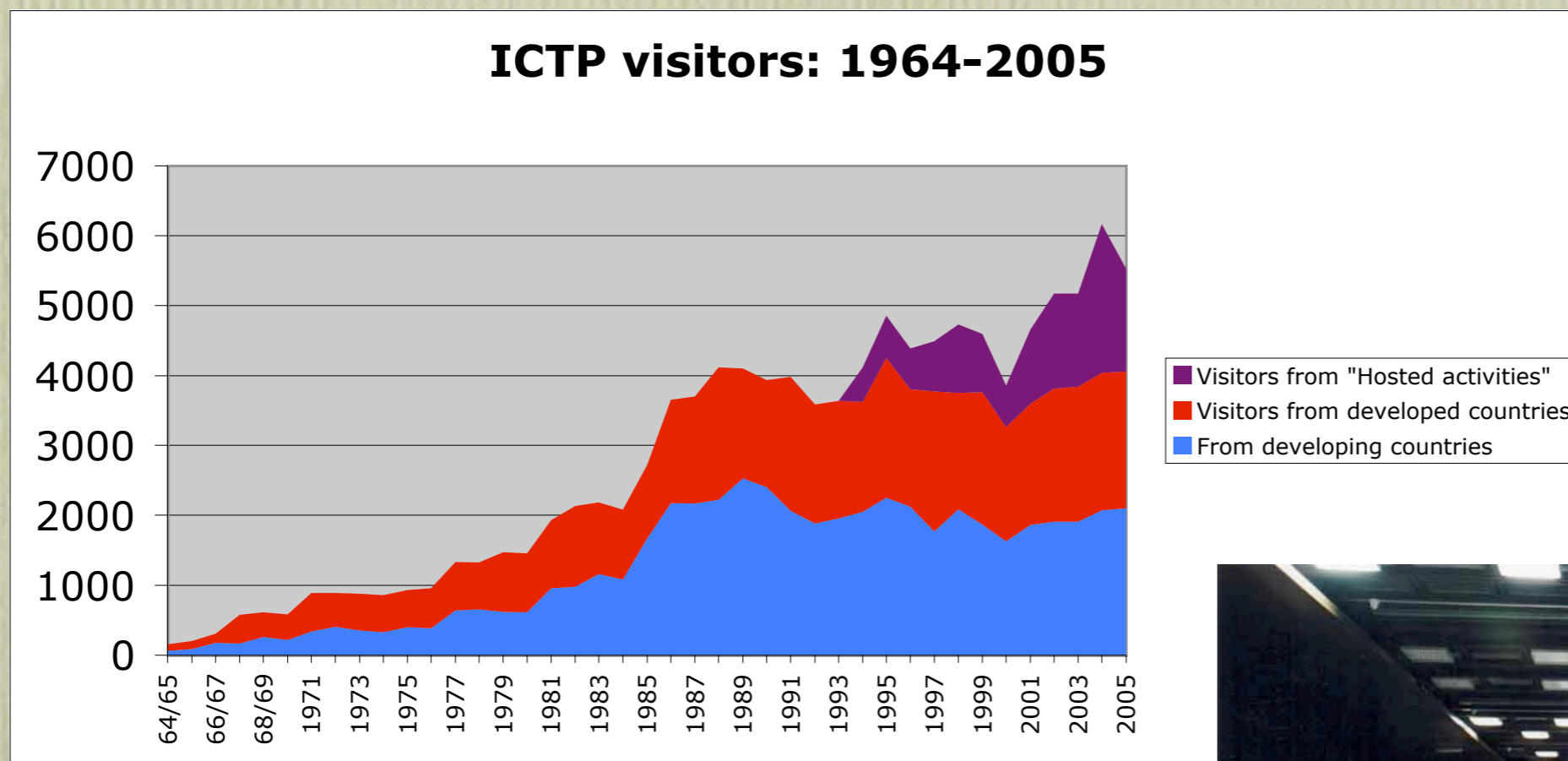50 scientific activities/year
    Conferences
    Workshops
    Schools

Visitors at ICTP

ICTP visitors: 1964-2005

Legend:
- Visitors from "Hosted activities"
- Visitors from developed countries
- From developing countries

**More than 100,000 visits since 1964
60% from developing countries
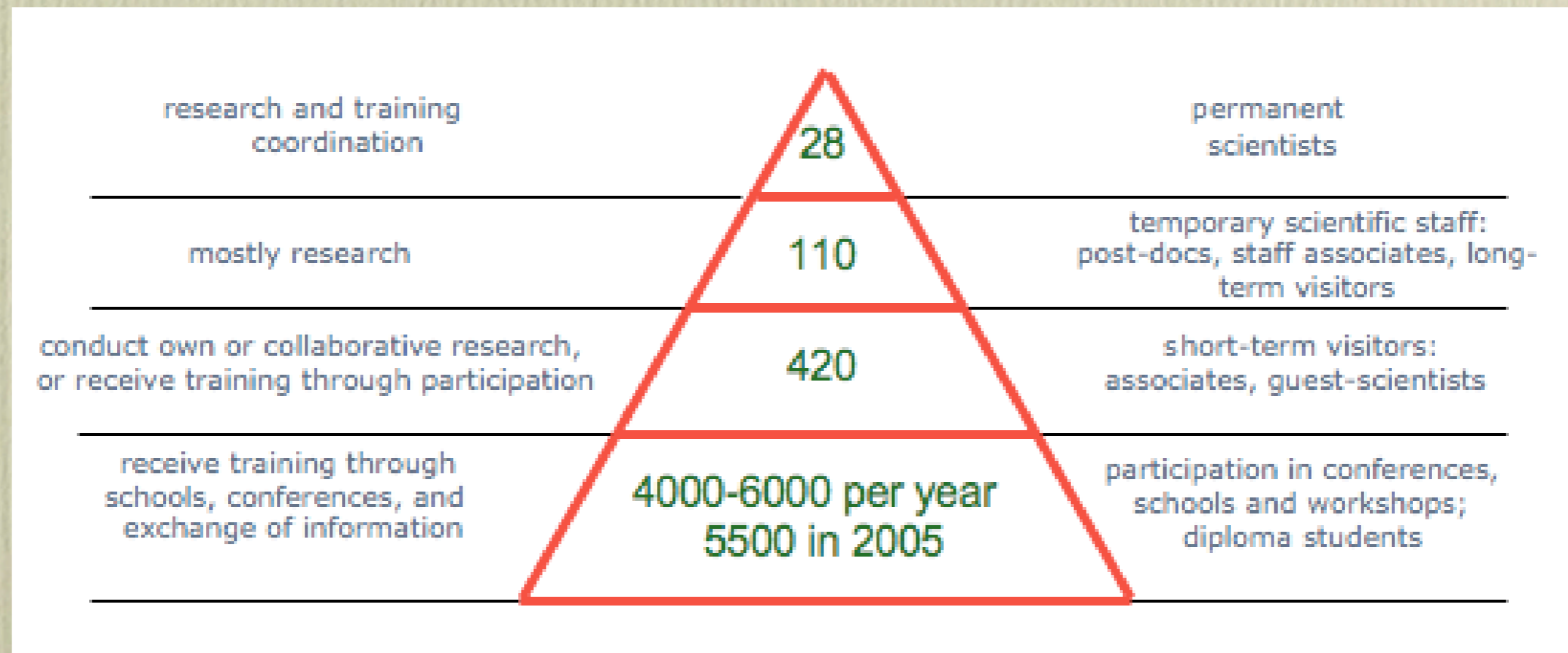40% from developed countries
170 nations represented**

ICTP scientists, visitors and their functions

ICTP is an institution run by a few scientists for the benefit of many

research and training coordination	28	permanent scientists
mostly research	110	temporary scientific staff: post-docs, staff associates, long-term visitors
conduct own or collaborative research, or receive training through participation	420	short-term visitors: associates, guest-scientists
receive training through schools, conferences, and exchange of information	4000-6000 per year 5500 in 2005	participation in conferences, schools and workshops; diploma students

Research and training for research

Applied physics (AP)
Condensed matter and statistical physics (CMSP)
Earth system physics (ESP):
    ARPL - Aeronomy and Radiopropagation Laboratory
    PWC - Physics of Weather and Climate
    SAND - Structure and Non-Linear Dynamics of the Earth
    SPEE - Soil Physics, Energy and Environment
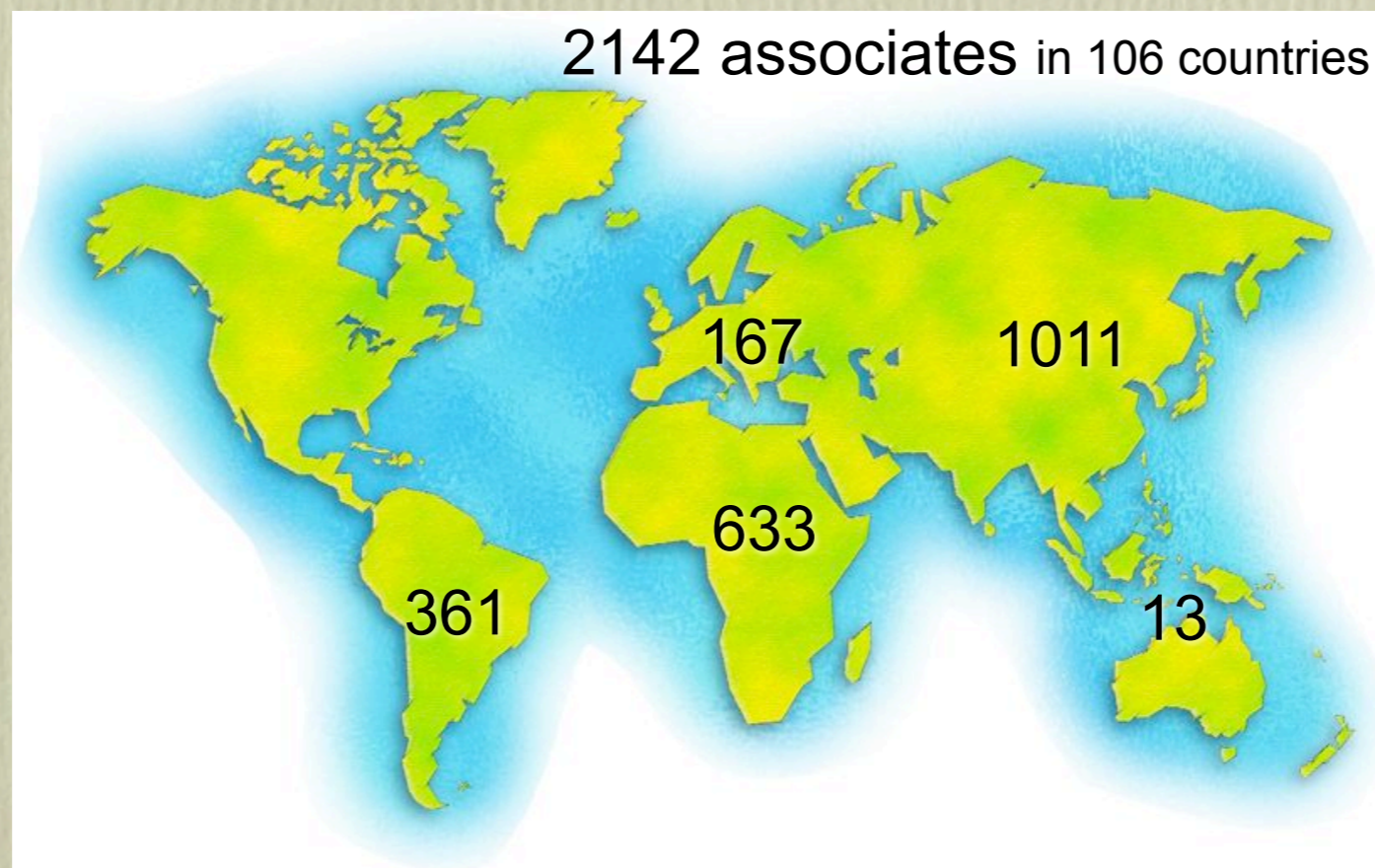High energy, cosmology and astroparticle physics (HECAP)
Mathematics (Math)
ICTP-INFN Laboratory (Mlab)

Impact beyond Trieste (I)

Associates Programme since 1964

2142 associates in 106 countries
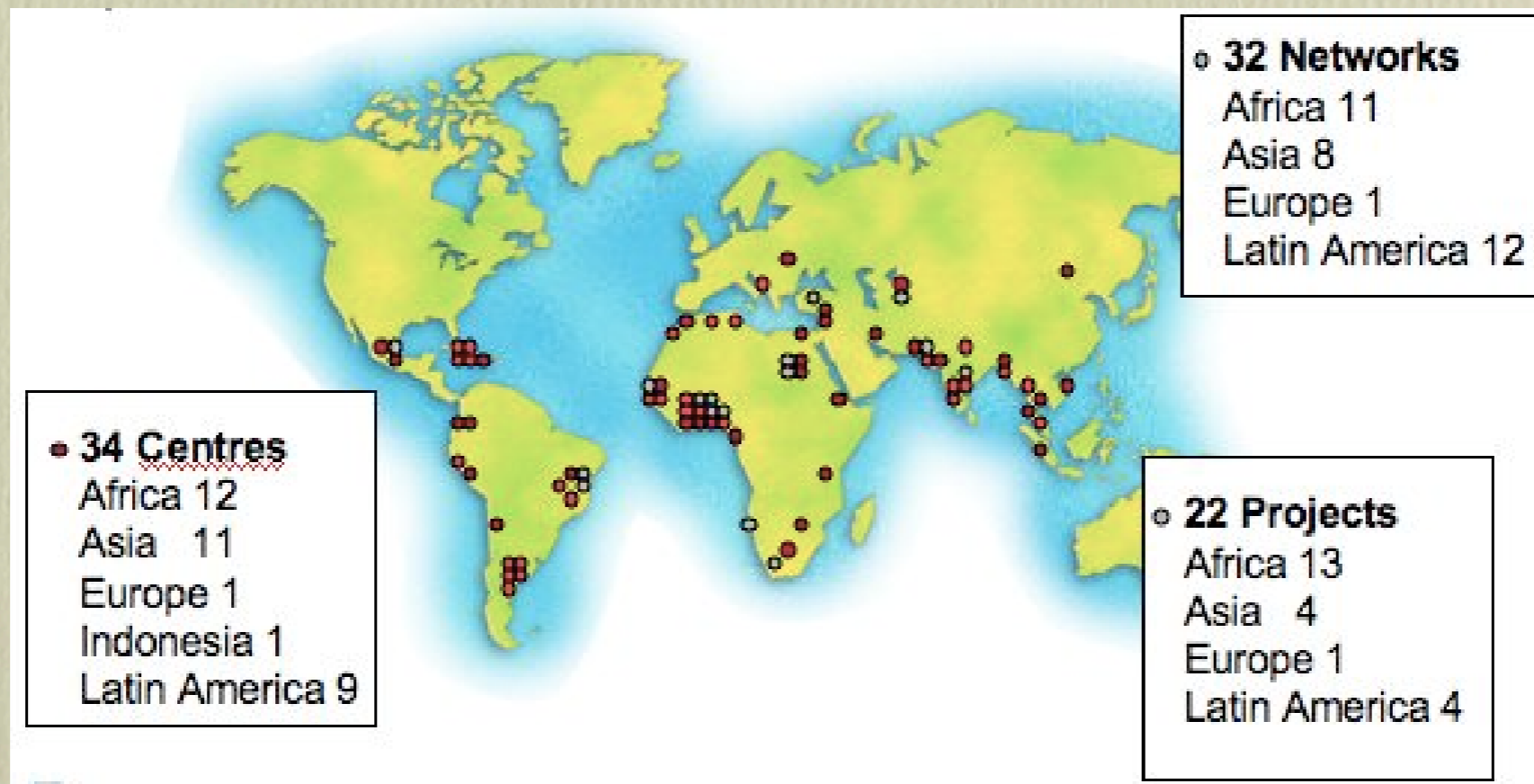
167   1011

633

361   13

Many ICTP Associate Members have achieved distinguished careers in their home countries as members of parliament, ministers, and university chancellors

Impact beyond Trieste (2)

OEA Centres and Networks since 1990

Administration and finances

Tripartite agreement
   Italian government
   UNESCO
   IAEA

Italian government
   €18.5 million a year
      85% of total budget
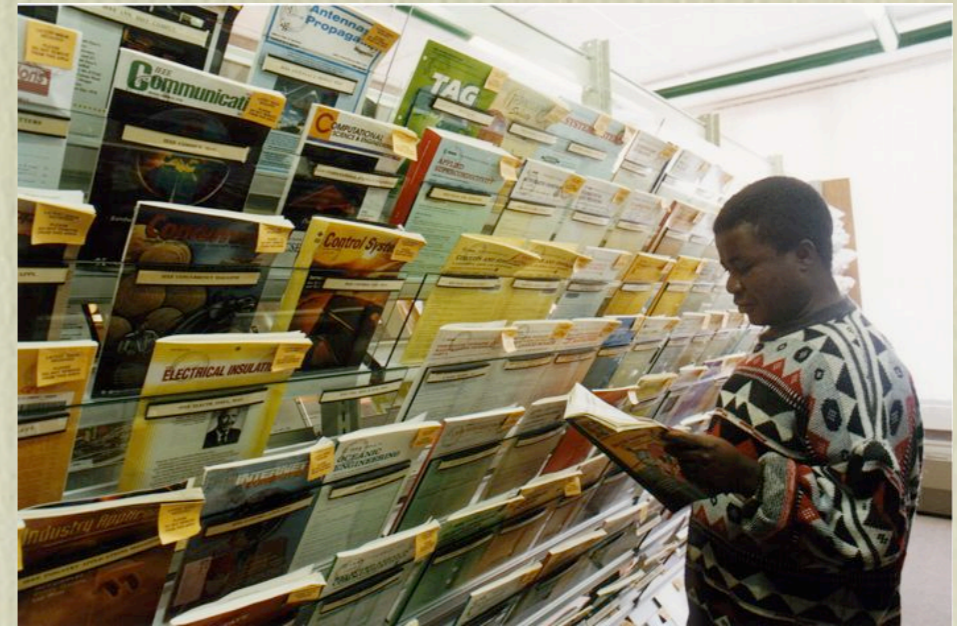

UNESCO
IAEA
Other national
   and international
   organizations
15% of total budget

On-campus facilities

Services for research and training
Library
Computers

Services for living
Guesthouses and housing
Banking and travel
Medical
Cafeteria

Introducing ICT

The advancements in telecommunications, media, the Internet, and most importantly the constant mergers of the three into the Information and Communication Technology (ICT), are responsible for the birth and growth of the Information Society we are in.

The implications and applications of it are endless.

ICT's make remote parts of the world globally accessible.

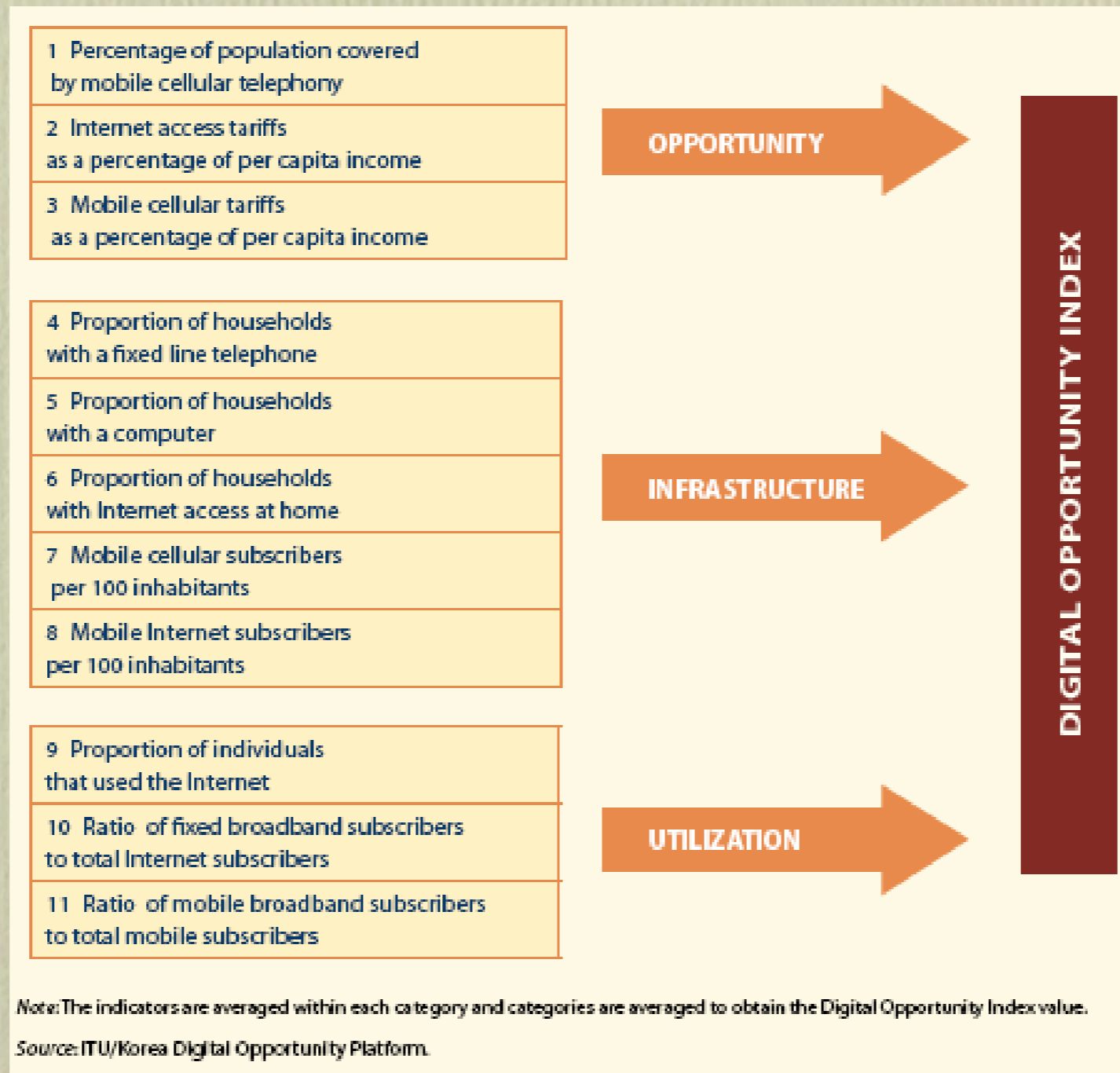The impact of the Information Society on education, culture, business, government, law, and many more issues is not a trend that is going to stop.

Taking into account that achieving scientific development depends on increased cooperation between scientists, including setting up networks of researchers and institutions, scientific advancement requires necessarily the use of the ICT.

# A new index to follow the growth of ICT worldwide

1 Percentage of population covered by mobile cellular telephony	
2 Internet access tariffs as a percentage of per capita income	**OPPORTUNITY**
3 Mobile cellular tariffs as a percentage of per capita income	
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	**INFRASTRUCTURE**
7 Mobile cellular subscribers per 100 inhabitants	
8 Mobile Internet subscribers per 100 inhabitants	
9 Proportion of individuals that used the Internet	
10 Ratio of fixed broadband subscribers to total Internet subscribers	**UTILIZATION**
11 Ratio of mobile broadband subscribers to total mobile subscribers	

DIGITAL OPPORTUNITY INDEX

Note: The indicators are averaged within each category and categories are averaged to obtain the Digital Opportunity Index value.

Source: ITU/Korea Digital Opportunity Platform.

Digital Opportunity Index

A world uneven (I)
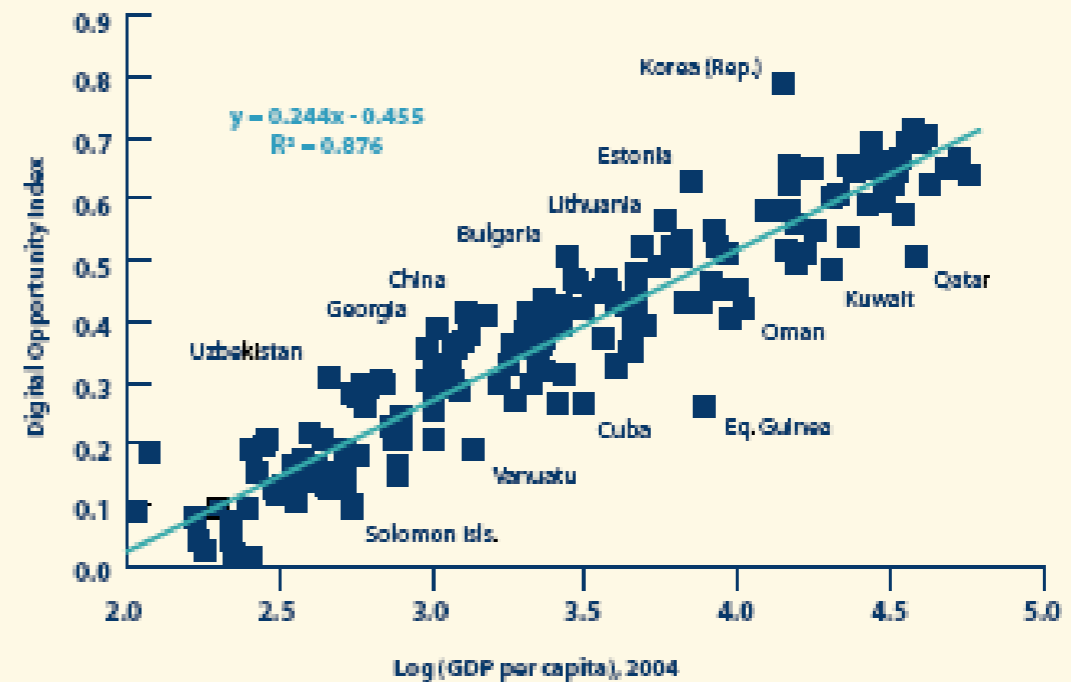

The Digital Opportunity Index Worldwide, 2005
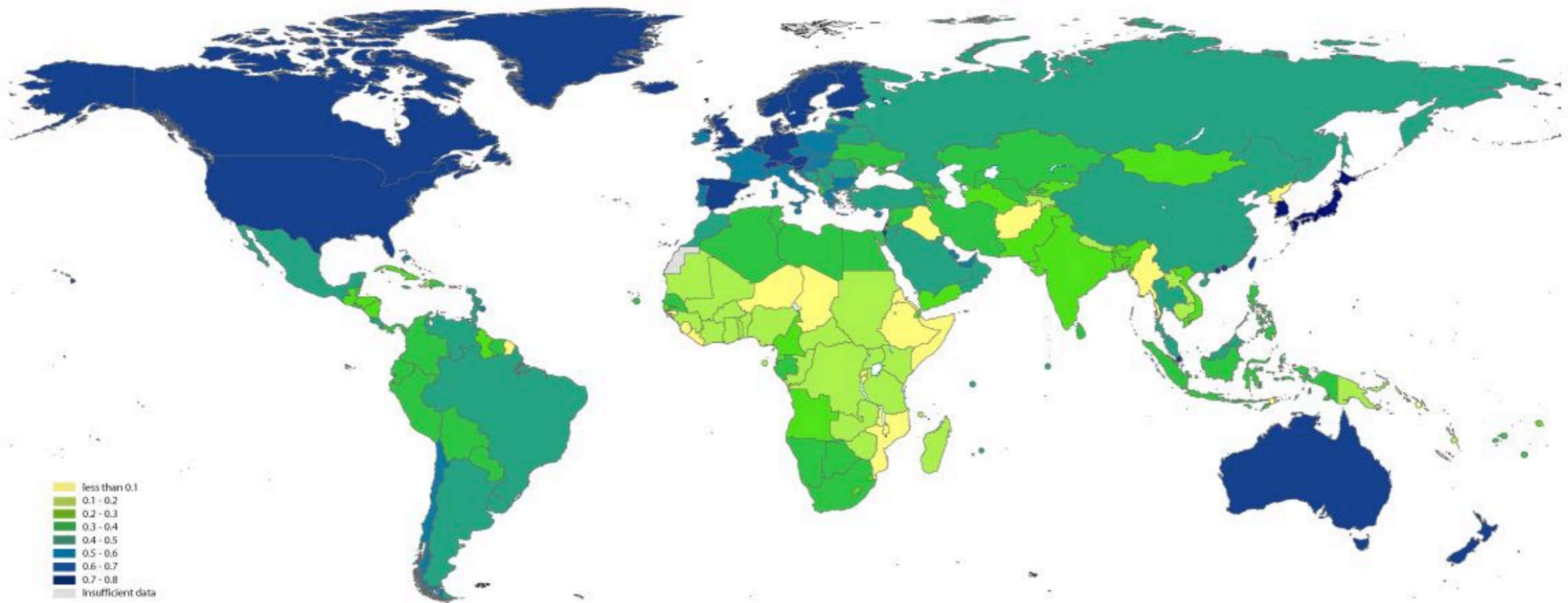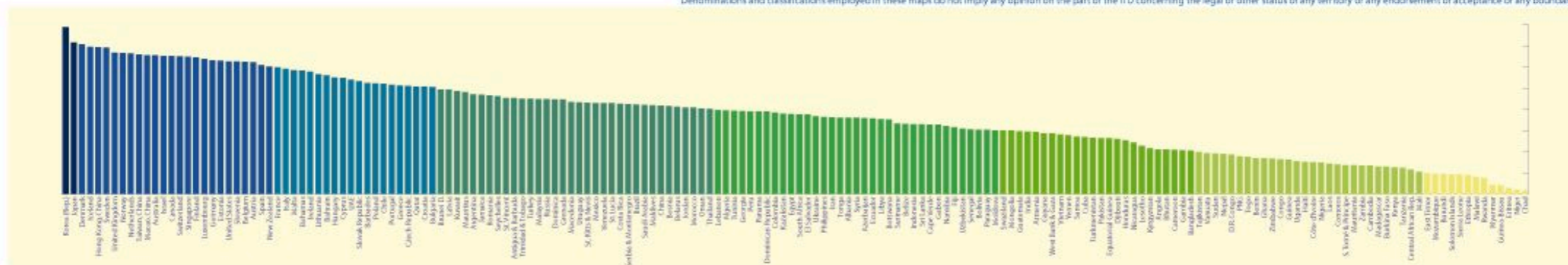
A world uneven (2)

Average Household ICT penetration, %, 2005
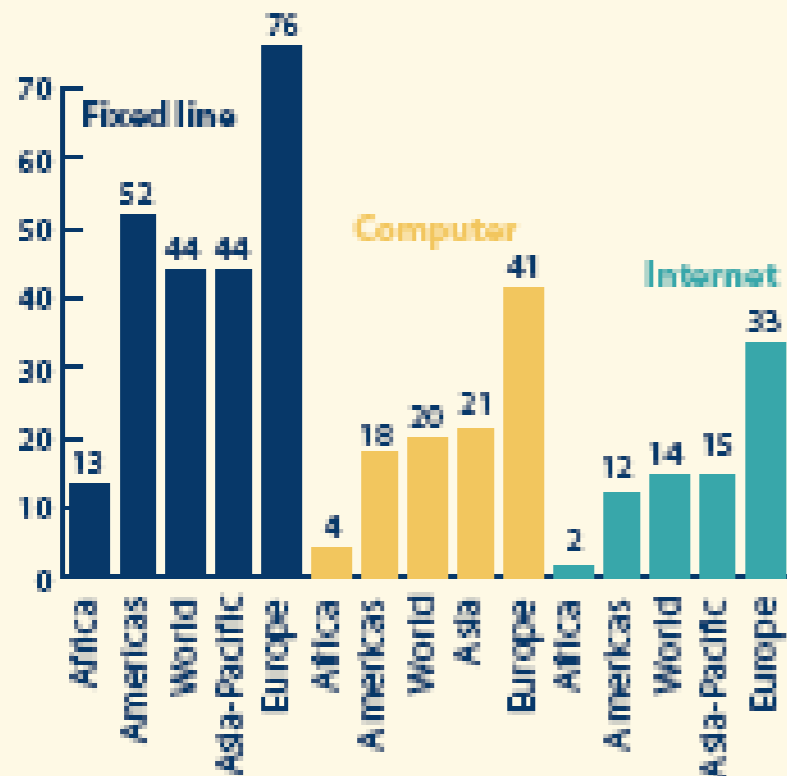
The chart shows the relationship between DOI and national wealth, as indicated by GDP per capita, using a logarithmic scale.

$y = 0.244x - 0.455$
$R^2 = 0.876$

Source: ITU/KADO Digital Opportunity Platform.

High income countries are associated with greater digital opportunity (and vice versa). However, it is difficult to identify the precise mechanics of the relationship between ICTs and improved economic performance, prove cause-effect relation, or isolate the influence of other variables.
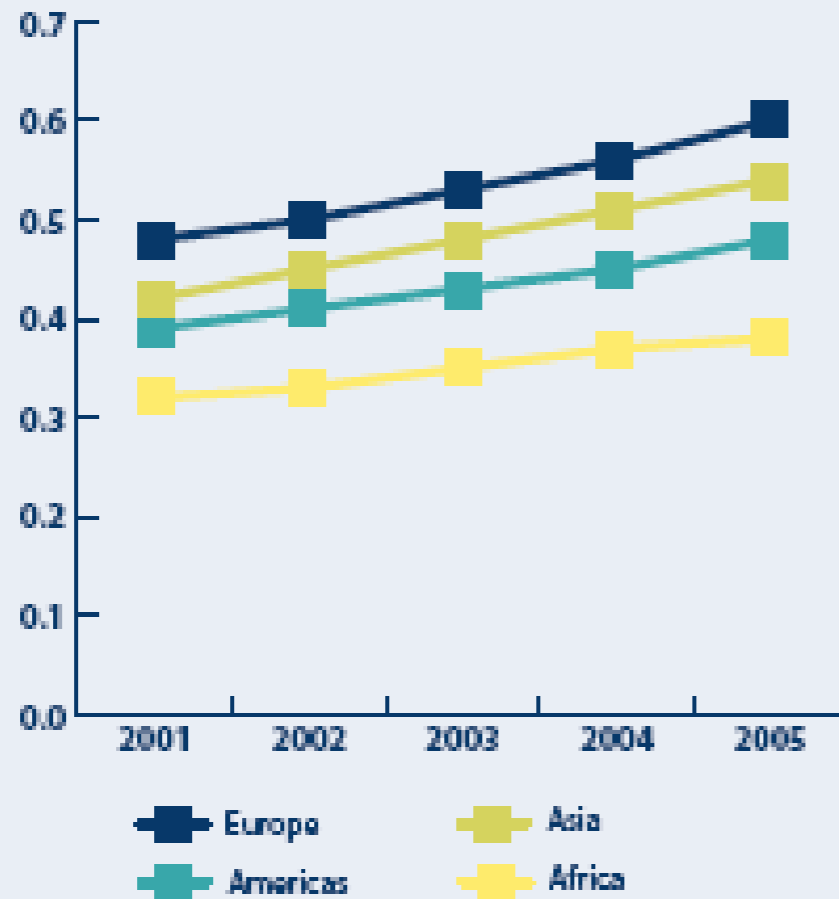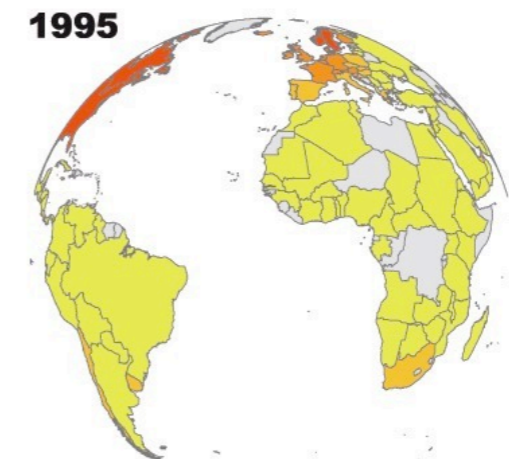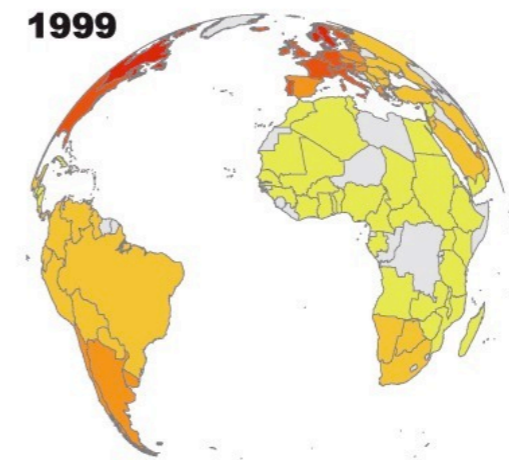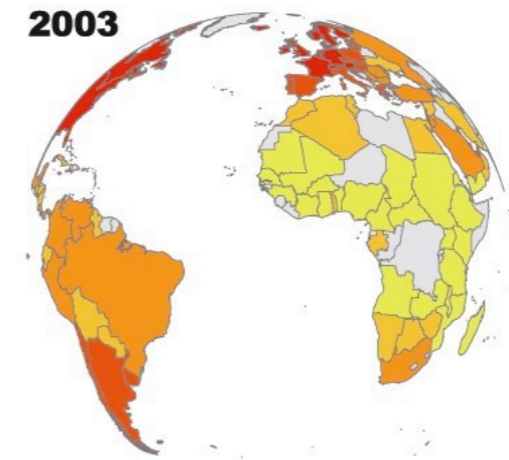
There is hope! (I)
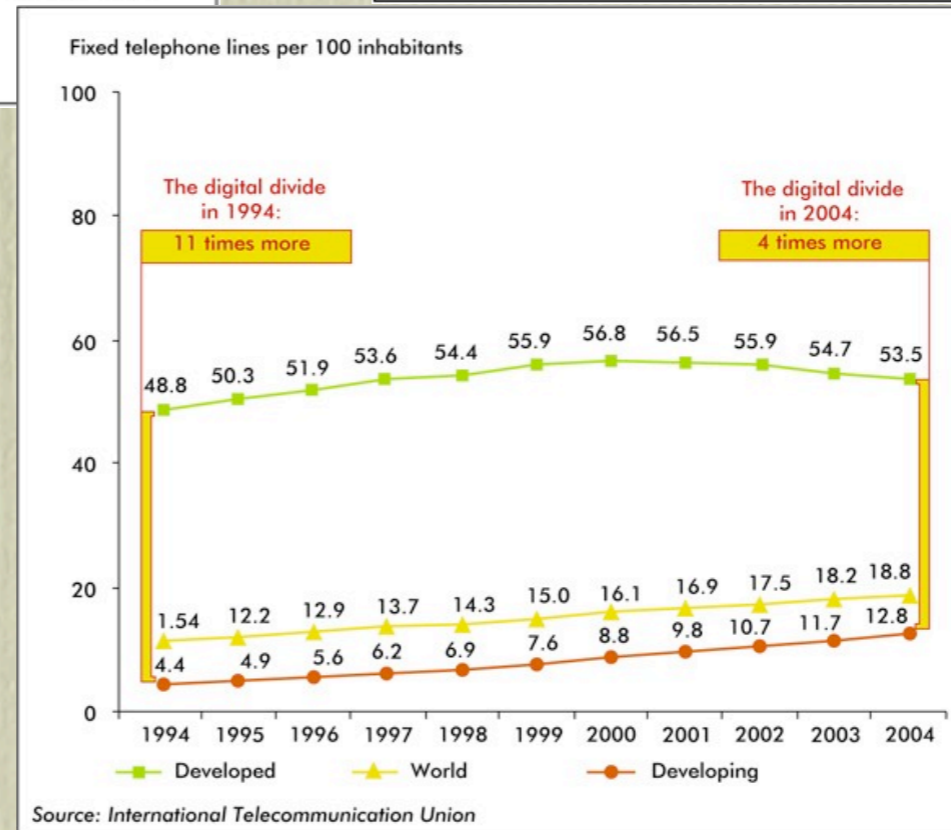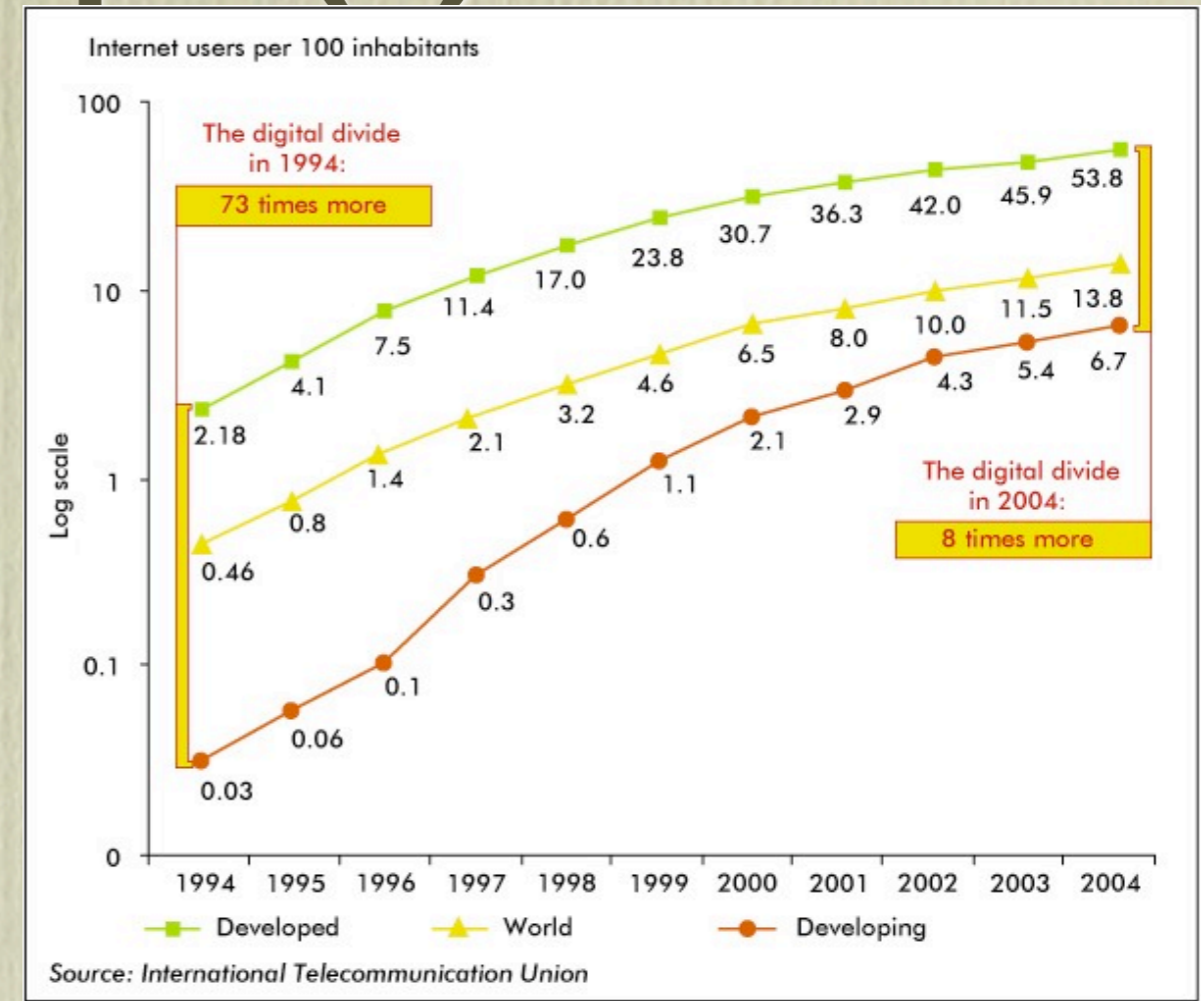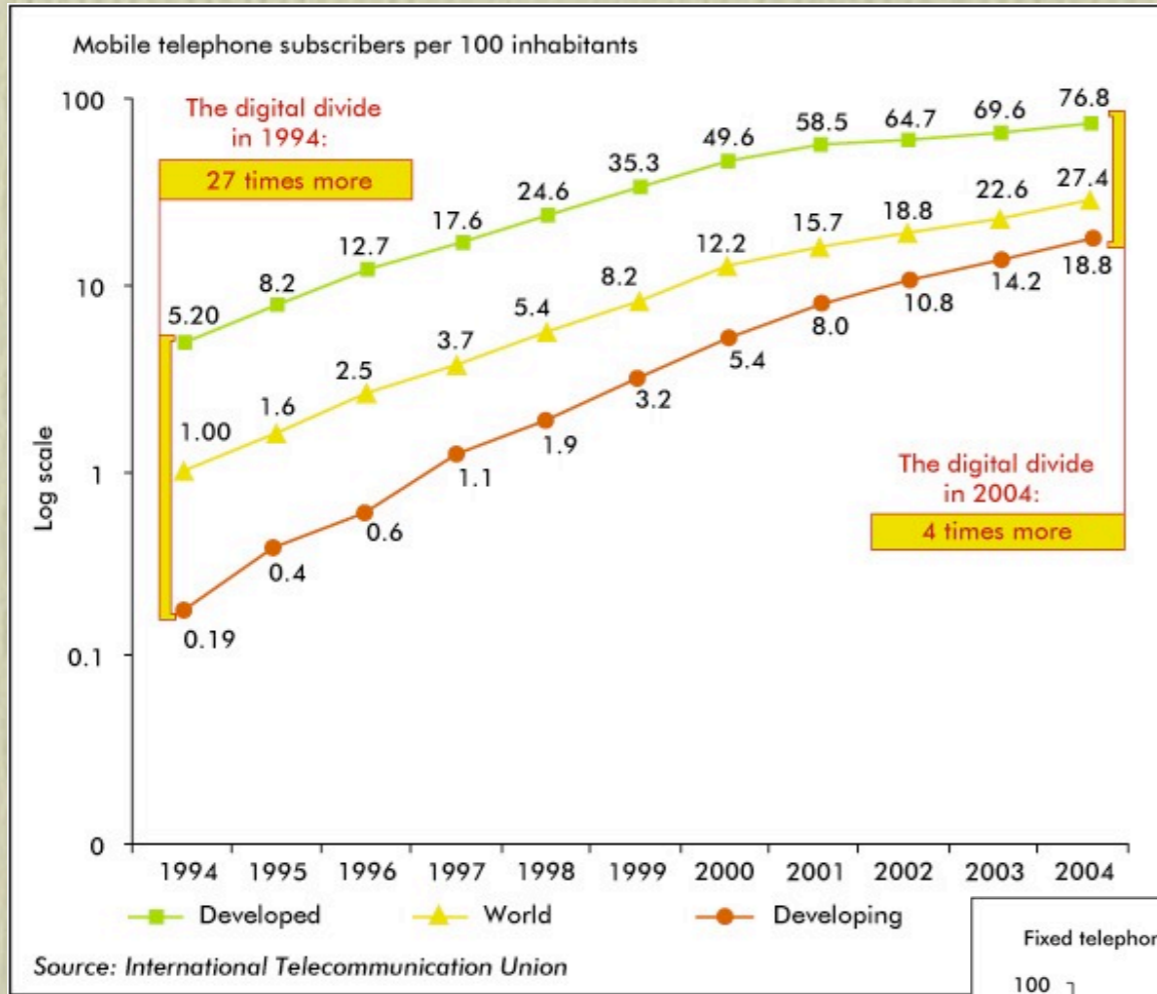
There is hope! (2)

Trends in regional average DOI score for the top 15 economies among those countries for which data are available, 2001-2005

Note: Data availability means that regions are not wholly representative.

Source: ITU/KADO Digital Opportunity Platform.

ICT and Research & Development

ICT is becoming a basic infrastructure necessary for the scientific and technological progress of a society,

and:

The academic community is a fundamental starting point for these efforts to permeate to the rest of society,

but:

The underlying problem is the lack of sufficient well qualified human resources able to handle the new systems and technologies.

Our activities

ICTP carried out since 1996 a series of activities in ICT to help developing countries scientists.

the "C", communications, is covered by the Aeronomy and Radiopropagation Laboratory (ARPL) which deals with wireless networking

the "I", information, is covered by the the Science Dissemination Unit (SDU) which works on electronic scientific contents

Why wireless?

The strengths of wireless networks are their easy installation, low costs, high capacity, and no transmission costs. Since there are no cables to be destroyed, they are also physically robust.

Weaknesses include their high tech hardware, the need for 'line of sight' (LOS) and specialized expertise. Capacity is also lower than for fibre cables.

On the opportunity side, they can be used for almost any social or economic activity (including higher education and research) that needs to connect people, especially in rural or remote areas.

Training in ICT at the Centre

From 1989 a series of Colleges, Schools and Workshops where carried out in the field of radiopropagation and radiocommunications.

But from 1998 it was decided to concentrate the training activities on ICT yearly Schools with intensive use of hands on experimental practice, including open source solutions and the construction of low cost microwaves directive antennas.

More than 1600 participants from all continents were trained in 38 training activities.

A former Programme

From 1996 to 2000 the *Programme of Training and System Development on Networking and Radiocommunications* was established with the objective of providing technical assistance and training to academic and scientific institutions in developing countries.

The main project was a Pilot project to establish a computer network for education and research at the Obafemi Awolowo University of Ile-Ife, Nigeria with the use of wireless technology. The project was successfully completed by June 1996.

Obafemi Awolowo University (OAU), Ile-Ife, Nigeria, became a reference point in the field of ICT in Nigeria.

As a result of this, the government appointed the Pioneer Director of the Information Technology and Communications Unit in OAU, Prof. G.O. Ajayi, as the Director of the National Information Technology Development Agency of Nigeria established in 2002.

Agreement with ITU/BDT

A Cooperation Agreement was signed by ITU/BDT and ICTP Directors in February 2004 to carry out joint activities in training and research for development of ICT in Developing Countries, with special focus on the LDC

One activity in 2004

Three activities carried out in 2005 (one of them in India)

Two activities carried out in 2006

More than 150 persons trained

The Joint ICTP-ITU/BDT
TO & TU

In 2005, in the framework of the agreement, the Joint ICTP-ITU/BDT

"ICT Technology Observatory and Training Unit for Developing Countries"

was created at ICTP as a part of the Aeronomy and Radiopropagation Laboratory.

The goal is to identify the most modern and cost-effective technology to be deployed typically in academic and research institutions in Developing Countries and to train trainers in their use.

"ICTP-ITU/BDT Project-Based Advanced Training on the Use of Wireless for Campus Networking", 13 June - 1 July 2005, with focus on wireless projects in Universities, Hospitals and Rural Areas in Africa.

"Advanced training on Wireless Networking for the University of Malawi wireless project", 27 June- 7 July 2006.

Our evolution

The birth of the ICT TO & TU

⇧

The need to link the choice of cost-effective tech with training

⇧

The question: What technology?

⇧

Courses on wireless technology for networking with emphasis on hands-on training

⇧

Theoretical courses on application-oriented topics

⇧

Theoretical courses on radiopropagation

Science Dissemination Unit

Since 1993, ICTP has pioneered in the implementation of Web technologies and Web-to-email gateways to help transferring knowledge and e-Journals to scientists in remote areas with low-bandwidth access to the Internet.

The Centre has organized since 1999 hands-on Workshops on Web-enabling technologies for scientific research, publishing and e-Learning.

E. Canessa (ext. 358)

eJournals Delivery Service

Frequently Asked Questions

• Which International Journals can I download?

The use of the eJournals Delivery Service is restricted to scientists from Developing Countries, subject to the particular conditions of each Publishing Company. To check which journals you can download form each Publisher, you need to login to the system, and click on the *Titles* link of each Publisher. Within eJDS, only Mathematical and Physics eJournals are available. Publishers strictly prohibit the systematic and indiscriminate mass downloading of files and the use of robots and net accelerators. License agreements may be terminated immediately at the discretion of individual Publishers if the above terms and conditions are breached, penalizing the entire scientific community.

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We do all of this because we dream a world like this:

and
Thank you for your attention!